

The L^AT_EX 2 _{ε} Sources

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This file is maintained by the L^AT_EX Project team.
Bug reports can be opened (category `latex`) at
<https://latex-project.org/bugs.html>.

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File a

ltdirchk.dtx

1 L^AT_EX System Dependent Initialisations

This file implements the semi-automatic determination of various system dependent parts of the initialisation. The actual definitions may be placed in a file `texsys.cfg`. Thus for operating systems for which the tests here do not result in acceptable settings, a ‘hand written’ `texsys.cfg` may be produced.

The macros that must be defined are:

`\@currdir`

`\@currdir`(*filename*)*(space)* should expand to a form of the filename that uniquely refers to the ‘current directory’ if this is possible. (The expansion should also end with a space.) on UNIX, this is `\def\@currdir{./}`. For more exotic operating systems you may want to make `\@currdir` a macro with arguments delimited by . and/or *(space)*. If the operating system has no concept of directory structure, this macro should be defined to be empty.

`\input@path`

If the primitive `\openin` searches the same directories as the primitive `\input`, then it is possible to tell (using `\ifeof`) whether a file exists before trying to input it. For systems like this, `\input@path` should be left undefined.

If `\openin` does not ‘follow’ `\input` then `\input@path` must be defined to be a list of directories to search for input files. The format for each directory is as for `\@currdir`, normally just a prefix is required, but it may be a macro with space-delimited argument. That is, if *(dir)* is an entry in the input path, T_EX will try to load the expansion of *(dir)**(filename)**(space)*

So either *(dir)* should be defined as a macro with argument delimited by space, or it should just expand to a directory name, including the final directory separator, so that it may be concatenated with the *(filename)*. This means that for UNIX-like syntax, each *(dir)* should end with a slash, /.

`\input@path` should expand to a list of such directories, each in a {} group.

`\filename@parse`

After a call of the form: `\filename@parse{<filename>}`, the three macros `\filename@area`, `\filename@base` and `\filename@ext` should be defined to be the ‘area’ (or directory), basename and extension respectively. If there was no extension specified in *(filename)*, `\filename@ext` should be `\let` to `\relax` (so this case may be tested with `\@ifundefined{\filename@ext}` and, perhaps a default extension substituted).

Normally one would not need to define this macro in `texsys.cfg` as the automatic tests can supply parsers that work with UNIX and VMS and Macintosh syntax, as well as a basic parser that will cover many other cases. However some operating systems may need a ‘hand produced’ parser in which case it should be defined in this file.

The UNIX parser also works for most MSDOS T_EX versions. Currently if the UNIX, VMS or Macintosh parser is not used, `\filename@parse` is defined to always return an empty area, and to split the argument into basename and extension at the first ‘.’ that occurs in the name. Parsers for other formats may be defined in `texsys.cfg`, in which case they will be used in preference to the default definitions.

`\@TeXversion`

`\@TeXversion` is now set automatically by the initialisation tests in this file. You should not need to set it in `texsys.cfg`, however the following documentation is left for information. L^AT_EX does not set this variable exactly, the automatic tests set it to:

2 for any version, *v*, *v* < 3.0

3 for any version, *v*, 3.0 ≤ *v* ≤ 3.14

<undefined> otherwise.

However these values are accurate enough for L^AT_EX to take appropriate action for these old T_EXs.

If your T_EX is older than version 3.141, then you should define `\@TeXversion` (using `\def`) to be the version number. If you do not do this¹, L^AT_EX will not work around a bug in old T_EX versions, and so error messages will appear in a very strange format, with `^^J` appearing instead of line breaks:

```
LaTeX Error: \rubbish undefined.^^J^^JSee the LaTeX manual or LaTeX=
Companion
for explanation.^^JType H <return> for immediate help.
...
.3 \renewcommand{\rubbish}
{}
```

However if you put `\def\@TeXversion{3.14}` in `texsys.cfg` the following format will be used:

```
LaTeX Error: \rubbish undefined.

See the LaTeX manual or LaTeX Companion for explanation.
Type H <return> for immediate help.
.
...
.3 \renewcommand{\rubbish}
{}
```

Note that this has an extra line `! .` which does not appear in error messages that use the default settings with a current version of T_EX, but this should not cause any confusion we hope.

2 Initialisation

As this file is read at a very early stage, some definitions that are normally considered to be part of the format must be made here.

2.1 INITEX

```
1  {*dircheck}
2  {*initex}
3  {initex}\ifnum\catcode`\\=1
4  {initex}  \errmessage
5  {initex}  {LaTeX must be made using an initex with no format preloaded}
6  {initex}\fi
7  \catcode`\\=1
```

¹Actually if your T_EX is really old, version 2, L^AT_EX can detect this, and sets `\@TeXversion` to 2 if it is not set in the `cfg` file.

```
8 \catcode`\}=2
```

If \LaTeX is in use the extensions and other new primitives have to be activated: this is done as early as possible. Older versions of \LaTeX do not hide the primitives: a version check is not needed as the version itself will be missing in the case where action is needed!

```
9 \ifx\directlua\undefined  
10 \else  
11   \ifx\luatexversion\undefined
```

Enable e-TeX/pdfTeX/Umath primitives with their natural names

```
12   \directlua{tex.enableprimitives("",%  
13     tex.extraprimitives('etex', 'pdftex', 'umath'))}
```

In current formats enable primitives with unprefixed names. the $\text{\textralatexrelease}$ guards allow the primitives to be defined with a \luatex prefix if older formats are specified.

```
14 </initex>  
15 </dircheck>  
16 <*initex, latexrelease>  
17 <latexrelease>\ifx\directlua\undefined\else  
18 <latexrelease>\IncludeInRelease{2015/10/01}{\luatexluafunction}  
19 <latexrelease>                                {LuaTeX (prefixed names)}%  
20   \directlua{tex.enableprimitives("",%  
21     tex.extraprimitives("omega", "aleph", "luatex"))}  
22 <latexrelease>\EndIncludeInRelease  
23 <latexrelease>\IncludeInRelease{0000/00/00}{\luatexluafunction}  
24 <latexrelease>                                {LuaTeX (prefixed names)}%  
25 <latexrelease>\directluaf  
26 <latexrelease>  tex.enableprimitives(  
27 <latexrelease>    "luatex",  
28 <latexrelease>    tex.extraprimitives("core", "omega", "aleph", "luatex")  
29 <latexrelease> )  
30 <latexrelease> local i  
31 <latexrelease> local t = { }  
32 <latexrelease> for _,i in pairs(tex.extraprimitives("luatex")) do  
33 <latexrelease>   if not string.match(i,"^U") then  
34 <latexrelease>     if not string.match(i, "^luatex") then  
35 <latexrelease>       table.insert(t,i)  
36 <latexrelease>     end  
37 <latexrelease>   else  
38 <latexrelease>     if string.match(i,"^Uchar$") then  
39 <latexrelease>       table.insert(t,i)  
40 <latexrelease>     end  
41 <latexrelease>   end  
42 <latexrelease> end  
43 <latexrelease> for _,i in pairs(t) do  
44 <latexrelease>   tex.print(  
45 <latexrelease>     "\noexpand\\let\\noexpand\\\" .. i  
46 <latexrelease>     .. "\\noexpand\\undefined"  
47 <latexrelease>   )  
48 <latexrelease> end  
49 <latexrelease>}  
50 <latexrelease>\EndIncludeInRelease  
51 <latexrelease>\fi  
52 </initex, latexrelease>  
53 <*dircheck>  
54 <*initex>
```

```

55      \fi
56  \fi
      A test can now be made for eTeX.
57 <initex> \ifx\TeXversion\undefined
58 <initex>   \errmessage
59 <initex>     {LaTeX requires e-TeX}
60 <initex>   \expandafter\endinput
61 <initex> \fi
      That distraction over, back to the basics of a format.
62 \catcode`\#=6
63 \catcode`\^=7
64 \chardef\active=13
65 \catcode`\@=11
66 \countdef\count@=255
67 \let\bgroup=\let\egroup=
68 \ifx\@input\@undefined\let\@input\input\fi
69 \ifx\@end\@undefined\let\@end\end\fi
70 \chardef\@inputcheck0
71 \chardef\sixt@n=16
72 \newlinechar`\^J
73 \def\typeout{\immediate\write17}
74 \def\dospecials{\do\ \do\\\do\f\do\}\do\$\\do\&%
75   \do#\do`\\do_\\do%\do`~}
76 \def\@makeother#1{\catcode`#1=12\relax}
77 \def\space{ }
78 \def\@tempswafalse{\let\if@tempswa\iffalse}
79 \def\@tempswatrue{\let\if@tempswa\iftrue}
80 \let\if@tempswa\iffalse
81 \def\loop#1\repeat{\def\iterate{\relax\expandafter\iterate\fi}%
82   \iterate\let\iterate\relax}
83 \let\repeat\fi
84 </initex>

```

2.2 Some bits of 2e

```

85 {*2ekernel}
86 \def\two@digits#1{\ifnum#1<10 0\fi\number#1}
87 \long\def\@firstoftwo#1#2{#1}
88 \long\def\@secondoftwo#1#2{#2}

```

This is a special version of \ProvidesFile for initex use.

```

89 \def\ProvidesFile#1{%
90   \begingroup
91     \catcode`\ 10 %
92     \ifnum \endlinechar<256 %
93       \ifnum \endlinechar>\m@ne
94         \catcode\endlinechar 10 %
95       \fi
96     \fi
97     \@makeother\%
98     \@ifnextchar[{\@providesfile{#1}}{\@providesfile{#1}[]}}
99   \def\@providesfile#1[#2]{%
100     \wlog{File: #1 #2}%
101     \@addtofilelist{ #2}%
102   \endgroup}

```

```

103 \long\def\@addtolist#1{%
104 \def\@empty{}%
105 \catcode`\%=12%
106 \def\@percentchar{\%}%
107 \catcode`\%=14%
108 \let\@currdir\@undefined%
109 \let\input@path\@undefined%
110 \let\filename@parse\@undefined%

```

\strip@prefix

```

111 \def\strip@prefix#1>{}%
112 </2ekernel>

```

(End definition for \strip@prefix.)

3 texsys.cfg

As mentioned above, any site specific definitions required to describe the filename handling must be entered into a file `texsys.cfg`. If `texsys.cfg` can not be located by `\openin`, we write a default version out. The default version only contains comments, so we do not actually input the file in that case. The automatic tests later will, hopefully, correctly define the required macros.

The tricky code below checks to see if `texsys.cfg` exists. If it does not, all the text in this file between START and END is copied verbatim to a new file `texsys.cfg`. If `texsys.cfg` is found, then it is simply input. This is only done when this file is being used unstripped.

```

113 /*docstrip*/
114 \openin15=texsys.cfg
115 \ifeof15
116 \typeout{** Writing a default texsys.cfg}
117 \immediate\openout15=texsys.cfg
118 \begingroup
119 \catcode`^^M\active%
120 \let^^M\par%
121 \def\reserved@a#1^^M{%
122 \def\reserved@b{#1}%
123 \ifx\reserved@b\reserved@c\endgroup\else%
124 \immediate\write15{#1}%
125 \expandafter\reserved@a\fi}%
126 \def\reserved@d#1START^^M{\let\do\@makeother\dospecials\reserved@a}%
127 \catcode`\%=12%
128 \def\reserved@c{\%END}%
129 \reserved@d

```

START

3.1 texsys.cfg

This file contains the site specific definitions of the four macros `\@currdir`, `\input@path`, `\filename@parse` and `\@TeXversion`.

As distributed it only contains comments, however this ‘empty’ file will work on many systems because of the automatic tests built into `ltdirchk.dtx`. You are allowed to edit this file to add definitions of these macros appropriate to your system.

The macros that must be defined are:

\@currdir
\@currdir $\langle\text{filename}\rangle\langle\text{space}\rangle$ should expand to a form of the filename that uniquely refers to the ‘current directory’ if this is possible. (The expansion should also end with a space.) on UNIX, this is $\backslash\text{def}\backslash\text{@currdir}\{\cdot/\}$. For more exotic operating systems you may want to make \@currdir a macro with arguments delimited by . and/or $\langle\text{space}\rangle$. If the operating system has no concept of directory structure, this macro should be defined to be empty.

\input@path
If the primitive \openin searches the same directories as the primitive \input, then it is possible to tell (using \ifeof) whether a file exists before trying to input it. For systems like this, \input@path should be left undefined.

If \openin does not ‘follow’ \input then \input@path must be defined to be a list of directories to search for input files. The format for each directory is as for \@currdir, normally just a prefix is required, but it may be a macro with space-delimited argument. That is, if $\langle\text{dir}\rangle$ is an entry in the input path, TeX will try to load the expansion of $\langle\text{dir}\rangle\langle\text{filename}\rangle\langle\text{space}\rangle$

So either $\langle\text{dir}\rangle$ should be defined as a macro with argument delimited by space, or it should just expand to a directory name, including the final directory separator, so that it may be concatenated with the $\langle\text{filename}\rangle$. This means that for UNIX-like syntax, each $\langle\text{dir}\rangle$ should end with a slash, /. One exception to this rule is that the input path should always contain the empty directory {} as this will allow ‘full pathnames’ to be used, and the ‘current directory’ to be searched.

\input@path should expand to a list of such directories, each in a {} group.

\filename@parse
After a call of the form: \filename@parse{\filename}, the three macros \filename@area, \filename@ext, \filename@base should be defined to be the ‘area’ (or directory), basename and extension respectively. If there was no extension specified in \filename, \filename@ext should be \let to \relax (so this case may be tested with \ifundefined{\filename@ext} and, perhaps a default extension substituted).

Normally one would not need to define this macro in **texsys.cfg** as the automatic tests can supply parsers that work with UNIX and VMS syntax, as well as a basic parser that will cover many other cases. However some operating systems may need a ‘hand produced’ parser in which case it should be defined in this file.

The UNIX parser also works for most MSDOS TeX versions. Currently if the UNIX or VMS parser is not used, \filename@parse is defined to always return an empty area, and to split the argument into basename and extension at the first ‘.’ that occurs in the name. Parsers for other formats may be defined in **texsys.cfg**, in which case they will be used in preference to the default definitions.

\@TeXversion
You should not need to set this macro in **texsys.cfg**. L^AT_EX tests to set this automatically. See the comments in the opening section of **ltdirchk.dtx**.

The following sections give examples of definitions which might work on various systems. These are currently mainly untested as I only have access to a few systems, all of which do not need this file as the automatic tests work. All the code is commented out.

3.2 UNIX (web2c)

This implementation does make \openin and \input look in the same places. Acceptable settings are made by **ltdirchk.dtx**, and so this file may be empty. The definitions below are therefore just for information.

```
130 %\def\@currdir{\cdot/}
131 %\let\input@path\@undefined
```

3.3 UNIX (other)

Apparently some commercial UNIX implementations have different paths for `\openin` and `\input`. For these one could use definitions like the following (with whatever directories are used at your site): note that the directory names should end with `/`.

```
132 % \def\@currdir{./}
133 % \def\input@path{%
134 %   {/usr/local/lib/tex/inputs/distrib/}%
135 %   {/usr/local/lib/tex/inputs/contrib/}%
136 %   {/usr/local/lib/tex/inputs/local/}%
137 % }
```

3.4 MSDOS (emtex)

This implementation does make `\openin` and `\input` look in the same places. Acceptable settings are made by `ltdirchk.dtx`, and so this file may be empty. The definitions below are therefore just for information.

```
138 % \def\@currdir{./}
139 % \let\input@path\@undefined
```

3.5 MSDOS (other)

Some PC implementations have different paths for `\openin` and `\input`. For these one could use definitions like the following (with whatever directories are used at your site): note that the directory names should end with `/`. This assumes the implementation uses UNIX style `/` as the directory separator.

```
140 % \def\@currdir{./}
141 % \def\input@path{%
142 %   {c:/tex/inputs/distrib/}%
143 %   {c:/tex/inputs/contrib/}%
144 %   {c:/tex/inputs/local/}%
145 % }
```

3.6 VMS (DECUS TEX, PD VMS 3.6)

This implementation does make `\openin` and `\input` look in the same places. Acceptable settings are made by `ltdirchk.dtx`, and so this file may be empty. The definitions below are therefore just for information.

```
146 % \def\@currdir{[]}
147 % \let\input@path\@undefined
```

3.7 VMS (???)

Some VMS implementations have different paths for `\openin` and `\input`. For these one could use definitions like the following:

```
148 % \def\@currdir{[]}
149 % \def\input@path{%
150 %   {tex_inputs:}%
151 %   {SOMEDISK:[SOME.TEX.DIRECTORY]}%
152 % }
```

3.8 MACINTOSH (OzTeX 1.6)

This implementation does make `\openin` and `\input` look in the same places. Acceptable settings are made by `ltdirchk.dtx`, and so this file may be empty. The definitions below are therefore just for information.

```
153 % \def\@currdir{:  
154 % \let\input@path\@undefined
```

3.9 MACINTOSH (other)

Some Macintosh implementations have different paths for `\openin` and `\input`. For these one could use definitions like the following (with whatever folders are used on your machine): note that the directory names should end with :, and they should contain *no* spaces.

```
155 % \def\@currdir{:  
156 % \def\input@path{  
157 %   {Hard-Disk:Applications:TeX:TeX-inputs:  
158 %   {Hard-Disk:Applications:TeX:My-inputs:  
159 % }
```

3.10 FAKE EXAMPLE

This example is for an operating system that has filenames of the form <area>name. For maximum compatibility with macro sets, you want `name.ext` to be mapped to <ext>name, and <area>name.ext to be mapped to <area.ext>name. `\input` does this mapping automatically, but `\openin` does not, and does not look in the same places as `\input`. <>name is the desired ‘current directory’ syntax.

the following code would possibly work:

```
160 % \def\@dir#1#2 {  
161 %   \@d@r{#1}#2..\@nil}  
162 % \def\@d@r#1#2.#3.#4@\nil{  
163 %   <\ifx\@dir#1\@dir\else#1\ifx\@dir#3\@dir\else.\fi\fi#3>#2 }  
164 %  
165 % \def\@currdir{\@dir{}}  
166 % \def\input@path{  
167 %   {\@dir{area.one}}%  
168 %   {\@dir{area.two}}%  
169 % }
```

END

```
170 \immediate\closeout15
```

If `texsys.cfg` did exist, then input it.

```
171 \else  
172 \typeout{** Using the existing texsys.cfg}  
173 \closein15  
174 \input texsys.cfg  
175 \fi  
176 </docstrip>
```

If the stripped version of this file is being used (in `latex2e.ltx`) then `texsys.cfg` should be there, so just input it.

```
177 <dircheck>\input texsys.cfg
```

4 Setting \@currdir

\@currdir
\IfFileExists This is a local definition of \IfFileExists. It tries to relocate `texssys.aux`. If it succeeds, then the \@currdir syntax has been determined. If all the tests fail then \@currdir will be set to \@empty, and `ltxcheck` will warn of this when it checks the format.

```
178  \begingroup
179  \count@ \time
180  \divide \count@ 60
181  \count2=-\count@
182  \multiply \count2 60
183  \advance \count2 \time
```

The current date and time stamp.

```
184  \edef \today{%
185    \the \year / \two@digits{\the \month} / \two@digits{\the \day} : %
186    \two@digits{\the \count@} : \two@digits{\the \count2}}
```

Create a file `texsys.aux` (hopefully in the current directory), then try to locate it again.

```
187  \immediate \openout 15 = texsys.aux
188  \immediate \write 15 {\today^J}
189  \immediate \closeout 15 %
```

#1 is the file to try, #2 is what to do on success, #3 on failure. Note that this definition is overwritten later on again!

```
190  \def \IfFileExists #1#2#3{%
191    \openin \a @inputcheck #1 %
192    \ifeof \a @inputcheck
193      #3 \relax
194    \else
195      \read \a @inputcheck to \reserved@a
196      \ifx \reserved@a \today
197        \typeout {#1 found} #2 \relax
198      \else
199        \typeout {BAD: old file \reserved@a (should be \today)} %
200        #3 \relax
201      \fi
202    \fi
203    \closein \a @inputcheck}
204 \endlinechar = -1
```

If \@currdir has not been pre-defined in `texsys.cfg` then test for UNIX, VMS and Oz-T_EX-Mac. syntax.

```
205  \ifx \a @currdir \undefined
206    \IfFileExists {./texsys.aux} {\gdef \a @currdir {./}} %
207    {\IfFileExists {} {texsys.aux} {\gdef \a @currdir {}}} %
208    {\IfFileExists {} {texsys.aux} {\gdef \a @currdir {}}}
```

If it is still undefined at this point, all the above tests failed. Earlier versions interactively prompted for a definition at this point, but it seems impossible to reliably obtain information from users at this point in the installation. This version of the file produces

a format with no user-interaction. Later if the format is not suitable for the system, `texsys.cfg` may be edited and the format re-made.

```

209  \ifx\@currdir\@undefined
210    \global\let\@currdir\@empty
211    \typeout{^^J^^J%
212      !! No syntax for the current directory could be found^^J%
213    }%
214  \fi

```

Otherwise `\@currdir` was defined in `texsys.cfg`. In this case check that the syntax specified works on this system. (In case a complete L^AT_EX system has been copied from one system to another.) If the test fails, give up. The installer should remove or correct the offending `texsys.cfg` and try again.

```

215 \else
216   \IfFileExists{\@currdir texsys.aux}{}{%
217     \edef\reserved@a{\errhelp{%
218       texsys.cfg specifies the current directory syntax to be^^J%
219       \meaning\@currdir^^J%
220       but this does not work on this system.^^J%
221       Remove texsys.cfg and restart.}}\reserved@a
222   \errmessage{Bad texsys.cfg file: \noexpand\@currdir}\@end}

```

The version of `\@currdir` in `texsys.cfg` looks OK.

```

223 \fi
224 \immediate\closeout15 %
225 \endgroup
226 \typeout{^^J^^J%
227   \noexpand\@currdir set to:
228   \expandafter\strip@prefix\meaning\@currdir.^^J%
229 }

```

(End definition for `\@currdir`, `\IfFileExists`, and `\today`.)

Stop here if the file is being used unstripped.

```

230 {*docstrip}
231 \relax\endinput
232 
```

5 Setting `\input@path`

Earlier versions of this file attempted to automatically test whether `\input@path` was required, and interactively prompt for a path if necessary. This was not found to be very reliable. The first-time installer of L^AT_EX 2_E can not be expected to have enough information to supply the correct information to the prompts. Now the interaction is omitted. After the format is made the installer can attempt to run the test document `ltxcheck.tex` through L^AT_EX 2_E. This will check, amongst other things, whether `texsys.cfg` will need to be edited and the format remade.

`\input@path` Now set up the `\input@path`.

`\input@path` should either be undefined, or a list of directories as described in the introduction.

```

233 \typeout{^^J%

```

```

234     Assuming \noexpand\openin and \noexpand\input^^J%
235     \ifx\input@path\@undefined
236         have the same search path.^^J%
237     \else
238         \input@path has been defined in texsys.cfg.
239             have different search paths.^^J%
240             LaTeX will use the path specified by \noexpand\input@path:^^J%
241         \fi
242     \}
243
244 (End definition for \input@path.)
```

6 Filename Parsing

\filename@parse Split a filename into its components.

```

242 \ifx\filename@parse\@undefined
243   \def\reserved@a{./}\ifx\@currdir\reserved@a
244 \filename@parse was not specified in texsys.cfg, but \@currdir looks like UNIX...
245   \typeout{^^JDefining UNIX/DOS style filename parser.^^J}
246   \def\filename@parse#1{%
247     \let\filename@area\empty
248     \expandafter\filename@path#1/\\"}
249
250 Search for the last /.
251   \def\filename@path#1/#2\\{%
252     \ifx\\#2\\%
253       \def\reserved@a{\filename@simple#1.\\"}%
254     \else
255       \edef\filename@area{\filename@area#1}%
256       \def\reserved@a{\filename@path#2\\"}%
257     \fi
258   \reserved@a}
259
260 \else\def\reserved@a{}{}\ifx\@currdir\reserved@a
261 \filename@parse was not specified in texsys.cfg, but \@currdir looks like VMS...
262   \typeout{^^JDefining VMS style filename parser.^^J}
263   \def\filename@parse#1{%
264     \let\filename@area\empty
265     \expandafter\filename@path#1\\"}
266
267 Search for the last ].
268   \def\filename@path#1]#2\\{%
269     \ifx\\#2\\%
270       \def\reserved@a{\filename@simple#1.\\"}%
271     \else
272       \edef\filename@area{\filename@area#1}%
273       \def\reserved@a{\filename@path#2\\"}%
274     \fi
275   \reserved@a}
276
277 \else\def\reserved@a{}{}\ifx\@currdir\reserved@a
```

```

\filename@parse was not specified in texsys.cfg, but \currdir looks like Macintosh...
270      \typeout{^^JDefining Mac style filename parser.^^J}
271      \def\filename@parse#1{%
272          \let\filename@area\empty
273          \expandafter\filename@path#1:\ //}
274      Search for the last :.
275      \def\filename@path#1:#2\\{%
276          \ifx\\#2\\%
277              \def\reserved@a{\filename@simple#1.\ //}
278          \else
279              \edef\filename@area{\filename@area#1:}%
280              \def\reserved@a{\filename@path#2\\}%
281          \fi
282          \reserved@a}
283      \else
284      \typeout{^^JDefining generic filename parser.^^J}
285      \def\filename@parse#1{%
286          \let\filename@area\empty
287          \expandafter\filename@simple#1.\ //}
288      \fi\fi\fi
289      \filename@simple is used by all three versions. Finally we can split off the extension.
290      </dircheck>
291      (*dircheck, latexrelease)
292      <|latexrelease>\IncludeInRelease{2019/10/01}{\filename@simple}
293          {Final dot for extension}%
294      \def\filename@simple#1.#2\\{%
295          \ifx\\#2\\%
296              \let\filename@ext\relax
297              \edef\filename@base{#1}%
298          \else
299              \filename@dots{#1}#2\\%
300          \fi}
301      \def\filename@dots#1.#2.#3\\{%
302          \ifx\\#3\\%
303              \def\filename@ext{#2}%
304              \edef\filename@base{#1}%
305          \else
306              \filename@dots{#1.#2}#3\\%
307          \fi}
308      <|latexrelease>\EndIncludeInRelease
309      <|latexrelease>\IncludeInRelease{0000/00/00}{\filename@simple}
310          {Final dot for extension}%
311      <|latexrelease>    \def\filename@simple#1.#2\\{%
312          \ifx\\#2\\%
313              \let\filename@ext\relax
314              \else
315                  \edef\filename@ext{\filename@dot#2\\}%

```

```

314 <|latexrelease>      \fi
315 <|latexrelease>      \edef\filename@base{\#1}
316 <|latexrelease> \EndIncludeInRelease
317 </dircheck, latexrelease>
318 (*dircheck)

        Remove a final dot, added earlier.

319 \def\filename@dot#1.\{\#1}

320 \else

Otherwise, \filename@parse was specified in texsys.cfg.
321 \typeout{^^J^^J%
322   \noexpand\filename@parse was defined in texsys.cfg:^^J%
323   \expandafter\strip@prefix\meaning\filename@parse.^^J%
324 }
325 \fi

(End definition for \filename@parse.)

```

7 TeX Versions

`\@TeXversion` TeX versions older than 3.141 require `\@TeXversion` to be set. This can be determined automatically due to a trick suggested by Bernd Raichle. (Actually this will not always get the correct version number, eg TeX3.14 would be detected as TeX3, but L^AT_EX only needs to take account of TeX's older than 3, or between 3 and 3.14.

```

326 \ifx\@TeXversion\undefined
327   \ifx\@undefined\inputlineno
328     \def\@TeXversion{2}
329   \else
330     {\catcode`\\=active
331       \def\reserved@a{\if#1\string^3\fi}
332       \edef\reserved@a{\expandafter\reserved@a\string^3\@c}
333       \ifx\reserved@a\empty\else\gdef\@TeXversion{3}\fi}
334   \fi
335 \fi

(End definition for \@TeXversion.)

336 </dircheck>

```

8 ltxcheck.tex

After the format has been made, and `article.cls` moved with the other files to the ‘standard input directory’ as specified in `install.txt`, the format may be checked by running the file `ltxcheck.tex`.

File b

ltplain.dtx

1 Plain T_EX

L^AT_EX includes almost all of the functionality of Knuth's original 'Basic Macros'. That is, the plain T_EX format described in Appendix B of the T_EXBook. However, some of the user commands are not much use so, in order to save memory, we may remove them from the kernel into a package. Here is a list of the commands that may be removed (PROBABLY NOT COMPLETE).

```
\magstep     \magstephalf  
\mathhexbox  
\vglue      \vgl@  
\hglue      \hgl@
```

This file is by now very small as most of it has been moved to more appropriate kernel files: it may disappear completely one day.

L^AT_EX font definitions are done using NFSS2 so none of PLAIN's font definitions are in L^AT_EX.

L^AT_EX has its own tabbing environment, so PLAIN's is disabled.

L^AT_EX uses its own output routine, so most of the plain one was removed.

```
1  /*2ekernel*/  
2  \catcode`{\=1 % left brace is begin-group character  
3  \catcode`}=\=2 % right brace is end-group character  
4  \catcode`$=\=3 % dollar sign is math shift  
5  \catcode`&=\=4 % ampersand is alignment tab  
6  \catcode`#=\=6 % hash mark is macro parameter character  
7  \catcode`^=\=7 % circumflex and uparrow are for superscripts  
8  \catcode`_=\=8 % underline and downarrow are for subscripts  
9  \catcode`^^I=\=10 % ascii tab is a blank space  
10 \chardef\active=13 \catcode`~=\active % tilde is active  
11 \catcode`^^L=\active \def^^L{\par}% ascii form-feed is \par  
12 \message{catcodes,}
```

We had to define the \catcodes right away, before the message line, since \message uses the { and } characters. When INITEX (the T_EX initializer) starts up, it has defined the following \catcode values:

```
\catcode`^^@=\=9 % ascii null is ignored  
\catcode`^^M=\=5 % ascii return is end-line  
\catcode`\\=\=0 % backslash is TeX escape character  
\catcode`%=\=14 % percent sign is comment character  
\catcode` =\=10 % ascii space is blank space  
\catcode`^^?=\=15 % ascii delete is invalid  
\catcode`A=\=11 ... \catcode`Z=\=11 % uppercase letters  
\catcode`a=\=11 ... \catcode`z=\=11 % lowercase letters  
all others are type 12 (other)
```

Here is a list of the characters that have been specially catcoded:

```
13 \def\dospecials{\do\ \do\\\do\{\do\}\do\$\\do\&%  
14 \do\#\do\^\do\_\\do\%\do\~}
```

(not counting ascii null, tab, linefeed, formfeed, return, delete) Each symbol in the list is preceded by , which can be defined if you want to do something to every item in the list.

We make @ signs act like letters, temporarily, to avoid conflict between user names and internal control sequences of plain format.

15 \catcode`@=11

To make the plain macros more efficient in time and space, several constant values are declared here as control sequences. If they were changed, anything could happen; so they are private symbols.

\@ne Small constants are defined using \chardef.

\tw@ 16 \chardef\@ne=1

\thr@@ 17 \chardef\tw@=2

\sixt@@n 18 \chardef\thr@@=3

\@cclv 19 \chardef\sixt@@n=16

20 \chardef\@cclv=255

(End definition for \@ne and others.)

\@cclvi Constants above 255 defined using \mathchardef.

\@m 21 \mathchardef\@cclvi=256

\@M 22 \mathchardef\@m=1000

\@MM 23 \mathchardef\@M=10000

24 \mathchardef\@MM=20000

(End definition for \@cclvi and others.)

Allocation of registers

Here are macros for the automatic allocation of \count, \box, \dimen, \skip, \muskip, and \toks registers, as well as \read and \write stream numbers, \fam codes, \language codes, and \insert numbers.

25 \message{registers,}

When a register is used only temporarily, it need not be allocated; grouping can be used, making the value previously in the register return after the close of the group. The main use of these macros is for registers that are defined by one macro and used by others, possibly at different nesting levels. All such registers should be defined through these macros; otherwise conflicts may occur, especially when two or more macro packages are being used at the same time.

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

The following counters are reserved:

0 to 9 page numbering

10 count allocation

11 dimen allocation

12 skip allocation

13 muskip allocation

14 box allocation

15 toks allocation

16 read file allocation

17 write file allocation

18 math family allocation

19 language allocation

20 insert allocation

21 the most recently allocated number

22 constant -1
End of historical L^AT_EX 2.09 comments.

New counters are allocated starting with 23, 24, etc. Other registers are allocated starting with 10. This leaves 0 through 9 for the user to play with safely, except that counts 0 to 9 are considered to be the page and subpage numbers (since they are displayed during output). In this scheme, \count 10 always contains the number of the highest-numbered counter that has been allocated, \count 14 the highest-numbered box, etc. Inserts are given numbers 254, 253, etc., since they require a \count, \dimen, \skip, and \box all with the same number; \count 20 contains the lowest-numbered insert that has been allocated. Of course, \box255 is reserved for \output; \count255, \dimen255, and \skip255 can be used freely.

It is recommended that macro designers always use \global assignments with respect to registers numbered

1, 3, 5, 7, 9,

and always non-\global assignments with respect to registers

0, 2, 4, 6, 8, 255.

This will prevent “save stack buildup” that might otherwise occur.

```
26 \count10=22 % allocates \count registers 23, 24, ...
27 \count11=9 % allocates \dimen registers 10, 11, ...
28 \count12=9 % allocates \skip registers 10, 11, ...
29 \count13=9 % allocates \muskip registers 10, 11, ...
30 \count14=9 % allocates \box registers 10, 11, ...
31 \count15=9 % allocates \toks registers 10, 11, ...
32 \count16=-1 % allocates input streams 0, 1, ...
33 \count17=-1 % allocates output streams 0, 1, ...
34 \count18=3 % allocates math families 4, 5, ...
35 \count19=0 % allocates \language codes 1, 2, ...
36 \count20=255 % allocates insertions 254, 253, ...
```

\insc@unt The insertion counter and most recent allocation.
\allocationnumber

```
37 \countdef\insc@unt=20
38 \countdef\allocationnumber=21
```

(*End definition for \insc@unt and \allocationnumber.*)

\m@ne The constant -1.

```
39 \countdef\m@ne=22 \m@ne=-1
```

(*End definition for \m@ne.*)

\wlog Write on log file (only)

```
40 \def\wlog{\immediate\write\m@ne}
```

(*End definition for \wlog.*)

\count@ Here are abbreviations for the names of scratch registers that don't need to be allocated.
\dimen@
\dimen@i
\dimen@ii
\skip@
\toks@

```
41 \countdef\count@=255
```

```
42 \dimendef\dimen@=0
```

```
43 \dimendef\dimen@i=1 % global only
```

```
44 \dimendef\dimen@ii=2
```

```
45 \skipdef\skip@=0
```

```
46 \toksdef\toks@=0
```

(End definition for `\count@` and others.)

```
\newcount Now, we define \newcount, \newbox, etc. so that you can say \newcount\foo and \foo  
\newdimen will be defined (with \countdef) to be the next counter.  
\newskip To find out which counter \foo is, you can look at \allocationnumber.  
\newmuskip Since there's no \boxdef command, \chardef is used to define a \newbox,  
\newbox, \newinsert, \newfam, and so on.  
\newtoks LATEX change: remove \outer from \newcount and \newdimen (FMi) This is nec-  
\newread essary to use \newcount inside \if... later on. Also remove from \newskip, \newbox  
\newwrite and \newfam (DPC) to save later redefinition.  
\newfam  
\newlanguage 47 </2ekernel>  
48 {*2ekernel | latexrelease}  
49 <| latexrelease> \IncludeInRelease{2015/01/01}%  
50 <| latexrelease> {\newcount}{Extended Allocation}%  
51 \def\newcount {\e@alloc\count \countdef {\count10}\insc@unt\float@count}  
52 \def\newdimen {\e@alloc\dimen \dimendef {\count11}\insc@unt\float@count}  
53 \def\newskip {\e@alloc\skip \skipdef {\count12}\insc@unt\float@count}  
54 \def\newmuskip  
55 {\e@alloc\muskip\muskipdef{\count13}\m@ne\e@alloc@top}
```

For compatibility use \chardef in the classical range.

```
56 \def\newbox {\e@alloc\box  
57 {\ifnum\allocationnumber<\@ccclvi  
58 \expandafter\chardef  
59 \else  
60 \expandafter\@alloc@chardef  
61 \fi}  
62 {\count14}\insc@unt\float@count}  
63 \def\newtoks {\e@alloc\toks \toksdef{\count15}\m@ne\@alloc@top}  
64 \def\newread {\e@alloc\read \chardef{\count16}\m@ne\sixt@@n}  
Skip \write18 due to its traditional use as a shell-escape.  
65 \ifx\directlua\@undefined  
66 \def\newwrite {\e@alloc\write \chardef{\count17}\m@ne\sixt@@n}  
67 \else  
68 \def\newwrite {\e@alloc\write  
69 {\ifnum\allocationnumber=18  
70 \advance\count17\@ne  
71 \allocationnumber\count17 %  
72 \fi  
73 \global\chardef} %  
74 {\count17} %  
75 \m@ne  
76 {128}}  
77 \fi  
78 \def\new@mathgroup  
79 {\e@alloc\mathgroup\chardef{\count18}\m@ne\@mathgroup@top}  
80 \let\newfam\new@mathgroup  
81 \ifx\directlua\@undefined  
82 \def\newlanguage {\e@alloc\language \chardef{\count19}\m@ne\@ccclvi}  
83 \else  
84 \def\newlanguage {\e@alloc\language \chardef{\count19}\m@ne{16384}}
```

```

85 \fi
86 </2ekernel | latexrelease>
87 <latexrelease>\EndIncludeInRelease
88 <latexrelease>\IncludeInRelease{0000/00/00}%
89 <latexrelease> {\newcount}{Extended Allocation}%
90 <latexrelease>\def\newcount{\alloc@0\count\countdef\insc@unt}
91 <latexrelease>\def\newdimen{\alloc@1\dimen\dimendef\insc@unt}
92 <latexrelease>\def\newskip{\alloc@2\skip\skipdef\insc@unt}
93 <latexrelease>\def\newmuskip{\alloc@3\muskip\muskipdef\ccclvi}
94 <latexrelease>\def\newbox{\alloc@4\box\chardef\insc@unt}
95 <latexrelease>\def\newtoks{\alloc@5\toks\toksdef\ccclvi}
96 <latexrelease>\def\newread{\alloc@6\read\chardef\sixt@n}
97 <latexrelease>\def\newwrite{\alloc@7\write\chardef\sixt@n}
98 <latexrelease>\def\new@mathgroup{\alloc@8\fam\chardef\sixt@n}
99 <latexrelease>\def\newlanguage{\alloc@9\language\chardef\ccclvi}
100 <latexrelease>\let\newfam\new@mathgroup
101 <latexrelease>\EndIncludeInRelease

```

(End definition for `\newcount` and others.)

`\e@alloc@chardef` The upper limit of extended registers, which leaves this number (eg `\dimen32767`) always unallocated by these macros. cf traditional `\dimen255`.

```

102 <*2ekernel | latexrelease>
103 <latexrelease>\IncludeInRelease{2015/01/01}%
104 <latexrelease> {\e@alloc@chardef}{Extended Allocation}%
105 \ifx\directlua\undefined
106   \ifx\widowpenalties\undefined

```

classic tex has 2^8 registers.

```

107   \mathchardef\e@alloc@top=255
108   \let\@alloc@chardef\mathchardef
109 \else

```

etex and xetex have 2^{15} registers.

```

110   \mathchardef\@alloc@top=32767
111   \let\@alloc@chardef\mathchardef
112 \fi
113 \else

```

luatex has 2^{16} registers.

```

114   \chardef\@alloc@top=65535
115   \let\@alloc@chardef\mathchardef
116 \fi
117 </2ekernel | latexrelease>
118 <latexrelease>\EndIncludeInRelease
119 <latexrelease>\IncludeInRelease{0000/00/00}%
120 <latexrelease> {\e@alloc@chardef}{Extended Allocation}%
121 <latexrelease>\let\@alloc@top\undefined
122 <latexrelease>\let\@alloc@chardef\undefined
123 <latexrelease>\EndIncludeInRelease

```

(End definition for `\e@alloc@chardef` and `\e@alloc@top`.)

<code>\e@mathgroup@top</code>	The upper limit of extended math groups (<code>\fam</code>) 16 in classic TeX and e-TeX, but 256 in Unicode TeX variants. <pre> 124 {*2ekernel latexrelease} 125 <tex>\IncludeInRelease{2015/01/01}% 126 <tex>\fam{\e@mathgroup@top}{Extended Allocation}% 127 \ifx\Umathcode\undefined </pre> <p>classic and e tex have 16 fam (0–15).</p> <pre> 128 \chardef\mathgroup@top=16 129 \else </pre> <p>xetex and luatex have 256 fam (0–255).</p> <pre> 130 \chardef\mathgroup@top=256 131 \fi 132 </2ekernel latexrelease> 133 <tex>\EndIncludeInRelease 134 <tex>\IncludeInRelease{0000/00/00}% 135 <tex>\fam{\e@mathgroup@top}{Extended Allocation}% 136 <tex>\let\mathgroup@top\undefined 137 <tex>\EndIncludeInRelease </pre> <p>(End definition for <code>\e@mathgroup@top</code>.)</p>
<code>\e@alloc</code>	A modified version of <code>\alloc@</code> that takes the count register rather than just the final digit of its number (assuming <code>\count1x</code>). It also has an extra argument to give the top of the extended range. <pre> #1 #2 #3 #4 #5 #6 \@alloc type defcmd current top extended-top newname </pre> <p>Note that if just a single allocation range is required (not omitting a range up to 255 for inserts) then –1 should be used for the first upper bound argument, #4.</p> <pre> 138 {*2ekernel latexrelease} 139 <tex>\IncludeInRelease{2015/01/01}{\e@alloc}{Extended Allocation}% 140 \def\@alloc#1#2#3#4#5#6{% 141 \global\advance#3\@ne 142 \e@ch@ck{#3}{#4}{#5}{#1}% 143 \allocationnumber#3\relax 144 \global#2#6\allocationnumber 145 \wlog{\string#6=\string#1\the\allocationnumber}% 146 </2ekernel latexrelease> 147 <tex>\EndIncludeInRelease 148 <tex>\IncludeInRelease{0000/00/00}{\e@alloc}{Extended Allocation}% 149 <tex>\let\@alloc\undefined 150 <tex>\EndIncludeInRelease 151 {*2ekernel} </pre> <p>(End definition for <code>\e@alloc</code>.)</p>
<code>\e@ch@ck</code>	Extended check command. If the first range is exceeded, bump to 256 (or 266 for counts) and try again, testing the extended range.

```

Allocate matching registers from the top of the extended range and add to \c@freelist.

\extrafloats 152  {/2ekernel}
              {*2ekernel | latexrelease}
              {latexrelease\IncludeInRelease{2015/10/01}
               {latexrelease} {\e@ch@ck}{Extended Allocation (checking)}%
156  \gdef\c@ch@ck#1#2#3#4{%
157    \ifnum#1<#2\else

```

If we've reached the classical top limit, bump to 256 or 266 for counts (count 256–265 are reserved by the allocation system).

```

158    \ifnum#1=#2\relax
159      \global\c@cclvi
160      \ifx\c@count\c@global\advance\c@count 10 \fi
161    \fi

```

Check we are below the extended limit.

```

162    \ifnum#1<#3\relax
163    \else
164      \errmessage{No room for a new \string#4}%
165    \fi
166  \fi}%
167  {latexrelease\EndIncludeInRelease
168  {latexrelease\IncludeInRelease{2015/01/01}%
169  {latexrelease} {\e@ch@ck}{Extended Allocation (checking)}%
170  {latexrelease\gdef\c@ch@ck#1#2#3#4{%
171    {latexrelease} \ifnum#1<#2\else
172    {latexrelease} \ifnum#1=#2\relax
173    {latexrelease} #1\c@cclvi
174    {latexrelease} \ifx\c@count\c@global\advance\c@count 10 \fi
175    {latexrelease} \fi
176    {latexrelease} \ifnum#1<#3\relax
177    {latexrelease} \else
178    {latexrelease} \errmessage{No room for a new #4}%
179    {latexrelease} \fi
180  {latexrelease} \fi}%
181  {latexrelease\EndIncludeInRelease
182  {latexrelease\IncludeInRelease{0000/00/00}%
183  {latexrelease} {\e@ch@ck}{Extended Allocation (checking)}%
184  {latexrelease\let\c@ch@ck\c@undefined
185  {latexrelease\EndIncludeInRelease
186  {latexrelease\IncludeInRelease{2015/01/01}%
187  {latexrelease} {\extrafloats}{Extra floats}%
188 \let\c@float\c@count\c@alloc@\top

```

```

\extrafloats 189 \ifx\c@numexpr\c@undefined

```

In classic TeX use \newinsert to allocate float boxes.

```

190 \def\extrafloats#1{%
191 \c@count\c@#1\relax
192 \ifnum\c@count>\c@z@%
193 \newinsert\c@reserved\c@a
194 \c@global\c@expandafter\c@chardef

```

```

195           \csname bx@\the\allocationnumber\endcsname\allocationnumber
196   \@cons\@freelist{\csname bx@\the\allocationnumber\endcsname}%
197   \advance\count@\m@ne
198   \expandafter\extrafloats
199   \expandafter\count@
200   \fi
201 }%
202 \else

```

In e-tex take float boxes from the top of the extended range.

```

203 \def\extrafloats#1{%
204 \ifnum#1>\z@
205 \count@\numexpr\float@count-1\relax
206 \ch@ck0\count@\count
207 \ch@ck1\count@\dimen
208 \ch@ck2\count@\skip
209 \ch@ck4\count@\box
210 \global\@alloc@chardef\float@count\count@
211 \global\expandafter\@alloc@chardef
212 \csname bx@\the\float@count\endcsname\float@count
213 \@cons\@freelist{\csname bx@\the\float@count\endcsname}%
214 \expandafter
215 \extrafloats\expandafter{\numexpr#1-1\relax}%
216 \fi}%
217 \fi
218 </2ekernel | latexrelease>
219 <latexrelease>\EndIncludeInRelease
220 <latexrelease>\IncludeInRelease{0000/00/00}%
221 <latexrelease>          {\extrafloats}{Extra floats}%
222 <latexrelease>\let\float@count\undefined
223 <latexrelease>\let\extrafloats\undefined
224 <latexrelease>\EndIncludeInRelease
225 <*2ekernel>

```

(End definition for `\e@ch@ck`, `\extrafloats`, and `\extrafloats`.)

\alloc@ Since `\e@alloc` was added in 2015, `\alloc` has not been used, but was left as some legacy code calls it. However the original definition gives spurious errors once the “classic” registers run out, so it is now defined to call `\e@alloc` internally.

```

226 </2ekernel>
227 <*2ekernel | latexrelease>
228 <latexrelease>\IncludeInRelease{2020/10/01}
229 <latexrelease>          {\alloc@}{emulate alloc@}%
230 \def\alloc@#1#2#3#4{\e@alloc#2#3{\count1#1}#4\float@count}
231 </2ekernel | latexrelease>

232 <latexrelease>\EndIncludeInRelease
233 <latexrelease>\IncludeInRelease{0000/00/00}%
234 <latexrelease>          {\alloc@}{emulate alloc@}%
235 <latexrelease>\def\alloc@#1#2#3#4#5{\global\advance\count1#1\@ne
236 <latexrelease> \ch@ck1#4#2%
237 <latexrelease> \allocationnumber\count1#1%
238 <latexrelease> \global#3#5\allocationnumber
239 <latexrelease> \wlog{string#5=string#2\the\allocationnumber}%

```

```

240  ⟨\latexrelease⟩\EndIncludeInRelease
241  ⟨*2ekernel⟩

(End definition for \alloc@.)
```

\newinsert

```

242  ⟨/2ekernel⟩
243  ⟨*2ekernel | \latexrelease⟩
244  ⟨\latexrelease⟩\IncludeInRelease{2015/10/01}
245  ⟨\latexrelease⟩           {\newinsert}{Extended \newinsert}%
246  \ifx\numexpr\undefined
```

If e-TeX is not available use the original plain TeX definition of \newinsert.

```

247  \def\newinsert#1{\global\advance\insc@unt \m@ne
248    \ch@ck0\insc@unt\count
249    \ch@ck1\insc@unt\dimen
250    \ch@ck2\insc@unt\skip
251    \ch@ck4\insc@unt\box
252    \allocationnumber\insc@unt
253    \global\chardef#1\allocationnumber
254    \wlog{\string#1=\string\insert\the\allocationnumber}%
255  \else
```

The highest register allowed with \insert.

```

256  \ifx\directlua\undefined
257    \chardef\@insert@top255
258  \else
259    \chardef\@insert@top\@alloc@top
260  \fi
```

If the classic registers are exhausted, take an insert from the free float list and use \extrafloats to add a new float to that list.

```

261  \def\newinsert#1{%
262  \@tempswafalse
263  \global\advance\insc@unt\m@ne
264  \ifnum\count10<\insc@unt
265  \ifnum\count11<\insc@unt
266  \ifnum\count12<\insc@unt
267  \ifnum\count14<\insc@unt
268    \@tempswatrue
269  \fi\fi\fi\fi
270  \@tempswa
271  \allocationnumber\insc@unt
272  \else
273  \global\advance\insc@unt\@ne
274  \extrafloats\@ne
275  \@next\@currbox\@freelist
276  {\ifnum\@currbox<\@insert@top
277    \allocationnumber\@currbox
278  \else
279    \ch@ck0\m@ne\insert
280  \fi}%
281  {\ch@ck0\m@ne\insert}%
282  \fi
```

```

283 \global\chardef#1\allocationnumber
284 \wlog{\string#1=\string\insert\the\allocationnumber}%
285 }

286 \fi
287 /2ekernel | latexrelease

288 \latexrelease\EndIncludeInRelease
289 \latexrelease\IncludeInRelease{0000/00/00}%
290 \latexrelease\{\newinsert\Extended \newinsert\%
291 \latexrelease\let\@insert@top\@undefined
292 \latexrelease\def\newinsert#1{\global\advance\insc@unt \m@ne
293 \latexrelease\ch@ck0\insc@unt\count
294 \latexrelease\ch@ck1\insc@unt\dimen
295 \latexrelease\ch@ck2\insc@unt\skip
296 \latexrelease\ch@ck4\insc@unt\box
297 \latexrelease\allocationnumber\insc@unt
298 \latexrelease\global\chardef#1\allocationnumber
299 \latexrelease\wlog{\string#1=\string\insert\the\allocationnumber}}
300 \latexrelease\EndIncludeInRelease
301 *2ekernel
```

(End definition for \newinsert.)

```
\ch@ck
302 \gdef\ch@ck#1#2#3{%
303   \ifnum\count1#1<#2\else
304     \errmessage{No room for a new #3}%
305   \fi}
```

(End definition for \ch@ck.)

```
\newhelp
306 \def\newhelp#1#2{\newtoks#1\expandafter{\csname#2\endcsname}}
```

(End definition for \newhelp.)

\maxdimen Here are some examples of allocation.

```
\hideskip
307 \newdimen\maxdimen \maxdimen=16383.99999pt % the largest legal <dimen>
308 \newskip\hideskip \hideskip=-1000pt plus 1fill % negative but can grow
```

(End definition for \maxdimen and \hideskip.)

```
\p@
\z@
309 \newdimen\p@ \p@=1pt % this saves macro space and time
\z@skip
310 \newdimen\z@ \z@=0pt % can be used both for 0pt and 0
\voidb@x
311 \newskip\z@skip \z@skip=0pt plus0pt minus0pt
312 \newbox\voidb@x % permanently void box register
```

(End definition for \p@ and others.)

Assign initial values to T_EX's parameters

```
313 \message{parameters,}
```

All of TeX's numeric parameters are listed here, but the code is commented out if no special value needs to be set. INITEX makes all parameters zero except where noted.
Historical LATeX 2.09 comments (not necessarily accurate any more):

```

314 \pretolerance=100
315 \tolerance=200 % INITEX sets this to 10000
316 \hbadness=1000
317 \vbadness=1000
318 \linepenalty=10
319 \hyphenpenalty=50
320 \exhyphenpenalty=50
321 \binoppenalty=700
322 \relpenalty=500
323 \clubpenalty=150
324 \widowpenalty=150
325 \displaywidowpenalty=50
326 \brokenpenalty=100
327 \predisplaypenalty=10000

\postdisplaypenalty=0
\interlinepenalty=0
\floatingpenalty=0, set during \insert
\outputpenalty=0, set before TeX enters \output

328 \doublehyphendemerits=10000
329 \finalhyphendemerits=5000
330 \adjdemerits=10000

\looseness=0, cleared by TeX after each paragraph
\pausing=0
\holdinginserts=0
\tracingonline=0
\tracingmacros=0
\tracingstats=0
\tracingparagraphs=0
\tracingpages=0
\tracingoutput=0

331 \tracinglostchars=1

\tracingcommands=0
\tracingrestores=0
\language=0

332 \uchyph=1

\lefthyphenmin=2 \righthyphenmin=3 set below
\globaldefs=0
\maxdeadcycles=25 % INITEX does this
\hangafter=1 % INITEX does this, also TeX after each paragraph
\fam=0
\mag=1000 % INITEX does this
\escapechar='\\ % INITEX does this

333 \defaulthyphenchar='-
334 \defaultskewchar=-1

```

```

\endlinechar='\^M % INITEX does this
\newlinechar=-1      \LaTeX\ sets this in ltdefns.dtx.

335 \delimiterfactor=901

\time=now % TeX does this at beginning of job
\day=now % TeX does this at beginning of job
\month=now % TeX does this at beginning of job
\year=now % TeX does this at beginning of job

```

End of historical L^AT_EX 2.09 comments.

In L^AT_EX we don't want box information in the transcript unless we do a full tracing.

```

336 \showboxbreadth=-1
337 \showboxdepth=-1
338 \errorcontextlines=-1

339 \hfuzz=0.1pt
340 \vfuzz=0.1pt
341 \overfullrule=5pt
342 \maxdepth=4pt
343 \splitmaxdepth=\maxdimen
344 \boxmaxdepth=\maxdimen

```

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

\lineskiplimit=0pt, changed by \normalbaselines

```

345 \delimitershortfall=5pt
346 \nulldelimiterspace=1.2pt
347 \scriptspace=0.5pt

\mathsurround=0pt
\predisplaysize=0pt, set before TeX enters $$
\displaywidth=0pt, set before TeX enters $$
\displayindent=0pt, set before TeX enters $$

348 \parindent=20pt

```

\hangindent=0pt, zeroed by TeX after each paragraph

\hoffset=0pt
\voffset=0pt

\baselineskip=0pt, changed by \normalbaselines
\lineskip=0pt, changed by \normalbaselines

```

349 \parskip=0pt plus 1pt
350 \abovedisplayskip=12pt plus 3pt minus 9pt
351 \abovedisplayshortskip=0pt plus 3pt
352 \belowdisplayskip=12pt plus 3pt minus 9pt
353 \belowdisplayshortskip=7pt plus 3pt minus 4pt

```

\leftskip=0pt
\rightskip=0pt

```

354 \topskip=10pt
355 \splittopskip=10pt

```

```

\tabskip=0pt
\spaceskip=0pt
\xspaceskip=0pt
356 \parfillskip=0pt plus 1fil

End of historical LATEX 2.09 comments.

\normalbaselineskip We also define special registers that function like parameters:
\normallineskip 357 \newskip\normalbaselineskip \normalbaselineskip=12pt
\normallineskiplimit 358 \newskip\normallineskip \normallineskip=1pt
359 \newdimen\normallineskiplimit \normallineskiplimit=0pt

(End definition for \normalbaselineskip, \normallineskip, and \normallineskiplimit.)

```

```

\interfootlinepenalty 360 \newcount\interfootnotelinepenalty \interfootnotelinepenalty=100

(End definition for \interfootlinepenalty.)

```

Definitions for preloaded fonts

```

\magstephalf
\magstep 361 \def\magstephalf{1095 }
362 \def\magstep#1{\ifcase#1 \or 1200\or 1440\or 1728\or
363 2074\or 2488\fi\relax}

(End definition for \magstephalf and \magstep.)

```

Macros for setting ordinary text

```

\frenchspacing
\nonfrenchspacing 364 \def\frenchspacing{\sfcode`\. \sfcode`?\!` \sfcode`\!\` \sfcode`\: \sfcode`\; \sfcode`\, \sfcode`\,}
365 \sfcode`\!` \sfcode`\; \sfcode`\, \sfcode`\, \sfcode`\,
366 \def\nonfrenchspacing{\sfcode`\.3000\sfcode`?\!3000\sfcode`\!`3000%
367 \sfcode`\!`2000\sfcode`\;1500\sfcode`\,1250 }

(End definition for \frenchspacing and \nonfrenchspacing.)

```

```

\normalbaselines
368 \def\normalbaselines{\lineskip\normallineskip
369 \baselineskip\normalbaselineskip \lineskip\limits\normallineskip\limits}

(End definition for \normalbaselines.)

```

```

\I Save a bit of space by using \let here.
\I 370 \def\^\M{\ } % control <return> = control <space>
371 \let\^\I\^\M % same for <tab>

(End definition for \I and \I.)

```

```

\lq
\rq 372 \def\lq{'
373 \def\rq{'}

(End definition for \lq and \rq.)

```

```

\lbrack
\rbrack 374 \def\lbrack{[]}
375 \def\rbrack{}}

(End definition for \lbrack and \rbrack.)

\aa These are not from plain.tex but they are similar to other commands found here and
\AA nowhere else, being alternate input forms for characters.
376 \def \aa {\r a}
377 \def \AA {\r A}

(End definition for \aa and \AA.)

\endgraf
\endline 378 \let\endgraf=\par
379 \let\endline=\cr

(End definition for \endgraf and \endline.)

\space
380 \def\space{ }

(End definition for \space.)

\empty This probably ought to go altogether, but let it to the LATEX version to save space.
381 \let\empty\@empty

(End definition for \empty.)

\null
382 \def\null{\hbox{}}

(End definition for \null.)

\bgroup
\egroup 383 \let\bgroup=
384 \let\egroup=}

(End definition for \bgroup and \egroup.)

\obeylines In \obeylines, we say \let^M=\par instead of \def^M{\par} since this allows, for
\obeyspaces example, \let\par=\cr \obeylines \halign{...}
385 {\catcode`^M=\active % these lines must end with %
386 \gdef\obeylines{\catcode`^M\active \let^M\par}%
387 \global\let^M\par} % this is in case ^M appears in a \write
388 \def\obeyspaces{\catcode`\ \active}
389 {\obeyspaces\global\let =\space}

(End definition for \obeylines and \obeyspaces.)

```

\loop We use Kabelschacht's method of doing loops, see TUB 8#2 (1987). (unless that breaks something :-). It turned out to need an extra \relax: see pr/642 (\loop could do one iteration too much in certain cases).

```

390 \long\def \loop #1\repeat{%
391   \def\iterate{\#1\relax % Extra \relax
392             \expandafter\iterate\fi
393           }%
394   \iterate
395   \let\iterate\relax
396 }
```

This setting of \repeat is needed to make \loop...\\if...\\repeat skippable within another \\if....

```
397 \let\repeat=\fi
```

(End definition for \loop, \iterate, and \repeat.)

L^AT_EX defines \smallskip, etc. in ltspacex.dtx.

```
\nointerlineskip
```

```
\offinterlineskip
```

```

398 \def\nointerlineskip{\prevdepth-\@m\p@}
399 \def\offinterlineskip{\baselineskip-\@m\p@
400 \lineskip\z@ \lineskiplimit\maxdimen}
```

(End definition for \nointerlineskip and \offinterlineskip.)

```
\vglue
```

```
\hglue
```

```

401 \def\vglue{\afterassignment\vglue\skip@=}
402 \def\vglue{\par \dimen@\prevdepth \hrule \height\z@%
403 \nobreak\vskip\skip@ \prevdepth\dimen@}
404 \def\hglue{\afterassignment\hglue\skip@=}
405 \def\hglue{\leavevmode \count@\spacefactor \vrule \width\z@%
406 \nobreak\hskip\skip@ \spacefactor\count@}
```

(End definition for \vglue and \hglue.)

L^AT_EX defines ~ in ltdefns.dtx.

\slash

This generates a / acting a bit like - but still allows hyphenation in the word part preceding it (but not after).

```
407 \def\slash{/penalty\exhyphenpenalty}
```

(End definition for \slash.)

```
\break
```

```
\nobreak
```

```
\allowbreak
```

```

408 \def\break{\penalty-\@M}
409 \def\nobreak{\penalty \@M}
410 \def\allowbreak{\penalty \z@}
```

(End definition for \break, \nobreak, and \allowbreak.)

```
\filbreak
```

```
\goodbreak
```

```

411 \def\filbreak{\par\vfil\penalty-200\vfilneg}
412 \def\goodbreak{\par\penalty-500 }
```

(End definition for \filbreak and \goodbreak.)

\eject Define `\eject` as in plain T_EX but define `\supereject` only in the compatibility file.

413 `\def\eject{\par\break}`

(End definition for `\eject`.)

\removelastskip

414 `\def\removelastskip{\ifdim\lastskip=\z@\else\vskip-\lastskip\fi}`

(End definition for `\removelastskip`.)

\smallbreak

\medbreak 415 `\def\smallbreak{\par\ifdim\lastskip<\smallskipamount`

\bigbreak 416 `\removelastskip\penalty-50\smallskip\fi}`

 417 `\def\medbreak{\par\ifdim\lastskip<\medskipamount`

 418 `\removelastskip\penalty-100\medskip\fi}`

 419 `\def\bigbreak{\par\ifdim\lastskip<\bigskipamount`

 420 `\removelastskip\penalty-200\bigskip\fi}`

(End definition for `\smallbreak`, `\medbreak`, and `\bigbreak`.)

\m@th

421 `\def\m@th{\mathsurround\z@}`

(End definition for `\m@th`.)

\underbar Due to L^AT_EX's redefinition of `\underline` plain T_EX's `\underbar` can be done in a simpler fashion (but do we need it at all?).

422 `\def\underbar#1{\underline{\sbox\tw@{\#1}\dp\tw@\z@\box\tw@}}`

(End definition for `\underbar`.)

\strutbox L^AT_EX sets `\strutbox` in `\set@fontsize`.

\strut 423 `\newbox\strutbox`

 424 `\def\strut{\relax\ifmmode\copy\strutbox\else\unhcopy\strutbox\fi}`

(End definition for `\strutbox` and `\strut`.)

\hidewidth For alignment entries that can stick out.

425 `\def\hidewidth{\hskip\hideskip}`

(End definition for `\hidewidth`.)

\narrower

426 `\def\narrower{%`

 427 `\advance\leftskip\parindent`

 428 `\advance\rightskip\parindent}`

(End definition for `\narrower`.)

L^AT_EX defines `\ae` and similar commands elsewhere.

429 `\chardef\%='\%`

430 `\chardef\&='\&`

431 `\chardef\#= '\#`

Most text commands are actually encoding specific and therefore defined later, so commented out or removed from this file.

- \leavevmode begins a paragraph, if necessary
- ```
432 \def\leavevmode{\unhbox\vvoidb@x}
```
- (End definition for \leavevmode.)
- \mathhexbox
- ```
433 \def\mathhexbox#1#2#3{\mbox{$\mathchar"##1#2#3$}}
```
- (End definition for \mathhexbox.)
- \ialign
- ```
434 \def\ialign{\everycr{}\tabskip\z@skip\halign} % initialized \halign
```
- (End definition for \ialign.)
- \oalign
- ```
435 \def\oalign#1{\leavevmode\vtop{\baselineskip\z@skip \lineskip.25ex%
```
- \ooalign
- ```
436 \ialign{##\crcr#1\crcr}}}
```
- ```
437 \def\o@lign{\lineskiplimit\z@ \oalign}
```
- ```
438 \def\ooalign{\lineskiplimit-\maxdimen \oalign}
```
- (End definition for \oalign, \o@lign, and \ooalign.)
- \sh@ft The definition of this macro in plain.tex was improved in about 1997; but as a result its usage was changed and its new definition is not appropriate for L<sup>A</sup>T<sub>E</sub>X.
- Since the version given here has been in use by L<sup>A</sup>T<sub>E</sub>X for many years it does not seem prudent to remove it now. As far as we can tell it has only been used to define \b and \d but this cannot be certain.
- ```
439 \def\sh@ft#1{\dimen@.00#1ex\multiply\dimen@\fontdimen1\font
```
- ```
440 \kern-.0156\dimen@} % compensate for slant in lowered accents
```
- (End definition for \sh@ft.)
- \ltx@sh@ft This is the L<sup>A</sup>T<sub>E</sub>X version of the second incarnation of the plain macro \sh@ft, which takes a dimension as its argument. It shifts a pseudo-accent horizontally by an amount proportional to the product of its argument and the slant-per-point (fontdimen 1).
- ```
441 \def\ltx@sh@ft #1{%
```
- ```
442 \dimen@ #1%
```
- ```
443   \kern \strip@pt
```
- ```
444 \fontdimen1\font \dimen@
```
- ```
445 } % kern by #1 times the current slant
```
- (End definition for \ltx@sh@ft.)
- L^AT_EX change: the text commands such as \d, \b, \c, \copyright, \TeX are now defined elsewhere.
- L^AT_EX change: Make \t work in a moving argument. Now defined elsewhere.
- \hrulefill L^AT_EX change: \kern\z@ added to end of \hrulefill and \dotfill to make them work in ‘tabular’ and ‘array’ environments. (Change made 24 July 1987). L^AT_EX change: \leavevmode added at beginning of \dotfill and \hrulefill so that they work as expected in vertical mode.
- ```
446 \def\hrulefill{\leavevmode\leaders\hrule\hfill\kern\z@}
```

The box in `\dotfill` originally contained (in plain.tex):

`\mkern 1.5mu .\mkern 1.5mu;`

the width of `.44em` differs from this by `.04pt` which is probably an acceptable difference within leaders.

```
447 \def\dotfill{%
448 \leavevmode
449 \cleaders \hb@xt@ .44em{\hss.\hss}\hfill
450 \kern\z@}
```

(End definition for `\hrulefill` and `\dotfill`.)

INITEX sets `\sfcode x=1000` for all x, except that `\sfcode'X=999` for uppercase letters. The following changes are needed:

```
451 \sfcode`\'=0 \sfcode`\'=0 \sfcode`\'=0
```

The `\nonfrenchspacing` macro will make further changes to `\sfcode` values.

Definitions related to output

`\magnification` doesn't work in L<sup>A</sup>T<sub>E</sub>X.

```
def\magnification{\afterassignment\m@g\count@}
def\m@g{\mag\count@
 \hsize6.5truein\vsiz8.9truein\dimen\footins8truein}
```

`\showoverfull` The following commands are used in debugging:

```
452 \def\showoverfull{\tracingonline\one}
```

(End definition for `\showoverfull`.)

```
\showoutput
\loggingoutput
453 \gdef\loggingoutput{\tracingoutput\one
454 \showboxbreadth\maxdimen\showboxdepth\maxdimen\errorstopmode}
455 \gdef\showoutput{\loggingoutput\showoverfull}
456 {/2ekernel}
```

(End definition for `\showoutput` and `\loggingoutput`.)

```
\tracingall
\loggingall
457 {/latexrelease}\IncludeInRelease{2015/01/01}{\loggingall}{\etex tracing}%
458 {*2ekernel | latexrelease}
459 \ifx\tracingscantokens\undefined
460 \gdef\loggingall{%
461 \tracingstats\tw@%
462 \tracingpages\one
463 \tracinglostchars\one
464 \tracingparagraphs\one
465 \errorcontextlines\maxdimen
466 \loggingoutput
467 \tracingmacros\tw@%
468 \tracingcommands\tw@%
469 \tracingrestores\one
470 }%
471 \else
472 \gdef\loggingall{%
473 \tracingstats\tw@%
474 \tracingpages\one
```

```

475 \tracinglostchars\tw@
476 \tracingparagraphs\@ne
477 \tracinggroups\@ne
478 \tracingifs\@ne
479 \tracingscantokens\@ne
480 \tracingnesting\@ne
481 \errorcontextlines\maxdimen
482 \loggingoutput
483 \tracingmacros\tw@
484 \tracingcommands\thr@@
485 \tracingrestores\@ne
486 \tracingassigns\@ne
487 }%
488 \fi
489 \gdef\tracingall{\showoverfull\loggingall}
490 {/2ekernel | latexrelease}
491 \langle latexrelease\rangle\EndIncludeInRelease
492 \langle latexrelease\rangle\IncludeInRelease{0000/00/00}{\loggingall}{etex tracing}%
493 \langle latexrelease\rangle\gdef\loggingall{\tracingcommands\tw@\tracingstats\tw@
494 \langle latexrelease\rangle \tracingpages\@ne\tracinglostchars\@ne
495 \langle latexrelease\rangle \tracingmacros\tw@\tracingparagraphs\@ne\tracingrestores\@ne
496 \langle latexrelease\rangle \errorcontextlines\maxdimen\loggingoutput}
497 \langle latexrelease\rangle \gdef\tracingall{\loggingall\showoverfull}
498 \langle latexrelease\rangle\EndIncludeInRelease

```

(End definition for \tracingall and \loggingall.)

```

\tracingnone
\hideoutput
499 \langle latexrelease\rangle\IncludeInRelease{2015/01/01}{\tracingnone}%
500 \langle latexrelease\rangle
501 {*2ekernel | latexrelease}
502 \ifx\tracingscantokens\@undefined
503 \def\tracingnone{%
504 \tracingonline\z@
505 \tracingcommands\z@
506 \showboxdepth\m@ne
507 \showboxbreadth\m@ne
508 \tracingoutput\z@
509 \errorcontextlines\m@ne
510 \tracingrestores\z@
511 \tracingparagraphs\z@
512 \tracingmacros\z@
513 \tracinglostchars\@ne
514 \tracingpages\z@
515 \tracingstats\z@
516 }%
517 \else
518 \def\tracingnone{%
519 \tracingassigns\z@
520 \tracingrestores\z@
521 \tracingonline\z@
522 \tracingcommands\z@
523 \showboxdepth\m@ne
524 \showboxbreadth\m@ne

```

```

525 \tracingoutput{z@}
526 \errorcontextlines{m@ne}
527 \tracingnesting{z@}
528 \tracingscantokens{z@}
529 \tracingifs{z@}
530 \tracinggroups{z@}
531 \tracingparagraphs{z@}
532 \tracingmacros{z@}
533 \tracinglostchars{@ne}
534 \tracingpages{z@}
535 \tracingstats{z@}
536 }%
537 \fi
538 \def\hideoutput{%
539 \tracingoutput{z@}
540 \showboxbreadth{m@ne}
541 \showboxdepth{m@ne}
542 \tracingonline{m@ne}
543 }%
544 </2ekernel | latexrelease>
545 <latexrelease>\EndIncludeInRelease
546 <latexrelease>\IncludeInRelease{0000/00/00}{\tracingnone}%
547 <latexrelease> {turn off etex tracing}%
548 <latexrelease>\let\tracingnone@\undefined
549 <latexrelease>\let\hideoutput@\undefined
550 <latexrelease>\EndIncludeInRelease

(End definition for \tracingnone and \hideoutput.)
1TEX change: \showhyphens Defined later.
Punctuation affects the spacing.

551 <*2ekernel>
552 \nonfrenchspacing
553 </2ekernel>

```

# File c

## ltvers.dtx

### 1 Version Identification

First we identify the date and version number of this release of L<sup>A</sup>T<sub>E</sub>X, and set \everyjob so that it is printed at the start of every L<sup>A</sup>T<sub>E</sub>X run.

```
1 \fmtname
2 \fmtversion
3 \latexreleaseversion
4 \patch@level
```

A \patch@level of 0 or higher denotes an official public release. A negative value indicates a candidate release that is not distributed.  
If we put code updates into the kernel that are supposed to go into the next release we set the \patch@level to -1 and the \fmtversion / \latexreleaseversion to the dated of the next release (guessed, the real value is not so important and will get corrected when we make the release official).

If the \patch@level is already at -1 we do nothing here and use the \fmtversion date for any new \IncludeInRelease line when we add further code.

Finally, if we do make a public release we either just set the \patch@level to zero (if our initial guess was good) or we also change the date and then have to additionally change to that date on all the \IncludeInRelease statements that used the “guessed” date.

```
1 {*2ekernel}
2 \def\fmtname{LaTeX2e}
3 \edef\fmtversion
4 {*}2ekernel
5 <latexrelease>\edef\latexreleaseversion
6 {*}2ekernel | latexrelease>
7 {2020-10-01}
8 {*}2ekernel | latexrelease>
9 {*}2ekernel
10 \def\patch@level{4}
```

For more fine grain control there is the possibility to name the current development branch. This is only used when the \patch@level is negative (i.e., a pre-release format) and is intended to help us internally when we locally install a format out of some development branch.

```
11 \edef\development@branch@name{}
```

(End definition for \fmtname and others.)

Check that the format being made is not too old. The error message complains about ‘more than 5 years’ but in fact the error is not triggered until 65 months.

This code is currently not activated as we don’t know if we already got to the last official 2e version (due to staff shortage or due to a successor (think positive:-)).

```
12 \iffalse
13 \def\reserved@a{\#1/\#2/\#3\@nil}%
14 \count@\year
15 \advance\count@-\#1\relax
16 \multiply\count@ by 12\relax
17 \advance\count@\month
18 \advance\count@-\#2\relax}
19 \expandafter\reserved@a\fmtversion\@nil
```

\count0 is now the age of this file in months. Take a generous definition of ‘year’ so this message is not generated too often.

```

20 \ifnum\count0>65
21 \typeout{^^J%
22 !!! You are attempting to make a LaTeX format from a source file^^J%
23 ! That is more than five years old.^^J%
24 ! ^^J%
25 ! If you enter <return> to scroll past this message then the format^^J%
26 ! will be built, but please consider obtaining newer source files^^J%
27 ! before continuing to build LaTeX.^^J%
28 !!!
29 !!!
30 }
31 \errhelp{To avoid this error message, obtain new LaTeX sources.}
32 \errmessage{LaTeX source files more than 5 years old!}
33 \fi
34 \let\reserved@a\relax
35 \fi

36 \ifnum0\ifnum\patch@level=0 \ifx\development@branch@name\@empty 1\fi\fi>0 %
37 \everyjob\expandafter{\the\everyjob
38 \typeout{\fmtname \space<\fmtversion>}}
39 \immediate
40 \write16{\fmtname \space<\fmtversion>}
41 \else\ifnum\patch@level>0
42 \everyjob\expandafter{\the\everyjob
43 \typeout{\fmtname \space<\fmtversion> patch level \patch@level}}
44 \immediate
45 \write16{\fmtname \space<\fmtversion> patch level \patch@level}
46 \else
47 \everyjob\expandafter{\the\everyjob
48 \typeout{\fmtname \space<\fmtversion> pre-release-\number-\patch@level\space
49 \ifx\development@branch@name\@undefined \else
50 \ifx\development@branch@name\@empty \else
51 \space (\development@branch@name\space branch)%
52 \fi
53 \fi
54 }}
55 \immediate
56 \write16{\fmtname \space<\fmtversion> pre-release-\number-\patch@level\space
57 \ifx\development@branch@name\@undefined \else
58 \ifx\development@branch@name\@empty \else
59 \space (\development@branch@name\space branch)%
60 \fi
61 \fi
62 }
63 \fi
64 \fi
65
```

\IncludeInRelease

```

66 〈2ekernel〉\let\@currname\@empty
67 〈*2ekernel | latexrelease〉

```

```

68 \if{latexrelease} \newif\if@includeinrelease
69 \if{latexrelease} \@includeinreleasefalse
70 \def\IncludeInRelease#1{%
71 \if@includeinrelease
72 \PackageError{latexrelease}{mis-matched \IncludeInRelease}{%
73 There is an \string\EndIncludeRelease\space missing}%
74 \else
75 \fi
76 \kernel@ifnextchar[%
77 {\@IncludeInRelease{#1}}
78 {\@IncludeInRelease{#1}[#1]}}

```

If a specific date has not been specified in *latexrelease* use '#1'.

```

79 \def\@IncludeInRelease#1[#2]{\@IncludeInRelease{#2}}
80 \def\@IncludeInRelease#1#2#3{%
81 \toks@{[#1] #3}%
82 \expandafter\ifx\csname string#2+\currname+IIR\endcsname\relax

```

If we roll back and the first patch already match then applying that is actually reapplying what is already in the format, i.e., it is useless and possibly allocating new registers. However, it makes the logic simpler so this is the way it is for now. In theory we could always jump overthe first patch because that is only really needed for rolling forward. So maybe one day ...

```

83 \ifnum\expandafter\@parse@version#1//00\@nil
84 >\expandafter\@parse@version\fmtversion//00\@nil
85 \GenericInfo{}{Skipping: \the\toks@}%
86 \expandafter\expandafter\expandafter\gobble@IncludeInRelease
87 \else
88 \GenericInfo{}{Applying: \the\toks@}%
89 \@includeinreleasetrue
90 \expandafter\let\csname string#2+\currname+IIR\endcsname\@empty
91 \fi
92 \else
93 \GenericInfo{}{Already applied: \the\toks@}%
94 \expandafter\gobble@IncludeInRelease
95 \fi
96 }

97 \def\EndIncludeInRelease{%
98 \if@includeinrelease
99 \@includeinreleasefalse
100 \else
101 \PackageError{latexrelease}{mis-matched \EndIncludeInRelease}{}%
102 \fi}

```

```

103 \long\def\@gobble@IncludeInRelease#1\EndIncludeInRelease{%
104 \@includeinreleasefalse
105 \@check@IncludeInRelease#1\IncludeInRelease\@check@IncludeInRelease
106 \@end@check@IncludeInRelease}

107 \long\def\@check@IncludeInRelease#1\IncludeInRelease
108 #2#3\@end@check@IncludeInRelease{%
109 \ifx\@check@IncludeInRelease#2\else
110 \PackageError{latexrelease}{skipped \IncludeInRelease for tag \string#2}{}%
111 \fi}

```

112 ⟨/2ekernel | latexrelease⟩  
*(End definition for \IncludeInRelease.)*

# File d

## ltluatex.dtx

### 1 Overview

LuaTeX adds a number of engine-specific functions to TeX. Several of these require set up that is best done in the kernel or need related support functions. This file provides *basic* support for LuaTeX at the L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  kernel level plus as a loadable file which can be used with plain TeX and L<sup>A</sup>T<sub>E</sub>X.

This file contains code for both TeX (to be stored as part of the format) and Lua (to be loaded at the start of each job). In the Lua code, the kernel uses the namespace `luatexbase`.

The following \count registers are used here for register allocation:

```
\e@alloc@attribute@count Attributes (default 258)
\e@alloc@ccodetable@count Category code tables (default 259)
\e@alloc@luafunction@count Lua functions (default 260)
\e@alloc@whatsit@count User whatsits (default 261)
\e@alloc@bytecode@count Lua bytecodes (default 262)
\e@alloc@luachunk@count Lua chunks (default 263)
```

(\count 256 is used for \newmarks allocation and \count 257 is used for \newXeTeXintercharclass with XeTeX, with code defined in `ltfinal.dtx`). With any L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  kernel from 2015 onward these registers are part of the block in the extended area reserved by the kernel (prior to 2015 the L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  kernel did not provide any functionality for the extended allocation area).

### 2 Core TeX functionality

The commands defined here are defined for possible inclusion in a future L<sup>A</sup>T<sub>E</sub>X format, however also extracted to the file `ltluatex.tex` which may be used with older L<sup>A</sup>T<sub>E</sub>X formats, and with plain TeX.

```
\newattribute \newattribute{\langle attribute\rangle}
Defines a named \attribute, indexed from 1 (i.e. \attribute0 is never defined). Attributes initially have the marker value -"7FFFFFFF ('unset') set by the engine.

\newcatcodetable \newcatcodetable{\langle catcodetable\rangle}
Defines a named \catcodetable, indexed from 1 (\catcodetable0 is never assigned). A new catcode table will be populated with exactly those values assigned by IniTeX (as described in the LuaTeX manual).

\newluafunction \newluafunction{\langle function\rangle}
Defines a named \luafunction, indexed from 1. (Lua indexes tables from 1 so \luafunction0 is not available).

\newwhatsit \newwhatsit{\langle whatsit\rangle}
Defines a custom \whatsit, indexed from 1.

\newluabytecode \newluabytecode{\langle bytecode\rangle}
```

|                                                         |                                                                                                                                                                                                   |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>\newluachunkname</code>                           | Allocates a number for Lua bytecode register, indexed from 1.                                                                                                                                     |
| <code>\newluachunkname{\langle chunkname\rangle}</code> | Allocates a number for Lua chunk register, indexed from 1. Also enters the name of the register (without backslash) into the <code>lua.name</code> table to be used in stack traces.              |
| <code>\catcodetable@initex</code>                       | Predefined category code tables with the obvious assignments. Note that the <code>latex</code> and <code>atletter</code> tables set the full Unicode range to the codes predefined by the kernel. |
| <code>\catcodetable@string</code>                       | <code>\setattribute{\langle attribute\rangle}{\langle value\rangle}</code>                                                                                                                        |
| <code>\catcodetable@latex</code>                        | <code>\unsetattribute{\langle attribute\rangle}</code>                                                                                                                                            |
| <code>\catcodetable@atletter</code>                     | Set and unset attributes in a manner analogous to <code>\setlength</code> . Note that attributes take a marker value when unset so this operation is distinct from setting the value to zero.     |
| <code>\setattribute</code>                              |                                                                                                                                                                                                   |
| <code>\unsetattribute</code>                            |                                                                                                                                                                                                   |

### 3 Plain T<sub>E</sub>X interface

The `ltlualatex` interface may be used with plain T<sub>E</sub>X using `\input{ltlualatex}`. This inputs `ltlualatex.tex` which inputs `etex.src` (or `etex.sty` if used with L<sup>A</sup>T<sub>E</sub>X) if it is not already input, and then defines some internal commands to allow the `ltlualatex` interface to be defined.

The `luatexbase` package interface may also be used in plain T<sub>E</sub>X, as before, by inputting the package `\input luatexbase.sty`. The new version of `luatexbase` is based on this `ltlualatex` code but implements a compatibility layer providing the interface of the original package.

## 4 Lua functionality

### 4.1 Allocators in Lua

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>new_attribute</code>   | <code>luatexbase.new_attribute(\langle attribute\rangle)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                              | Returns an allocation number for the <code>\langle attribute\rangle</code> , indexed from 1. The attribute will be initialised with the marker value <code>-"7FFFFFFF"</code> ('unset'). The attribute allocation sequence is shared with the T <sub>E</sub> X code but this function does <i>not</i> define a token using <code>\attributedef</code> . The attribute name is recorded in the <code>attributes</code> table. A metatable is provided so that the table syntax can be used consistently for attributes declared in T <sub>E</sub> X or Lua. |
| <code>new_whatsit</code>     | <code>luatexbase.new_whatsit(\langle whatsit\rangle)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                              | Returns an allocation number for the custom <code>\langle whatsit\rangle</code> , indexed from 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <code>new_bytecode</code>    | <code>luatexbase.new_bytecode(\langle bytecode\rangle)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                              | Returns an allocation number for a bytecode register, indexed from 1. The optional <code>\langle name\rangle</code> argument is just used for logging.                                                                                                                                                                                                                                                                                                                                                                                                     |
| <code>new_chunkname</code>   | <code>luatexbase.new_chunkname(\langle chunkname\rangle)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                              | Returns an allocation number for a Lua chunk name for use with <code>\directlua</code> and <code>\latelua</code> , indexed from 1. The number is returned and also <code>\langle name\rangle</code> argument is added to the <code>lua.name</code> array at that index.                                                                                                                                                                                                                                                                                    |
| <code>new_luafunction</code> | <code>luatexbase.new_luafunction(\langle functionname\rangle)</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                              | Returns an allocation number for a lua function for use with <code>\luafunction</code> , <code>\lateluafunction</code> , and <code>\luadef</code> , indexed from 1. The optional <code>\langle functionname\rangle</code> argument is just used for logging.                                                                                                                                                                                                                                                                                               |

These functions all require access to a named T<sub>E</sub>X count register to manage their allocations. The standard names are those defined above for access from T<sub>E</sub>X,

e.g. `\e@alloc@attribute@count`, but these can be adjusted by defining the variable `(type)_count_name` before loading `ltluatex.lua`, for example

```
local attribute_count_name = "attributetracker"
require("ltluatex")
```

would use a `\TeX \count` (`\countdef`'d token) called `attributetracker` in place of `\e@alloc@attribute@count`.

## 4.2 Lua access to `\TeX` register numbers

`registernumber` `luatexbase.registernumber(<name>)`  
Sometimes (notably in the case of Lua attributes) it is necessary to access a register *by number* that has been allocated by `\TeX`. This package provides a function to look up the relevant number using `\TeX`'s internal tables. After for example `\newattribute\myattrib`, `\myattrib` would be defined by (say) `\myattrib=\attribute15`. `luatexbase.registernumber("myattrib")` would then return the register number, 15 in this case. If the string passed as argument does not correspond to a token defined by `\attributedef`, `\countdef` or similar commands, the Lua value `false` is returned.

As an example, consider the input:

```
\newcommand{\test}[1]{%
\typeout{#1: \expandafter\meaning\csname#1\endcsname^^J
\space\space\space\space
\directlua{\tex.write(luatexbase.registernumber("#1") or "bad input")}%
}

\test{undefinedrubbish}

\test{space}

\test{hbox}

\test{@MM}

\test{@tempdima}
\test{@tempdimb}

\test{strutbox}

\test{sixt@@n}

\attributedef\myattr=12
\myattr=200
\test{myattr}
```

If the demonstration code is processed with `Lua\TeX` then the following would be produced in the log and terminal output.

```
undefinedrubbish: \relax
bad input
```

```

space: macro:->
 bad input
 hbox: \hbox
 bad input
@MM: \mathchar"4E20
 20000
@tempdima: \dimen14
 14
@tempdimb: \dimen15
 15
strutbox: \char"B
 11
sixt@@n: \char"10
 16
myattr: \attribute12
 12

```

Notice how undefined commands, or commands unrelated to registers do not produce an error, just return `false` and so print `bad input` here. Note also that commands defined by `\newbox` work and return the number of the box register even though the actual command holding this number is a `\chardef` defined token (there is no `\boxdef`).

### 4.3 Module utilities

`provides_module` `luatexbase.provides_module(<info>)`

This function is used by modules to identify themselves; the `info` should be a table containing information about the module. The required field `name` must contain the name of the module. It is recommended to provide a field `date` in the usual L<sup>A</sup>T<sub>E</sub>X format `yyyy/mm/dd`. Optional fields `version` (a string) and `description` may be used if present. This information will be recorded in the log. Other fields are ignored.

`module_info` `luatexbase.module_info(<module>, <text>)`

`module_warning` `luatexbase.module_warning(<module>, <text>)`

`module_error` `luatexbase.module_error(<module>, <text>)`

These functions are similar to L<sup>A</sup>T<sub>E</sub>X's `\PackageError`, `\PackageWarning` and `\PackageInfo` in the way they format the output. No automatic line breaking is done, you may still use `\n` as usual for that, and the name of the package will be prepended to each output line.

Note that `luatexbase.module_error` raises an actual Lua error with `error()`, which currently means a call stack will be dumped. While this may not look pretty, at least it provides useful information for tracking the error down.

### 4.4 Callback management

`add_to_callback` `luatexbase.add_to_callback(<callback>, <function>, <description>)` Registers the `<function>` into the `<callback>` with a textual `<description>` of the function. Functions are inserted into the callback in the order loaded.

`remove_from_callback` `luatexbase.remove_from_callback(<callback>, <description>)` Removes the callback function with `<description>` from the `<callback>`. The removed function and its description are returned as the results of this function.

`in_callback` `luatexbase.in_callback(<callback>, <description>)` Checks if the `<description>` matches one of the functions added to the list for the `<callback>`, returning a boolean value.

|                                    |                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>disable_callback</code>      | <code>luatexbase.disable_callback(&lt;callback&gt;)</code> Sets the <code>&lt;callback&gt;</code> to <code>false</code> as described in the LuaTeX manual for the underlying <code>callback.register</code> built-in. Callbacks will only be set to false (and thus be skipped entirely) if there are no functions registered using the callback. |
| <code>callback_descriptions</code> | A list of the descriptions of functions registered to the specified callback is returned. <code>{}</code> is returned if there are no functions registered.                                                                                                                                                                                       |
| <code>create_callback</code>       | <code>luatexbase.create_callback(&lt;name&gt;,metatype,&lt;default&gt;)</code> Defines a user defined callback. The last argument is a default function or <code>false</code> .                                                                                                                                                                   |
| <code>call_callback</code>         | <code>luatexbase.call_callback(&lt;name&gt;,...)</code> Calls a user defined callback with the supplied arguments.                                                                                                                                                                                                                                |

## 5 Implementation

```

1 {*2ekernel | tex | latexrelease}
2 {2ekernel | latexrelease}\ifx\directlua\@undefined\else

```

### 5.1 Minimum LaTeX version

LuaTeX has changed a lot over time. In the kernel support for ancient versions is not provided: trying to build a format with a very old binary therefore gives some information in the log and loading stops. The cut-off selected here relates to the tree-searching behaviour of `require()`: from version 0.60, LuaTeX will correctly find Lua files in the `texmf` tree without ‘help’.

```

3 \ifx\directlua\@undefined\else
4 \newluafunction{LuaTeX}%
5 \ifnum\luatexversion<60 %
6 \wlog{*****}
7 \wlog{* LuaTeX version too old for ltluatex support *}
8 \wlog{*****}
9 \expandafter\endinput
10 \fi

```

Two simple L<sup>A</sup>T<sub>E</sub>X macros from `ltdefns.dtx` have to be defined here because `ltdefns.dtx` is not loaded yet when `ltluatex.dtx` is executed.

```

11 \long\def\@gobble#1{}
12 \long\def\@firstofone#1{#1}

```

### 5.2 Older L<sup>A</sup>T<sub>E</sub>X/Plain T<sub>E</sub>X setup

```

13 {*tex}

```

Older L<sup>A</sup>T<sub>E</sub>X formats don’t have the primitives with ‘native’ names: sort that out. If they already exist this will still be safe.

```

14 \directlua{tex.enableprimitives("",tex.extraprimitives("luatex"))}
15 \ifx\alloc\@undefined

```

In pre-2014 L<sup>A</sup>T<sub>E</sub>X, or plain T<sub>E</sub>X, load `etex.{sty,src}`.

```

16 \ifx\documentclass\@undefined
17 \ifx\loccount\@undefined
18 \input{etex.src}%
19 \fi
20 \catcode`\@=11 %
21 \outer\expandafter\def\csname newfam\endcsname

```

```

22 {\alloc@8\fam\chardef\et@xmaxfam}
23 \else
24 \RequirePackage{etex}
25 \expandafter\def\csname newfam\endcsname
26 {\alloc@8\fam\chardef\et@xmaxfam}
27 \expandafter\let\expandafter\new@mathgroup\csname newfam\endcsname
28 \fi

```

### 5.2.1 Fixes to etex.src/etex.sty

These could and probably should be made directly in an update to `etex.src` which already has some LuaTeX-specific code, but does not define the correct range for LuaTeX.

2015-07-13 higher range in luatex.

```

29 \edef \et@xmaxregs {\ifx\directlua\undefined 32768\else 65536\fi}

```

luatex/xetex also allow more math fam.

```

30 \edef \et@xmaxfam {\ifx\Umathcode\undefined\sixt@@n\else@cc@lvi\fi}
31 \count 270=\et@xmaxregs % locally allocates \count registers
32 \count 271=\et@xmaxregs % ditto for \dimen registers
33 \count 272=\et@xmaxregs % ditto for \skip registers
34 \count 273=\et@xmaxregs % ditto for \muskip registers
35 \count 274=\et@xmaxregs % ditto for \box registers
36 \count 275=\et@xmaxregs % ditto for \toks registers
37 \count 276=\et@xmaxregs % ditto for \marks classes

```

and 256 or 16 fam. (Done above due to plain/LaTeX differences in `ltluatex.`)

```

38 % \outer\def\newfam{\alloc@8\fam\chardef\et@xmaxfam}

```

End of proposed changes to `etex.src`

### 5.2.2 luatex specific settings

Switch to global cf `luatex.sty` to leave room for inserts not really needed for luatex but possibly most compatible with existing use.

```

39 \expandafter\let\csname newcount\expandafter\expandafter\endcsname
40 \csname globcount\endcsname
41 \expandafter\let\csname newdimen\expandafter\expandafter\endcsname
42 \csname globdimen\endcsname
43 \expandafter\let\csname newskip\expandafter\expandafter\endcsname
44 \csname globskip\endcsname
45 \expandafter\let\csname newbox\expandafter\expandafter\endcsname
46 \csname globbox\endcsname

```

Define `\e@alloc` as in latex (the existing macros in `etex.src` hard to extend to further register types as they assume specific 26x and 27x count range. For compatibility the existing register allocation is not changed.

```

47 \chardef\@alloc@top=65535
48 \let\@alloc@chardef\chardef
49 \def\@alloc#1#2#3#4#5#6{%
50 \global\advance#3\@ne
51 \e@ch@ck{#3}{#4}{#5}{#1}
52 \allocationnumber#3\relax
53 \global#2#6\allocationnumber
54 \wlog{\string#6=\string#1\the\allocationnumber}}%

```

```

55 \gdef\@ch@ck#1#2#3#4{%
56 \ifnum#1<#2\else
57 \ifnum#1=#2\relax
58 #1\@cclvi
59 \ifx\count#4\advance#1 10 \fi
60 \fi
61 \ifnum#1<#3\relax
62 \else
63 \errmessage{No room for a new \string#4}%
64 \fi
65 \fi}%

Fix up allocations not to clash with etex.src.

66 \expandafter\csname newcount\endcsname\@alloc@attribute@count
67 \expandafter\csname newcount\endcsname\@alloc@ccodetable@count
68 \expandafter\csname newcount\endcsname\@alloc@luafunction@count
69 \expandafter\csname newcount\endcsname\@alloc@whatsit@count
70 \expandafter\csname newcount\endcsname\@alloc@bytecode@count
71 \expandafter\csname newcount\endcsname\@alloc@luachunk@count

End of conditional setup for plain TEX / old LATEX.

72 \fi
73 </tex>

```

### 5.3 Attributes

`\newattribute` As is generally the case for the LuaT<sub>E</sub>X registers we start here from 1. Notably, some code assumes that `\attribute0` is never used so this is important in this case.

```

74 \ifx\@alloc@attribute@count\@undefined
75 \countdef\@alloc@attribute@count=258
76 \@alloc@attribute@count=\z@
77 \fi
78 \def\newattribute#1{%
79 \@alloc@attribute\attributedef
80 \@alloc@attribute@count\m@ne\@alloc@top#1%
81 }

```

(End definition for `\newattribute`.)

`\setattribute` Handy utilities.

```

82 \def\setattribute#1#2{\#1=\numexpr#2\relax}
83 \def\unsetattribute#1{\#1=-"7FFFFFFF\relax}

```

(End definition for `\setattribute` and `\unsetattribute`.)

### 5.4 Category code tables

`\newcatcodetable` Category code tables are allocated with a limit half of that used by LuaT<sub>E</sub>X for everything else. At the end of allocation there needs to be an initialisation step. Table 0 is already taken (it's the global one for current use) so the allocation starts at 1.

```

84 \ifx\@alloc@ccodetable@count\@undefined
85 \countdef\@alloc@ccodetable@count=259
86 \@alloc@ccodetable@count=\z@
87 \fi

```

```

88 \def\newcatcodetable#1{%
89 \e@alloc\catcodetable\chardef
90 \e@alloc@ccodetable@count\m@ne{"8000}#1%
91 \initcatcodetable\allocationnumber
92 }

(End definition for \newcatcodetable.)
```

\catcodetable@initex Save a small set of standard tables. The Unicode data is read here in using a parser simplified from that in `load-unicode-data`: only the nature of letters needs to be detected.

```

93 \newcatcodetable\catcodetable@initex
94 \newcatcodetable\catcodetable@string
95 \begingroup
96 \def\setstrangeccatcode#1#2#3{%
97 \ifnum#1>#2 %
98 \expandafter\@gobble
99 \else
100 \expandafter\@firstofone
101 \fi
102 {%
103 \catcode#1=#3 %
104 \expandafter\setstrangeccatcode\expandafter
105 {\number\numexpr#1 + 1\relax}{#2}{#3}
106 }%
107 }
108 \@firstofone{%
109 \catcodetable\catcodetable@initex
110 \catcode0=12 %
111 \catcode13=12 %
112 \catcode37=12 %
113 \setstrangeccatcode{65}{90}{12}%
114 \setstrangeccatcode{97}{122}{12}%
115 \catcode92=12 %
116 \catcode127=12 %
117 \savecatcodetable\catcodetable@string
118 \endgroup
119 }%
120 \newcatcodetable\catcodetable@latex
121 \newcatcodetable\catcodetable@atletter
122 \begingroup
123 \def\parseunicodedataI#1;#2;#3;#4\relax{%
124 \parseunicodedataII#1;#3;#2 First>\relax
125 }%
126 \def\parseunicodedataII#1;#2;#3 First>#4\relax{%
127 \ifx\relax#4\relax
128 \expandafter\parseunicodedataIII
129 \else
130 \expandafter\parseunicodedataIV
131 \fi
132 {#1}#2\relax%
133 }%
134 \def\parseunicodedataIII#1#2#3\relax{%
135 \ifnum 0%
136 \if L#21\fi

```

```

137 \if M#21\fi
138 >0 %
139 \catcode"#1=11 %
140 \fi
141 }%
142 \def\parseunicodedataIV#1#2#3\relax{%
143 \read\unicoderead to \unicodedataline
144 \if L#2%
145 \count0="#1 %
146 \expandafter\parseunicodedataV\unicodedataline\relax
147 \fi
148 }%
149 \def\parseunicodedataV#1;#2\relax{%
150 \loop
151 \unless\ifnum\count0>"#1 %
152 \catcode\count0=11 %
153 \advance\count0 by 1 %
154 \repeat
155 }%
156 \def\storedpar{\par}%
157 \chardef\unicoderead=\numexpr\count16 + 1\relax
158 \openin\unicoderead=UnicodeData.txt %
159 \loop\unless\ifeof\unicoderead %
160 \read\unicoderead to \unicodedataline
161 \unless\ifx\unicodedataline\storedpar
162 \expandafter\parseunicodedataI\unicodedataline\relax
163 \fi
164 \repeat
165 \closein\unicoderead
166 \@firstofone{%
167 \catcode64=12 %
168 \savecatcodetable\catcodetable@lateX
169 \catcode64=11 %
170 \savecatcodetable\catcodetable@atletter
171 }
172 \endgroup

```

(End definition for `\catcodetable@initex` and others.)

## 5.5 Named Lua functions

`\newluafunction` Much the same story for allocating LuaTeX functions except here they are just numbers so they are allocated in the same way as boxes. Lua indexes from 1 so once again slot 0 is skipped.

```

173 \ifx\@alloc@luafunction@count\@undefined
174 \countdef\@alloc@luafunction@count=260
175 \@alloc@luafunction@count=\z@
176 \fi
177 \def\newluafunction{%
178 \@alloc@luafunction\@alloc@chardef
179 \@alloc@luafunction@count\m@ne\@alloc@top
180 }

```

(End definition for `\newluafunction`.)

## 5.6 Custom whatsits

\newwhatsit These are only settable from Lua but for consistency are definable here.

```
181 \ifx\@alloc@whatsit@count\@undefined
182 \countdef\@alloc@whatsit@count=261
183 \@alloc@whatsit@count=\z@
184 \fi
185 \def\newwhatsit#1{%
186 \@alloc@whatsit\@alloc@chardef
187 \@alloc@whatsit@count\m@ne\@alloc@top#1%
188 }
```

(End definition for \newwhatsit.)

## 5.7 Lua bytecode registers

\newluabytecode These are only settable from Lua but for consistency are definable here.

```
189 \ifx\@alloc@bytecode@count\@undefined
190 \countdef\@alloc@bytecode@count=262
191 \@alloc@bytecode@count=\z@
192 \fi
193 \def\newluabytecode#1{%
194 \@alloc@luabytecode\@alloc@chardef
195 \@alloc@bytecode@count\m@ne\@alloc@top#1%
196 }
```

(End definition for \newluabytecode.)

## 5.8 Lua chunk registers

\newluachunkname As for bytecode registers, but in addition we need to add a string to the `lua.name` table to use in stack tracing. We use the name of the command passed to the allocator, with no backslash.

```
197 \ifx\@alloc@luachunk@count\@undefined
198 \countdef\@alloc@luachunk@count=263
199 \@alloc@luachunk@count=\z@
200 \fi
201 \def\newluachunkname#1{%
202 \@alloc@luachunk\@alloc@chardef
203 \@alloc@luachunk@count\m@ne\@alloc@top#1%
204 {\escapechar\m@ne
205 \directlua{\lua.name[\the\allocationnumber]="\string#1"}%}
206 }
```

(End definition for \newluachunkname.)

## 5.9 Lua loader

Lua code loaded in the format often has to be loaded again at the beginning of every job, so we define a helper which allows us to avoid duplicated code:

```
207 \def\now@and@everyjob#1{%
208 \everyjob\expandafter{\the\everyjob
209 #1%
```

```

210 }%
211 #1%
212 }

```

Load the Lua code at the start of every job. For the conversion of TeX into numbers at the Lua side we need some known registers: for convenience we use a set of systematic names, which means using a group around the Lua loader.

```

213 <2ekernel> \now@and@everyjob{%
214 \begingroup
215 \attributedef\attributezero=0 %
216 \chardef\charzero=0 %

```

Note name change required on older luatex, for hash table access.

```

217 \countdef\CountZero=0 %
218 \dimendef\dimenzero=0 %
219 \mathchardef\mathcharzero=0 %
220 \muskipdef\muskipzero=0 %
221 \skipdef\skipzero=0 %
222 \toksdef\tokszero=0 %
223 \directlua{require("ltluatex")}
224 \endgroup
225 <2ekernel>
226 <|latexrelease>\EndIncludeInRelease

227 <|latexrelease>\IncludeInRelease{0000/00/00}
228 <|latexrelease> {\newluafunction}{LuaTeX}%
229 <|latexrelease>\let\e@alloc@attribute@count\@undefined
230 <|latexrelease>\let\newattribute\@undefined
231 <|latexrelease>\let\setattribute\@undefined
232 <|latexrelease>\let\unsetattribute\@undefined
233 <|latexrelease>\let\e@alloc@ccodetable@count\@undefined
234 <|latexrelease>\let\newcatcodetable\@undefined
235 <|latexrelease>\let\catcodetable@initex\@undefined
236 <|latexrelease>\let\catcodetable@string\@undefined
237 <|latexrelease>\let\catcodetable@latex\@undefined
238 <|latexrelease>\let\catcodetable@atletter\@undefined
239 <|latexrelease>\let\e@alloc@luafunction@count\@undefined
240 <|latexrelease>\let\newluafunction\@undefined
241 <|latexrelease>\let\e@alloc@luafunction@count\@undefined
242 <|latexrelease>\let\newwhatsit\@undefined
243 <|latexrelease>\let\e@alloc@whatsit@count\@undefined
244 <|latexrelease>\let\newluabytecode\@undefined
245 <|latexrelease>\let\e@alloc@bytecode@count\@undefined
246 <|latexrelease>\let\newluachunkname\@undefined
247 <|latexrelease>\let\e@alloc@luachunk@count\@undefined
248 <|latexrelease>\directlua{luatexbase.uninstall()}%
249 <|latexrelease>\EndIncludeInRelease

```

In \everyjob, if luatofloat is available, load it and switch to TU.

```

250 <|latexrelease>\IncludeInRelease{2017/01/01}%
251 <|latexrelease> {\fontencoding}{TU in everyjob}%
252 <|latexrelease>\fontencoding{TU}\let\encodingdefault\f@encoding
253 <|latexrelease>\ifx\directlua\@undefined\else
254 <2ekernel>\everyjob\expandafter{%
255 <2ekernel> \the\everyjob

```

```

256 {*2ekernel,latexrelease}
257 \directlua{%
258 if xpcall(function ()%
259 require('luaotfload-main')%
260 end,texio.write_nl) then %
261 local _void = luaotfload.main ()%
262 else %
263 texio.write_nl('Error in luaotfload: reverting to OT1')%
264 tex.print('\string\\def\string\\encodingdefault{OT1}')%
265 end %
266 }%
267 \let\f@encoding\encodingdefault
268 \expandafter\let\csname ver@luaotfload.sty\endcsname\fmtversion
269 //2ekernel,latexrelease)
270 \end{if}
271 \end{2ekernel} }
272 \end{if}
273 \end{EndIncludeInRelease}
274 \end{IncludeInRelease{0000/00/00}}%
275 \end{fontencoding}{TU in everyjob}%
276 \end{fontencoding{OT1}\let\encodingdefault\f@encoding
277 \end{EndIncludeInRelease}
278 /2ekernel | tex | latexrelease)

```

## 5.10 Lua module preliminaries

```
279 (*lua)
```

Some set up for the Lua module which is needed for all of the Lua functionality added here.

**luatexbase** Set up the table for the returned functions. This is used to expose all of the public functions.

```

280 luatexbase = luatexbase or { }
281 local luatexbase = luatexbase

```

(*End definition for luatexbase.*)

Some Lua best practice: use local versions of functions where possible.

```

282 local string_gsub = string.gsub
283 local tex_count = tex.count
284 local tex_setattribute = tex.setattribute
285 local tex_setcount = tex.setcount
286 local texio_write_nl = texio.write_nl

287 local luatexbase_warning
288 local luatexbase_error

```

## 5.11 Lua module utilities

### 5.11.1 Module tracking

**modules** To allow tracking of module usage, a structure is provided to store information and to return it.

```
289 local modules = modules or { }
```

(End definition for modules.)

`provides_module` Local function to write to the log.

```
290 local function luatexbase_log(text)
291 texio_write_nl("log", text)
292 end
```

Modelled on `\ProvidesPackage`, we store much the same information but with a little more structure.

```
293 local function provides_module(info)
294 if not (info and info.name) then
295 luatexbase_error("Missing module name for provides_module")
296 end
297 local function spaced(text)
298 return text and (" " .. text) or ""
299 end
300 luatexbase_log(
301 "Lua module: " .. info.name
302 .. spaced(info.date)
303 .. spaced(info.version)
304 .. spaced(info.description)
305)
306 modules[info.name] = info
307 end
308 luatexbase.provides_module = provides_module
```

(End definition for `provides_module`.)

### 5.11.2 Module messages

There are various warnings and errors that need to be given. For warnings we can get exactly the same formatting as from `TEX`. For errors we have to make some changes. Here we give the text of the error in the `LATEX` format then force an error from Lua to halt the run. Splitting the message text is done using `\n` which takes the place of `\MessageBreak`.

First an auxiliary for the formatting: this measures up the message leader so we always get the correct indent.

```
309 local function msg_format(mod, msg_type, text)
310 local leader = ""
311 local cont
312 local first_head
313 if mod == "LaTeX" then
314 cont = string.gsub(leader, ".", " ")
315 first_head = leader .. "LaTeX: "
316 else
317 first_head = leader .. "Module " .. msg_type
318 cont = "(" .. mod .. ")"
319 .. string.gsub(first_head, ".", " ")
320 first_head = leader .. "Module " .. mod .. " " .. msg_type .. ":" ..
321 end
322 if msg_type == "Error" then
323 first_head = "\n" .. first_head
324 end
325 if string.sub(text,-1) ~= "\n" then
```

```

326 text = text .. " "
327 end
328 return first_head .. " "
329 .. string.gsub(
330 text
331 .. "on input line "
332 .. tex.inputlineno, "\n", "\n" .. cont .. " "
333)
334 .. "\n"
335 end

module_info Write messages.
module_warning
module_error 336 local function module_info(mod, text)
337 texio_write_nl("log", msg_format(mod, "Info", text))
338 end
339 luatexbase.module_info = module_info
340 local function module_warning(mod, text)
341 texio_write_nl("term and log", msg_format(mod, "Warning", text))
342 end
343 luatexbase.module_warning = module_warning
344 local function module_error(mod, text)
345 error(msg_format(mod, "Error", text))
346 end
347 luatexbase.module_error = module_error

```

*(End definition for module\_info, module\_warning, and module\_error.)*

Dedicated versions for the rest of the code here.

```

348 function luatexbase_warning(text)
349 module_warning("luatexbase", text)
350 end
351 function luatexbase_error(text)
352 module_error("luatexbase", text)
353 end

```

## 5.12 Accessing register numbers from Lua

Collect up the data from the T<sub>E</sub>X level into a Lua table: from version 0.80, LuaT<sub>E</sub>X makes that easy.

```

354 local luaregisterbasetable = { }
355 local registermap = {
356 attributezero = "assign_attr" ,
357 charzero = "char_given" ,
358 CountZero = "assign_int" ,
359 dimenzero = "assign_dimen" ,
360 mathcharzero = "math_given" ,
361 muskipzero = "assign_mu_skip" ,
362 skipzero = "assign_skip" ,
363 tokszero = "assign_toks" ,
364 }
365 local createtoken
366 if tex.luatexversion > 81 then
367 createtoken = token.create
368 elseif tex.luatexversion > 79 then

```

```

369 createtoken = newtoken.create
370 end
371 local hashtokens = tex.hashtokens()
372 local luatexversion = tex.luatexversion
373 for i,j in pairs (registermap) do
374 if luatexversion < 80 then
375 luaregisterbasetable[hashtokens[i][1]] =
376 hashtokens[i][2]
377 else
378 luaregisterbasetable[j] = createtoken(i).mode
379 end
380 end

```

`registernumber` Working out the correct return value can be done in two ways. For older LuaTEX releases it has to be extracted from the `hashtokens`. On the other hand, newer LuaTEX's have `newtoken`, and whilst `.mode` isn't currently documented, Hans Hagen pointed to this approach so we should be OK.

```

381 local registernumber
382 if luatexversion < 80 then
383 function registernumber(name)
384 local nt = hashtokens[name]
385 if(nt and luaregisterbasetable[nt[1]]) then
386 return nt[2] - luaregisterbasetable[nt[1]]
387 else
388 return false
389 end
390 end
391 else
392 function registernumber(name)
393 local nt = createtoken(name)
394 if(luaregisterbasetable[nt.cmdname]) then
395 return nt.mode - luaregisterbasetable[nt.cmdname]
396 else
397 return false
398 end
399 end
400 end
401 luatexbase.registernumber = registernumber

```

(End definition for `registernumber`.)

### 5.13 Attribute allocation

`new_attribute` As attributes are used for Lua manipulations its useful to be able to assign from this end.

```

402 local attributes=setmetatable(
403 {}, {
404 __index = function(t,key)
405 return registernumber(key) or nil
406 end}
407)
408 luatexbase.attributes = attributes

```

```

410 local attribute_count_name =
411 attribute_count_name or "e@alloc@attribute@count"
412 local function new_attribute(name)
413 tex_setcount("global", attribute_count_name,
414 tex_count[attribute_count_name] + 1)
415 if tex_count[attribute_count_name] > 65534 then
416 luatexbase_error("No room for a new \\attribute")
417 end
418 attributes[name]= tex_count[attribute_count_name]
419 luatexbase_log("Lua-only attribute " .. name .. " = " ..
420 tex_count[attribute_count_name])
421 return tex_count[attribute_count_name]
422 end
423 luatexbase.new_attribute = new_attribute

```

(End definition for `new_attribute`.)

## 5.14 Custom whatsit allocation

`new_whatsit` Much the same as for attribute allocation in Lua.

```

424 local whatsit_count_name = whatsit_count_name or "e@alloc@whatsit@count"
425 local function new_whatsit(name)
426 tex_setcount("global", whatsit_count_name,
427 tex_count[whatsit_count_name] + 1)
428 if tex_count[whatsit_count_name] > 65534 then
429 luatexbase_error("No room for a new custom whatsit")
430 end
431 luatexbase_log("Custom whatsit " .. (name or "") .. " = " ..
432 tex_count[whatsit_count_name])
433 return tex_count[whatsit_count_name]
434 end
435 luatexbase.new_whatsit = new_whatsit

```

(End definition for `new_whatsit`.)

## 5.15 Bytecode register allocation

`new bytecode` Much the same as for attribute allocation in Lua. The optional  $\langle name \rangle$  argument is used in the log if given.

```

436 local bytecode_count_name =
437 bytecode_count_name or "e@alloc@bytecode@count"
438 local function new_bytecode(name)
439 tex_setcount("global", bytecode_count_name,
440 tex_count[bytecode_count_name] + 1)
441 if tex_count[bytecode_count_name] > 65534 then
442 luatexbase_error("No room for a new bytecode register")
443 end
444 luatexbase_log("Lua bytecode " .. (name or "") .. " = " ..
445 tex_count[bytecode_count_name])
446 return tex_count[bytecode_count_name]
447 end
448 luatexbase.new_bytecode = new_bytecode

```

(End definition for `new bytecode`.)

## 5.16 Lua chunk name allocation

`new_chunkname` As for bytecode registers but also store the name in the `lua.name` table.

```
449 local chunkname_count_name =
450 chunkname_count_name or "e@alloc@luachunk@count"
451 local function new_chunkname(name)
452 tex_setcount("global", chunkname_count_name,
453 tex_count[chunkname_count_name] + 1)
454 local chunkname_count = tex_count[chunkname_count_name]
455 chunkname_count = chunkname_count + 1
456 if chunkname_count > 65534 then
457 luatexbase_error("No room for a new chunkname")
458 end
459 lua.name[chunkname_count]=name
460 luatexbase_log("Lua chunkname " .. (name or "") .. " = " ..
461 chunkname_count .. "\n")
462 return chunkname_count
463 end
464 luatexbase.new_chunkname = new_chunkname
```

(*End definition for new\_chunkname.*)

## 5.17 Lua function allocation

`new_luafunction` Much the same as for attribute allocation in Lua. The optional `<name>` argument is used in the log if given.

```
465 local luafunction_count_name =
466 luafunction_count_name or "e@alloc@luafunction@count"
467 local function new_luafunction(name)
468 tex_setcount("global", luafunction_count_name,
469 tex_count[luafunction_count_name] + 1)
470 if tex_count[luafunction_count_name] > 65534 then
471 luatexbase_error("No room for a new luafunction register")
472 end
473 luatexbase_log("Lua function " .. (name or "") .. " = " ..
474 tex_count[luafunction_count_name])
475 return tex_count[luafunction_count_name]
476 end
477 luatexbase.new_luafunction = new_luafunction
```

(*End definition for new\_luafunction.*)

## 5.18 Lua callback management

The native mechanism for callbacks in LuaTeX allows only one per function. That is extremely restrictive and so a mechanism is needed to add and remove callbacks from the appropriate hooks.

### 5.18.1 Housekeeping

The main table: keys are callback names, and values are the associated lists of functions. More precisely, the entries in the list are tables holding the actual function as `func` and

the identifying description as `description`. Only callbacks with a non-empty list of functions have an entry in this list.

```
478 local callbacklist = callbacklist or { }
```

Numerical codes for callback types, and name-to-value association (the table keys are strings, the values are numbers).

```
479 local list, data, exclusive, simple, reverselist = 1, 2, 3, 4, 5
480 local types = {
481 list = list,
482 data = data,
483 exclusive = exclusive,
484 simple = simple,
485 reverselist = reverselist,
486 }
```

Now, list all predefined callbacks with their current type, based on the LuaTeX manual version 1.01. A full list of the currently-available callbacks can be obtained using

```
\directlua{
 for i,_ in pairs(callback.list()) do
 texio.write_nl("- " .. i)
 end
}
\bye
```

in plain LuaTeX. (Some undocumented callbacks are omitted as they are to be removed.)

```
487 local callbacktypes = callbacktypes or { }
```

Section 8.2: file discovery callbacks.

```
488 find_read_file = exclusive,
489 find_write_file = exclusive,
490 find_font_file = data,
491 find_output_file = data,
492 find_format_file = data,
493 find_vf_file = data,
494 find_map_file = data,
495 find_enc_file = data,
496 find_pk_file = data,
497 find_data_file = data,
498 find_opentype_file = data,
499 find_truetype_file = data,
500 find_type1_file = data,
501 find_image_file = data,
502 open_read_file = exclusive,
503 read_font_file = exclusive,
504 read_vf_file = exclusive,
505 read_map_file = exclusive,
506 read_enc_file = exclusive,
507 read_pk_file = exclusive,
508 read_data_file = exclusive,
509 read_truetype_file = exclusive,
510 read_type1_file = exclusive,
511 read_opentype_file = exclusive,
```

Not currently used by luatex but included for completeness. may be used by a font handler.

```
512 find_cidmap_file = data,
513 read_cidmap_file = exclusive,
```

Section 8.3: data processing callbacks.

```
514 process_input_buffer = data,
515 process_output_buffer = data,
516 process_jobname = data,
```

Section 8.4: node list processing callbacks.

```
517 contribute_filter = simple,
518 buildpage_filter = simple,
519 build_page_insert = exclusive,
520 pre_linebreak_filter = list,
521 linebreak_filter = exclusive,
522 append_to_vlist_filter = exclusive,
523 post_linebreak_filter = reverselist,
524 hpack_filter = list,
525 vpack_filter = list,
526 hpack_quality = list,
527 vpack_quality = list,
528 pre_output_filter = list,
529 process_rule = exclusive,
530 hyphenate = simple,
531 ligaturing = simple,
532 kerning = simple,
533 insert_local_par = simple,
534 pre_mlist_to_hlist_filter = list,
535 mlist_to_hlist = exclusive,
536 post_mlist_to_hlist_filter = reverselist,
537 new_graf = exclusive,
```

Section 8.5: information reporting callbacks.

```
538 pre_dump = simple,
539 start_run = simple,
540 stop_run = simple,
541 start_page_number = simple,
542 stop_page_number = simple,
543 show_error_hook = simple,
544 show_warning_message = simple,
545 show_error_message = simple,
546 show_lua_error_hook = simple,
547 start_file = simple,
548 stop_file = simple,
549 call_edit = simple,
550 finish_synctex = simple,
551 wrapup_run = simple,
```

Section 8.6: PDF-related callbacks.

```
552 finish_pdffile = data,
553 finish_pdfpage = data,
554 page_objnum_provider = data,
555 page_order_index = data,
556 process_pdf_image_content = data,
```

## Section 8.7: font-related callbacks.

```
557 define_font = exclusive,
558 glyph_info = exclusive,
559 glyph_not_found = exclusive,
560 glyph_stream_provider = exclusive,
561 make_extensible = exclusive,
562 font_descriptor_objnum_provider = exclusive,

563 }
564 luatexbase.callbacktypes=callbacktypes
```

**callback.register** Save the original function for registering callbacks and prevent the original being used. The original is saved in a place that remains available so other more sophisticated code can override the approach taken by the kernel if desired.

```
565 local callback_register = callback_register or callback.register
566 function callback.register()
567 luatexbase_error("Attempt to use callback.register() directly\n")
568 end
```

(End definition for `callback.register`.)

### 5.18.2 Handlers

The handler function is registered into the callback when the first function is added to this callback's list. Then, when the callback is called, the handler takes care of running all functions in the list. When the last function is removed from the callback's list, the handler is unregistered.

More precisely, the functions below are used to generate a specialized function (closure) for a given callback, which is the actual handler.

The way the functions are combined together depends on the type of the callback. There are currently 4 types of callback, depending on the calling convention of the functions the callback can hold:

**simple** is for functions that don't return anything: they are called in order, all with the same argument;

**data** is for functions receiving a piece of data of any type except node list head (and possibly other arguments) and returning it (possibly modified): the functions are called in order, and each is passed the return value of the previous (and the other arguments untouched, if any). The return value is that of the last function;

**list** is a specialized variant of *data* for functions filtering node lists. Such functions may return either the head of a modified node list, or the boolean values **true** or **false**. The functions are chained the same way as for *data* except that for the following. If one function returns **false**, then **false** is immediately returned and the following functions are *not* called. If one function returns **true**, then the same head is passed to the next function. If all functions return **true**, then **true** is returned, otherwise the return value of the last function not returning **true** is used.

**reverselist** is a specialized variant of *list* which executes functions in inverse order.

**exclusive** is for functions with more complex signatures; functions in this type of callback are *not* combined: An error is raised if a second callback is registered..

Handler for data callbacks.

```
569 local function data_handler(name)
570 return function(data, ...)
571 for _,i in ipairs(callbacklist[name]) do
572 data = i.func(data,...)
573 end
574 return data
575 end
576 end
```

Default for user-defined data callbacks without explicit default.

```
577 local function data_handler_default(value)
578 return value
579 end
```

Handler for exclusive callbacks. We can assume `callbacklist[name]` is not empty: otherwise, the function wouldn't be registered in the callback any more.

```
580 local function exclusive_handler(name)
581 return function(...)
582 return callbacklist[name][1].func(...)
583 end
584 end
```

Handler for list callbacks.

```
585 local function list_handler(name)
586 return function(head, ...)
587 local ret
588 local alltrue = true
589 for _,i in ipairs(callbacklist[name]) do
590 ret = i.func(head, ...)
591 if ret == false then
592 luatexbase_warning(
593 "Function '" .. i.description .. "' returned false\n"
594 .. "in callback '" .. name .. "'"
595)
596 return false
597 end
598 if ret ~= true then
599 alltrue = false
600 head = ret
601 end
602 end
603 return alltrue and true or head
604 end
605 end
```

Default for user-defined list and reverselist callbacks without explicit default.

```
606 local function list_handler_default()
607 return true
608 end
```

Handler for reverselist callbacks.

```
609 local function reverselist_handler(name)
610 return function(head, ...)
611 local ret
612 local alltrue = true
```

```

613 local callbacks = callbacklist[name]
614 for i = #callbacks, 1, -1 do
615 local cb = callbacks[i]
616 ret = cb.func(head, ...)
617 if ret == false then
618 luatexbase_warning(
619 "Function '" .. cb.description .. "' returned false\n"
620 .. "in callback '" .. name .. "'")
621)
622 return false
623 end
624 if ret ~= true then
625 alltrue = false
626 head = ret
627 end
628 end
629 return alltrue and true or head
630 end
631 end

```

Handler for `simple` callbacks.

```

632 local function simple_handler(name)
633 return function(...)
634 for _,i in ipairs(callbacklist[name]) do
635 i.func(...)
636 end
637 end
638 end

```

Default for user-defined `simple` callbacks without explicit default.

```

639 local function simple_handler_default()
640 end

```

Keep a handlers table for indexed access and a table with the corresponding default functions.

```

641 local handlers = {
642 [data] = data_handler,
643 [exclusive] = exclusive_handler,
644 [list] = list_handler,
645 [reverselist] = reverselist_handler,
646 [simple] = simple_handler,
647 }
648 local defaults = {
649 [data] = data_handler_default,
650 [exclusive] = nil,
651 [list] = list_handler_default,
652 [reverselist] = list_handler_default,
653 [simple] = simple_handler_default,
654 }

```

### 5.18.3 Public functions for callback management

Defining user callbacks perhaps should be in package code, but impacts on `add_to_callback`. If a default function is not required, it may be declared as `false`. First we need a list of user callbacks.

```

655 local user_callbacks_defaults = {
656 pre_mlist_to_hlist_filter = list_handler_default,
657 mlist_to_hlist = node.mlist_to_hlist,
658 post_mlist_to_hlist_filter = list_handler_default,
659 }

```

`create_callback` The allocator itself.

```

660 local function create_callback(name, ctype, default)
661 local ctype_id = types[ctype]
662 if not name or name == ""
663 or not ctype_id
664 then
665 luatexbase_error("Unable to create callback:\n" ..
666 "valid callback name and type required")
667 end
668 if callbacktypes[name] then
669 luatexbase_error("Unable to create callback '" .. name ..
670 "' :\ncallback is already defined")
671 end
672 default = default or defaults[ctype_id]
673 if not default then
674 luatexbase_error("Unable to create callback '" .. name ..
675 "' :\ndefault is required for '" .. ctype ..
676 "' callbacks")
677 elseif type (default) ~= "function" then
678 luatexbase_error("Unable to create callback '" .. name ..
679 "' :\ndefault is not a function")
680 end
681 user_callbacks_defaults[name] = default
682 callbacktypes[name] = ctype_id
683 end
684 luatexbase.create_callback = create_callback

```

(*End definition for `create_callback`.*)

`call_callback` Call a user defined callback. First check arguments.

```

685 local function call_callback(name,...)
686 if not name or name == "" then
687 luatexbase_error("Unable to create callback:\n" ..
688 "valid callback name required")
689 end
690 if user_callbacks_defaults[name] == nil then
691 luatexbase_error("Unable to call callback '" .. name ..
692 "' :\nunknown or empty")
693 end
694 local l = callbacklist[name]
695 local f
696 if not l then
697 f = user_callbacks_defaults[name]
698 else
699 f = handlers[callbacktypes[name]](name)
700 end
701 return f...
702 end
703 luatexbase.call_callback=call_callback

```

(End definition for `call_callback`.)

`add_to_callback` Add a function to a callback. First check arguments.

```
704 local function add_to_callback(name, func, description)
705 if not name or name == "" then
706 luatexbase_error("Unable to register callback:\n" ..
707 "valid callback name required")
708 end
709 if not callbacktypes[name] or
710 type(func) ~= "function" or
711 not description or
712 description == "" then
713 luatexbase_error(
714 "Unable to register callback.\n\n"
715 .. "Correct usage:\n"
716 .. "add_to_callback(<callback>, <function>, <description>)"
717)
718 end
```

Then test if this callback is already in use. If not, initialise its list and register the proper handler.

```
719 local l = callbacklist[name]
720 if l == nil then
721 l = { }
722 callbacklist[name] = l
```

If it is not a user defined callback use the primitive callback register.

```
723 if user_callbacks_defaults[name] == nil then
724 callback_register(name, handlers[callbacktypes[name]](name))
725 end
726 end
```

Actually register the function and give an error if more than one exclusive one is registered.

```
727 local f = {
728 func = func,
729 description = description,
730 }
731 local priority = #l + 1
732 if callbacktypes[name] == exclusive then
733 if #l == 1 then
734 luatexbase_error(
735 "Cannot add second callback to exclusive function\n" ..
736 name .. "'")
737 end
738 end
739 table.insert(l, priority, f)
```

Keep user informed.

```
740 luatexbase_log(
741 "Inserting '" .. description .. "' at position "
742 .. priority .. " in '" .. name .. "'."
743)
744 end
745 luatexbase.add_to_callback = add_to_callback
```

*(End definition for add\_to\_callback.)*

`remove_from_callback` Remove a function from a callback. First check arguments.

```
746 local function remove_from_callback(name, description)
747 if not name or name == "" then
748 luatexbase_error("Unable to remove function from callback:\n" ..
749 "valid callback name required")
750 end
751 if not callbacktypes[name] or
752 not description or
753 description == "" then
754 luatexbase_error(
755 "Unable to remove function from callback.\n\n"
756 .. "Correct usage:\n"
757 .. "remove_from_callback(<callback>, <description>)"
758)
759 end
760 local l = callbacklist[name]
761 if not l then
762 luatexbase_error(
763 "No callback list for '" .. name .. "'\n")
764 end
```

Loop over the callback's function list until we find a matching entry. Remove it and check if the list is empty: if so, unregister the callback handler.

```
765 local index = false
766 for i,j in ipairs(l) do
767 if j.description == description then
768 index = i
769 break
770 end
771 end
772 if not index then
773 luatexbase_error(
774 "No callback '" .. description .. "' registered for '" ..
775 name .. "'\n")
776 end
777 local cb = l[index]
778 table.remove(l, index)
779 luatexbase_log(
780 "Removing '" .. description .. "' from '" .. name .. "'."
781)
782 if #l == 0 then
783 callbacklist[name] = nil
784 if user_callbacks_defaults[name] == nil then
785 callback_register(name, nil)
786 end
787 end
788 return cb.func,cb.description
789 end
790 luatexbase.remove_from_callback = remove_from_callback
```

*(End definition for remove\_from\_callback.)*

`in_callback` Look for a function description in a callback.

```
791 local function in_callback(name, description)
792 if not name
793 or name == ""
794 or not callbacklist[name]
795 or not callbacktypes[name]
796 or not description then
797 return false
798 end
799 for _, i in pairs(callbacklist[name]) do
800 if i.description == description then
801 return true
802 end
803 end
804 return false
805 end
806 luatexbase.in_callback = in_callback
```

(End definition for `in_callback`.)

`disable_callback` As we subvert the engine interface we need to provide a way to access this functionality.

```
807 local function disable_callback(name)
808 if(callbacklist[name] == nil) then
809 callback_register(name, false)
810 else
811 luatexbase_error("Callback list for " .. name .. " not empty")
812 end
813 end
814 luatexbase.disable_callback = disable_callback
```

(End definition for `disable_callback`.)

`callback_descriptions` List the descriptions of functions registered for the given callback.

```
815 local function callback_descriptions (name)
816 local d = {}
817 if not name
818 or name == ""
819 or not callbacklist[name]
820 or not callbacktypes[name]
821 then
822 return d
823 else
824 for k, i in pairs(callbacklist[name]) do
825 d[k]= i.description
826 end
827 end
828 return d
829 end
830 luatexbase.callback_descriptions =callback_descriptions
```

(End definition for `callback_descriptions`.)

`uninstall` Unlike at the TeX level, we have to provide a back-out mechanism here at the same time as the rest of the code. This is not meant for use by anything other than `latexrelease`: as such this is *deliberately* not documented for users!

```

831 local function uninstall()
832 module_info(
833 "luatexbase",
834 "Uninstalling kernel luatexbase code"
835)
836 callback.register = callback_register
837 luatexbase = nil
838 end
839 luatexbase.uninstall = uninstall

```

(End definition for `uninstall`.)

`mlist_to_hlist` To emulate these callbacks, the “real” `mlist_to_hlist` is replaced by a wrapper calling the wrappers before and after.

```

840 callback_register("mlist_to_hlist", function(head, display_type, need_penalties)
841 local current = call_callback("pre_mlist_to_hlist_filter", head, display_type, need_penalties)
842 if current == false then
843 flush_list(head)
844 return nil
845 elseif current == true then
846 current = head
847 end
848 current = call_callback("mlist_to_hlist", current, display_type, need_penalties)
849 local post = call_callback("post_mlist_to_hlist_filter", current, display_type, need_penalties)
850 if post == true then
851 return current
852 elseif post == false then
853 flush_list(current)
854 return nil
855 end
856 return post
857 end)

```

(End definition for `mlist_to_hlist`.)

858 ⟨/lua⟩

Reset the catcode of @.

859 ⟨tex⟩\catcode`@=\etacatcode\relax

# File e

## ltxexpl.dtx

### 1 expl3-dependent code

#### 1.1 Loader

\@kernel@after@enddocument  
\@kernel@after@enddocument@afterlastpage

These two kernel hooks are used by the shipout code. They are defined earlier here because the lthooks code adds material to them.

```
1 {*2ekernel | latexrelease}
2 <{latexrelease}> \IncludeInRelease{2020/10/01}%
3 <{latexrelease}> {kernel@enddocument hooks}{Define kernel enddocument Hooks}%
4 \let\@kernel@after@enddocument\@empty
5 \let\@kernel@after@enddocument@afterlastpage\@empty
6 <{latexrelease}> \EndIncludeInRelease

7 <{latexrelease}> \IncludeInRelease{0000/00/00}%
8 <{latexrelease}> {kernel@enddocument hooks}{Define kernel enddocument Hooks}%
9 <{latexrelease}> \let\@kernel@after@enddocument\@undefined
10 <{latexrelease}> \let\@kernel@after@enddocument@afterlastpage\@undefined
11 <{latexrelease}> \EndIncludeInRelease
12{/2ekernel | latexrelease}
```

(End definition for \@kernel@after@enddocument and \@kernel@after@enddocument@afterlastpage.)

First define some blank commands, so that in case something goes wrong while loading expl3, we won't get strange **Undefined control sequence** errors.

```
13 {*2ekernel | latexrelease}
14 <{latexrelease}> \IncludeInRelease{2020/10/01}%
15 <{latexrelease}> {\@expl@sys@load@backend@@}{Roll forward support}%
16 \def\@expl@sys@load@backend@@{}
17 \def\@expl@push@filename@@{}
18 \def\@expl@push@filename@aux@@{}
19 \def\@expl@pop@filename@@{}
20 <{latexrelease}> \EndIncludeInRelease
21{/2ekernel | latexrelease}
```

Create a hook for last-minute expl3 material.

```
22 {*2ekernel}
23 \def\@expl@finalise@setup@@{}
24{/2ekernel}
```

Now define some basics to support loading expl3. These macros can be defined here safely, because they are redefined later on by the kernel, so we define simpler versions just to suit our needs.

```
25 {*2ekernel}
26 \long\def\@gobble#1{}
27 \long\def\@firstofone#1{#1}
28 \long\def\@firstoftwo#1#2{#1}
29 \long\def\@secondoftwo#1#2{#2}
30 \long\def\IfFileExists#1{%
31 \openin\@inputcheck"#1" %
32 \ifeof\@inputcheck
33 \expandafter\@secondoftwo
```

```

34 \else
35 \closein\@inputcheck
36 \expandafter\@firstoftwo
37 \fi}
38 \long\def\@ifnextchar#1#2#3{%
39 \let\reserved@d=#1%
40 \def\reserved@a{#2}%
41 \def\reserved@b{#3}%
42 \futurelet\@let@token\@ifnch}
43 \def\@ifnch{%
44 \ifx\@let@token\reserved@a
45 \expandafter\reserved@a
46 \else
47 \expandafter\reserved@b
48 \fi}
49 </2ekernel>

```

If we are doing a rollback with a format containing expl3 we aren't reloading it as that creates havoc. This may need a refined version!

```

50 <*2ekernel | latexrelease>
51 <latexrelease>\IncludeInRelease{2020/10/01}%
52 <latexrelease> {expl3}{Pre-load expl3}%
53 \expandafter\ifx\csname tex\string _let:D\endcsname\relax
54 \expandafter\@firstofone
55 \else
56 \GenericInfo{}{Skipping: expl3 code already part of the format}%
57 <2ekernel> \expandafter\endinput
58 <latexrelease> \expandafter\@gobble
59 \fi

```

Check for the required primitive/engine support and the existence of a loader.

```

60 {%
61 \IfFileExists{expl3.ltx}%
62 {%
63 \ifnum0%
64 \ifdefinable\pdfffilesize 1\fi
65 \ifdefinable\filesize 1\fi
66 \ifdefinable\luatexversion\ifnum\luatexversion>94 1\fi\fi
67 \ifdefinable\kanjискip 1\fi
68 >0 %
69 \expandafter\@firstofone
70 }%

```

In `2ekernel` mode, an error is fatal and building the format is aborted. Use `\batchmode \read -1 to \tokenlist`, which errors with ! Emergency stop. (cannot `\read` from `\tokenlist`) and aborts the TeX run. In `latexrelease` mode, raise an error and do nothing. Both ways, the error message shows the minimum expl3 engine requirements.

```

71 <2ekernel> \def~{ }\def\MessageBreak{~~J~~~~~}%
72 <2ekernel> \errmessage{LaTeX Error:%
73 <latexrelease> @latex@error{%
74 LaTeX requires the e-TeX primitives and additional\MessageBreak
75 functionality available in the engines:\MessageBreak
76 - pdfTeX v1.40\MessageBreak
77 - XeTeX v0.99992\MessageBreak
78 - LuaTeX v0.95\MessageBreak

```

```

79 - e-(u)pTeX mid-2012\MessageBreak
80 or later%
81 <|latexrelease> }|\@ehd \expandafter\@gobble
82 <|2ekernel> }\batchmode \read -1 to \reserved@a
83 \fi
84 }
85 {%
86 <|*2ekernel>
87 \errmessage{LaTeX requires expl3}%
88 \batchmode \read -1 to \reserved@a
89 <|/2ekernel>

```

We do not support a roll forward across 2019. You need to start with 2019 if you want to get to 2020 or beyond.

```

90 <|*latxrelease>
91 \@latx@warning@no@line
92 {You need a format that already contains a recent\MessageBreak
93 expl3 as part of the kernel, e.g. at least a kernel\MessageBreak
94 from 2019 to roll forward to that date!\MessageBreak
95 --- I'm giving up!\MessageBreak\MessageBreak
96 Note that manually loading the expl3 package\MessageBreak
97 from your distribution is not enough}%
98 \@@end % die
99 <|/latxrelease>
100 }%
101 {%
102 \input expl3.ltx
103 \ifdefin@\NewDocumentCommand
104 \else
105 \IfFileExists{xparse.ltx}{%
106 \input xparse.ltx }%
107 {}%
108 \fi
109 }%
110 }%
111 <|latxrelease>\EndIncludeInRelease
112 <|latxrelease>
113 <|latxrelease>\IncludeInRelease{2020/02/02}%
114 <|latxrelease> {expl3}{Pre-load expl3}%
115 <|latxrelease>\IfFileExists{expl3.ltx}{}
116 <|latxrelease> {%
117 <|latxrelease> \ifnum0%
118 <|latxrelease> \ifdefin@\pdffilesize 1\fi
119 <|latxrelease> \ifdefin@\filesize 1\fi
120 <|latxrelease> \ifdefin@\luatexversion\ifnum\luatexversion>94 1\fi\fi
121 <|latxrelease> >0 %
122 <|latxrelease> \else
123 <|latxrelease> \message{Skipping expl3-dependent extensions}%
124 <|latxrelease> \expandafter\@gobbletwo
125 <|latxrelease> \fi
126 <|latxrelease> }%
127 <|latxrelease> {%
128 <|latxrelease> \message{Skipping expl3-dependent extensions}%
129 <|latxrelease> \@gobbletwo

```

```

130 \end{macro}
131 \end{macro}\input{expl3.ltx}
132 \end{macro}\EndIncludeInRelease

```

Starting with 2020-10 the kernel contains most of the `xparse` interfaces loaded above. These interfaces are later used to define various user command. However, if somebody with an earlier installation tries to roll forward (using a `latexrelease` package from a newer release) this will not work as the earlier kernel doesn't contain commands such as `\NewDocumentCommand`.

We therefore add code into `latexrelease.sty` to load the `xparse` package of the current installation instead. this may not work if the installation is really old, but roll forward can't do miracles.

If the kernel is 2020-10 or later `\NewDocumentCommand` is already known (whether or not you roll forward or back) so nothing happens, but if you start from an earlier kernel the `xparse` package gets loaded by `latexrelease`.

```

133 \IncludeInRelease{2020/10/01}%
134 \NewDocumentCommand{Emergency loading xparse}%
135 \IfDefined{\NewDocumentCommand}{\else
136 \RequirePackage{xparse}}
137 \fi
138 \EndIncludeInRelease

```

## 1.2 Using `expl3` code

In order to ease the implementation of some new features in L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  we may (temporarily) use some coding based on the `expl3`-code. Such macros will eventually vanish and may be changed unannounced. They are there for internal use in the L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  kernel and are not meant to be used in third-party packages. These macros will always have the `@expl@` prefix in their name.

The rest of the name matches the `expl3` name but with all underscores replaced by @s and the : replaced by @@, e.g.,

```
\cs_new_eq:NN \Expl@tl@trim@spaces@apply@@nN \tl_trim_spaces_apply:nN
```

if that `expl3` command is needed in places that are others coded in L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  conventions.

In this file, each release of LaTeX adds an `\IncludeInRelease` block, in which the macros copied for that release were defined. In case a rollback is requested, the entire block is changed.

Each macro copied has a `\changes` entry to explain when and why it was copied, so that further to that may spot it easily.

Here `\cs_gset_eq:NN` is used, instead of the `new` variant because if different releases use that same name for different purposes, each can copy the macro without worrying about redefinitions.

```

141 \IncludeInRelease{2020/10/01}{\Expl@cs@to@str@@N}%
142 \Expl3 macros added for the 2020-10-01 release}%

```

The `expl3` activation needs to be inside the release guards as otherwise rolling forward is broken in old kernels that do not have `expl3` loaded.

```
143 \ExplSyntaxOn
```

```

144 \cs_gset_eq:NN \Expl@cs@to@str@@N \cs_to_str:N
145 \cs_gset_eq:NN \Expl@str@if@eq@@nnTF \str_if_eq:nnTF

146 \cs_gset_eq:NN \Expl@cs@prefix@spec@@N \cs_prefix_spec:N
147 \cs_gset_eq:NN \Expl@cs@argument@spec@@N \cs_argument_spec:N
148 \cs_gset_eq:NN \Expl@cs@replacement@spec@@N \cs_replacement_spec:N

149 \cs_gset_eq:NN \Expl@str@map@function@@NN \str_map_function:NN
150 \cs_gset_eq:NN \Expl@char@generate@@nn \char_generate:nn

151 \ExplSyntaxOff

```

Here we can't assume that `expl3` is available. It will be if we roll back but if this code is executed rolling forward it needs to be pure 2e.

```

152 ⟨latexrelease⟩\EndIncludeInRelease
153 ⟨latexrelease⟩\IncludeInRelease{0000/00/00}{\Expl@cs@to@str@@N}%
154 ⟨latexrelease⟩ {expl3 macros added for the 2020-10-01 release}%
155 ⟨latexrelease⟩\let \Expl@cs@to@str@@N \undefined
156 ⟨latexrelease⟩\let \Expl@str@if@eq@@nnTF \undefined
157 ⟨latexrelease⟩\let \Expl@cs@prefix@spec@@N \undefined
158 ⟨latexrelease⟩\let \Expl@cs@argument@spec@@N \undefined
159 ⟨latexrelease⟩\let \Expl@cs@replacement@spec@@N \undefined
160 ⟨latexrelease⟩\let \Expl@str@map@function@@NN \undefined
161 ⟨latexrelease⟩\EndIncludeInRelease
162 ⟨/2ekernel | latexrelease⟩

```

# File f

## ltdfns.dtx

### 1 Definitions

This section contains commands used in defining other macros.

1 `(*2ekernel)`

#### 1.1 Initex initialisations

`\two@digits` Prefix a number less than 10 with ‘0’.

2 `\def\two@digits#1{\ifnum#1<10 0\fi\number#1}`

(*End definition for \two@digits.*)

`\typeout` Display something on the terminal.

3 `</2ekernel>`  
4 `(*2ekernel | latexrelease)`  
5 `\textrm{\\IncludeInRelease\{2020/10/01\}}`  
6 `\textrm{\\IncludeInRelease\{Allow "par" in \\typeout\}}`  
7 `\textrm{\\protected\\long\\def\\typeout#1{\begingroup}`  
8 `\textrm{\\set@display@protect}`  
9 `\textrm{\\def\\par{\\^J\\^J}}`  
10 `\textrm{\\immediate\\write\\@unused{#1}\\endgroup}`  
11 `\textrm{\\/2ekernel | latexrelease}`  
12 `\textrm{\\EndIncludeInRelease}`  
13 `\textrm{\\IncludeInRelease\{0000/00/00\}}`  
14 `\textrm{\\IncludeInRelease\{Allow "par" in \\typeout\}}`  
15 `\textrm{\\EndIncludeInRelease}`  
16 `\textrm{\\def\\typeout#1{\begingroup\\set@display@protect}`  
17 `\textrm{\\immediate\\write\\@unused{#1}\\endgroup}`  
18 `\textrm{\\EndIncludeInRelease}`  
19 `</2ekernel>`

(*End definition for \typeout.*)

`\newlinechar` A char to be used as new-line in output to files.

20 `\newlinechar`\\^J`

(*End definition for \newlinechar.*)

#### 1.2 Saved versions of TeX primitives

The TeX primitive `\foo` is saved as `\@@foo`. The following primitives are handled in this way:

`\@@par`

21 `\let\@@par=\par`  
22 `%\let\@@input=\input %%% moved earlier`  
23 `%\let\@@end=\end %%%`

(*End definition for \@@par.*)

\@@hyph Save original primitive definition.  
<sup>24</sup> \let\@@hyph=\-

(End definition for \@@hyph.)

\@@italiccorr Save the original italic correction.  
<sup>25</sup> \let\@@italiccorr=\/

(End definition for \@@italiccorr.)

\@height \@depth \@width \@minus \@plus The following definitions save token space. E.g., using \@height instead of height saves 5 tokens at the cost in time of one macro expansion.  
<sup>26</sup> \def\@height{height} \def\@depth{depth} \def\@width{width}  
<sup>27</sup> \def\@minus{minus}  
<sup>28</sup> \def\@plus{plus}

The next one is another 100 tokens worth.  
<sup>29</sup> \def\hb@xt@{\hbox to}

(End definition for \@height and others.)  
<sup>30</sup> \message{hacks,}  
\hb@xt@

### 1.3 Command definitions

This section defines the following commands:

\@namedef {*NAME*} Expands to \def\{*NAME*\}, except name can contain any characters.  
\@nameuse {*NAME*} Expands to \{*NAME*\}.  
\@ifnextchar X{*YES*}{*NO*} Expands to *YES* if next character is an 'X', and to *NO* otherwise. (Uses \reserved@a-\reserved@c.) NOTE: GOBBLES ANY SPACE FOLLOWING IT.  
\@ifstar {*YES*}{*NO*} Gobbles following spaces and then tests if next the character is a '\*'. If it is, then it gobbles the '\*' and expands to *YES*, otherwise it expands to *NO*.  
\@dblarg {*CMD*}{*ARG*} Expands to \{*CMD*\}[*ARG*]\{*ARG*\}. Use \@dblarg\CS when \CS takes arguments [ARG1]{ARG2}, where default is ARG1 = ARG2.  
\@ifundefined {*NAME*}{*YES*}{*NO*} : If \NAME is undefined then it executes *YES*, otherwise it executes *NO*. More precisely, true if \NAME either undefined or = \relax.  
\@ifdefinable \NAME{*YES*} Executes *YES* if the user is allowed to define \NAME, otherwise it gives an error. The user can define \NAME if \@ifundefined{\NAME} is true, '\NAME' ≠ 'relax' and the first three letters of '\NAME' are not 'end', and if \endNAME is not defined.  
\newcommand \*{*\FOO*}{*i*}{*TEXT*} User command to define \FOO to be a macro with *i* arguments (*i* = 0 if missing) having the definition *TEXT*. Produces an error if \FOO already defined.  
\renewcommand \*{*\FOO*}{*i*}{*TEXT*} Normally the command is defined to be \long (ie it may take multiple paragraphs in its argument). In the star-form, the command is not defined as \long and a blank line in any argument to the command would generate an error.

```

\newenvironment Same as \newcommand, except it checks if \FOO already defined.
 *{\langle FOO\rangle[\langle i\rangle]{\langle DEF1\rangle}{\langle DEF2\rangle}}
equivalent to:
\newcommand{\FOO}[i]{\def{\endFOO}{DEF2}}
(or the appropriate star forms).

\renewenvironment Obvious companion to \newenvironment.
 \@cons : See description of \output routine.
 \@car \@car T1 T2 ... Tn\@nil == T1 (unexpanded)
 \@cdr \@cdr T1 T2 ... Tn\@nil == T2 ... Tn (unexpanded)
 \typeout {\langle message\rangle}
Produces a warning message on the terminal.

\typein {\langle message\rangle}
Types message, asks the user to type in a command, then executes it
\typein [(\CS)]{\langle MSG\rangle}
Same as above, except defines \CS to be the input instead of executing it.

\typein
31 \def\typein{%
32 \let\@typein\relax
33 \@testopt\@xtypein\@typein}

34 \ifx\directlua\undefined
35 \def\@xtypein[#1]#2{%
36 \typeout{#2}%
37 \advance\endlinechar\@M
38 \read\@inputcheck to#1%
39 \advance\endlinechar-\@M
40 \@typein}%

41 \else
42 \def\@xtypein[#1]#2{%
43 \typeout{#2}%
44 \begingroup \endlinechar\m@ne
45 \read\@inputcheck to#1%
46 \expandafter\endgroup
47 \expandafter\def\expandafter#1\expandafter{#1}%
48 \@typein}%
49 \fi

(End definition for \typein.)

\@namedef
50 \def\@namedef#1{\expandafter\def\csname #1\endcsname}

(End definition for \@namedef.)

\@nameuse
51 \def\@nameuse#1{\csname #1\endcsname}

(End definition for \@nameuse.)

```

```

\@cons
52 \def\@cons#1#2{\begingroup\let\@elt\relax\xdef#1{#1\@elt #2}\endgroup}
(End definition for \@cons.)

\@car
\@cdr 53 \def\@car#1#2\@nil{#1}
54 \def\@cdr#1#2\@nil{#2}

(End definition for \@car and \@cdr.)

\@carcube \@carcube T1 ... Tn\@nil = T1 T2 T3 , n > 3
55 ⟨/2ekernel⟩
56 ⟨latexrelease⟩\IncludeInRelease{2020/10/01}{\@carcube}{Make \@carcube long}%
57 ⟨*2ekernel | latexrelease⟩
58 \long\def\@carcube#1#2#3#4\@nil{#1#2#3}
59 ⟨/2ekernel | latexrelease⟩
60 ⟨latexrelease⟩\EndIncludeInRelease
61 %
62 ⟨latexrelease⟩\IncludeInRelease{0000/00/00}{\@carcube}{Undo: Make \@carcube long}%
63 ⟨latexrelease⟩\def\@carcube#1#2#3#4\@nil{#1#2#3}
64 ⟨latexrelease⟩\EndIncludeInRelease
65 ⟨*2ekernel⟩

(End definition for \@carcube.)

\@onlypreamble \@preamblecmds This macro adds its argument to the list of commands stored in \@preamblecmds to be disabled after \begin{document}. These commands are redefined to generate \@notprerr at this point.
66 \def\@preamblecmds{}
67 \def\@onlypreamble#1{%
68 \expandafter\gdef\expandafter\@preamblecmds\expandafter{%
69 \@preamblecmds\do#1}}
70 \@onlypreamble\@onlypreamble
71 \@onlypreamble\@preamblecmds

(End definition for \@onlypreamble and \@preamblecmds.)

\@star@or@long Look ahead for a *. If present reset \l@ngrel@x so that the next definition, #1, will be non-long.
72 \def\@star@or@long#1{%
73 \@ifstar
74 {\let\l@ngrel@x\relax#1}%
75 {\let\l@ngrel@x\long#1}}

(End definition for \@star@or@long.)

\l@ngrel@x This is either \relax or \long depending on whether the *-form of a definition command is being executed.
76 \let\l@ngrel@x\relax

(End definition for \l@ngrel@x.)

\newcommand User level \newcommand.
77 \def\newcommand{\@star@or@long\new@command}

```

```

\new@command 78 \def\new@command#1{%
79 @testopt{\@newcommand#1}0}

(End definition for \newcommand and \new@command.)

```

\@newcommand Handling arguments for \newcommand.  
 \@argdef 80 \def\@newcommand#1[#2]{%
 \@xargdef 81 \kernel@ifnextchar [{}{\@argdef#1[#2]}{%
 82 {\@argdef#1[#2]}}}

Define #1 if it is definable.

Both here and in \@xargdef the replacement text is absorbed as an argument because if we are not allowed to make the definition we have to get rid of it completely.

```

83 \long\def\@argdef#1[#2]#3{%
84 \@ifdefinable #1{\@yargdef#1\@ne{#2}{#3}}}

```

Handle the second optional argument.

```

85 \long\def\@xargdef#1[#2][#3]#4{%
86 \@ifdefinable#1{%

```

Define the actual command to be:

```
\def\foo{\@protected@testopt\foo\\foo{default}}
```

where \\foo is a csname generated from applying \csname and \string to \foo, ie the actual name contains a backslash and therefore can't clash easily with existing command names. "Default" is the contents of the second optional argument of (re)newcommand.

```

87 \expandafter\def\expandafter#1\expandafter{%
88 \expandafter
89 \@protected@testopt
90 \expandafter
91 #1%
92 \csname\string#1\endcsname
93 {#3}}%

```

Now we define the internal macro ie \\foo which is supposed to pick up all arguments (optional and mandatory).

```

94 \expandafter\@yargdef
95 \csname\string#1\endcsname
96 \tw@
97 {#2}%
98 {#4}}}}

```

(End definition for \@newcommand, \@argdef, and \@xargdef.)

\@testopt This macro encapsulates the most common call to \@ifnextchar, saving several tokens each time it is used in the definition of a command with an optional argument. #1 The code to execute in the case that there is a [ need not be a single token but can be any sequence of commands that 'expects' to be followed by [. If this command were only used in \newcommand definitions then #1 would be a single token and the braces could be omitted from {#1} in the definition below, saving a bit of memory.

```

99 \long\def\@testopt#1#2{%
100 \kernel@ifnextchar[{#1}{#1[{#2}]}}}

```

(End definition for \@testopt.)

\@protected@testopt Robust version of \@testopt. The extra argument (#1) must be a single token. If protection is needed the call expands to \protect applied to this token, and the 2nd and 3rd arguments are discarded (by \cx@protect). Otherwise \@testopt is called on the 2nd and 3rd arguments.

This method of making commands robust avoids the need for using up two csnames per command, the price is the extra expansion time for the \ifx test.

```

101 \def\@protected@testopt#1{%
102 \ifx\protect\@typeset@protect
103 \expandafter\@testopt
104 \else
105 \c@x@protect#1%
106 \fi}

```

(End definition for \@protected@testopt.)

\@yargdef These generate a primitive argument specification, from a L<sup>A</sup>T<sub>E</sub>X [*digit*] form; in fact *digit* can be anything such that \number*digit* is single digit.

Reorganised slightly so that \renewcommand{\reserved@a}[1]{foo} works. I am not sure this is worth it, as a following \newcommand would over-write the definition of \reserved@a.

Recall that L<sup>A</sup>T<sub>E</sub>X2.09 goes into an infinite loop with  
\renewcommand[1]{\@tempa}{foo}  
(DPC 6 October 93).

Reorganised again (DPC 1999). Rather than make a loop to construct the argument spec by counting, just extract the required argument spec by using a delimited argument (delimited by the digit). This is faster and uses less tokens. The coding is slightly odd to preserve the old interface (using #2 = \tw@ as the flag to surround the first argument with []). But the new method did not allow for the number of arguments #3 not being given as an explicit digit; hence (further expansion of this argument and use of) \number was added later in 1999.

It is not clear why these are still \long.

```

107 \long \def \@yargdef #1#2#3{%
108 \ifx#2\tw@
109 \def\reserved@b##1{####1}%
110 \else
111 \let\reserved@b\@gobble
112 \fi
113 \expandafter
114 \@yargd@f \expandafter{\number #3}#1%
115 }

116 \long \def \@yargd@f#1#2{%
117 \def \reserved@a ##1##2##{%
118 \expandafter\def\expandafter#2\reserved@b ##1##
119 }%
120 \l@ngrel@x \reserved@a 0##1##2##3##4##5##6##7##8##9##1%
121 }

```

(End definition for \@yargdef and \@yargd@f.)

\@reargdef

```

122 \long\def\@reargdef#1[#2]{%
123 \@yargdef#1\@ne{#2}}

```

(End definition for \creargdef.)

- \renewcommand Check the command name is already used. If not give an error message. Then temporarily disable \@ifdefinable then call \newcommand. (Previous version \let#1=\relax but this does not work too well if #1 is \tempa-e.)

124 \def\renewcommand{\@star@or@long\renew@command}

```
125 \def\renew@command#1{%
126 \begingroup \escapechar`m@ne\xdef\@gtempa{{\string#1}}\endgroup
127 \expandafter\@ifundefined\@gtempa
128 {\@latex@error{Command \string#1 undefined}\@ehc}%
129 \relax
130 \let\@ifdefinable\@rc@ifdefinable
131 \new@command#1}
```

(End definition for \renewcommand and \renew@command.)

\@ifdefinable Test if user is allowed to define a command.

\@@ifdefinable 132 \long\def\@ifdefinable #1#2{%
133 \edef\reserved@a{\expandafter\@gobble\string #1}%
134 \@ifundefined\reserved@a
135 {\edef\reserved@b{\expandafter\@carcube \reserved@a xxx\@nil}%
136 \ifx \reserved@b\@qend \notdefinable\else
137 \ifx \reserved@a\@qrelax \notdefinable\else
138 #2%
139 \fi
140 \fi}%
141 \notdefinable}

Saved definition of \@ifdefinable.

142 \let\@@ifdefinable\@ifdefinable

Version of \@ifdefinable for use with \renewcommand. Does not do the check this time, but restores the normal definition.

143 \long\def\@rc@ifdefinable#1#2{%
144 \let\@ifdefinable\@@ifdefinable
145 #2}

(End definition for \@ifdefinable, \@@ifdefinable, and \@rc@ifdefinable.)

- \newenvironment Define a new user environment. #1 is the environment name. #2# Grabs all the tokens up to the first {. These will be any optional arguments. They are not parsed at this point, but are just passed to \@newenv which will eventually call \newcommand. Any optional arguments will then be parsed by \newcommand as it defines the command that executes the ‘begin code’ of the environment.

This #2# trick removed with version 1.2i as it fails if a { occurs in the optional argument. Now use \@ifnextchar directly.

146 \def\newenvironment{\@star@or@long\new@environment}

```
147 \def\new@environment#1{%
148 \@testopt{\@newenva#1}0}
```

```

149 \def\@newenva#1[#2]{%
150 \kernel@ifnextchar [{\@newenvb#1[#2]}{\@newenv{#1}{[#2]}}}

151 \def\@newenvb#1[#2][#3]{\@newenv{#1}{[#2][[#3]]}}
(End definition for \newenvironment and others.)

\renewenvironment Redefine an environment. For \renewenvironment disable \ifdefinable and then call
\newenvironment. It is OK to \let the argument to \relax here as there should not
be a @temp... environment.
152 \def\renewenvironment{\@star@or@long\renew@environment}

\renew@environment
153 \def\renew@environment#1{%
154 \@ifundefined{#1}%
155 {\@latex@error{Environment #1 undefined}\@ehc
156 }\relax
157 \expandafter\let\csname#1\endcsname\relax
158 \expandafter\let\csname end#1\endcsname\relax
159 \new@environment{#1}}
(End definition for \renewenvironment and \renew@environment.)

\@newenv The internal version of \newenvironment.
Call \newcommand to define the <begin-code> for the environment. \def is used for
the <end-code> as it does not take arguments. (but may contain \pars)
Make sure that an attempt to define a ‘graf’ or ‘group’ environment fails.
160 \long\def\@newenv#1#2#3#4{%
161 \@ifundefined{#1}%
162 {\expandafter\let\csname#1\expandafter\endcsname
163 \csname end#1\endcsname}%
164 \relax
165 \expandafter\new@command
166 \csname #1\endcsname#2{#3}%
167 \l@ngrel@x\expandafter\def\csname end#1\endcsname{#4}}
(End definition for \@newenv.)

\newif And here’s a different sort of allocation: For example, \newif\iff foo creates \foottrue,
\foofalse to go with \iff foo.
168 \def\newif#1{%
169 \count@\escapechar \escapechar\m@ne
170 \let#1\iffalse
171 \@if#1\iftrue
172 \@if#1\iffalse
173 \escapechar\count@}

\@if
174 \def\@if#1#2{%
175 \expandafter\def\csname\expandafter\@gobbletwo\string#1%
176 \expandafter\@gobbletwo\string#2\endcsname
177 {\let#1#2}}

```

(End definition for \newif and \@if.)

\providecommand \providecommand takes the same arguments as \newcommand, but discards them if #1 is already defined. Otherwise it just acts like \newcommand. This implementation currently leaves any discarded definition in \reserved@a (and possibly \\reserved@a) this wastes a bit of space, but it will be reclaimed as soon as these scratch macros are redefined.

178 \def\providecommand{\@star@or@long\provide@command}

\provide@command 179 \def\provide@command#1{%
 180 \begingroup
 181 \escapechar\m@ne\xdef\@gtempa{{\string#1}}%
 182 \endgroup
 183 \expandafter\@ifundefined\@gtempa
 184 {\def\reserved@a{\new@command#1}}%
 185 {\def\reserved@a{\renew@command\reserved@a}}%
 186 \reserved@a}%

(End definition for \providecommand and \provide@command.)

\CheckCommand \CheckCommand takes the same arguments as \newcommand. If the command already exists, with the same definition, then nothing happens, otherwise a warning is issued. Useful for checking the current state before a macro package starts redefining things. Currently two macros are considered to have the same definition if they are the same except for different default arguments. That is, if the old definition was: \newcommand\xxx[2][a]{(#1)(#2)} then \CheckCommand\xxx[2][b]{(#1)(#2)} would not generate a warning, but, for instance \CheckCommand\xxx[2]{(#1)(#2)} would.

187 \def\CheckCommand{\@star@or@long\check@command}

\CheckCommand is only available in the preamble part of the document.

188 \onlypreamble\CheckCommand

\check@command 189 \def\check@command#1#2{\@check@c#1{#2}}
190 \onlypreamble\check@command

(End definition for \CheckCommand and \check@command.)

\@check@c \CheckCommand itself just grabs all the arguments we need, without actually looking for [ optional argument forms. Now define \reserved@a. If \\reserved@a is then defined, compare it with the “\#1” otherwise compare \reserved@a with #1.

191 \long\def\@check@c#1#2#3{%
 192 \expandafter\let\csname\string\reserved@a\endcsname\relax
 193 \renew@command\reserved@a#2{#3}%
 194 \@ifundefined{\string\reserved@a}%
 195 {\@check@eq#1\reserved@a}%
 196 {\expandafter\@check@eq
 197 \csname\string#1\expandafter\endcsname
 198 \csname\string\reserved@a\endcsname}%
 199 \onlypreamble\@check@c

(End definition for \@check@c.)

\@check@eq Complain if #1 and #2 are not \ifx equal.

```

200 \def \@check@eq#1#2{%
201 \ifx#1#2\else
202 \@latex@warning@no@line
203 {Command \noexpand#1 has
204 changed.\MessageBreak
205 Check if current package is valid}%
206 \fi}
207 \onlypreamble \@check@eq

```

(End definition for \@check@eq.)

\@gobble The \@gobble macro is used to get rid of its argument.  
 \@gobbletwo  
 \@gobblethree  
 \@gobblefour

```

208 \long\def \@gobble #1{%
209 \long\def \@gobbletwo #1#2{%
210 \long\def \@gobblethree #1#2#3{%
211 \long\def \@gobblefour #1#2#3#4{%

```

(End definition for \@gobble and others.)

\@firstofone Some argument-grabbers.  
 \@firstoftwo  
 \@secondoftwo

```

212 \long\def \@firstofone#1{#1}
213 \long\def \@firstoftwo#1#2{#1}
214 \long\def \@secondoftwo#1#2{#2}

```

\@iden is another name for \@firstofone for compatibility reasons.

```

215 \let \@iden \@firstofone

```

(End definition for \@firstofone and others.)

\@thirdofthree Another grabber now used in the encoding specific section.

```

216 \long\def \@thirdofthree#1#2#3{#3}

```

(End definition for \@thirdofthree.)

\@expandtwoargs A macro to totally expand two arguments to another macro

```

217 \def \@expandtwoargs#1#2#3{%
218 \edef\reserved@a{\noexpand#1{#2}{#3}}\reserved@a

```

(End definition for \@expandtwoargs.)

\@backslashchar A category code 12 backslash.

```

219 \edef \@backslashchar{\expandafter\@gobble\string\\}

```

(End definition for \@backslashchar.)

## 1.4 Robust commands and protect

Fragile and robust commands are one of the thornier issues in L<sup>A</sup>T<sub>E</sub>X's commands. Whilst typesetting documents, L<sup>A</sup>T<sub>E</sub>X makes use of many of T<sub>E</sub>X's features, such as arithmetic, defining macros, and setting variables. However, there are (at least) three different occasions when these commands are not safe. These are called 'moving arguments' by L<sup>A</sup>T<sub>E</sub>X, and consist of:

- writing information to a file, such as indexes or tables of contents.
- writing information to the screen.
- inside an `\edef`, `\message`, `\mark`, or other command which evaluates its argument fully.

The method L<sup>A</sup>T<sub>E</sub>X uses for making fragile commands robust is to precede them with `\protect`. This can have one of four possible values:

- `\relax`, for normal typesetting. So `\protect\foo` will execute `\foo`.
- `\string`, for writing to the screen. So `\protect\foo` will write `\foo`.
- `\noexpand`, for writing to a file. So `\protect\foo` will write `\foo` followed by a space.
- `\@unexpandable@protect`, for writing a moving argument to a file. So `\protect\foo` will write `\protect\foo` followed by a space. This value is also used inside `\edefs`, `\marks` and other commands which evaluate their arguments fully. More precisely, whenever the content of an `\edef` or `\xdef` etc. can contain arbitrary user input not under the direct control of the programmer, one should use `\protected@edef` instead of `\edef`, etc., so that `\protect` has a suitable definition and the user input will not break if it contains fragile commands.

```
\@unexpandable@protect
 220 \def\@unexpandable@protect{\noexpand\protect\noexpand}
(End definition for \@unexpandable@protect.)
```

`\DeclareRobustCommand` `\declare@robustcommand` This is a package-writers command, which has the same syntax as `\newcommand`, but which declares a protected command. It does this by having

`\DeclareRobustCommand\foo`  
define `\foo` to be `\protect\foo<space>`,  
and then use `\newcommand\foo<space>`.

Since the internal command is `\foo<space>`, when it is written to an auxiliary file, it will appear as `\foo`.

We have to be a bit cleverer if we're defining a short command, such as `\_`, in order to make sure that the auxiliary file does not include a space after the command, since `\_ a` and `\_a` aren't the same. In this case we define `\_` to be:

```
\x@protect_ \protect_<space>
```

which expands to:

```
\ifx\protect\@typeset@protect\else
 \x@protect@
\fi
\protect_<space>
```

Then if `\protect` is `\@typeset@protect` (normally `\relax`) then we just perform `_<space>`, and otherwise `\x@protect@` gobbles everything up and expands to `\protect\_`.

*Note:* setting `\protect` to any value other than `\relax` whilst in ‘typesetting’ mode will cause commands to go into an infinite loop! In particular, setting `\protect` to `\empty` will cause `\_` to loop forever. It will also break lots of other things, such as protected `\ifmmode`s inside `\haligns`. If you really have to do such a thing, then please set `\@typeset@protect` to be `\empty` as well. (This is what the code for `\patterns` does, for example.)

More fun with `\expandafter` and `\csname`.

```
221 \def\DeclareRobustCommand{\@star@or@long\declare@robustcommand}
222 \def\declare@robustcommand#1{%
223 \ifx#1\undefined\else\ifx#1\relax\else
224 \x@latex@info{Redefining \string#1}%
225 \fi\fi
226 \edef\reserved@a{\string#1}%
227 \def\reserved@b{%
228 \expandafter\strip@prefix\meaning\reserved@b}%
229 \edef#1{%
230 \ifx\reserved@a\reserved@b
231 \noexpand\x@protect
232 \noexpand#1%
233 \fi
234 \noexpand\protect
235 \expandafter\noexpand\csname
236 \expandafter\gobble\string#1 \endcsname
237 }%
238 \let\@ifdefinable\@rc@ifdefinable
239 \expandafter\new@command\csname
240 \expandafter\gobble\string#1 \endcsname
241 }
```

(End definition for `\DeclareRobustCommand` and `\declare@robustcommand`.)

```
\x@protect
\x@protect
242 \def\x@protect#1{%
243 \ifx\protect\@typeset@protect\else
244 \x@protect#1%
245 \fi
246 }
247 \def\x@protect#1\fi#2#3{%
248 \fi\protect#1%
249 }
```

(End definition for `\x@protect` and `\x@protect`.)

`\@typeset@protect` We set `\@typeset@protect` to `\relax` rather than `\empty` to make sure that the protection mechanism stops the look-ahead and expansion performed at the start of `\halign` cells.

```
250 \let\@typeset@protect\relax
```

(End definition for \set@typeset@protect.)

\set@display@protect These macros set \protect appropriately for typesetting or displaying.

\set@typeset@protect  
251 \def\set@display@protect{\let\protect\string}  
252 \def\set@typeset@protect{\let\protect\@typeset@protect}

(End definition for \set@display@protect and \set@typeset@protect.)

\protected@edef \protected@xdef The commands \protected@edef and \protected@xdef perform ‘safe’ \edefs and \xdefs, saving and restoring \protect appropriately. For cases where restoring \protect doesn’t matter, there’s an ‘unsafe’ \unrestored@protected@xdef, useful if you know what you’re doing!

253 \def\protected@edef{  
254   \let\@@protect\protect  
255   \let\protect\@unexpandable@protect  
256   \afterassignment\restore@protect  
257   \edef  
258 }  
259 \def\protected@xdef{  
260   \let\@@protect\protect  
261   \let\protect\@unexpandable@protect  
262   \afterassignment\restore@protect  
263   \xdef  
264 }  
265 \def\unrestored@protected@xdef{  
266   \let\protect\@unexpandable@protect  
267   \xdef  
268 }  
269 \def\restore@protect{\let\protect\@@protect}

(End definition for \protected@edef and others.)

\protect The normal meaning of \protect

270 \set@typeset@protect

(End definition for \protect.)

\MakeRobust This macro makes an existing fragile macro robust, but only if it hasn’t been robust in the past, i.e., it checks for the existence of the macro \<name><sub>U</sub> and if that exists it assumes that \<name> is already robust. In that case either undefine the inner macro first or use \DeclareRobustCommand to define it in a robust way directly. We could probably test the top-level definition to have the right kind of structure, but this is somewhat problematical as we then have to distinguish between \long macros and others and also take into account that sometimes the top-level is deliberately done manually (like with \begin).

The macro firstly checks if the control sequence in question exists at all.

271 </2ekernel>  
272 <latexrelease>\IncludeInRelease{2020/10/01}{\MakeRobust}{\MakeRobust}%  
273 (\*2ekernel | latexrelease)  
274 \def\MakeRobust#1{  
275   \count@=\escapechar  
276   \escapechar='\\  
277   \@ifundefined{\expandafter\gobble\string#1}{%  
278     \@latex@error{The control sequence ‘\string#1’ is undefined!%

```

279 \MessageBreak There is nothing here to make robust}%
280 \@eha
281 }%

```

Then we check if the macro is already robust. We do this by testing if the internal name for a robust macro is defined, namely `\foo_`. If it is already defined do nothing, otherwise set `\foo_` equal to `\foo` and redefine `\foo` so that it acts like a macro defined with `\DeclareRobustCommand`. We use `\@kernel@rename@newcommand` to copy `\foo` over to `\foo_`, including a possible default optional argument.

```

282 }%
283 \@ifundefined{\expandafter\gobble\string#1\space}%
284 {%
285 \expandafter\@kernel@rename@newcommand
286 \csname\expandafter\gobble\string#1\space\endcsname
287 #1%
288 \edef\reserved@a{\string#1}%
289 \def\reserved@b{#1}%
290 \edef\reserved@b{\expandafter\strip@prefix\meaning\reserved@b}%
291 \xdef#1{%
292 \ifx\reserved@a\reserved@b
293 \noexpand\x@protect\noexpand#1%
294 \fi
295 \noexpand\protect\expandafter\noexpand
296 \csname\expandafter\gobble\string#1\space\endcsname}%
297 }%
298 {\@latex@info{The control sequence ‘\string#1’ is already robust}}%
299 }%
300 \escapechar=\count@
301 }%

```

This macro renames a command, possibly with an optional argument (defined with `\newcommand`) from #2 to #1, by renaming the internal macro `\#2` to `\#1` and defining #1 appropriately, then undefining #2 and `\#2`. The `\afterassignment` trick is to make both definitions in `\copy@newcommand` global (which are local by default).

In case the macro was defined with `\newcommand` and an optional argument, to replicate exactly the behaviour of `\DeclareRobustCommand` we have to move also the internal `\foo` to `\foo_`. In that case, #1 will be a parameterless macro (`\robust@command@chk@safe` checks that), and `\@if@newcommand` will return true (both defined below in this file). If so, we can use `\copy@newcommand` rather than plain `\let` to copy the command over. `\@kernel@rename@newcommand` does this test and carries out the renaming.

```

302 \def\@kernel@rename@newcommand#1#2{%
303 \robust@command@chk@safe#2%
304 {\@if@newcommand#2%
305 {\afterassignment\global
306 \global\copy@newcommand#1#2%
307 \global\let#2@\undefined
308 \global\expandafter\let\csname\string#2\endcsname\@undefined}%
309 {\global\let#1=#2}%
310 {\global\let#1=#2}%
311 </2ekernel | latexrelease>
312 <| latexrelease>\EndIncludeInRelease

```

```

313 %
314 <|latexrelease>\IncludeInRelease{2019/10/01}{\MakeRobust}{\MakeRobust}%
315 <|latexrelease>\def\MakeRobust#1{%
316 <|latexrelease> \@ifundefined{\expandafter\gobble\string#1}{%
317 <|latexrelease> \@latex@error{The control sequence ‘\string#1’ is undefined!}%
318 <|latexrelease> \MessageBreak There is nothing here to make robust}%
319 <|latexrelease> \@eha
320 <|latexrelease> }%
321 <|latexrelease> {%
322 <|latexrelease> \@ifundefined{\expandafter\gobble\string#1\space}{%
323 <|latexrelease> \global\expandafter\let\csname
324 <|latexrelease> \expandafter\gobble\string#1\space\endcsname=\#1%
325 <|latexrelease> \edef\reserved@a{\string#1}%
326 <|latexrelease> \def\reserved@b{\#1}%
327 <|latexrelease> \edef\reserved@b{\expandafter\strip@prefix\meaning\reserved@b}%
328 <|latexrelease> \xdef#1{%
329 <|latexrelease> \ifx\reserved@a\reserved@b
330 <|latexrelease> \noexpand\x@protect\noexpand#1%
331 <|latexrelease> \fi
332 <|latexrelease> \noexpand\protect\expandafter\noexpand
333 <|latexrelease> \csname\expandafter\gobble\string#1\space\endcsname}%
334 <|latexrelease> }%
335 <|latexrelease> {%
336 <|latexrelease> {\@latex@info{The control sequence ‘\string#1’ is already robust}}%
337 <|latexrelease> }%
338 <|latexrelease>}%
339 <|latexrelease>\let\@kernel@rename@newcommand\@undefined
340 <|latexrelease>\EndIncludeInRelease
341 %
342 <|latexrelease>\IncludeInRelease{2015/01/01}{\MakeRobust}{\MakeRobust}%
343 <|latexrelease>\def\MakeRobust#1{%
344 <|latexrelease> \@ifundefined{\expandafter\gobble\string#1}{%
345 <|latexrelease> \@latex@error{The control sequence ‘\string#1’ is undefined!}%
346 <|latexrelease> \MessageBreak There is nothing here to make robust}%
347 <|latexrelease> \@eha
348 <|latexrelease> }%
349 <|latexrelease> {%
350 <|latexrelease> \@ifundefined{\expandafter\gobble\string#1\space}{%
351 <|latexrelease> \expandafter\let\csname
352 <|latexrelease> \expandafter\gobble\string#1\space\endcsname=\#1%
353 <|latexrelease> \edef\reserved@a{\string#1}%
354 <|latexrelease> \def\reserved@b{\#1}%
355 <|latexrelease> \edef\reserved@b{\expandafter\strip@prefix\meaning\reserved@b}%
356 <|latexrelease> \xdef#1{%
357 <|latexrelease> \ifx\reserved@a\reserved@b
358 <|latexrelease> \noexpand\x@protect\noexpand#1%
359 <|latexrelease> \fi
360 <|latexrelease> \noexpand\protect\expandafter\noexpand
361 <|latexrelease> \csname\expandafter\gobble\string#1\space\endcsname}%
362 <|latexrelease> }%
363 <|latexrelease> {%
364 <|latexrelease> {\@latex@info{The control sequence ‘\string#1’ is already robust}}%
365 <|latexrelease> }%
366 <|latexrelease>}%

```

```

367 〈\latexrelease〉\let\@kernel@rename@newcommand\@undefined
368 〈\latexrelease〉\EndIncludeInRelease
369 %
370 〈\latexrelease〉\IncludeInRelease{0000/00/00}{\MakeRobust}{\MakeRobust}%
371 〈\latexrelease〉\let\MakeRobust\@undefined
372 〈\latexrelease〉\let\@kernel@rename@newcommand\@undefined
373 〈\latexrelease〉\EndIncludeInRelease
374 {*2ekernel}

```

(End definition for \MakeRobust and \@kernel@rename@newcommand.)

\@kernel@make@fragile The opposite of \MakeRobust except that it doesn't do many checks as it is internal to the kernel. Why does one want such a thing? Only for compatibility reasons if \latexrelease requests a rollback of the kernel. For this reason we pretend that this command existed in all earlier versions of L<sup>A</sup>T<sub>E</sub>X i.e., we are not rolling it back since we need it precisely then. But we have to get it into the \latexrelease file so that a roll forward is possible too.

```

375 〈/2ekernel〉
376 {*2ekernel | \latexrelease〉
377 〈\latexrelease〉\IncludeInRelease{2020/10/01}%
378 〈\latexrelease〉{\@kernel@make@fragile}{Undo robustness}%
379 \def\@kernel@make@fragile#1{%
380 \@ifundefined{\expandafter\gobble\string#1\space}%

```

If not robust do nothing.

```
381 {}%

```

Otherwise copy \foo\_ back to \foo. Then use \@kernel@rename@newcommand to check and copy \\foo\_ back to \\foo in case the command has an optional argument. If so, also undefine \\foo\_, and at the end undefine \foo\_.

```

382 {%
383 \global\expandafter\let\expandafter #1\csname
384 \expandafter\gobble\string#1\space\endcsname
385 \expandafter\@kernel@rename@newcommand
386 \csname\expandafter\gobble\string#1\expandafter\endcsname
387 \csname\expandafter\gobble\string#1\space\endcsname
388 \global\expandafter\let\csname
389 \expandafter\gobble\string#1\space\endcsname\@undefined
390 }%
391 }

392 〈\latexrelease〉\EndIncludeInRelease
393 %
394 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
395 〈\latexrelease〉{\@kernel@make@fragile}{Undo robustness}%
396 \def\@kernel@make@fragile#1{%
397 \ifundefined{\expandafter\gobble\string#1\space}%
398 {}%
399 {}%
400 \global\expandafter\let\expandafter #1\csname
401 \expandafter\gobble\string#1\space\endcsname
402 \global\expandafter\let\csname
403 \expandafter\gobble\string#1\space\endcsname\@undefined
404 {}%
405 〈\latexrelease〉}

```

```

406 〈\latexrelease〉\EndIncludeInRelease
407 〈/2ekernel | \latexrelease〉
408 〈*2ekernel〉

(End definition for \kernel@make@fragile.)

```

## 1.5 Acting on robust commands

```

409 〈/2ekernel〉
410 〈\latexrelease〉\IncludeInRelease{2020-10-01}{\robust@command@act}
411 〈\latexrelease〉 {Add \robust@command@act}%
412 〈*2ekernel | \latexrelease〉

```

With most document level commands being robust now there is more of a requirement to have a standard way of aliasing (or copying) a command to a new name, for example to save an original definition before changing a command. `\DeclareCommandCopy` is analogous to `\TeX`'s `\let`, except that it copes with the different types of robust commands defined by `\LaTeX`'s mechanisms.

A couple of “types of robustness” are defined by the `\LaTeX` 2 $\varepsilon$  kernel, namely robust commands defined with `\DeclareRobustCommand` and commands with optional arguments defined with `\newcommand`. However there are other types of robust commands that are frequently used, which are not defined in the `\LaTeX` 2 $\varepsilon$  kernel, like commands defined with `xparse`'s `\NewDocumentCommand` and `etoolbox`'s `\newrobustcmd`.

In this section we will define a generic extensible machinery to act on robust commands. This code will then be used to test if a command is robust, considered the different types of robustness, and then either copy that definition, if `\DeclareCommandCopy` (or similar) is used, or show the definition of the command, if `\ShowCommand` is used.

`\robust@command@act` The looping machinery is generic and knows nothing about what is to be done for each case. The syntax of the main macro `\robust@command@act` is:

```
\robust@command@act<action-list><robust-cmd>
 <fallback-action><act-arg>
```

`<action-list>` is a token list of the form:

```
{<if-type-1> <act-type-1>}
 {<if-type-2> <act-type-2>}
 ...

```

`\robust@command@act` will iterate over the `<action-list>`, evaluating each `<if-type-n> <robust-cmd> {<true>}`. If the `<if-type-n>` conditional returns `<true>`, then `<act-type-n> <act-arg>` is executed, and the loop ends. If the conditional returns `<false>`, then `<if-type-n+1>` is executed in the same way, until either one of the conditionals return `<true>`, or the end of the `<action-list>` is reached. If the end is reached, then `<fallback-action> <act-arg>` is executed before `\robust@command@act` exits.

`\robust@command@act` will start by using `\robust@command@act@chk@args` to check if the `<robust-cmd>` (#2) is a parameterless (possibly `\protected`) macro. If it is not, the command is not a robust command: these always start with a parameterless user-level macro; in that case, `\robust@command@act@end` is used to short-circuit the process and do the `<fallback-action>` (#3). This first test is necessary because later on we need to be able to expand the `<robust-cmd>` without the risk of it Breaking Badly, and as a bonus, this speeds up the process in case we used `\NewCommandCopy` in a “normal” macro.

```
413 \long\def\robust@command@act#1#2#3#{%
```

```

414 \robust@command@chk@safe#2%
415 {\expandafter\robust@command@act@loop
416 \expandafter#2%
417 #1{\@nnil\@nnil}%
418 \robust@command@act@end}%
419 {\robust@command@act@end}%
420 {#3}{#4}}%

```

If `\robust@command@act@chk@args` branched to false, then `\robust@command@act@loop` will loop over the list of items in the *<action-list>* (#1), and process each item as described earlier. If the *<if-type-n>* command expands to *<true>* then `\robust@command@act@do` is used to execute *<act-type-n>* on the *<act-arg>*, otherwise the loop resumes with the next item.

```

421 \long\def\robust@command@act@loop#1#2{\robust@command@act@loop@aux#1#2}
422 \long\def\robust@command@act@loop@aux#1#2#3{%
423 \ifx\@nnil#2%
424 \else
425 #2{#1}%
426 {\robust@command@act@do{#3}}%
427 {\expandafter\robust@command@act@loop\expandafter#1}%
428 \fi}
429 \long\def\robust@command@act@do#1%
430 \fi#2%
431 \robust@command@act@end#3#4{%
432 \fi
433 #1#4}

```

If the end is reached and no action was taken, then do *<fallback-action>**<act-arg>*.

```
434 \long\def\robust@command@act@end#1#2{#1#2}
```

```

\robust@command@chk@safe
\robust@command@act@chk@args
435 \long\def\robust@command@chk@safe#1{%
436 \begingroup
437 \escapechar='\\
438 \expandafter\endgroup\expandafter
439 \robust@command@act@chk@args\meaning#1:->\@nil}%
440 \def\robust@command@act@chk@args#1:->#2\@nil{%
441 \@expl@str@if@eq@@nnTF{#1}{macro}%
442 {\@firstoftwo}%
443 {\@expl@str@if@eq@@nnTF{#1}{\protected macro}%
444 {\@firstoftwo}%
445 {\@secondoftwo}}}}

446 </2ekernel | latexrelease>
447 <latexrelease>\EndIncludeInRelease
448 <latexrelease>\IncludeInRelease{0000-00-00}{\robust@command@act}
449 <latexrelease> {Add \robust@command@act}%
450 <latexrelease>\let\robust@command@act@\undefined
451 <latexrelease>\let\robust@command@act@loop@\undefined
452 <latexrelease>\let\robust@command@act@loop@aux@\undefined
453 <latexrelease>\let\robust@command@act@do@\undefined
454 <latexrelease>\let\robust@command@act@end@\undefined
455 <latexrelease>\let\robust@command@chk@safe@\undefined
456 <latexrelease>\let\robust@command@act@chk@args@\undefined

```

```

457 ⟨latexrelease⟩\EndIncludeInRelease
458 ⟨*2ekernel⟩

(End definition for \robust@command@act and others.)

```

### 1.5.1 Copying robust commands

```

459 ⟨/2ekernel⟩
460 ⟨latexrelease⟩\IncludeInRelease[2020-10-01]{\DeclareCommandCopy}
461 ⟨latexrelease⟩ {Add \NewCommandCopy, \RenewCommandCopy, and \DeclareCommandCopy}%
462 ⟨*2ekernel | latexrelease⟩

\NewCommandCopy \RenewCommandCopy \DeclareCommandCopy

```

\NewCommandCopy starts by checking if #1 is already defined, and raises an error if so, otherwise the definition is carried out. \RenewCommandCopy does (almost) the opposite. If the command is *not* defined, then an error is raised. But the definition is carried out anyhow, so the behaviour is consistent with \renewcommand.

A \ProvideCommandCopy isn't defined because it's not reasonably useful. \provide... commands mean "define this if there's no other definition", but copying a command (usually) implies that the command being copied is defined, so \ProvideCommandCopy doesn't make a lot of sense. But more importantly, the most common use case of copying a command is to redefine it later, while preserving the old definition, as in:

```

\ProvideCommandCopy \A \B
\renewcommand \B { ... \A ... }

```

then, if \A is already defined the first line is skipped, an in this case \B won't work as expected.

The three versions call the internal \declare@commandcopy with the proper action. \@firstofone will carry out the copy. The only case when the copy is not made is the ⟨false⟩ case for \NewCommandCopy, in which the command already exists and the definition is aborted.

```

463 \def\NewCommandCopy{%
464 \declare@commandcopy
465 {\@firstofone}%
466 {\@firstoftwo\@notdefinable}%
467 \def\RenewCommandCopy{%
468 \declare@commandcopy
469 {\@latex@error{Command \backslash reserved@a\space undefined}\@ehc
470 \@firstofone}%
471 {\@firstofone}%
472 \def\DeclareCommandCopy{%
473 \declare@commandcopy
474 {\@firstofone}%
475 {\@firstofone}}

```

Start by checking if the command is already defined. The proper action is taken by each specific command above. If all's good, then \robust@command@act is called with the proper arguments as described earlier, with \declarecommandcopylisthook as the ⟨action-list⟩ and \declare@commandcopy@let as the ⟨fallback-action⟩.

```

476 \long\def\declare@commandcopy#1#2#3#4{%
477 \edef\reserved@a{\@expl@cs@to@str@ON#3}%
478 \@ifundefined\reserved@a{#1}{#2}%
479 {\robust@command@act
480 \declarecommandcopylisthook#4%
481 \declare@commandcopy@let{#3#4}}}

```

The initial definition of `\@declarecommandcopylisthook` contains the tests for the two types of robust command in the kernel.

```
482 \def\@declarecommandcopylisthook{%
483 {\@if@DeclareRobustCommand \copy@DeclareRobustCommand}%
484 {\@if@newcommand \copy@newcommand}}
```

The initial definition of `\@declarecommandcopylisthook` contains the tests for the two types of robust command in the kernel.

```
485 \long\def\declare@commandcopy@let{\let#1=\relax}
```

`\declare@commandcopy@let`

Now the rollback code.

```
486 </2ekernel | latexrelease>
487 <| latexrelease>\EndIncludeInRelease
488 <| latexrelease>\IncludeInRelease{0000-00-00}{\DeclareCommandCopy}
489 <| latexrelease> {Undefined \NewCommandCopy, \RenewCommandCopy, and \DeclareCommandCopy}%
490 <| latexrelease>\let\NewCommandCopy\@undefined
491 <| latexrelease>\let\RenewCommandCopy\@undefined
492 <| latexrelease>\let\DeclareCommandCopy\@undefined
493 <| latexrelease>\let\declare@commandcopy\@undefined
494 <| latexrelease>\let\@declarecommandcopylisthook\@undefined
495 <| latexrelease>\let\declare@commandcopy@let\@undefined
496 <| latexrelease>\EndIncludeInRelease
497 <*2ekernel>
```

(*End definition for \NewCommandCopy and others.*)

### 1.5.2 Showing robust commands

`\ShowCommand` Most of the machinery defined for `\NewCommandCopy` can be used to show the definition of a robust command, in a similar fashion to `\texdef`. The difference is that after the command's is detected to has a given type of robustness, rather than making a copy, we use a separate routine to show its definition.

With all the machinery in place, `\ShowCommand` itself is quite simple: use `\robust@command@act` to iterate through the `\@showcommandlisthook` list, and if nothing is found, fallback to `\show`.

```
498 </2ekernel>
499 <| latexrelease>\IncludeInRelease{2020-10-01}{\ShowCommand}%
500 <| latexrelease> {Add \ShowCommand}%
501 <*2ekernel | latexrelease>
502 \long\def\ShowCommand#1{%
503 \robust@command@act
504 \@showcommandlisthook#1%
505 \show#1}
```

`\@showcommandlisthook` The initial definition of `\@showcommandlisthook` contains the same tests as used for copying, but `\@show@...` commands instead of `\copy@....` Same as before, it is initialised to cope with `\DeclareRobustCommand` and `\newcommand` with optional arguments.

```
506 \def\@showcommandlisthook{%
507 {\@if@DeclareRobustCommand \show@DeclareRobustCommand}%
508 {\@if@newcommand \show@newcommand}}
```

```
Now the rollback code.

509 </2ekernel | latexrelease>
510 <latexrelease>\EndIncludeInRelease
511 <latexrelease>\IncludeInRelease{0000-00-00}{\ShowCommand}
512 <latexrelease> {Undefine \ShowCommand}%
513 <latexrelease>\let\ShowCommand\@undefined
514 <latexrelease>\let\@showcommandlisthook\@undefined
515 <latexrelease>\EndIncludeInRelease
516 {*2ekernel}

(End definition for \ShowCommand and \@showcommandlisthook.)

517 </2ekernel>
518 <latexrelease>\IncludeInRelease{2020-10-01}{\@if@DeclareRobustCommand}
519 <latexrelease> {Add \@if@DeclareRobustCommand, \@if@newcommand,
520 <latexrelease> \@copy@DeclareRobustCommand, \@copy@newcommand,
521 <latexrelease> \@show@DeclareRobustCommand, \@show@newcommand}%
522 {*2ekernel | latexrelease}
```

### 1.5.3 Commands defined with \DeclareRobustCommand

Now that we provided a generic way to copy one macro to another, we need to define a way to check if a command is one of L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> 's robust types. These tests are heavily based on Heiko's \LetLtxMacro, but chopped into separate macros.

`\@if@DeclareRobustCommand` checks if a command `\cmd` was defined by `\DeclareRobustCommand`. The test returns true if the expansion of `\cmd` is exactly `\protect\cmd`.

```
523 \long\def\c@if@DeclareRobustCommand#1{%
524 \begingroup
525 \escapechar='\\
526 \edef\reserved@a{\string#1}%
527 \edef\reserved@b{\detokenize{#1}}%
528 \xdef\@gtempa{%
529 \ifx\reserved@a\reserved@b
530 \noexpand\x@protect
531 \noexpand#1%
532 \fi
533 \noexpand\protect
534 \expandafter\noexpand\csname\@expl@cs@to@str@N#1 \endcsname}%
535 \endgroup
536 \ifx\@gtempa#1\relax
537 \expandafter\@firstoftwo
538 \else
539 \expandafter\@secondoftwo
540 \fi}
```

If a command was defined by `\DeclareRobustCommand` (that is, `\@if@DeclareRobustCommand` returns true), then to make a copy of `\cmd` into `\foo` we define the latter such that it expands to `\protect\fooi`, then make `\fooi` equal to `\cmdi`.

There is one detail we need to take care of: if a command was defined with `\DeclareRobustCommand` it may still have an optional argument, in which case there is one more macro layer before the actual definition of the command. We use `\c@if@newcommand` to check that and `\c@copy@newcommand` to do the copying.

```
541 \long\def\@copy@DeclareRobustCommand#1#2{%
```

```

542 \begingroup
543 \escapechar='\\
544 \edef\reserved@a{\string#1}%
545 \edef\reserved@b{\detokenize{#1}}%
546 \edef\reserved@a{%
547 \endgroup
548 \def\noexpand#1{%
549 \ifx\reserved@a\reserved@b
550 \noexpand\x@protect
551 \noexpand#1%
552 \fi
553 \noexpand\protect
554 \expandafter\noexpand\csname\@expl@cs@to@str@@N#1 \endcsname}%
555 \noexpand\copy@kernel@robust@command
556 \expandafter\noexpand\csname\@expl@cs@to@str@@N#1 \endcsname
557 \expandafter\noexpand\csname\@expl@cs@to@str@@N#2 \endcsname}%
558 \reserved@a}
559 \long\def\copy@kernel@robust@command#1#2{%
560 \robust@command@chk@safe#2%
561 {\@if@newcommand#2%
562 {\@copy@newcommand}%
563 {\declare@commandcopy@let}%
564 {\declare@commandcopy@let}%
565 #1#2}

```

Showing the command is pretty simple. This command prints the top-level expansion as TeX's `\show` would, but with `robust macro:` rather than just `macro:`, then a blank line and then `\show` the inner command. For a macro defined with, say, `\DeclareRobustCommand\foo[1]{bar}`, it will print:

```

> \foo=robust macro:
->\protect \foo .
> \foo =\long macro:
#1->bar.

```

If the inner command is defined with an optional argument, then `\@show@newcommand` is also used.

The value of `\escapechar` is deliberately not enforced, so `\ShowCommand` behaves more like `\show`.

```

566 \long\def\@show@DeclareRobustCommand#1{%
567 \typeout{> \string#1=robust macro:}%
568 \typeout{->\@expl@cs@replacement@spec@@N#1.^~J}%
569 \expandafter\show@kernel@robust@command
570 \csname\@expl@cs@to@str@@N#1 \endcsname}%
571 \long\def\show@kernel@robust@command#1{%
572 \robust@command@chk@safe#1%
573 {\@if@newcommand#1%
574 {\@show@newcommand}%
575 {\show}%
576 {\show}%
577 #1}

```

*(End definition for `\@if@DeclareRobustCommand` and others.)*

### 1.5.4 Commands defined with \newcommand (with optional argument)

\@if@newcommand A command \cmd (or \cmd\_ if it was defined with \DeclareRobustCommand) with an optional argument will expand to \protected@testopt\cmd{\cmd{<opt>}}. To check that we look at the first three tokens in the expansion of \cmd, and return true or false accordingly.

This test *requires* that the command be a parameterless macro, otherwise it will not work (and probably break). This is ensured with \robust@command@chk@safe before calling \@if@newcommand.

```

578 \long\def\@if@newcommand#1{%
579 \edef\reserved@a{%
580 \noexpand\@protected@testopt
581 \noexpand#1%
582 \expandafter\noexpand\csname\@backslashchar\@expl@cs@to@str@@N#1\endcsname}%
583 \edef\reserved@b{%
584 \unexpanded\expandafter\expandafter\expandafter
585 {\expandafter\@car\@cube#1{}{}{\@nil}}}%
586 \ifx\reserved@a\reserved@b
587 \expandafter\@firstoftwo
588 \else
589 \expandafter\@secondoftwo
590 \fi}

```

Then, if a command \cmd takes an optional argument, we copy it to \foo by defining the latter to expand to \protected@testopt\foo\foo{<opt>}.

```

591 \long\def\@copy@newcommand#1#2{%
592 \edef#1{\noexpand\@protected@testopt
593 \noexpand#1%
594 \expandafter\noexpand\csname\@backslashchar\@expl@cs@to@str@@N#1\endcsname
595 \unexpanded\expandafter\expandafter\expandafter
596 {\expandafter\@gobblethree#2}}%
597 \expandafter
598 \let\csname\@backslashchar\@expl@cs@to@str@@N#1\expandafter\endcsname
599 \csname\@backslashchar\@expl@cs@to@str@@N#2\endcsname}

```

A command being \shown here is guaranteed to have an optional argument. Start by showing the top-level expansion of the command (using \typeout to avoid TeX asking for interaction and extra context lines), then call \@show@newcommand@aux with the internal command, which contains the actual definition, and with the expansion of the command to extract the default value of the optional argument.

```

600 \long\def\@show@newcommand#1{%
601 \typeout{> \string#1=robust macro:}%
602 \typeout{->\@expl@cs@replacement@spec@@N#1.^~J}%
603 \expandafter\@show@newcommand@aux
604 \csname\@backslashchar\@expl@cs@to@str@@N#1\expandafter\endcsname
605 \expandafter{#1}}

```

For a macro defined with, say, \newcommand\foo[1][opt]{bar}, it will print:

```

> \foo=robust macro:
->\@protected@testopt \foo \\\foo {opt}.

> \\\foo=\long macro:

```

```
> default #1=opt.
[#1]->bar.
```

If the command was defined with `\DeclareRobustCommand`, then another pair of lines show the top-level expansion `\protect\foo`.

The extra gymnastics with `\showtokens` ensures that `\showtokens` itself, and the internals of this macro aren't showed in the context lines.

```
606 \long\def\@show@newcommandaux#1#2{%
607 \typeout{> \string#1=\@expl@cs@prefix@spec@@N#1macro:}%
608 \edef\reserved@a{%
609 default \string##1=\expandafter\detokenize@\gobblethree#2.^~J%
610 \@expl@cs@argument@spec@@N#1->\@expl@cs@replacement@spec@@N#1}%
611 \showtokens\expandafter\expandafter\expandafter{\expandafter\reserved@a}}
```

Now the rollback code.

```
612 </2ekernel | latexrelease>
613 <latexrelease>\EndIncludeInRelease
614 <latexrelease>\IncludeInRelease{0000-00-00}{\@if@DeclareRobustCommand}
615 <latexrelease> {Undefine \@if@DeclareRobustCommand, \@if@newcommand,
616 <latexrelease> \@copy@DeclareRobustCommand, \@copy@newcommand,
617 <latexrelease> \@show@DeclareRobustCommand, \@show@newcommand}%
618 <latexrelease>\let\@if@DeclareRobustCommand\@undefined
619 <latexrelease>\let\@copy@DeclareRobustCommand\@undefined
620 <latexrelease>\let\@show@DeclareRobustCommand\@undefined
621 <latexrelease>\let\@if@newcommand\@undefined
622 <latexrelease>\let\@copy@newcommand\@undefined
623 <latexrelease>\let\@show@newcommand\@undefined
624 %
625 <latexrelease>\let\copy@kernel@robust@command\@undefined
626 <latexrelease>\let\show@kernel@robust@command\@undefined
627 <latexrelease>\let\@show@newcommand@aux\@undefined
628 <latexrelease>\EndIncludeInRelease
629 {*2ekernel}
```

(End definition for `\@if@newcommand` and others.)

## 1.6 Internal defining commands

These commands are used internally to define other L<sup>A</sup>T<sub>E</sub>X commands.

`\@ifundefined` Check if first arg is undefined or `\relax` and execute second or third arg depending,

```
630 </2ekernel>
631 <latexrelease>\IncludeInRelease{2018-04-01}{\@ifundefined}
632 <latexrelease>{Leave commands undefined in \@ifundefined}%
633 {*2ekernel | latexrelease}
```

Version using `\ifcsname` to avoid defining undefined tokens to `\relax`. Defined here to simplify using unmatched `\fi`.

```
634 \def\@ifundefined#1{%
635 \ifcsname#1\endcsname\@ifundefined@#1\else\@ifundefined@#1\fi{#1}}
636 \long\def\@ifundefined@#1\fi{#2}{%
637 \expandafter\ifx\csname #2\endcsname\relax
638 \quad\@ifundefined@#1\fi
639 \quad\@secondoftwo}
```

```
641 \long\def\@ifundefined@d@i\fi#1#2#3{\fi #2}
```

Now test of engine.

```
642 \ifx\numexpr\@undefined
```

Classic version (should not be needed as etex is assumed).

```
643 \def\@ifundefined#1{%
644 \expandafter\ifx\csname#1\endcsname\relax
645 \expandafter\@firstoftwo
646 \else
647 \expandafter\@secondoftwo
648 \fi}
649 \else\ifx\directlua\@undefined
```

Use the \ifcsname defined above.

```
650 \else
```

Optimised version for LuaTeX, using \lastnamedcs

```
651 \def\@ifundefined#1{%
652 \ifcsname#1\endcsname
653 \expandafter\ifx\lastnamedcs\relax\else\@ifundefined@d@i\fi
654 \fi
655 \@firstoftwo}
656 \long\def\@ifundefined@d@i#1#2#3#4#5{#1#2#5}
657 \fi
658 \fi
659 {/2ekernel | latexrelease}
660 {/latexrelease}\EndIncludeInRelease
661 {/latexrelease}\IncludeInRelease{0000-00-00}{\@ifundefined}
662 {/latexrelease}{Leave commands undefined in \@ifundefined}%
663 {/latexrelease}\def\@ifundefined#1{%
664 {/latexrelease} \expandafter\ifx\csname#1\endcsname\relax
665 {/latexrelease} \expandafter\@firstoftwo
666 {/latexrelease} \else
667 {/latexrelease} \expandafter\@secondoftwo
668 {/latexrelease} \fi}
669 {/latexrelease}\EndIncludeInRelease
670 {*}2ekernel}
```

(End definition for \@ifundefined.)

\@qend The following define \@qend and \@qrelax to be the strings ‘end’ and ‘relax’ with the characters \catcodel 12.

```
671 \edef\@qend{\expandafter\@cdr\string\end\@nil}
672 \edef\@qrelax{\expandafter\@cdr\string\relax\@nil}
```

(End definition for \@qend and \@qrelax.)

\@ifnextchar \@ifnextchar peeks at the following character and compares it with its first argument. If both are the same it executes its second argument, otherwise its third.

```
673 \long\def\@ifnextchar#1#2#3{%
674 \let\reserved@d=#1%
675 \def\reserved@a{#2}%
676 \def\reserved@b{#3}%
677 \futurelet\@let@token\@ifnch}
```

(End definition for `\@ifnextchar`.)

- `\kernel@ifnextchar` This macro is the kernel version of `\@ifnextchar` which is used in a couple of places to prevent the AMS variant from being used since in some places this produced chaos (for example if an `fd` file is loaded in a random place then the optional argument to `\ProvidesFile` could get printed there instead of being written only in the log file. This happened when there was a space or a newline between the mandatory and optional arguments! It should really be fixed in the `amsmath` package one day, but...

Note that there may be other places in the kernel where this version should be used rather than the original, but variable, version.

```
678 \let\kernel@ifnextchar\@ifnextchar
```

(End definition for `\kernel@ifnextchar`.)

- `\@ifnch` `\@ifnch` is a tricky macro to skip any space tokens that may appear before the character in question. If it encounters a space token, it calls `xifnch`.

```
679 \def\@ifnch{%
680 \ifx\@let@token\@sptoken
681 \let\reserved@c\@xifnch
682 \else
683 \ifx\@let@token\reserved@d
684 \let\reserved@c\reserved@a
685 \else
686 \let\reserved@c\reserved@b
687 \fi
688 \fi
689 }
```

(End definition for `\@ifnch`.)

- `\@sptoken` The following code makes `\@sptoken` a space token. It is important here that the control sequence `\:` consists of a non-letter only, so that the following whitespace is significant. Together with the fact that the equal sign in a `\let` may be followed by only one optional space the desired effect is achieved. NOTE: the following hacking must precede the definition of `\:` as math medium space.

```
690 \def\:\{\let\@sptoken= } \: % this makes \@sptoken a space token
```

(End definition for `\@sptoken`.)

- `\@xifnch` In the following definition of `\@xifnch`, `\:` is again used to get a space token as delimiter into the definition.

```
691 \def\:\{\@xifnch} \expandafter\def\:\ {\futurelet\@let@token\@ifnch}
```

(End definition for `\@xifnch`.)

- `\@ifstar` The new implementation below avoids passing the *true code* through one more `\def` than the *false code*, which previously meant that `#` had to be written as `####` in one argument, but `##` in the other. The `*` is gobbled by `\@firstoftwo`.

```
692 \def\@ifstar#1{\@ifnextchar *{\@firstoftwo{#1}}}
```

(End definition for `\@ifstar`.)

```

\@dblarg
\@xdblarg 693 \long\def\@dblarg#1{\kernel@ifnextchar[{\#1}{\@xdblarg{#1}}]}
694 \long\def\@xdblarg#1#2[#1[{\#2}]{#2}]

(End definition for \@dblarg and \@xdblarg.)

```

**\@sanitize** The command `\@sanitize` changes the catcode of all special characters except for braces to ‘other’. It can be used for commands like `\index` that want to write their arguments verbatim. Needless to say, this command should only be executed within a group, or chaos will ensue.

```

695 \def\@sanitize{\@makeother\ \@makeother\\ \@makeother\$ \@makeother\&%
696 \@makeother\#\@makeother\^ \@makeother_ \@makeother\% \@makeother\~}

```

(End definition for \@sanitize.)

**\@onelvel@sanitize** This makes the whole “meaning” of #1 (its one-level expansion) into catcode 12 tokens: it could be used in `\DeclareRobustCommand`.

If it is to be used on default float specifiers, this should be done when they are defined.

```

697 \def \@onelvel@sanitize #1{%
698 \edef #1{\expandafter\strip@prefix
699 \meaning #1}%
700 }

```

(End definition for \@onelvel@sanitize.)

**\string@makeletter** Iterates through a string, turning each alphabetic character into a catcode-11 token (partly undoes a `\detokenize`). Useful for `\ifx`-based string comparisons where `\detokenize`-ing the other string would break too much code.

The macro uses `expl3`’s `\@expl@str@map@function@@NN` to iterate on the string (without losing spaces) and applies `\string@makeletter` on each character. The latter checks if character is between a–z or A–Z, and uses `\@alph` or `\@Alph` to get the corresponding catcode-11 token. Other tokens are passed through unchanged.

```

701 </2ekernel>
702 <latexrelease>\IncludeInRelease{2020/10/01}{\string@makeletter}
703 <latexrelease> {Add \string@makeletter}%
704 <2ekernel | latexrelease>
705 \def\string@makeletter#1{%
706 \@expl@str@map@function@@NN#1\@string@makeletter}
707 \def\@string@makeletter#1{%
708 \char@if@alph{#1}%
709 {\@expl@char@generate@nn{'#1}{11}}%
710 {#1}}
711 \def\char@if@alph#1{%
712 \ifnum0\ifnum`#1<`A 1\fi\ifnum`#1>`z 1\fi
713 \if\ifnum`#1>`Z @\fi\ifnum`#1<`a @\fi01\fi>0
714 \expandafter\@secondoftwo
715 \else
716 \expandafter\@firstoftwo
717 \fi}
718 </2ekernel | latexrelease>
719 <latexrelease>\EndIncludeInRelease
720 %

```

```

721 〈latexrelease〉\IncludeInRelease{0000/00/00}{\string@makeletter}
722 〈latexrelease〉 {Undefined \string@makeletter}%
723 〈latexrelease〉\let\string@makeletter\@undefined
724 〈latexrelease〉\let\@string@makeletter\@undefined
725 〈latexrelease〉\let\char@if@alph\@undefined
726 〈latexrelease〉\EndIncludeInRelease
727 {*2ekernel}

```

(End definition for `\string@makeletter`, `\@string@makeletter`, and `\char@if@alph`.)

`\makeatletter` Make internal control sequences accessible or inaccessible.

`\makeatother` 728 \DeclareRobustCommand\makeatletter{\catcode`@11\relax}
729 \DeclareRobustCommand\makeatother{\catcode`@12\relax}

(End definition for `\makeatletter` and `\makeatother`.)

## 2 Discretionary Hyphenation

\-  
`\@dischypf`

Moved here to be after the definition of `\DeclareRobustCommand`.

The primitive `\-` command adds a discretionary hyphen using the current font's `\hyphenchar`. Monospace fonts are usually declared with `\hyphenchar` set to `-1` to suppress hyphenation.

LATEX, from LATEX2.09 in 1986 defined `\-` by

```
\def\-\{\discretionary{-}{ }{ }\}
```

The following comment was added when these commands were first set up, 19 April 1986:

the `\-` command is redefined to allow it to work in the `\ttfamily` type style, where automatic hyphenation is suppressed by setting `\hyphenchar` to `-1`. The original primitive `TEX` definition is saved as `\@@hyph` just in case anyone needs it.

LATEX 2 $\varepsilon$ , between 1993 and 2017, had a comment at this point saying that the definition “would probably change” because the definition always uses `-`. The definition used below was given in comments at this point during time.

In 2017 we finally enabled this definition by default, with the older `LATEX` definition accessible via `latexrelease` as usual.

In `LuaLATEX` the primitive definition of `\-` is used directly because it's use of extended hyphenation parameters means that `\-` works correctly even with `\hyphenchar` set to `-1`. This change makes `\-` under `LuaLATEX` compatible with language specific hyphenation characters.

Temporary definition of `\@latex@info`, final definition is later.

```

730 \def\@latex@info#1{%
731 \ifx\directlua\undefined
732 \IncludeInRelease{2020/10/01}{\-\{Use primitive \- in Lua\LaTeX\}%
733 {*2ekernel | latexrelease}}
734 \else
735 \DeclareRobustCommand{\-}{%
736 \discretionary{}{%
737 \char \ifnum\hyphenchar<\z@

```

```

738 \defaulthyphenchar
739 \else
740 \hyphenchar\font
741 \fi
742 }{}{}%
743 }
744 \else
745 \let\-\@hyph
746 \fi
747 </2ekernel | latexrelease>
748 <latexrelease>\EndIncludeInRelease
749 <latexrelease>\IncludeInRelease{2017/04/15}{\Use \hyphenchar in \-}%
750 <latexrelease>\DeclareRobustCommand{\-}{%
751 <latexrelease> \discretionary{%
752 <latexrelease> \char \ifnum\hyphenchar\font<\z@
753 <latexrelease> \defaulthyphenchar
754 <latexrelease> \else
755 <latexrelease> \hyphenchar\font
756 <latexrelease> \fi
757 <latexrelease> }{}{}%
758 <latexrelease> }
759 <latexrelease>\EndIncludeInRelease
760 <latexrelease>\IncludeInRelease{0000/00/00}{\Use \hyphenchar in \-}%
761 <latexrelease>\def\-\{\discretionary{-}{ }{}{}\}
762 <latexrelease>\EndIncludeInRelease
763 <*2ekernel | latexrelease>
764 \let\@dischyp=\-
765 </2ekernel | latexrelease>
766 <*2ekernel>

(End definition for \- and \@dischyp.)
Delayed from ltvers.dtx
767 \newif\if@includeinrelease
768 \Q@includeinreleasefalse
Delayed from ltplain.dtx
769 </2ekernel>
770 <*2ekernel | latexrelease>
771 <latexrelease>\IncludeInRelease{2019/10/01}%
772 <latexrelease> {\allowbreak}{\Make various commands robust}%
773 \MakeRobust\allowbreak
774 \MakeRobust\bigbreak
775 \MakeRobust\break
776 \MakeRobust\dotfill
777 \MakeRobust\frenchspacing
778 \MakeRobust\goodbreak
779 \MakeRobust\hrulefill
780 \MakeRobust\medbreak
781 \MakeRobust\nobreak
782 \MakeRobust\nonfrenchspacing
783 \MakeRobust\obeyslines
784 \MakeRobust\obeyspaces
785 \MakeRobust\slash
786 \MakeRobust\smallbreak

```

```

787 \MakeRobust\strut
788 \MakeRobust\underbar
789 </2ekernel | latexrelease>
790 <latexrelease>\EndIncludeInRelease
791 <latexrelease>\IncludeInRelease{0000/00/00}%
792 <latexrelease> {\allowbreak}{\Make various commands robust}%
793 <latexrelease>
794 <latexrelease>\kernel@make@fragile\allowbreak
795 <latexrelease>\kernel@make@fragile\bigbreak
796 <latexrelease>\kernel@make@fragile\break
797 <latexrelease>\kernel@make@fragile\dotfill
798 <latexrelease>\kernel@make@fragile\frenchspacing
799 <latexrelease>\kernel@make@fragile\goodbreak
800 <latexrelease>\kernel@make@fragile\hrulefill
801 <latexrelease>\kernel@make@fragile\medbreak
802 <latexrelease>\kernel@make@fragile\nobreak
803 <latexrelease>\kernel@make@fragile\nonfrenchspacing
804 <latexrelease>\kernel@make@fragile\obeylines
805 <latexrelease>\kernel@make@fragile\obeyspaces
806 <latexrelease>\kernel@make@fragile\slash
807 <latexrelease>\kernel@make@fragile\smallbreak
808 <latexrelease>\kernel@make@fragile\strut
809 <latexrelease>\kernel@make@fragile\underbar
810 <latexrelease>
811 <latexrelease>\EndIncludeInRelease
812 <*2ekernel>

```

**\g@addto@macro** Globally add to the end of a macro.

```

813 \long\def\g@addto@macro#1#2{%
814 \begingroup
815 \toks@\expandafter{\#1#2}%
816 \xdef#1{\the\toks@}%
817 \endgroup}

```

(*End definition for \g@addto@macro.*)

```
818 </2ekernel>
```

# File g

## lthooks.dtx

### Contents

## 1 Introduction

Hooks are points in the code of commands or environments where it is possible to add processing code into existing commands. This can be done by different packages that do not know about each other and to allow for hopefully safe processing it is necessary to sort different chunks of code added by different packages into a suitable processing order.

This is done by the packages adding chunks of code (via `\AddToHook`) and labeling their code with some label by default using the package name as a label.

At `\begin{document}` all code for a hook is then sorted according to some rules (given by `\DeclareHookRule`) for fast execution without processing overhead. If the hook code is modified afterwards (or the rules are changed), a new version for fast processing is generated.

Some hooks are used already in the preamble of the document. If that happens then the hook is prepared for execution (and sorted) already at that point.

## 2 Package writer interface

The hook management system is offered as a set of CamelCase commands for traditional L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  packages (and for use in the document preamble if needed) as well as `expl3` commands for modern packages, that use the L3 programming layer of L<sup>A</sup>T<sub>E</sub>X. Behind the scenes, a single set of data structures is accessed so that packages from both worlds can coexist and access hooks in other packages.

### 2.1 L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> interfaces

#### 2.1.1 Declaring hooks and using them in code

With two exceptions, hooks have to be declared before they can be used. The exceptions are hooks in environments (i.e., executed at `\begin{...}` and `\end{...}`) and hooks run when loading files, e.g. before and after a package is loaded, etc. Their hook names depend on the environment or the file name and so declaring them beforehand is difficult.

---

`\NewHook {⟨hook⟩}`

Creates a new `⟨hook⟩`. If this is a hook provided as part of a package it is suggested that the `⟨hook⟩` name is always structured as follows: `⟨package-name⟩/⟨hook-name⟩`. If necessary you can further subdivide the name by adding more / parts. If a hook name is already taken, an error is raised and the hook is not created.

The `⟨hook⟩` can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

---

`\NewReversedHook` `\NewReversedHook {⟨hook⟩}`

Like `\NewHook` declares a new *⟨hook⟩*. the difference is that the code chunks for this hook are in reverse order by default (those added last are executed first). Any rules for the hook are applied after the default ordering. See sections 2.3 and 2.4 for further details.

The *⟨hook⟩* can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

---

`\NewMirroredHookPair` `\NewMirroredHookPair {⟨hook-1⟩} {⟨hook-2⟩}`

A shorthand for `\NewHook{⟨hook-1⟩}\NewReversedHook{⟨hook-2⟩}`.

The *⟨hooks⟩* can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

---

`\UseHook` `\UseHook {⟨hook⟩}`

Execute the hook code inside a command or environment.

Before `\begin{document}` the fast execution code for a hook is not set up, so in order to use a hook there it is explicitly initialized first. As that involves assignments using a hook at those times is not 100% the same as using it after `\begin{document}`.

The *⟨hook⟩* *cannot* be specified using the dot-syntax. A leading `.` is treated literally.

---

`\UseOneTimeHook` `\UseOneTimeHook {⟨hook⟩}`

Some hooks are only used (and can be only used) in one place, for example, those in `\begin{document}` or `\end{document}`. Once we have passed that point adding to the hook through a defined `\⟨addto-cmd⟩` command (e.g., `\AddToHook` or `\AtBeginDocument`, etc.) would have no effect (as would the use of such a command inside the hook code itself). It is therefore customary to redefine `\⟨addto-cmd⟩` to simply process its argument, i.e., essentially make it behave like `\@firstofone`.

`\UseOneTimeHook` does that: it records that the hook has been consumed and any further attempt to add to it will result in executing the code to be added immediately.

*FMi: Maybe add an error version as well?*

The *⟨hook⟩* *cannot* be specified using the dot-syntax. A leading `.` is treated literally.

### 2.1.2 Updating code for hooks

---

#### \AddToHook {*hook*}[*label*]{*code*}

Adds *code* to the *hook* labeled by *label*. When the optional argument *label* is not provided, the *default label* is used (see section 2.1.3). If \AddToHook is used in a package/class, the *default label* is the package/class name, otherwise it is **top-level** (the **top-level** label is treated differently: see section 2.1.4).

If there already exists code under the *label* then the new *code* is appended to the existing one (even if this is a reversed hook). If you want to replace existing code under the *label*, first apply \RemoveFromHook.

The hook doesn't have to exist for code to be added to it. However, if it is not declared, then obviously the added *code* will never be executed. This allows for hooks to work regardless of package loading order and enables packages to add to hooks from other packages without worrying whether they are actually used in the current document. See section 2.1.6.

The *hook* and *label* can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

---

#### \RemoveFromHook {*hook*}[*label*]

Removes any code labeled by *label* from the *hook*. When the optional argument *label* is not provided, the *default label* is used (see section 2.1.3).

If the code for that *label* wasn't yet added to the *hook*, an order is set so that when some code attempts to add that label, the removal order takes action and the code is not added.

If the optional argument is \*, then all code chunks are removed. This is rather dangerous as it drops code from other packages one may not know about!

The *hook* and *label* can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

In contrast to the **voids** relationship between two labels in a \DeclareHookRule this is a destructive operation as the labeled code is removed from the hook data structure, whereas the relationship setting can be undone by providing a different relationship later.

A useful application for this declaration inside the document body is when one wants to temporarily add code to hooks and later remove it again, e.g.,

```
\AddToHook{env/quote/before}{\small}
\begin{quote}
 A quote set in a smaller typeface
\end{quote}
...
\RemoveFromHook{env/quote/before}
... now back to normal for further quotes
```

Note that you can't cancel the setting with

```
\AddToHook{env/quote/before}{}
because that only "adds" a further empty chunk of code to the hook. Adding
\normalsize would work but that means the hook then contained \small\normalsize
which means to font size changes for no good reason.
```

The above is only needed if one wants to typeset several quotes in a smaller typeface. If the hook is only needed once then `\AddToHookNext` is simpler, because it resets itself after one use.

---

`\AddToHookNext {⟨hook⟩}{⟨code⟩}`

Adds `⟨code⟩` to the next invocation of the `⟨hook⟩`. The code is executed after the normal hook code has finished and it is executed only once, i.e. it is deleted after it was used.

Using the declaration is a global operation, i.e., the code is not lost, even if the declaration is used inside a group and the next invocation happens after the group. If the declaration is used several times before the hook is executed then all code is executed in the order in which it was declared.<sup>2</sup>

It is possible to nest declarations using the same hook (or different hooks), e.g.,

`\AddToHookNext{⟨hook⟩}{⟨code-1⟩}\AddToHookNext{⟨hook⟩}{⟨code-2⟩}}`

will execute `⟨code-1⟩` next time the `⟨hook⟩` is used and at that point puts `⟨code-2⟩` into the `⟨hook⟩` so that it gets executed on following time the hook is run.

A hook doesn't have to exist for code to be added to it. This allows for hooks to work regardless of package loading order. See section 2.1.6.

The `⟨hook⟩` can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

### 2.1.3 Hook names and default labels

It is best practice to use `\AddToHook` in packages or classes *without specifying a ⟨label⟩* because then the package or class name is automatically used, which is helpful if rules are needed, and avoids mistyping the `⟨label⟩`.

Using an explicit `⟨label⟩` is only necessary in very specific situations, e.g., if you want to add several chunks of code into a single hook and have them placed in different parts of the hook (by providing some rules).

The other case is when you develop a larger package with several sub-packages. In that case you may want to use the same `⟨label⟩` throughout the sub-packages in order to avoid that the labels change if you internally reorganize your code.

Except for `\UseHook`, `\UseOneTimeHook`, `\IfHookEmptyTF`, and `\IfHookExistsTF` (and their `expl3` interfaces `\hook_use:n`, `\hook_use_once:n`, `\hook_if_empty:nTF`, and `\hook_if_exist:nTF`), all `⟨hook⟩` and `⟨label⟩` arguments are processed in the same way: first, spaces are trimmed around the argument, then it is fully expanded until only character tokens remain. If the full expansion of the `⟨hook⟩` or `⟨label⟩` contains a non-expandable non-character token, a low-level TeX error is raised (namely, the `⟨hook⟩` is expanded using TeX's `\csname... \endcsname`, as such, Unicode characters are allowed in `⟨hook⟩` and `⟨label⟩` arguments). The arguments of `\UseHook`, `\UseOneTimeHook`, `\IfHookEmptyTF`, and `\IfHookExistsTF` are processed much in the same way except that spaces are not trimmed around the argument, for better performance.

It is not enforced, but highly recommended that the hooks defined by a package, and the `⟨labels⟩` used to add code to other hooks contain the package name to easily identify the source of the code chunk and to prevent clashes. This should be the standard practice, so this hook management code provides a shortcut to refer to the current package in the name of a `⟨hook⟩` and in a `⟨label⟩`. If the `⟨hook⟩` name or the `⟨label⟩` consist just of a single dot (.), or starts with a dot followed by a slash (./) then the dot denotes the `⟨default`

---

<sup>2</sup>There is no mechanism to reorder such code chunks (or delete them).

*label* (usually the current package or class name—see `\SetDefaultHookLabel`). A “.” or “./” anywhere else in a *hook* or in *label* is treated literally and is not replaced.

For example, inside the package `mypackage.sty`, the default label is `mypackage`, so the instructions:

```
\NewHook {./hook}
\AddToHook {./hook}[]{}{code} % Same as \AddToHook{./hook}{code}
\AddToHook {./hook}[/sub]{}{code}
\DeclareHookRule{begindocument}{}{before}{babel}
\AddToHook {file/after/foo.tex}{code}
```

are equivalent to:

```
\NewHook {mymodule/module}
\AddToHook {mymodule/module} [mymodule]{code}
\AddToHook {mymodule/module} [/sub]{code}
\DeclareHookRule{begindocument}{mymodule}{before}{babel}
\AddToHook {file/after/foo.tex}{code} % unchanged
```

The *default label* is automatically set equal to the name of the current package or class at the time the package is loaded. If the hook command is used outside of a package, or the current file wasn’t loaded with `\usepackage` or `\documentclass`, then the `top-level` is used as the *default label*. This may have exceptions—see `\PushDefaultHookLabel`.

This syntax is available in all *label* arguments and most *hook* arguments, both in the  $\text{\LaTeX}\ 2\varepsilon$  interface, and the  $\text{\LaTeX}3$  interface described in section 2.2.

Note, however, that the replacement of `.` by the *default label* takes place when the hook command is executed, so actions that are somehow executed after the package ends will have the wrong *default label* if the dot-syntax is used. For that reason, this syntax is not available in `\UseHook` (and `\hook_use:n`) because the hook is most of the time used outside of the package file in which it was defined. This syntax is also not available in the hook conditionals `\IfHookEmptyTF` (and `\hook_if_empty:nTF`) and `\IfHookExistsTF` (and `\hook_if_exist:nTF`) because these conditionals are used in some performance-critical parts of the hook management code, and because they are usually used to refer to other package’s hooks, so the dot-syntax doesn’t make much sense.

In some cases, for example in large packages, one may want to separate it in logical parts, but still use the main package name as *label*, then the *default label* can be set using `\SetDefaultHookLabel` or `\PushDefaultHookLabel..\\PopDefaultHookLabel`.

---

```
\PushDefaultHookLabel {<default label>}
 <code>
\PopDefaultHookLabel
```

---

\PushDefaultHookLabel sets the current *<default label>* to be used in *<label>* arguments, or when replacing a leading “.” (see above). \PopDefaultHookLabel reverts the *<default label>* to its previous value.

Inside a package or class, the *<default label>* is equal to the package or class name, unless explicitly changed. Everywhere else, the *<default label>* is **top-level** (see section 2.1.4) unless explicitly changed.

The effect of \PushDefaultHookLabel holds until the next \PopDefaultHookLabel. \usepackage (and \RequirePackage and \documentclass) internally use

```
\PushDefaultHookLabel{<package name>}
 <package code>
\PopDefaultHookLabel
```

to set the *<default label>* for the package or class file. Inside the *<package code>* the *<default label>* can also be changed with \SetDefaultHookLabel. \input and other file input-related commands from the L<sup>A</sup>T<sub>E</sub>X kernel do not use \PushDefaultHookLabel, so code within files loaded by these commands does *not* get a dedicated *<label>*! (that is, the *<default label>* is the current active one when the file was loaded.)

Packages that provide their own package-like interfaces (TikZ’s \usetikzlibrary, for example) can use \PushDefaultHookLabel and \PopDefaultHookLabel to set dedicated labels and emulate \usepackage-like hook behaviour within those contexts.

The **top-level** label is treated differently, and is reserved to the user document, so it is not allowed to change the *<default label>* to **top-level**.

---

```
\SetDefaultHookLabel {<default label>}
```

---

Similarly to \PushDefaultHookLabel, sets the current *<default label>* to be used in *<label>* arguments, or when replacing a leading “.”. The effect holds until the label is changed again or until the next \PopDefaultHookLabel. The difference between \PushDefaultHookLabel and \SetDefaultHookLabel is that the latter does not save the current *<default label>*.

This command is useful when a large package is composed of several smaller packages, but all should have the same *<label>*, so \SetDefaultHookLabel can be used at the beginning of each package file to set the correct label.

\SetDefaultHookLabel is not allowed in the main document, where the *<default label>* is **top-level** and there is no \PopDefaultHookLabel to end its effect. It is also not allowed to change the *<default label>* to **top-level**.

#### 2.1.4 The top-level label

The **top-level** label, assigned to code added from the main document, is different from other labels. Code added to hooks (usually \AtBeginDocument) in the preamble is almost always to change something defined by a package, so it should go at the very end of the hook.

Therefore, code added in the **top-level** is always executed at the end of the hook, regardless of where it was declared. If the hook is reversed (see \NewReversedHook), the **top-level** chunk is executed at the very beginning instead.

Rules regarding `top-level` have no effect: if a user wants to have a specific set of rules for a code chunk, they should use a different label to said code chunk, and provide a rule for that label instead.

The `top-level` label is exclusive for the user, so trying to add code with that label from a package results in an error.

### 2.1.5 Defining relations between hook code

The default assumption is that code added to hooks by different packages are independent and the order in which they are executed is irrelevant. While this is true in many cases it is obviously false in others.

Before the hook management system was introduced packages had to take elaborate precaution to determine of some other package got loaded as well (before or after) and find some ways to alter its behavior accordingly. In addition it was often the user's responsibility to load packages in the right order so that code added to hooks got added in the right order and some cases even altering the loading order wouldn't resolve the conflicts.

With the new hook management system it is now possible to define rules (i.e., relationships) between code chunks added by different packages and explicitly describe in which order they should be processed.

---

```
\DeclareHookRule {<hook>}{{<label1>}}{<relation>}{{<label2>}}
```

Defines a relation between `<label1>` and `<label2>` for a given `<hook>`. If `<hook>` is `??` this defines a default relation for all hooks that use the two labels, i.e., that have chunks of code labeled with `<label1>` and `<label2>`. Rules specific to a given hook take precedence over default rules that use `??` as the `<hook>`.

Currently, the supported relations are the following:

`before` or `<` Code for `<label1>` comes before code for `<label2>`.

`after` or `>` Code for `<label1>` comes after code for `<label2>`.

`incompatible-warning` Only code for either `<label1>` or `<label2>` can appear for that hook (a way to say that two packages—or parts of them—are incompatible). A warning is raised if both labels appear in the same hook.

`incompatible-error` Like `incompatible-warning` but instead of a warning a L<sup>A</sup>T<sub>E</sub>X error is raised, and the code for both labels are dropped from that hook until the conflict is resolved.

`voids` Code for `<label1>` overwrites code for `<label2>`. More precisely, code for `<label2>` is dropped for that hook. This can be used, for example if one package is a superset in functionality of another one and therefore wants to undo code in some hook and replace it with its own version.

`unrelated` The order of code for `<label1>` and `<label2>` is irrelevant. This rule is there to undo an incorrect rule specified earlier.

There can only be a single relation between two labels for a given hook, i.e., a later `\DeclareHookrule` overwrites any previous declaration.

The `<hook>` and `<label>` can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

---

`\ClearHookRule`

`\ClearHookRule{\hook}{\label1}{\label2}`

Syntactic sugar for saying that `\label1` and `\label2` are unrelated for the given `\hook`.

---

`\DeclareDefaultHookRule`

`\DeclareDefaultHookRule{\label1}{\relation}{\label2}`

This sets up a relation between `\label1` and `\label2` for all hooks unless overwritten by a specific rule for a hook. Useful for cases where one package has a specific relation to some other package, e.g., is `incompatible` or always needs a special ordering `before` or `after`. (Technically it is just a shorthand for using `\DeclareHookRule` with `??` as the hook name.)

Declaring default rules is only supported in the document preamble.<sup>3</sup>

The `\label` can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

### 2.1.6 Querying hooks

Simpler data types, like token lists, have three possible states; they can:

- exist and be empty;
- exist and be non-empty; and
- not exist (in which case emptiness doesn't apply);

Hooks are a bit more complicated: they have four possible states. A hook may exist or not, and either way it may or may not be empty. This means that even a hook that doesn't exist may be non-empty.

This seemingly strange state may happen when, for example, package *A* defines hook `A/foo`, and package *B* adds some code to that hook. However, a document may load package *B* before package *A*, or may not load package *A* at all. In both cases some code is added to hook `A/foo` without that hook being defined yet, thus that hook is said to be non-empty, whereas it doesn't exist. Therefore, querying the existence of a hook doesn't imply its emptiness, neither does the other way around.

A hook is said to be empty when no code was added to it, either to its permanent code pool, or to its “next” token list. The hook doesn't need to be declared to have code added to its code pool. A hook is said to exist when it was declared with `\NewHook` or some variant thereof. Generic `file` and `env` hooks are automatically declared when code is added to them.

---

`\IfHookEmptyTF *`

`\IfHookEmptyTF {\hook} {\truecode} {\falsecode}`

Tests if the `\hook` is empty (*i.e.*, no code was added to it using either `\AddToHook` or `\AddToHookNext`), and branches to either `\truecode` or `\falsecode` depending on the result.

The `\hook` cannot be specified using the dot-syntax. A leading `.` is treated literally.

---

<sup>3</sup>Trying to do so, e.g., via `\DeclareHookRule` with `??` has bad side-effects and is not supported (though not explicitly caught for performance reasons).

---

```
\IfHookExistsTF *
```

Tests if the *hook* exists (if it was created with either `\NewHook`, `\NewReversedHook`, or `\NewMirroredHookPair`), and branches to either *true code* or *false code* depending on the result.

The existence of a hook usually doesn't mean much from the viewpoint of code that tries to add/remove code from that hook, since package loading order may vary, thus the creation of hooks is asynchronous to adding and removing code from it, so this test should be used sparingly.

Generic hooks are declared at the time code is added to them, so the result of `\hook_if_exist:n` will change once code is added to said hook (unless the hook was previously declared).

The *hook* cannot be specified using the dot-syntax. A leading `.` is treated literally.

*FMi: Would be helpful if we provide some use cases*

### 2.1.7 Displaying hook code

If one has to adjust the code execution in a hook using a hook rule it is helpful to get some information about the code associated with a hook, its current order and the existing rules.

---

```
\ShowHook {<hook>}
```

---

```
\LogHook
```

Displays information about the *hook* such as

- the code chunks (and their labels) added to it,
- any rules set up to order them,
- the computed order in which the chunks are executed,
- any code executed on the next invocation only.

`\LogHook` prints the information to the `.log` file, and `\ShowHook` prints them to the terminal/command window and starts TeX's prompt (only in `\errorstopmode`) to wait for user action.

The *hook* can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

Suppose a hook `example-hook` whose output of `\ShowHook{example-hook}` is:

```
1 -> The hook 'example-hook':
2 > Code chunks:
3 > foo -> [code from package 'foo']
4 > bar -> [from package 'bar']
5 > baz -> [package 'baz' is here]
6 > Document-level (top-level) code (executed last):
7 > -> [code from 'top-level']
8 > Extra code for next invocation:
9 > -> [one-time code]
10 > Rules:
11 > foo|baz with relation >
```

```

12 > baz|bar with default relation <
13 > Execution order (after applying rules):
14 > baz, foo, bar.

```

In the listing above, lines 3 to 5 show the three code chunks added to the hook and their respective labels in the format

$\langle label \rangle \rightarrow \langle code \rangle$

Line 7 shows the code chunk added by the user in the main document (labeled **top-level**) in the format

Document-level (top-level) code (executed  $\langle first/last \rangle$ ):  
 $\rightarrow \langle top-level\ code \rangle$

This code will be either the first or last code executed by the hook (**last** if the hook is normal, **first** if it is reversed). This chunk is not affected by rules and does not take part in sorting.

Line 9 shows the code chunk for the next execution of the hook in the format

$\rightarrow \langle next-code \rangle$

This code will be used and disappear at the next `\UseHook{example-hook}`, in contrast to the chunks mentioned earlier, which can only be removed from that hook by doing `\RemoveFromHook{\langle label \rangle}{example-hook}`.

Lines 11 and 12 show the rules declared that affect this hook in the format

$\langle label-1 \rangle | \langle label-2 \rangle \text{ with } \langle \text{default?} \rangle \text{ relation } \langle relation \rangle$

which means that the  $\langle relation \rangle$  applies to  $\langle label-1 \rangle$  and  $\langle label-2 \rangle$ , in that order, as detailed in `\DeclareHookRule`. If the relation is **default** it means that that rule applies to  $\langle label-1 \rangle$  and  $\langle label-2 \rangle$  in *all* hooks, (unless overriden by a non-default relation).

Finally, line 14 lists the labels in the hook after sorting; that is, in the order they will be executed when the hook is used.

### 2.1.8 Debugging hook code

---

`\DebugHooksOn`  
`\DebugHooksOff`

Turn the debugging of hook code on or off. This displays changes made to the hook data structures. The output is rather coarse and not really intended for normal use.

## 2.2 L3 programming layer (`expl3`) interfaces

This is a quick summary of the L<sup>A</sup>T<sub>E</sub>X3 programming interfaces for use with packages written in `expl3`. In contrast to the L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> interfaces they always use mandatory arguments only, e.g., you always have to specify the  $\langle label \rangle$  for a code chunk. We therefore suggest to use the declarations discussed in the previous section even in `expl3` packages, but the choice is yours.

|                                      |                                                                                                                                                                                                                                                                                                |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>\hook_new:n</code>             | <code>\hook_new:n {&lt;hook&gt;}</code>                                                                                                                                                                                                                                                        |
| <code>\hook_new_reversed:n</code>    | <code>\hook_new_reversed:n {&lt;hook&gt;}</code>                                                                                                                                                                                                                                               |
| <code>\hook_new_pair:nn</code>       | <code>\hook_new_pair:nn {&lt;hook-1&gt;} {&lt;hook-2&gt;}</code>                                                                                                                                                                                                                               |
|                                      | Creates a new <code>&lt;hook&gt;</code> with normal or reverse ordering of code chunks. <code>\hook_new_pair:nn</code> creates a pair of such hooks with <code>{&lt;hook-2&gt;}</code> being a reversed hook. If a hook name is already taken, an error is raised and the hook is not created. |
|                                      | The <code>&lt;hook&gt;</code> can be specified using the dot-syntax to denote the current package name. See section 2.1.3.                                                                                                                                                                     |
| <code>\hook_use:n</code>             | <code>\hook_use:n {&lt;hook&gt;}</code>                                                                                                                                                                                                                                                        |
|                                      | Executes the <code>{&lt;hook&gt;}</code> code followed (if set up) by the code for next invocation only, then empties that next invocation code.                                                                                                                                               |
|                                      | The <code>&lt;hook&gt;</code> cannot be specified using the dot-syntax. A leading <code>.</code> is treated literally.                                                                                                                                                                         |
| <code>\hook_use_once:n</code>        | <code>\hook_use_once:n {&lt;hook&gt;}</code>                                                                                                                                                                                                                                                   |
|                                      | Changes the <code>{&lt;hook&gt;}</code> status so that from now on any addition to the hook code is executed immediately. Then execute any <code>{&lt;hook&gt;}</code> code already set up.                                                                                                    |
|                                      | The <code>&lt;hook&gt;</code> cannot be specified using the dot-syntax. A leading <code>.</code> is treated literally.                                                                                                                                                                         |
| <code>\hook_gput_code:nnn</code>     | <code>\hook_gput_code:nnn {&lt;hook&gt;} {&lt;label&gt;} {&lt;code&gt;}</code>                                                                                                                                                                                                                 |
|                                      | Adds a chunk of <code>&lt;code&gt;</code> to the <code>&lt;hook&gt;</code> labeled <code>&lt;label&gt;</code> . If the label already exists the <code>&lt;code&gt;</code> is appended to the already existing code.                                                                            |
|                                      | If code is added to an external <code>&lt;hook&gt;</code> (of the kernel or another package) then the convention is to use the package name as the <code>&lt;label&gt;</code> not some internal module name or some other arbitrary string.                                                    |
|                                      | The <code>&lt;hook&gt;</code> and <code>&lt;label&gt;</code> can be specified using the dot-syntax to denote the current package name. See section 2.1.3.                                                                                                                                      |
| <code>\hook_gput_next_code:nn</code> | <code>\hook_gput_next_code:nn {&lt;hook&gt;} {&lt;code&gt;}</code>                                                                                                                                                                                                                             |
|                                      | Adds a chunk of <code>&lt;code&gt;</code> for use only in the next invocation of the <code>&lt;hook&gt;</code> . Once used it is gone.                                                                                                                                                         |
|                                      | This is simpler than <code>\hook_gput_code:nnn</code> , the code is simply appended to the hook in the order of declaration at the very end, i.e., after all standard code for the hook got executed.                                                                                          |
|                                      | Thus if one needs to undo what the standard does one has to do that as part of <code>&lt;code&gt;</code> .                                                                                                                                                                                     |
|                                      | The <code>&lt;hook&gt;</code> can be specified using the dot-syntax to denote the current package name. See section 2.1.3.                                                                                                                                                                     |

---

**\hook\_gremove\_code:nn**

```
\hook_gremove_code:nn {\hook} {\label}
```

Removes any code for *hook* labeled *label*.

If the code for that *label* wasn't yet added to the *hook*, an order is set so that when some code attempts to add that label, the removal order takes action and the code is not added.

If the second argument is \*, then all code chunks are removed. This is rather dangerous as it drops code from other packages one may not know about, so think twice before using that!

The *hook* and *label* can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

---

**\hook\_gset\_rule:nnnn**

```
\hook_gset_rule:nnnn {\hook} {\label1} {\relation} {\label2}
```

Relate *label1* with *label2* when used in *hook*. See \DeclareHookRule for the allowed *relation*s. If *hook* is ?? a default rule is specified.

The *hook* and *label* can be specified using the dot-syntax to denote the current package name. See section 2.1.3. The dot-syntax is parsed in both *label* arguments, but it usually makes sense to be used in only one of them.

---

**\hook\_if\_empty\_p:n \***  
**\hook\_if\_empty:nTF \***

```
\hook_if_empty:nTF {\hook} {\true} {\false}
```

Tests if the *hook* is empty (*i.e.*, no code was added to it using either \AddToHook or \AddToHookNext), and branches to either *true code* or *false code* depending on the result.

The *hook* cannot be specified using the dot-syntax. A leading . is treated literally.

---

**\hook\_if\_exist\_p:n \***  
**\hook\_if\_exist:nTF \***

```
\hook_if_exist:nTF {\hook} {\true} {\false}
```

Tests if the *hook* exists (if it was created with either \NewHook, \NewReversedHook, or \NewMirroredHookPair), and branches to either *true code* or *false code* depending on the result.

The existence of a hook usually doesn't mean much from the viewpoint of code that tries to add/remove code from that hook, since package loading order may vary, thus the creation of hooks is asynchronous to adding and removing code from it, so this test should be used sparingly.

Generic hooks are declared at the time code is added to them, so the result of \hook\_if\_exist:n will change once code is added to said hook (unless the hook was previously declared).

The *hook* cannot be specified using the dot-syntax. A leading . is treated literally.

---

`\hook_show:n` `\hook_show:n {<hook>}`

`\hook_log:n` Displays information about the `<hook>` such as

- the code chunks (and their labels) added to it,
- any rules set up to order them,
- the computed order in which the chunks are executed,
- any code executed on the next invocation only.

`\hook_log:n` prints the information to the `.log` file, and `\hook_show:n` prints them to the terminal/command window and starts T<sub>E</sub>X's prompt (only if `\errorstopmode`) to wait for user action.

The `<hook>` can be specified using the dot-syntax to denote the current package name. See section 2.1.3.

---

`\hook_debug_on:`

`\hook_debug_off:`

Turns the debugging of hook code on or off. This displays changes to the hook data.

## 2.3 On the order of hook code execution

Chunks of code for a `<hook>` under different labels are supposed to be independent if there are no special rules set up that define a relation between the chunks. This means that you can't make assumptions about the order of execution!

Suppose you have the following declarations:

```
\NewHook{myhook}
\AddToHook{myhook}{packageA}{\typeout{A}}
\AddToHook{myhook}{packageB}{\typeout{B}}
\AddToHook{myhook}{packageC}{\typeout{C}}
```

then executing the hook with `\UseHook` will produce the typeout A B C in that order. In other words, the execution order is computed to be `packageA`, `packageB`, `packageC` which you can verify with `\ShowHook{myhook}`:

```
-> The hook 'myhook':
> Code chunks:
> packageA -> \typeout {A}
> packageB -> \typeout {B}
> packageC -> \typeout {C}
> Document-level (top-level) code (executed last):
> ---
> Extra code for next invocation:
> ---
> Rules:
> ---
> Execution order:
> packageA, packageB, packageC.
```

The reason is that the code chunks are internally saved in a property list and the initial order of such a property list is the order in which key-value pairs got added. However, that is only true if nothing other than adding happens!

Suppose, or example, you want to replace the code chunk for `packageA`, e.g.,

```
\RemoveFromHook{myhook}{packageA}
\AddToHook{myhook}{packageA}{\typeout{A alt}}
```

then your order becomes `packageB`, `packageC`, `packageA` because the label got removed from the property list and then re-added (at its end).

While that may not be too surprising, the execution order is also sometimes altered if you add a redundant rule, e.g. if you specify

```
\DeclareHookRule{myhook}{packageA}{before}{packageB}
```

instead of the previous lines we get

```
-> The hook 'myhook':
> Code chunks:
> packageA -> \typeout {A}
> packageB -> \typeout {B}
> packageC -> \typeout {C}
> Document-level (top-level) code (executed last):
> ---
> Extra code for next invocation:
> ---
> Rules:
> packageB|packageA with relation >
> Execution order (after applying rules):
> packageA, packageC, packageB.
```

As you can see the code chunks are still in the same order, but in the execution order for the labels `packageB` and `packageC` have swapped places. The reason is that, with the rule there are two orders that satisfy it, and the algorithm for sorting happened to pick a different one compared to the case without rules (where it doesn't run at all as there is nothing to resolve). Incidentally, if we had instead specified the redundant rule

```
\DeclareHookRule{myhook}{packageB}{before}{packageC}
```

the execution order would not have changed.

In summary: it is not possible to rely on the order of execution unless there are rules that partially or fully define the order (in which you can rely on them being fulfilled).

## 2.4 The use of “reversed” hooks

You may have wondered why you can declare a “reversed” hook with `\NewReversedHook` and what that does exactly.

In short: the execution order of a reversed hook (without any rules!) is exactly reversed to the order you would have gotten for a hook declared with `\NewHook`.

This is helpful if you have a pair of hooks where you expect to see code added that involves grouping, e.g., starting an environment in the first and closing that environment in the second hook. To give a somewhat contrived example<sup>4</sup>, suppose there is a package adding the following:

---

<sup>4</sup>there are simpler ways to achieve the same effect.

```
\AddToHook{env/quote/before}{[package-1]}{\begin{itshape}}
\AddToHook{env/quote/after}{[package-1]}{\end{itshape}}
```

As a result, all quotes will be in italics. Now suppose further that another `package-too` makes the quotes also in blue and therefore adds:

```
\usepackage{color}
\AddToHook{env/quote/before}{[package-too]}{\begin{color}{blue}}
\AddToHook{env/quote/after}{[package-too]}{\end{color}}
```

Now if the `env/quote/after` hook would be a normal hook we would get the same execution order in both hooks, namely:

`package-1, package-too`

(or vice versa) and as a result, would get:

```
\begin{itshape}\begin{color}{blue} ...
\end{itshape}\end{color}
```

and an error message that `\begin{color}` ended by `\end{itshape}`. With `env/quote/after` declared as a reversed hook the execution order is reversed and so all environments are closed in the correct sequence and `\ShowHook` would give us the following output:

```
-> The hook 'env/quote/after':
> Code chunks:
> package-1 -> \end {itshape}
> package-too -> \end {color}
> Document-level (top-level) code (executed first):
> ---
> Extra code for next invocation:
> ---
> Rules:
> ---
> Execution order (after reversal):
> package-too, package-1.
```

The reversal of the execution order happens before applying any rules, so if you alter the order you will probably have to alter it in both hooks, not just in one, but that depends on the use case.

## 2.5 Difference between “normal” and “one-time” hooks

When executing a hook a developer has the choice of using either `\UseHook` or `\UseOneTimeHook` (or their `expl3` equivalents `\hook_use:n` and `\hook_use_once:n`). This choice affects how `\AddToHook` is handled after the hook has been executed for the first time.

With normal hooks adding code via `\AddToHook` means that the code chunk is added to the hook data structure and then used each time `\UseHook` is called.

With one-time hooks it this is handled slightly differently: After `\UseOneTimeHook` has been called, any further attempts to add code to the hook via `\AddToHook` will simply execute the `<code>` immediately.

This has some consequences one needs to be aware of:

- If  $\langle code \rangle$  is added to a normal hook after the hook was executed and it is never executed again for one or the other reason, then this new  $\langle code \rangle$  will never be executed.
- In contrast if that happens with a one-time hook the  $\langle code \rangle$  is executed immediately.

In particular this means that construct such as

```
\AddToHook{myhook}
{ \langle code-1 \rangle \AddToHook{myhook}{\langle code-2 \rangle} \langle code-3 \rangle }
```

works for one-time hooks<sup>5</sup> (all three code chunks are executed one after another), but it makes little sense with a normal hook, because with a normal hook the first time `\UseHook{myhook}` is executed it would

- execute  $\langle code-1 \rangle$ ,
- then execute `\AddToHook{myhook}{code-2}` which adds the code chunk  $\langle code-2 \rangle$  to the hook for use on the next invocation,
- and finally execute  $\langle code-3 \rangle$ .

The second time `\UseHook` is called it would execute the above and in addition  $\langle code-2 \rangle$  as that was added as a code chunk to the hook in the meantime. So each time the hook is used another copy of  $\langle code-2 \rangle$  is added and so that code chunk is executed  $\langle \# \text{ of invocations} \rangle - 1$  times.

## 2.6 Private L<sup>A</sup>T<sub>E</sub>X kernel hooks

There are a few places where it is absolutely essential for L<sup>A</sup>T<sub>E</sub>X to function correctly that code is executed in a precisely defined order. Even that could have been implemented with the hook management (by adding various rules to ensure the appropriate ordering with respect to other code added by packages). However, this makes every document unnecessary slow, because there has to be sorting even though the result is predetermined. Furthermore it forces package writers to unnecessarily add such rules if they add further code to the hook (or break L<sup>A</sup>T<sub>E</sub>X).

For that reason such code is not using the hook management, but instead private kernel commands directly before or after a public hook with the following naming convention: `\@kernel@before@<hookname>` or `\@kernel@after@<hookname>`. For example, in `\enddocument` you find

```
\UseHook{enddocument}%
\@kernel@after@enddocument
```

which means first the user/package-accessible `enddocument` hook is executed and then the internal kernel hook. As their name indicates these kernel commands should not be altered by third-party packages, so please refrain from that in the interest of stability and instead use the public hook next to it.<sup>6</sup>

---

<sup>5</sup>This is sometimes used with `\AtBeginDocument` which is why it is supported.

<sup>6</sup>As with everything in T<sub>E</sub>X there is no enforcement of this rule, and by looking at the code it is easy to find out how the kernel adds to them. The main reason of this section is therefore to say “please don’t do that, this is unconfigurable code!”

## 2.7 Legacy L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> interfaces

L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  offered a small number of hooks together with commands to add to them. They are listed here and are retained for backwards compatibility.

With the new hook management several additional hooks have been added to L<sup>A</sup>T<sub>E</sub>X and more will follow. See the next section for what is already available.

---

### `\AtBeginDocument`

`\AtBeginDocument [<label>] {<code>}`

If used without the optional argument  $\langle label \rangle$ , it works essentially like before, i.e., it is adding  $\langle code \rangle$  to the hook `begindocument` (which is executed inside `\begin{document}`). However, all code added this way is labeled with the label `top-level` (see section 2.1.4) if done outside of a package or class or with the package/class name if called inside such a file (see section 2.1.3).

This way one can add further code to the hook using `\AddToHook` or `\AtBeginDocument` using a different label and explicitly order the code chunks as necessary, e.g., run some code before or after another package's code. When using the optional argument the call is equivalent to running `\AddToHook {begindocument} [<label>] {<code>}`.

`\AtBeginDocument` is a wrapper around the `begindocument` hook (see section 2.8.2), which is a one-time hook. As such, after the `begindocument` hook is executed at `\begin{document}` any attempt to add  $\langle code \rangle$  to this hook with `\AtBeginDocument` or with `\AddToHook` will cause that  $\langle code \rangle$  to execute immediately instead. See section 2.5 for more on one-time hooks.

For important packages with known order requirement we may over time add rules to the kernel (or to those packages) so that they work regardless of the loading-order in the document.

---

### `\AtEndDocument`

Like `\AtBeginDocument` but for the `enddocument` hook.

---

### `\AtBeginDvi`

This hook is discussed in conjunction with the shipout hooks.

The few hooks that existed previously in L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  used internally commands such as `\@begindocumenthook` and packages sometimes augmented them directly rather than working through `\AtBeginDocument`. For that reason there is currently support for this, that is, if the system detects that such an internal legacy hook command contains code it adds it to the new hook system under the label `legacy` so that it doesn't get lost.

However, over time the remaining cases of direct usage need updating because in one of the future release of L<sup>A</sup>T<sub>E</sub>X we will turn this legacy support off, as it does unnecessary slow down the processing.

## 2.8 L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> commands and environments augmented by hooks

*intro to be written*

### 2.8.1 Generic hooks for all environments

Every environment  $\langle env \rangle$  has now four associated hooks coming with it:

**env/ $\langle env \rangle$ /before** This hook is executed as part of `\begin` as the very first action, in particular prior to starting the environment group. Its scope is therefore not restricted by the environment.

**env/ $\langle env \rangle$ /begin** This hook is executed as part of `\begin` directly in front of the code specific to the environment start (e.g., the second argument of `\newenvironment`). Its scope is the environment body.

**env/ $\langle env \rangle$ /end** This hook is executed as part of `\end` directly in front of the code specific to the end of the environment (e.g., the third argument of `\newenvironment`).

**env/ $\langle env \rangle$ /after** This hook is executed as part of `\end` after the code specific to the environment end and after the environment group has ended. Its scope is therefore not restricted by the environment.

The hook is implemented as a reversed hook so if two packages add code to `env/ $\langle env \rangle$ /before` and to `env/ $\langle env \rangle$ /after` they can add surrounding environments and the order of closing them happens in the right sequence.

Generic environment hooks are never one-time hooks even with environments that are supposed to appear only once in a document.<sup>7</sup> In contrast to other hooks there is also no need to declare them using `\NewHook`.

The hooks are only executed if `\begin{ $\langle env \rangle$ }` and `\end{ $\langle env \rangle$ }` is used. If the environment code is executed via low-level calls to `\langle env \rangle` and `\end{ $\langle env \rangle$`  (e.g., to avoid the environment grouping) they are not available. If you want them available in code using this method, you would need to add them yourself, i.e., write something like

```
\UseHook{env/quote/before}\quote
...
\endquote\UseHook{env/quote/after}
```

to add the outer hooks, etc.

---

**\BeforeBeginEnvironment**

```
\BeforeBeginEnvironment [$\langle label \rangle$] { $\langle code \rangle$ }
```

This declaration adds to the `env/ $\langle env \rangle$ /before` hook using the  $\langle label \rangle$ . If  $\langle label \rangle$  is not given, the  $\langle default label \rangle$  is used (see section 2.1.3).

---

**\AtBeginEnvironment**

```
\AtBeginEnvironment [$\langle label \rangle$] { $\langle code \rangle$ }
```

Like `\BeforeBeginEnvironment` but adds to the `env/ $\langle env \rangle$ /begin` hook.

---

**\AtEndEnvironment**

```
\AtEndEnvironment [$\langle label \rangle$] { $\langle code \rangle$ }
```

Like `\BeforeBeginEnvironment` but adds to the `env/ $\langle env \rangle$ /end` hook.

---

**\AfterEndEnvironment**

```
\AfterEndEnvironment [$\langle label \rangle$] { $\langle code \rangle$ }
```

Like `\BeforeBeginEnvironment` but adds to the `env/ $\langle env \rangle$ /after` hook.

<sup>7</sup>Thus if one adds code to such hooks after the environment has been processed, it will only be executed if the environment appears again and if that doesn't happen the code will never get executed.

### 2.8.2 Hooks provided by `\begin{document}`

Until 2020 `\begin{document}` offered exactly one hook that one could add to using `\AtBeginDocument`. Experiences over the years have shown that this single hook in one place was not enough and as part of adding the general hook management system a number of additional hooks have been added at this point. The places for these hooks have been chosen to provide the same support as offered by external packages, such as `etoolbox` and others that augmented `\document` to gain better control.

Supported are now the following hooks (all of them one-time hooks):

**`begindocument/before`** This hook is executed at the very start of `\document`, one can think of it as a hook for code at the end of the preamble section and this is how it is used by `etoolbox`'s `\AtEndPreamble`.

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5).

**`begindocument`** This hook is added to when using `\AtBeginDocument` and it is executed after the `.aux` file has been read in and most initialization are done, so they can be altered and inspected by the hook code. It is followed by a small number of further initializations that shouldn't be altered and are therefore coming later.

The hook should not be used to add material for typesetting as we are still in L<sup>A</sup>T<sub>E</sub>X's initialization phase and not in the document body. If such material needs to be added to the document body use the next hook instead.

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5).

**`begindocument/end`** This hook is executed at the end of the `\document` code in other words at the beginning of the document body. The only command that follows it is `\ignorespaces`.

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5).

The generic hooks executed by `\begin` also exist, i.e., `env/document/before` and `env/document/begin`, but with this special environment it is better to use the dedicated one-time hooks above.

### 2.8.3 Hooks provided by `\end{document}`

L<sup>A</sup>T<sub>E</sub>X 2<sub>E</sub> always provided `\AtEndDocument` to add code to the execution of `\end{document}` just in front of the code that is normally executed there. While this was a big improvement over the situation in L<sup>A</sup>T<sub>E</sub>X 2.09 it was not flexible enough for a number of use cases and so packages, such as `etoolbox`, `atveryend` and others patched `\enddocument` to add additional points where code could be hooked into.

Patching using packages is always problematical as leads to conflicts (code availability, ordering of patches, incompatible patches, etc.). For this reason a number of additional hooks have been added to the `\enddocument` code to allow packages to add code in various places in a controlled way without the need for overwriting or patching the core code.

Supported are now the following hooks (all of them one-time hooks):

**enddocument** The hook associated with `\AtEndDocument`. It is immediately called at the beginning of `\end{document}`.

When this hook is executed there may be still unprocessed material (e.g., floats on the deferlist) and the hook may add further material to be typeset. After it, `\clearpage` is called to ensure that all such material gets typeset. If there is nothing waiting the `\clearpage` has no effect.

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5).

**enddocument/afterlastpage** As the name indicates this hook should not receive code that generates material for further pages. It is the right place to do some final housekeeping and possibly write out some information to the `.aux` file (which is still open at this point to receive data). It is also the correct place to set up any testing code to be run when the `.aux` file is re-read in the next step.

After this hook has been executed the `.aux` file is closed for writing and then read back in to do some tests (e.g., looking for missing references or duplicated labels, etc.).

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5).

**enddocument/afteraux** At this point, the `.aux` file has been reprocessed and so this is a possible place for final checks and display of information to the user. However, for the latter you might prefer the next hook, so that your information is displayed after the (possibly longish) list of files if that got requested via `\listfiles`.

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5).

**enddocument/info** This hook is meant to receive code that write final information messages to the terminal. It follows immediately after the previous hook (so both could have been combined, but then packages adding further code would always need to also supply an explicit rule to specify where it should go).

This hook already contains some code added by the kernel (under the labels `kernel/filelist` and `kernel/warnings`), namely the list of files when `\listfiles` has been used and the warnings for duplicate labels, missing references, font substitutions etc.

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5).

**enddocument/end** Finally, this hook is executed just in front of the final call to `\@end`.

This is a one-time hook, so after it is executed, all further attempts to add code to it will execute such code immediately (see section 2.5). Is it even possible to add code after this one?

There is also the hook `shipout/lastpage`. This hook is executed as part of the last `\shipout` in the document to allow package to add final `\special`'s to that page. Where this hook is executed in relation to those from the above list can vary from document to document. Furthermore to determine correctly which of the `\shipouts` is the last one, L<sup>A</sup>T<sub>E</sub>X needs to be run several times, so initially it might get executed on the wrong page. See section 2.8.4 for where to find the details.

It is also possible to use the generic `env/document/end` hook which is executed by `\end`, i.e., just in front of the first hook above. Note however that the other generic `\end` environment hook, i.e., `env/document/after` will never get executed, because by that time L<sup>A</sup>T<sub>E</sub>X has finished the document processing.

#### 2.8.4 Hooks provided `\shipout` operations

There are several hooks and mechanisms added to L<sup>A</sup>T<sub>E</sub>X's process of generating pages. These are documented in `ltshipout-doc.pdf` or with code in `ltshipout-code.pdf`.

#### 2.8.5 Hooks provided by file loading operations

There are several hooks added to L<sup>A</sup>T<sub>E</sub>X's process of loading file via its high-level interfaces such as `\input`, `\include`, `\usepackage`, etc. These are documented in `ltfilehook-doc.pdf` or with code in `ltfilehook-code.pdf`.

#### 2.8.6 Hooks provided in NFSS commands

In languages that need to support for more than one script in parallel (and thus several sets of fonts), e.g., Latin and Japanese fonts, NFSS font commands, such as `\sffamily`, need to switch both the Latin family to "Sans Serif" and in addition alter a second set of fonts.

To support this several NFSS have hooks in which such support can be added.

**rmfamily** After `\rmfamily` has done its initial checks and prepared a any font series update this hook is executed and only afterwards `\selectfont`.

**sffamily** Like the `rmfamily` hook but for the `\sffamily` command.

**ttfamily** Like the `rmfamily` hook but for the `\ttfamily` command.

**normalfont** The `\normalfont` command resets font encoding family series and shape to their document defaults. It then executes this hook and finally calls `\selectfont`.

**expand@font@defaults** The internal `\expand@font@defaults` command expands and saves the current defaults for the meta families (rm/sf/tt) and the meta series (bf/md). If the NFSS machinery has been augmented, e.g., for Chinese or Japanese fonts, then further defaults may need to be set at this point. This can be done in this hook which is executed at the end of this macro.

**bfseries/defaults, bfseries** If the `\bfdefault` was explicitly changed by the user its new value is used to set the bf series defaults for the meta families (rm/sf/tt) when `\bfseries` is called. In the `bfseries/defaults` hook further adjustments can be made in this case. This hook is only executed if such a change is detected. In contrast the `bfseries` hook is always executed just before `\selectfont` is called to change to the new series.

**mdseries/defaults, mdseries** These two hooks are like the previous ones but used in `\mdseries` command.

### 3 The Implementation

#### 3.1 Loading further extensions

```
1 (@@=hook)
```

At the moment the whole module rolls back in one go, but if we make any modifications in later releases this will then need splitting.

```
2 {*2ekernel | latexrelease}
3 <latexrelease>\IncludeInRelease{2020/10/01}%
4 <latexrelease> {\NewHook}{The hook management}%
5 \ExplSyntaxOn
```

#### 3.2 Debugging

\g\_hook\_debug\_bool Holds the current debugging state.

```
6 \bool_new:N \g_hook_debug_bool
```

(End definition for \g\_hook\_debug\_bool.)

```
\hook_debug_on: Turns debugging on and off by redefining __hook_debug:n.
\hook_debug_off:
__hook_debug:n
__hook_debug_gset:
7 \cs_new_eq:NN __hook_debug:n \use_none:n
8 \cs_new_protected:Npn \hook_debug_on:
9 {
10 \bool_gset_true:N \g_hook_debug_bool
11 __hook_debug_gset:
12 }
13 \cs_new_protected:Npn \hook_debug_off:
14 {
15 \bool_gset_false:N \g_hook_debug_bool
16 __hook_debug_gset:
17 }
18 \cs_new_protected:Npn __hook_debug_gset:
19 {
20 \cs_gset_protected:Npx __hook_debug:n ##1
21 { \bool_if:NT \g_hook_debug_bool {##1} }
22 }
```

(End definition for \hook\_debug\_on: and others. These functions are documented on page 112.)

#### 3.3 Borrowing from internals of other kernel modules

\\_\_hook\_str\_compare:nn Private copy of \\_\_str\_if\_eq:nn

```
23 \cs_new_eq:NN __hook_str_compare:nn __str_if_eq:nn
```

(End definition for \\_\_hook\_str\_compare:nn.)

#### 3.4 Declarations

\l\_hook\_tmpa\_bool Scratch boolean used throughout the package.

```
24 \bool_new:N \l_hook_tmpa_bool
```

(End definition for \l\_hook\_tmpa\_bool.)

|                                                |                                                                                                                                                                                       |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>\l__hook_return_tl</code>                | Scratch variables used throughout the package.                                                                                                                                        |
|                                                | <code>25 \tl_new:N \l__hook_return_tl</code>                                                                                                                                          |
|                                                | <code>26 \tl_new:N \l__hook_tmpa_tl</code>                                                                                                                                            |
|                                                | <code>27 \tl_new:N \l__hook_tmpb_tl</code>                                                                                                                                            |
|                                                | <i>(End definition for \l__hook_return_tl, \l__hook_tmpa_tl, and \l__hook_tmpb_tl.)</i>                                                                                               |
| <code>\g__hook_all_seq</code>                  | In a few places we need a list of all hook names ever defined so we keep track if them in this sequence.                                                                              |
|                                                | <code>28 \seq_new:N \g__hook_all_seq</code>                                                                                                                                           |
|                                                | <i>(End definition for \g__hook_all_seq.)</i>                                                                                                                                         |
| <code>\g__hook_removal_list_prop</code>        | A token list to hold delayed removals.                                                                                                                                                |
|                                                | <code>29 \tl_new:N \g__hook_removal_list_tl</code>                                                                                                                                    |
|                                                | <i>(End definition for \g__hook_removal_list_prop.)</i>                                                                                                                               |
| <code>\l__hook_cur_hook_tl</code>              | Stores the name of the hook currently being sorted.                                                                                                                                   |
|                                                | <code>30 \tl_new:N \l__hook_cur_hook_tl</code>                                                                                                                                        |
|                                                | <i>(End definition for \l__hook_cur_hook_tl.)</i>                                                                                                                                     |
| <code>\l__hook_work_prop</code>                | A property list holding a copy of the <code>\g__hook_{hook}_code_prop</code> of the hook being sorted to work on, so that changes don't act destructively on the hook data structure. |
|                                                | <code>31 \prop_new:N \l__hook_work_prop</code>                                                                                                                                        |
|                                                | <i>(End definition for \l__hook_work_prop.)</i>                                                                                                                                       |
| <code>\g__hook_execute_immediately_prop</code> | List of hooks that from no on should not longer receive code.                                                                                                                         |
|                                                | <code>32 \prop_new:N \g__hook_execute_immediately_prop</code>                                                                                                                         |
|                                                | <i>(End definition for \g__hook_execute_immediately_prop.)</i>                                                                                                                        |
| <code>\g__hook_used_prop</code>                | All hooks that receive code (for use in debugging display).                                                                                                                           |
|                                                | <code>33 \prop_new:N \g__hook_used_prop</code>                                                                                                                                        |
|                                                | <i>(End definition for \g__hook_used_prop.)</i>                                                                                                                                       |
| <code>\g__hook_hook_curr_name_tl</code>        | Default label used for hook commands, and a stack to keep track of packages within packages.                                                                                          |
| <code>\g__hook_name_stack_seq</code>           |                                                                                                                                                                                       |
|                                                | <code>34 \tl_new:N \g__hook_hook_curr_name_tl</code>                                                                                                                                  |
|                                                | <code>35 \seq_new:N \g__hook_name_stack_seq</code>                                                                                                                                    |
|                                                | <i>(End definition for \g__hook_hook_curr_name_tl and \g__hook_name_stack_seq.)</i>                                                                                                   |
| <code>\_\_hook\_tmp:w</code>                   | Temporary macro for generic usage.                                                                                                                                                    |
|                                                | <code>36 \cs_new_eq:NN \_\_hook_tmp:w ?</code>                                                                                                                                        |
|                                                | <i>(End definition for \_\_hook\_tmp:w.)</i>                                                                                                                                          |
| <code>\tl_gremove_once:Nx</code>               | Some variants of <code>expl3</code> functions.                                                                                                                                        |
| <code>\tl_show:x</code>                        | <i>FMi: should be moved to <code>expl3</code></i>                                                                                                                                     |
| <code>\tl_log:x</code>                         |                                                                                                                                                                                       |

```

37 \cs_generate_variant:Nn \tl_gremove_once:Nn { Nx }
38 \cs_generate_variant:Nn \tl_show:n { x }
39 \cs_generate_variant:Nn \tl_log:n { x }

(End definition for \tl_gremove_once:Nx, \tl_show:x, and \tl_log:x.)
```

\s\_\_hook\_mark Scan mark used for delimited arguments.

```
40 \scan_new:N \s__hook_mark
```

(End definition for \s\_\_hook\_mark.)

\\_\_hook\_tl\_set:Nn \\_\_hook\_tl\_set:Nx \\_\_hook\_tl\_set:cn \\_\_hook\_tl\_set:cx Private copies of a few expl3 functions. l3debug will only add debugging to the public names, not to these copies, so we don't have to use \debug\_suspend: and \debug\_resume: everywhere.

Functions like \\_\_hook\_tl\_set:Nn have to be redefined, rather than copied because in expl3 they use \\_\_kernel\_tl\_(g)set:Nx, which is also patched by l3debug.

```

41 \cs_new_protected:Npn __hook_tl_set:Nn #1#2
42 { \cs_set_nopar:Npx #1 { __kernel_exp_not:w {#2} } }
43 \cs_new_protected:Npn __hook_tl_set:Nx #1#2
44 { \cs_set_nopar:Npx #1 {#2} }
45 \cs_generate_variant:Nn __hook_tl_set:Nn { c }
46 \cs_generate_variant:Nn __hook_tl_set:Nx { c }
```

(End definition for \\_\_hook\_tl\_set:Nn.)

\\_\_hook\_tl\_gset:Nn \\_\_hook\_tl\_gset:Nx \\_\_hook\_tl\_gset:cn \\_\_hook\_tl\_gset:cw \\_\_hook\_tl\_gset:cx Same as above.

```

47 \cs_new_protected:Npn __hook_tl_gset:Nn #1#2
48 { \cs_gset_nopar:Npx #1 { __kernel_exp_not:w {#2} } }
49 \cs_new_protected:Npn __hook_tl_gset:Nx #1#2
50 { \cs_gset_nopar:Npx #1 { __kernel_exp_not:w \exp_after:wN {#2} } }
51 \cs_new_protected:Npn __hook_tl_gset:Nx #1#2
52 { \cs_gset_nopar:Npx #1 {#2} }
53 \cs_generate_variant:Nn __hook_tl_gset:Nn { c }
54 \cs_generate_variant:Nn __hook_tl_gset:Nx { c }
55 \cs_generate_variant:Nn __hook_tl_gset:Nx { c }
```

(End definition for \\_\_hook\_tl\_gset:Nn.)

\\_\_hook\_tl\_gput\_right:Nn \\_\_hook\_tl\_gput\_right:Nx \\_\_hook\_tl\_gput\_right:cn Same as above.

```

56 \cs_new_protected:Npn __hook_tl_gput_right:Nn #1#2
57 { __hook_tl_gset:Nx #1 { __kernel_exp_not:w \exp_after:wN { #1 #2 } } }
58 \cs_generate_variant:Nn __hook_tl_gput_right:Nn { No, cn }
```

(End definition for \\_\_hook\_tl\_gput\_right:Nn.)

\\_\_hook\_tl\_gput\_left:Nn \\_\_hook\_tl\_gput\_left:Nx \\_\_hook\_tl\_gput\_left:cn Same as above.

```

59 \cs_new_protected:Npn __hook_tl_gput_left:Nn #1#2
60 {
61 __hook_tl_gset:Nx #1
62 { __kernel_exp_not:w {#2} __kernel_exp_not:w \exp_after:wN {#1} }
63 }
64 \cs_generate_variant:Nn __hook_tl_gput_left:Nn { No }
```

(End definition for \\_\_hook\_tl\_gput\_left:Nn.)

```
__hook_tl_gset_eq:NN Same as above.
65 \cs_new_eq:NN __hook_tl_gset_eq:NN \tl_gset_eq:NN
(End definition for __hook_tl_gset_eq:NN.)
```

```
__hook_tl_gclear:N Same as above.
66 \cs_new_protected:Npn __hook_tl_gclear:N #1
67 { __hook_tl_gset_eq:NN #1 \c_empty_tl }
68 \cs_generate_variant:Nn __hook_tl_gclear:N { c }
```

(End definition for \\_\\_hook\\_tl\\_gclear:N.)

### 3.5 Providing new hooks

\g\\_hook\\_...\_code\\_prop  
\\_\\_hook~...  
\\_\\_hook\\_next~... Hooks have a  $\langle name \rangle$  and for each hook we have to provide a number of data structures. These are

\g\\_hook\\_<name>\\_code\\_prop A property list holding the code for the hook in separate chunks. The keys are by default the package names that add code to the hook, but it is possible for packages to define other keys.

\g\\_hook\\_<name>\\_rule\\_<label1>|<label2>\\_tl A token list holding the relation between  $\langle label1 \rangle$  and  $\langle label2 \rangle$  in the  $\langle name \rangle$ . The  $\langle labels \rangle$  are lexically (reverse) sorted to ensure that two labels always point to the same token list. For global rules, the  $\langle name \rangle$  is ??.

\\_\\_hook <name> The code that is actually executed when the hook is called in the document is stored in this token list. It is constructed from the code chunks applying the information. This token list is named like that so that in case of an error inside the hook, the reported token list in the error is shorter, and to make it simpler to normalize hook names in \\_\\_hook\\_make\\_name:n.

\g\\_hook\\_<name>\\_reversed\\_tl Some hooks are “reversed”. This token list stores a - for such hook so that it can be identified. The - character is used because  $\langle reversed \rangle$ 1 is +1 for normal hooks and -1 for reversed ones.

\\_\\_hook\\_toplevel <name> This token list stores the code inserted in the hook from the user’s document, in the **toplevel** label. This label is special, and doesn’t participate in sorting. Instead, all code is appended to it and executed after (or before, if the hook is reversed) the normal hook code, but before the **next** code chunk.

\\_\\_hook\\_next <name> Finally there is extra code (normally empty) that is used on the next invocation of the hook (and then deleted). This can be used to define some special behavior for a single occasion from within the document. This token list follows the same naming scheme than the main \\_\\_hook <name> token list. It is called \\_\\_hook\\_next <name> rather than \\_\\_hook next\\_<name> because otherwise a hook whose name is **next\\_<name>** would clash with the next code-token list of the hook called <name>.

(End definition for \g\\_hook\\_...\_code\\_prop, \\_\\_hook~..., and \\_\\_hook\\_next~...)

\hook\_new:n The \hook\_new:n declaration declare a new hook and expects the hook *<name>* as its argument, e.g., `\begin{document}`.

```

79 \cs_new_protected:Npn \hook_new:n #1
80 { __hook_normalize_hook_args:Nn __hook_new:n {#1} }
81 \cs_new_protected:Npn __hook_new:n #1
82 {

```

We check for one of the internal data structures and if it already exists we complain.

```

83 \hook_if_exist:nTF {#1}
84 { \msg_error:nnn { hooks } { exists } {#1} }

```

Otherwise we add the hook name to the list of all hooks and allocate the necessary data structures for the new hook.

```

85 {
86 \seq_gput_right:Nn \g__hook_all_seq {#1}

```

This is only used by the actual code of the current hook, so declare it normally:

```

87 \tl_new:c { __hook~#1 }

```

Now ensure that the base data structure for the hook exists:

```

88 __hook_declare:n {#1}

```

The \g\_\_hook\_<hook>\_labels\_clist holds the sorted list of labels (once it got sorted). This is used only for debugging.

```

89 \clist_new:c {g__hook_#1_labels_clist}

```

Some hooks should reverse the default order of code chunks. To signal this we have a token list which is empty for normal hooks and contains a - for reversed hooks.

```

90 \tl_new:c { g__hook_#1_reversed_tl }

```

The above is all in L3 convention, but we also provide an interface to legacy L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  hooks of the form \@...hook, e.g., \begin{document}hook. There have been a few of them and they have been added to using \g@addto@macro. If there exists such a macro matching the name of the new hook, i.e., \@<hook-name>hook and it is not empty then we add its contents as a code chunk under the label `legacy`.

#### Warning: this support will vanish in future releases!

```

91 __hook_include_legacy_code_chunk:n {#1}
92 }
93 }

```

(End definition for \hook\_new:n. This function is documented on page 110.)

\\_\_hook\_declare:n This function declares the basic data structures for a hook without actually declaring the hook itself. This is needed to allow adding to undeclared hooks. Here it is unnecessary to check whether all variables exist, since all three are declared at the same time (either all of them exist, or none).

```

94 \cs_new_protected:Npn __hook_declare:n #1
95 {
96 __hook_if_exist:nF {#1}
97 {
98 \prop_new:c {g__hook_#1_code_prop}
99 \tl_new:c {__hook_toplevel~#1}
100 \tl_new:c {__hook_next~#1}
101 }
102 }

```

(End definition for `\_hook_declare:n`.)

`\hook_new_reversed:n` Declare a new hook. The default ordering of code chunks is reversed, signaled by setting the token list to a minus sign.

```
93 \cs_new_protected:Npn \hook_new_reversed:n #1
94 { _hook_normalize_hook_args:Nn _hook_new_reversed:n {#1} }
95 \cs_new_protected:Npn _hook_new_reversed:n #1
96 {
97 _hook_new:n {#1}
```

If the hook already exists the above will generate an error message, so the next line should be executed (but it is — too bad).

```
98 \tl_gset:cn { g_hook_#1_reversed_tl } { - }
99 }
```

(End definition for `\hook_new_reversed:n` and `\_hook_new_reversed:n`. This function is documented on page 110.)

`\hook_new_pair:nn` A shorthand for declaring a normal and a (matching) reversed hook in one go.

```
100 \cs_new_protected:Npn \hook_new_pair:nn #1#2
101 { \hook_new:n {#1} \hook_new_reversed:n {#2} }
```

(End definition for `\hook_new_pair:nn`. This function is documented on page 110.)

`\_hook_include_legacy_code_chunk:n` The L<sup>A</sup>T<sub>E</sub>X legacy concept for hooks uses with hooks the following naming scheme in the code: `\@...hook`.

If this macro is not empty we add it under the label `legacy` to the current hook and then empty it globally. This way packages or classes directly manipulating commands such as `\begindocumenthook` still get their hook data added.

**Warning: this support will vanish in future releases!**

```
102 \cs_new_protected:Npn _hook_include_legacy_code_chunk:n #1
103 {
```

If the macro doesn't exist (which is the usual case) then nothing needs to be done.

```
104 \tl_if_exist:cT { @#1hook }
```

Of course if the legacy hook exists but is empty, there is no need to add anything under `legacy` the legacy label.

```
105 {
106 \tl_if_empty:cF { @#1hook }
107 {
108 \exp_args:Nnnv _hook_hook_gput_code_do:nnn {#1}
109 { legacy } { @#1hook }
```

Once added to the hook, we need to clear it otherwise it might get added again later if the hook data gets updated.

```
110 _hook_tl_gclear:c { @#1hook }
111 }
112 }
113 }
```

(End definition for `\_hook_include_legacy_code_chunk:n`.)

### 3.6 Parsing a label

\\_\\_hook\\_parse\\_label\\_default:n This macro checks if a label was given (not \c\_novalue\\_tl), and if so, tries to parse the label looking for a leading . to replace by \\_\\_hook\\_currname\\_or\\_default::.

```

114 \cs_new:Npn __hook_parse_label_default:n #1
115 {
116 \tl_if_novalue:nTF {#1}
117 {
118 __hook_currname_or_default:
119 }

```

(End definition for \\_\\_hook\_parse\_label\_default:n.)

\\_\\_hook\_parse\_dot\_label:n Start by checking if the label is empty, which raises an error, and uses the fallback value.

\\_\\_hook\_parse\_dot\_label:w If not, split the label at a ./, if any, and check if no tokens are before the ./, or if the only character is a .. If these requirements are fulfilled, the leading . is replaced with \\_\\_hook\\_currname\\_or\\_default:. Otherwise the label is returned unchanged.

```

120 \cs_new:Npn __hook_parse_dot_label:n #1
121 {
122 \tl_if_empty:nTF {#1}
123 {
124 \msg_expandable_error:nn { hooks } { empty-label }
125 __hook_currname_or_default:
126 }
127 {
128 \str_if_eq:nnTF {#1} { . }
129 {
130 __hook_parse_dot_label:w #1 ./ \s__hook_mark
131 }
132 }
133 \cs_new:Npn __hook_parse_dot_label:w #1 ./ #2 \s__hook_mark
134 {
135 \tl_if_empty:nTF {#1}
136 {
137 __hook_parse_dot_label_aux:w #2 \s__hook_mark
138 {
139 \tl_if_empty:nTF {#2}
140 {
141 __hook_make_name:n {#1}
142 __hook_parse_dot_label_cleanup:w #1 ./ #2 \s__hook_mark
143 }
144 }
145 __hook_parse_dot_label_cleanup:w #1 ./ \s__hook_mark {#1}
146 \cs_new:Npn __hook_parse_dot_label_aux:w #1 ./ \s__hook_mark
147 {
148 __hook_make_name:n {#1}
149 }
150 }
151
```

(End definition for \\_\\_hook\_parse\_dot\_label:n and others.)

\\_\\_hook\\_currname\\_or\\_default: Uses \g\\_\\_hook\_hook\\_curr\\_name\\_tl if it is set, otherwise tries \@\currname. If neither is set, raises an error and uses the fallback value label-missing.

```

146 \cs_new:Npn __hook_currname_or_default:
147 {
148 \tl_if_empty:NTF \g__hook_hook_curr_name_tl
149 {
150 \tl_if_empty:NTF \@\currname
151 {

```

```

152 \msg_expandable_error:n { hooks } { should-not-happen }
153 { Empty-default-label. }
154 _hook_make_name:n { label-missing }
155 }
156 { \@currname }
157 }
158 { \g_hook_hook_curr_name_tl }
159 }
```

(End definition for `\_hook_currname_or_default..`)

`\_hook_make_name:n` Provides a standard sanitisation of a hook's name. It uses `\cs:w` to build a control sequence out of the hook name, then uses `\cs_to_str:N` to get the string representation of that, without the escape character. `\cs:w`-based expansion is used instead of `e`-based because Unicode characters don't behave well inside `\expanded`. The macro adds the `\_hook~` prefix to the hook name to reuse the hook's code token list to build the csname and avoid leaving "public" control sequences defined (as `\relax`) in TeX's memory.

```

160 \cs_new:Npn _hook_make_name:n #1
161 {
162 \exp_after:wN \exp_after:wN \exp_after:wN _hook_make_name:w
163 \exp_after:wN \token_to_str:N \cs:w __hook~ #1 \cs_end:
164 }
165 \exp_last_unbraced:NNNNo
166 \cs_new:Npn _hook_make_name:w #1 \tl_to_str:n { __hook~ } { }
```

(End definition for `\_hook_make_name:n` and `\_hook_make_name:w`.)

`\_hook_normalize_hook_args:Nn`  
`\_hook_normalize_hook_args:Nnn`  
`\_hook_normalize_hook_rule_args:Nnnnn`  
`\_hook_normalize_hook_args_aux:Nn`

Standard route for normalising hook and label arguments. The main macro does the entire operation within a group so that csnames made by `\_hook_make_name:n` are wiped off before continuing. This means that this function cannot be used for `\hook_use:n!`

```

167 \cs_new_protected:Npn _hook_normalize_hook_args_aux:Nn #1 #2
168 {
169 \group_begin:
170 \use:e
171 {
172 \group_end:
173 \exp_not:N #1 #2
174 }
175 }
176 \cs_new_protected:Npn _hook_normalize_hook_args:Nn #1 #2
177 {
178 _hook_normalize_hook_args_aux:Nn #1
179 { { _hook_parse_label_default:n {#2} } }
180 }
181 \cs_new_protected:Npn _hook_normalize_hook_args:Nnn #1 #2 #3
182 {
183 _hook_normalize_hook_args_aux:Nn #1
184 {
185 { _hook_parse_label_default:n {#2} }
186 { _hook_parse_label_default:n {#3} }
187 }
188 }
189 \cs_new_protected:Npn _hook_normalize_hook_rule_args:Nnnnn #1 #2 #3 #4 #5
```

```

190 {
191 __hook_normalize_hook_args:Nn #1
192 {
193 { __hook_parse_label_default:n {#2} }
194 { __hook_parse_label_default:n {#3} }
195 { \tl_trim_spaces:n {#4} }
196 { __hook_parse_label_default:n {#5} }
197 }
198 }

```

(End definition for `\__hook_normalize_hook_args:Nn` and others.)

`\hook_gput_code:nnn`  
`\__hook_gput_code:nnn`  
`\__hook_gput_code:nxv`  
`\__hook_hook_gput_code_do:nnn`

With `\hook_gput_code:nnn{<hook>}{<label>}{<code>}` a chunk of `<code>` is added to an existing `<hook>` labeled with `<label>`.

```

199 \cs_new_protected:Npn \hook_gput_code:nnn #1 #2
200 { __hook_normalize_hook_args:Nnn __hook_gput_code:nnn {#1} {#2} }
201 \cs_new_protected:Npn __hook_gput_code:nnn #1 #2 #3
202 {

```

First check if the hook was used as a one-time hook:

```

203 \prop_if_in:NnTF \g__hook_execute_immediately_prop {#1}
204 {#3}
205 {

```

Then check if the current `<hook>/<label>` pair was marked for removal, in which case `\__hook_unmark_removal:nn` is used to remove that mark (once). This may happen when a package removes code from another package which was not yet loaded: the removal order is stored, and at this stage it is executed by not adding to the hook.

```

206 __hook_if_marked_removal:nnTF {#1} {#2}
207 { __hook_unmark_removal:nn {#1} {#2} }
208 {

```

If no removal is queued, we are free to add. Start by checking if the hook exists.

```
209 \hook_if_exist:nTF {#1}
```

If so we simply add (or append) the new code to the property list holding different chunks for the hook. At `\begin{document}` this is then sorted into a token list for fast execution.

```

210 {
211 __hook_hook_gput_code_do:nnn {#1} {#2} {#3}

```

However, if there is an update within the document we need to alter this execution code which is done by `\__hook_update_hook_code:n`. In the preamble this does nothing.

```

212 __hook_update_hook_code:n {#1}
213 }

```

If the hook does not exist, however, before giving up try to declare it as a generic hook, if its name matches one of the valid patterns.

```

214 { __hook_try_declarng_generic_hook:nnn {#1} {#2} {#3} }
215 }
216 }
217 }
218 \cs_generate_variant:Nn __hook_gput_code:nnn { nxv }

```

This macro will unconditionally add a chunk of code to the given hook.

```

219 \cs_new_protected:Npn __hook_hook_gput_code_do:nnn #1 #2 #3
220 {

```

However, first some debugging info if debugging is enabled:

```

221 __hook_debug:n{\iow_term:x{****~ Add~ to~
222 \hook_if_exist:nF {#1} { undeclared~ }
223 hook~ #1~ (#2)
224 \on@line\space <-- \tl_to_str:n{#3}} }

```

Then try to get the code chunk labeled #2 from the hook. If there's code already there, then append #3 to that, otherwise just put #3. If the current label is **top-level**, the code is added to a dedicated token list `\__hook_toplevel <hook>` that goes at the end of the hook (or at the beginning, for a reversed hook), just before `\__hook_next <hook>`.

```

225 \str_if_eq:nnTF {#2} { top-level }
226 {
227 \str_if_eq:eeTF { top-level } { __hook_currname_or_default: }
228 {

```

If the hook's basic structure does not exist, we need to declare it with `\__hook_declare:n`.

```

229 __hook_declare:n {#1}
230 __hook_tl_gput_right:cn { __hook_toplevel~#1 } {#3}
231 }
232 { \msg_error:nnn { hooks } { misused-top-level } {#1} }
233 }
234 {
235 \prop_get:cnNTF { g__hook_#1_code_prop } {#2} \l__hook_return_tl
236 {
237 \prop_gput:cno { g__hook_#1_code_prop } {#2}
238 { \l__hook_return_tl #3 }
239 }
240 { \prop_gput:cnn { g__hook_#1_code_prop } {#2} {#3} }
241 }
242 }

```

*(End definition for \hook\_gput\_code:nnn, \\_\_hook\_gput\_code:nnn, and \\_\_hook\_hook\_gput\_code\_do:nnn. This function is documented on page 110.)*

### `\__hook_gput_undeclared_hook:nnn`

Often it may happen that a package *A* defines a hook `foo`, but package *B*, that adds code to that hook, is loaded before *A*. In such case we need to add code to the hook before its declared.

```

243 \cs_new_protected:Npn __hook_gput_undeclared_hook:nnn #1 #2 #3
244 {
245 __hook_declare:n {#1}
246 __hook_hook_gput_code_do:nnn {#1} {#2} {#3}
247 }

```

*(End definition for \\_\_hook\_gput\_undeclared\_hook:nnn.)*

These entry-level macros just pass the arguments along to the common `\__hook_try_declaring_generic_hook:nNNnn` with the right functions to execute when some action is to be taken.

The wrapper `\__hook_try_declaring_generic_hook:nnn` then defers `\hook_gput_code:nnn` if the generic hook was declared, or to `\__hook_gput_undeclared_hook:nnn` otherwise (the hook was tested for existence before, so at this point if it isn't generic, it doesn't exist).

The wrapper `\_hook_try_declarng_generic_next_hook:nn` for next-execution hooks does the same: it defers the code to `\hook_gput_next_code:nn` if the generic hook was declared, or to `\_hook_gput_next_do:nn` otherwise.

```

248 \cs_new_protected:Npn _hook_try_declarng_generic_hook:nnn #1
249 {
250 _hook_try_declarng_generic_hook:nNNnn {#1}
251 \hook_gput_code:nnn _hook_gput_undeclared_hook:nnn
252 }
253 \cs_new_protected:Npn _hook_try_declarng_generic_next_hook:nn #1
254 {
255 _hook_try_declarng_generic_hook:nNNnn {#1}
256 \hook_gput_next_code:nn _hook_gput_next_do:nn
257 }

```

`\_hook_try_declarng_generic_hook:nNNnn` now splits the hook name at the first / (if any) and first checks if it is a file-specific hook (they require some normalization) using `\_hook_if_file_hook:wTF`. If not then check it is one of a predefined set for generic names. We also split off the second component to see if we have to make a reversed hook. In either case the function returns `<true>` for a generic hook and `<false>` in other cases.

```

258 \cs_new_protected:Npn _hook_try_declarng_generic_hook:nNNnn #1
259 {
260 _hook_if_file_hook:wTF #1 / / \s__hook_mark
261 {
262 \exp_args:Ne _hook_try_declarng_generic_hook_split:nNNnn
263 { \exp_args:Ne _hook_file_hook_normalize:n {#1} }
264 }
265 { _hook_try_declarng_generic_hook_split:nNNnn {#1} }
266 }
267 \cs_new_protected:Npn _hook_try_declarng_generic_hook_split:nNNnn #1 #2 #3
268 {
269 _hook_try_declarng_generic_hook:wnTF #1 / / \scan_stop: {#1}
270 { #2 }
271 { #3 } {#1}
272 }
273 \prg_new_protected_conditional:Npnn _hook_try_declarng_generic_hook:wn
274 #1 / #2 / #3 / #4 \scan_stop: #5 { TF }
275 {
276 \tl_if_empty:nTF {#2}
277 { \prg_return_false: }
278 {
279 \prop_if_in:NnTF \c__hook_genetics_prop {#1}
280 {
281 \hook_if_exist:nF {#5} { \hook_new:n {#5} }

```

After having declared the hook we check the second component (for file hooks) or the third component for environment hooks) and if it is on the list of components for which we should have declared a reversed hook we alter the hook data structure accordingly.

```

282 \prop_if_in:NnTF \c__hook_genetics_reversed_ii_prop {#2}
283 { \tl_gset:cn { g__hook_#5_reversed_tl } { - } }
284 {
285 \prop_if_in:NnT \c__hook_genetics_reversed_iii_prop {#3}
286 { \tl_gset:cn { g__hook_#5_reversed_tl } { - } }
287 }

```

Now that we know that the hook is declared we can add the code to it.

```

288 \prg_return_true:
289 }
290 { \prg_return_false: }
291 }
292 }
```

(End definition for `\_hook_try_declarng_generic_hook:nnn` and others.)

`\_hook_if_file_hook:p:wTF` checks if the argument is a valid file-specific hook (not, for example, `file/before`, but `file/before/foo.tex`). If it is a file-specific hook, then it executes the `<true>` branch, otherwise `<false>`.

A file-specific hook is `file/<position>/<name>`. If any of these parts don't exist, it is a general file hook or not a file hook at all, so the conditional evaluates to `<false>`. Otherwise, it checks that the first part is `file` and that the `<position>` is in the `\c__hook_generics_file_prop`.

A property list is used here to avoid having to worry with catcodes, because `expl3`'s file name parsing turns all characters into catcode-12 tokens, which might differ from hand-input letters.

```

293 \prg_new_conditional:Npnn _hook_if_file_hook:w
294 #1 / #2 / #3 \s__hook_mark { TF }
295 {
296 \str_if_eq:nnTF {#1} { file }
297 {
298 \bool_lazy_or:nnTF
299 { \tl_if_empty_p:n {#3} }
300 { \str_if_eq_p:nn {#3} { / } }
301 { \prg_return_false: }
302 {
303 \prop_if_in:NnTF \c__hook_generics_file_prop {#2}
304 { \prg_return_true: }
305 { \prg_return_false: }
306 }
307 }
308 { \prg_return_false: }
309 }
```

(End definition for `\_hook_if_file_hook:wTF`.)

`\_hook_file_hook_normalize:n`, `\_hook_strip_double_slash:n` and `\_hook_strip_double_slash:w` When a file-specific hook is found, before being declared it is lightly normalized by `\_hook_file_hook_normalize:n`. The current implementation just replaces two consecutive slashes (//) by a single one, to cope with simple cases where the user did something like `\def\input@path{./mypath/}`, in which case a hook would have to be `\AddToHook{file/after/./mypath//file.tex}`.

```

310 \cs_new:Npn _hook_file_hook_normalize:n #1
311 { _hook_strip_double_slash:n {#1} }
312 \cs_new:Npn _hook_strip_double_slash:n #1
313 { _hook_strip_double_slash:w #1 // \s__hook_mark }
```

This function is always called after testing if the argument is a file hook with `\_hook_if_file_hook:wTF`, so we can assume it has three parts (it is either `file/before/...` or `file/after/...`), so we use `#1/#2/#3 //` instead of just `#1 //` to prevent losing a slash if the file name is empty.

```

314 \cs_new:Npn __hook_strip_double_slash:w #1/#2/#3 // #4 \s__hook_mark
315 {
316 \tl_if_empty:nTF {#4}
317 { #1/#2/#3 }
318 { __hook_strip_double_slash:w #1/#2/#3 / #4 \s__hook_mark }
319 }

(End definition for __hook_file_hook_normalize:n, __hook_strip_double_slash:n, and __hook-
strip_double_slash:w.)

```

### \c\_\_hook\_generics\_prop

Property list holding the generic names. We don't provide any user interface to this as this is meant to be static.

**env** The generic hooks used in \begin and \end.

**file** The generic hooks used when loading a file

```

320 \prop_const_from_keyval:Nn \c__hook_generics_prop
321 {env=,file=,package=,class=,include=}

```

(End definition for \c\_\_hook\_generics\_prop.)

### \c\_\_hook\_generics\_reversed\_ii\_prop \c\_\_hook\_generics\_reversed\_iii\_prop

Some of the generic hooks are supposed to use reverse ordering, these are the following (only the second or third sub-component is checked):

```

322 \prop_const_from_keyval:Nn \c__hook_generics_reversed_ii_prop {after=,end=}
323 \prop_const_from_keyval:Nn \c__hook_generics_reversed_iii_prop {after=}
324 \prop_const_from_keyval:Nn \c__hook_generics_file_prop {before=,after=}

```

(End definition for \c\_\_hook\_generics\_reversed\_ii\_prop, \c\_\_hook\_generics\_reversed\_iii\_prop, and \c\_\_hook\_generics\_file\_prop.)

### \hook\_gremove\_code:nn \\_\_hook\_gremove\_code:nn

With \hook\_gremove\_code:nn{\langle hook\rangle}{\langle label\rangle} any code for \langle hook\rangle stored under \langle label\rangle is removed.

```

325 \cs_new_protected:Npn \hook_gremove_code:nn #1 #2
326 { __hook_normalize_hook_args:Nnn __hook_gremove_code:nn {#1} {#2} }
327 \cs_new_protected:Npn __hook_gremove_code:nn #1 #2
328 {

```

First check that the hook code pool exists. \hook\_if\_exist:nTF isn't used here because it should be possible to remove code from a hook before its defined (see section 2.1.6).

```

329 __hook_if_exist:nTF {#1}
330 {

```

Then remove the chunk and run \\_\_hook\_update\_hook\_code:n so that the execution token list reflects the change if we are after \begin{document}.

If all code is to be removed, clear the code pool \g\_\_hook\_{\langle hook\rangle}\_code\_prop, the top-level code \\_\_hook\_toplevel {\langle hook\rangle}, and the next-execution code \\_\_hook\_next {\langle hook\rangle}.

```

331 \str_if_eq:nnTF {#2} {*}
332 {
333 \prop_gclear:c { g__hook_#1_code_prop }
334 __hook_tl_gclear:c { __hook_toplevel~#1 }
335 __hook_tl_gclear:c { __hook_next~#1 }
336 }
337 {

```

If the label is `top-level` then clear the token list, as all code there is under the same label. Marked removal is not implemented for `top-level` because it is hard to reliably know that no code was added to `\__hook_toplevel <hook>` (granted that an empty code could be interpreted as that, but then it differs in behaviour from other labels, in which an empty chunk is still valid for removal). Besides, it doesn't make much (if any) sense for packages to remove `top-level` code. So here the chunk is just cleared unconditionally.

```
338 \str_if_eq:nnTF {#2} { top-level }
339 { __hook_tl_gclear:c { __hook_toplevel~#1 } }
340 { }
```

Otherwise check if the label being removed exists in the code pool. If it does, just call `\__hook_gremove_code_do:nn` to do the removal, otherwise mark it to be removed.

```
341 \prop_get:cnNTF { g__hook_#1_code_prop } {#2} \l__hook_return_tl
342 { __hook_gremove_code_do:nn }
343 { __hook_mark_removal:nn }
344 {#1} {#2}
345 }
346 }
```

Finally update the code, if the hook exists.

```
347 \hook_if_exist:nT {#1}
348 { __hook_update_hook_code:n {#1} }
349 }
```

If the code pool for this hook doesn't exist it means that nothing tried to add to it before, so we just queue this removal order for later.

```
350 { __hook_mark_removal:nn {#1} {#2} }
351 }
```

Remove code for a given label.

```
352 \cs_new_protected:Npn __hook_gremove_code_do:nn #1 #2
353 { \prop_gremove:cn { g__hook_#1_code_prop } {#2} }
```

(End definition for `\hook_gremove_code:nn`, `\__hook_gremove_code:nn`, and `\__hook_gremove_code_do:nn`. This function is documented on page 111.)

`\__hook_mark_removal:nn` Marks `<label>` (#2) to be removed from `<hook>` (#1). The number of removals should be fairly small, and `\tl_gremove_once:Nx` is fairly efficient even for longer token lists, so we use a single global token list, rather than one for each hook.

A hand-crafted token list is used here because property lists don't hold repeated items, so multiple usages of `\__hook_mark_removal:nn` would be cancelled by a single `\__hook_unmark_removal:nn`.

```
354 \cs_new_protected:Npn __hook_mark_removal:nn #1 #2
355 {
356 \tl_gput_right:Nx \g__hook_removal_list_tl
357 { __hook_removal_tl:nn {#1} {#2} }
358 }
```

(End definition for `\__hook_mark_removal:nn`.)

`\__hook_unmark_removal:nn` Unmarks `<label>` (#2) to be removed from `<hook>` (#1). `\tl_gremove_once:Nx` is used rather than `\tl_gremove_all:Nx` so that two additions are needed to cancel two marked removals, rather than only one.

```
359 \cs_new_protected:Npn __hook_unmark_removal:nn #1 #2
```

```

360 {
361 \tl_gremove_once:Nx \g__hook_removal_list_tl
362 { __hook_removal_tl:nn {#1} {#2} }
363 }

(End definition for __hook_unmark_removal:nn.)
```

`\__hook_if_marked_removal:nnTF` Checks if the `\g__hook_removal_list_tl` contains the current *<label>* (#2) and *<hook>* (#1).

```

364 \prg_new_protected_conditional:Npnn __hook_if_marked_removal:nn #1 #2 { TF }
365 {
366 \exp_args:NNx \tl_if_in:NnTF \g__hook_removal_list_tl
367 { __hook_removal_tl:nn {#1} {#2} }
368 { \prg_return_true: } { \prg_return_false: }
369 }

(End definition for __hook_if_marked_removal:nnTF.)
```

`\__hook_removal_tl:nn` Builds a token list with #1 and #2 which can only be matched by #1 and #2. The &4 anchors a removal, so that #1 can't be mistaken by #2 and vice versa, and the two \$3 delimit the two arguments

```

370 \cs_new:Npn __hook_removal_tl:nn #1 #2
371 { & \tl_to_str:n {#2} $ \tl_to_str:n {#1} $ }
```

(End definition for \\_\_hook\_removal\_tl:nn.)

`\g__hook_??_code_prop`  
`\__hook~??`  
`\g__hook_??_reversed_tl`

Initially these variables simply used an empty “label” name (not two question marks). This was a bit unfortunate, because then `l3doc` complains about `__` in the middle of a command name when trying to typeset the documentation. However using a “normal” name such as `default` has the disadvantage of that being not really distinguishable from a real hook name. I now have settled for `??` which needs some gymnastics to get it into the `csname`, but since this is used a lot things should be fast, so this is not done with `c` expansion in the code later on.

`\__hook~??` isn't used, but it has to be defined to trick the code into thinking that `??` is actually a hook.

```

372 \prop_new:c {g__hook_??_code_prop}
373 \prop_new:c {__hook~??}
```

Default rules are always given in normal ordering (never in reversed ordering). If such a rule is applied to a reversed hook it behaves as if the rule is reversed (e.g., `after` becomes `before`) because those rules are applied first and then the order is reversed.

```

374 \tl_new:c {g__hook_??_reversed_tl}
```

(End definition for `\g__hook_??_code_prop`, `\__hook~??`, and `\g__hook_??_reversed_tl`.)

### 3.7 Setting rules for hooks code

`\hook_gset_rule:nnnn`  
`\__hook_gset_rule:nnnn`

*FMi: needs docu correction given new implementation*

With `\hook_gset_rule:nnnn{<hook>}{<label1>}{'<relation>'}{<label2>}` a relation is defined between the two code labels for the given *<hook>*. The special hook `??` stands for *any* hook describing a default rule.

```

375 \cs_new_protected:Npn \hook_gset_rule:nnnn #1#2#3#4
376 {
377 __hook_normalize_hook_rule_args:Nnnnn __hook_gset_rule:nnnn
```

```

378 {#1} {#2} {#3} {#4}
379 }
380 \cs_new_protected:Npn __hook_gset_rule:nnn #1#2#3#4
381 {

```

First we ensure the basic data structure of the hook exists:

```
382 __hook_declare:n {#1}
```

Then we clear any previous relationship between both labels.

```
383 __hook_rule_gclear:nnn {#1} {#2} {#4}
```

Then we call the function to handle the given rule. Throw an error if the rule is invalid.

```

384 \cs_if_exist_use:cTF { __hook_rule_#3_gset:nnn }
385 {
386 {#1} {#2} {#4}
387 __hook_update_hook_code:n {#1}
388 }
389 { \msg_error:nnnnn { hooks } { unknown-rule }
390 {#1} {#2} {#3} {#4} }
391 }
```

*(End definition for \hook\_gset\_rule:nnn and \\_\_hook\_gset\_rule:nnn. This function is documented on page 111.)*

Then we add the new rule. We need to normalize the rules here to allow for faster processing later. Given a pair of labels  $l_A$  and  $l_B$ , the rule  $l_A > l_B$  is the same as  $l_B < l_A$  only presented differently. But by normalizing the forms of the rule to a single representation, say,  $l_B < l_A$ , reduces the time spent looking for the rules later considerably.

Here we do that normalization by using `\(pdf)strcmp` to lexically sort labels  $l_A$  and  $l_B$  to a fixed order. This order is then enforced every time these two labels are used together.

Here we use `\__hook_label_pair:nn {⟨hook⟩} {⟨lA⟩} {⟨lB⟩}` to build a string  $l_B | l_A$  with a fixed order, and use `\__hook_label_ordered:nnTF` to apply the correct rule to the pair of labels, depending if it was sorted or not.

```

392 \cs_new_protected:Npn __hook_rule_before_gset:nnn #1#2#3
393 {
394 __hook_tl_gset:cx { g__hook_#1_rule_ __hook_label_pair:nn {#2} {#3} _tl }
395 { __hook_label_ordered:nnTF {#2} {#3} {<} {>} }
396 }
397 \cs_new_eq:cN { __hook_rule_<_gset:nnn } __hook_rule_before_gset:nnn
398 \cs_new_protected:Npn __hook_rule_after_gset:nnn #1#2#3
399 {
400 __hook_tl_gset:cx { g__hook_#1_rule_ __hook_label_pair:nn {#3} {#2} _tl }
401 { __hook_label_ordered:nnTF {#3} {#2} {<} {>} }
402 }
403 \cs_new_eq:cN { __hook_rule_>_gset:nnn } __hook_rule_after_gset:nnn
```

*(End definition for \\_\_hook\_rule\_before\_gset:nnn and others.)*

This rule removes (clears, actually) the code from label #3 if label #2 is in the hook #1.

```

404 \cs_new_protected:Npn __hook_rule_voids_gset:nnn #1#2#3
405 {
406 __hook_tl_gset:cx { g__hook_#1_rule_ __hook_label_pair:nn {#2} {#3} _tl }
407 { __hook_label_ordered:nnTF {#2} {#3} {->} {<-} }
408 }
```

(End definition for `\_\_hook\_rule\_voids_gset:nnn`.)

These relations make an error/warning if labels #2 and #3 appear together in hook #1.

```
409 \cs_new_protected:cpn { __hook_rule_incompatible_error_gset:nnn } #1#2#3
410 { __hook_tl_gset:cn { g__hook_#1_rule_ __hook_label_pair:nn {#2} {#3} _tl } { xE } }
411 \cs_new_protected:cpn { __hook_rule_incompatible_warning_gset:nnn } #1#2#3
412 { __hook_tl_gset:cn { g__hook_#1_rule_ __hook_label_pair:nn {#2} {#3} _tl } { xW } }
```

(End definition for `\_\_hook\_rule\_incompatible\_error\_gset:nnn` and `\_\_hook\_rule\_incompatible\_warning\_gset:nnn`.)

Undo a setting. `\_\_hook\_rule\_unrelated\_gset:nnn` doesn't need to do anything, since we use `\_\_hook\_rule\_gclear:nnn` before setting any rule.

```
413 \cs_new_protected:Npn __hook_rule_unrelated_gset:nnn #1#2#3 { }
414 \cs_new_protected:Npn __hook_rule_gclear:nnn #1#2#3
415 { \cs_undefine:c { g__hook_#1_rule_ __hook_label_pair:nn {#2} {#3} _tl } }
```

(End definition for `\_\_hook\_rule\_unrelated\_gset:nnn` and `\_\_hook\_rule\_gclear:nnn`.)

`\_\_hook_label_pair:nn` Ensure that the lexically greater label comes first.

```
416 \cs_new:Npn __hook_label_pair:nn #1#2
417 {
418 \if_case:w __hook_str_compare:nn {#1} {#2} \exp_stop_f:
419 #1 | #1 % 0
420 \or: #1 | #2 % +1
421 \else: #2 | #1 % -1
422 \fi:
423 }
```

(End definition for `\_\_hook_label_pair:nn`.)

`\_\_hook_label_ordered_p:nn` Check that labels #1 and #2 are in the correct order (as returned by `\_\_hook_label\_pair:nn`) and if so return true, else return false.

```
424 \prg_new_conditional:Npnn __hook_label_ordered:nn #1#2 { TF }
425 {
426 \if_int_compare:w __hook_str_compare:nn {#1} {#2} > 0 \exp_stop_f:
427 \prg_return_true:
428 \else
429 \prg_return_false:
430 \fi:
431 }
```

(End definition for `\_\_hook_label_ordered:nnTF`.)

`\_\_hook_if_label_case:nnnnn` To avoid doing the string comparison twice in `\_\_hook_initialize_single:NNn` (once with `\str_if_eq:nn` and again with `\_\_hook_label_ordered:nn`), we use a three-way branching macro that will compare #1 and #2 and expand to `\use_i:nnn` if they are equal, `\use_ii:nn` if #1 is lexically greater, and `\use_iii:nn` otherwise.

```
432 \cs_new:Npn __hook_if_label_case:nnnnn #1#2
433 {
434 \cs:w use_
435 \if_case:w __hook_str_compare:nn {#1} {#2}
436 i \or: ii \else: iii \fi: :nnn
437 \cs_end:
438 }
```

(End definition for `\_\_hook\_if\_label\_case:nnnnn`.)

`\_\_hook_update_hook_code:n`: Before `\begin{document}` this does nothing, in the body it reinitializes the hook code using the altered data.

439 `\cs_new_eq:NN \_\_hook_update_hook_code:n \use_none:n`

(End definition for `\_\_hook_update_hook_code:n`.)

`\_\_hook_initialize_all:`: Initialize all known hooks (at `\begin{document}`), i.e., update the fast execution token lists to hold the necessary code in the right order.

440 `\cs_new_protected:Npn \_\_hook_initialize_all: {`

First we change `\_\_hook_update_hook_code:n` which so far was a no-op to now initialize one hook. This way any later updates to the hook will run that code and also update the execution token list.

441 `\cs_gset_eq:NN \_\_hook_update_hook_code:n \_\_hook_initialize_hook_code:n`

Now we loop over all hooks that have been defined and update each of them.

442 `\_\_hook_debug:n { \prop_gclear:N \g_\_\_hook_used_prop }`  
443 `\seq_map_inline:Nn \g_\_\_hook_all_seq`  
444 `{`  
445 `\_\_hook_update_hook_code:n {\#\#1}`  
446 `}`

If we are debugging we show results hook by hook for all hooks that have data.

447 `\_\_hook_debug:n`  
448 `{ \iow_term:x{^\^\_JAll~ initialized~ (non-empty)~ hooks:}`  
449 `\prop_map_inline:Nn \g_\_\_hook_used_prop`  
450 `{ \iow_term:x{^\^\_J~ \#\#1~ ->~`  
451 `\exp_not:v {\_\_hook-\#\#1}~ }`  
452 `}`  
453 `}`

After all hooks are initialized we change the “use” to just call the hook code and not initialize it (as it was done in the preamble).

454 `\cs_gset_eq:NN \hook_use:n \_\_hook_use_initialized:n`  
455 `\cs_gset_eq:NN \_\_hook_preamble_hook:n \use_none:n`  
456 `}`

(End definition for `\_\_hook_initialize_all:..`)

`\_\_hook_initialize_hook_code:n`: Initializing or reinitializing the fast execution hook code. In the preamble this is selectively done in case a hook gets used and at `\begin{document}` this is done for all hooks and afterwards only if the hook code changes.

457 `\cs_new_protected:Npn \_\_hook_initialize_hook_code:n #1`  
458 `{`  
459 `\_\_hook_debug:n{ \iow_term:x{^\^\_JUpdate~ code~ for~ hook-`  
460 `'##1' \on@line :^\^\_J} }`

This does the sorting and the updates. First thing we do is to check if a legacy hook macro exists and if so we add it to the hook under the label `legacy`. This might make the hook non-empty so we have to do this before the then following test.

461 `\_\_hook_include_legacy_code_chunk:n {\#1}`

If there aren't any code chunks for the current hook, there is no point in even starting the sorting routine so we make a quick test for that and in that case just update `\__-hook <hook>` to hold the `top-level` and `next` code chunks. If there are code chunks we call `\__hook_initialize_single:Nn` and pass to it ready made csnames as they are needed several times inside. This way we save a bit on processing time if we do that up front.

```

462 \hook_if_exist:nT {#1}
463 {
464 \prop_if_empty:cTF {g__hook_#1_code_prop}
465 {
466 __hook_tl_gset:co { __hook~#1 }
467 {
468 \cs:w __hook_toplevel~#1 \exp_after:wN \cs_end:
469 \cs:w __hook_next~#1 \cs_end:
470 }
471 }
472 }
```

By default the algorithm sorts the code chunks and then saves the result in a token list for fast execution by adding the code one after another using `\tl_gput_right:NV`. When we sort code for a reversed hook, all we have to do is to add the code chunks in the opposite order into the token list. So all we have to do in preparation is to change two definitions used later on.

```

473 __hook_if_reversed:nTF {#1}
474 {
475 \cs_set_eq:NN __hook_tl_gput:Nn __hook_tl_gput_left:Nn
476 \cs_set_eq:NN __hook_clist_gput:NV \clist_gput_left:NV
477 {
478 \cs_set_eq:NN __hook_tl_gput:Nn __hook_tl_gput_right:Nn
479 \cs_set_eq:NN __hook_clist_gput:NV \clist_gput_right:NV
480 }
```

When sorting, some relations (namely `voids`) need to act destructively on the code property lists to remove code that shouldn't appear in the sorted hook token list, so we temporarily save the old code property list so that it can be restored later.

```

481 \prop_set_eq:Nc \l__hook_work_prop { g__hook_#1_code_prop }
482 __hook_initialize_single:ccn
483 { __hook~#1 } { g__hook_#1_labels_clist } {#1}
```

For debug display we want to keep track of those hooks that actually got code added to them, so we record that in plist. We use a plist to ensure that we record each hook name only once, i.e., we are only interested in storing the keys and the value is arbitrary.

```

484 __hook_debug:n{ \exp_args:NNx \prop_gput:Nnn
485 \g__hook_used_prop {#1}{} }
```

*(End definition for `\__hook_initialize_hook_code:n`.)*

`\__hook_tl_cname:n` It is faster to pass a single token and expand it when necessary than to pass a bunch of `\__hook_seq_cname:n` character tokens around.

*FMi: note to myself: verify*

```

486 \cs_new:Npn __hook_tl_cname:n #1 { l__hook_label_#1_tl }
487 \cs_new:Npn __hook_seq_cname:n #1 { l__hook_label_#1_seq }
```

(End definition for `\_hook_tl_cname:n` and `\_hook_seq_cname:n`.)

```
\l_hook_labels_seq
\l_hook_labels_int
\l_hook_front_tl
\l_hook_rear_tl
\l_hook_label_0_tl
```

For the sorting I am basically implementing Knuth's algorithm for topological sorting as given in TAOCP volume 1 pages 263–266. For this algorithm we need a number of local variables:

- List of labels used in the current hook to label code chunks:

```
488 \seq_new:N \l_hook_labels_seq
```

- Number of labels used in the current hook. In Knuth's algorithm this is called  $N$ :

```
489 \int_new:N \l_hook_labels_int
```

- The sorted code list to be build is managed using two pointers one to the front of the queue and one to the rear. We model this using token list pointers. Knuth calls them  $F$  and  $R$ :

```
490 \tl_new:N \l_hook_front_tl
491 \tl_new:N \l_hook_rear_tl
```

- The data for the start of the queue is kept in this token list, it corresponds to what Don calls `QLINK[0]` but since we aren't manipulating individual words in memory it is slightly differently done:

```
492 \tl_new:c { _hook_tl_cname:n { 0 } }
```

(End definition for `\l_hook_labels_seq` and others.)

```
_hook_initialize_single>NNn
_hook_initialize_single:ccn
```

`\_hook_initialize_single>NNn` implements the sorting of the code chunks for a hook and saves the result in the token list for fast execution (#4). The arguments are `<hook-code-plist>`, `<hook-code-tl>`, `<hook-top-level-code-tl>`, `<hook-next-code-tl>`, `<hook-ordered-labels-clist>` and `<hook-name>` (the latter is only used for debugging—the `<hook-rule-plist>` is accessed using the `<hook-name>`).

The additional complexity compared to Don's algorithm is that we do not use simple positive integers but have arbitrary alphanumeric labels. As usual Don's data structures are chosen in a way that one can omit a lot of tests and I have mimicked that as far as possible. The result is a restriction I do not test for at the moment: a label can't be equal to the number 0!

*FMi: Needs checking for, just in case*

```
493 \cs_new_protected:Npn _hook_initialize_single>NNn #1#2#3
494 {
```

Step T1: Initialize the data structure ...

```
495 \seq_clear:N \l_hook_labels_seq
496 \int_zero:N \l_hook_labels_int
```

Store the name of the hook:

```
497 \tl_set:Nn \l_hook_cur_hook_tl {#3}
```

We loop over the property list holding the code and record all labels listed there. Only rules for those labels are of interest to us. While we are at it we count them (which gives us the  $N$  in Knuth's algorithm. The prefix `label_` is added to the variables to ensure that labels named `front`, `rear`, `labels`, or `return` don't interact with our code.

```

498 \prop_map_inline:Nn \l__hook_work_prop
499 {
500 \int_incr:N \l__hook_labels_int
501 \seq_put_right:Nn \l__hook_labels_seq {##1}
502 __hook_tl_set:cn { __hook_tl_cname:n {##1} } { 0 }
503 \seq_clear_new:c { __hook_seq_cname:n {##1} }
504 }

```

Steps T2 and T3: Sort the relevant rules into the data structure...

This loop constitutes a square matrix of the labels in `\l__hook_work_prop` in the vertical and the horizontal directions. However since the rule  $l_A \langle rel \rangle l_B$  is the same as  $l_B \langle rel \rangle^{-1} l_A$  we can cut the loop short at the diagonal of the matrix (*i.e.*, when both labels are equal), saving a good amount of time. The way the rules were set up (see the implementation of `\__hook_rule_before_gset:nnn` above) ensures that we have no rule in the ignored side of the matrix, and all rules are seen. The rules are applied in `\__hook_apply_label_pair:nnn`, which takes the properly-ordered pair of labels as argument.

```

505 \prop_map_inline:Nn \l__hook_work_prop
506 {
507 \prop_map_inline:Nn \l__hook_work_prop
508 {
509 __hook_if_label_case:nnnn {##1} {####1}
510 { \prop_map_break: }
511 { __hook_apply_label_pair:nnn {##1} {####1} }
512 { __hook_apply_label_pair:nnn {####1} {##1} }
513 {##3}
514 }
515 }

```

Take a breath and take a look at the data structures that have been set up:

```
516 __hook_debug:n { __hook_debug_label_data:N \l__hook_work_prop }
```

Step T4:

```

517 \tl_set:Nn \l__hook_rear_tl { 0 }
518 \tl_set:cn { __hook_tl_cname:n { 0 } } { 0 }
519 \seq_map_inline:Nn \l__hook_labels_seq
520 {
521 \int_compare:nNnT { \cs:w __hook_tl_cname:n {##1} \cs_end: } = 0
522 {
523 \tl_set:cn { __hook_tl_cname:n { \l__hook_rear_tl } } {##1}
524 \tl_set:Nn \l__hook_rear_tl {##1}
525 }
526 }
527 \tl_set_eq:Nc \l__hook_front_tl { __hook_tl_cname:n { 0 } }
528 __hook_tl_gclear:N #1
529 \clist_gclear:N #2

```

The whole loop combines steps T5–T7:

```

530 \bool_while_do:nn { ! \str_if_eq_p:Vn \l__hook_front_tl { 0 } }
531 {

```

This part is step T5:

```

532 \int_decr:N \l__hook_labels_int
533 \prop_get:NVN \l__hook_work_prop \l__hook_front_tl \l__hook_return_tl
534 \exp_args:NNV __hook_tl_gput:Nn #1 \l__hook_return_tl
535
536 __hook_clist_gput:NV #2 \l__hook_front_tl
 __hook_debug:n{ \iow_term:x{Handled~ code~ for~ \l__hook_front_tl} }

```

This is step T6 except that we don't use a pointer  $P$  to move through the successors, but instead use  $\#\#1$  of the mapping function.

```

537 \seq_map_inline:cn { __hook_seq_cname:n { \l__hook_front_tl } }
538 {
539 \tl_set:cx { __hook_tl_cname:n {\#\#1} }
540 \int_eval:n
541 { \cs:w __hook_tl_cname:n {\#\#1} \cs_end: - 1 }
542 }
543 \int_compare:nNnT
544 { \cs:w __hook_tl_cname:n {\#\#1} \cs_end: } = 0
545 {
546 \tl_set:cn { __hook_tl_cname:n { \l__hook_rear_tl } } {\#\#1}
547 \tl_set:Nn \l__hook_rear_tl {\#\#1}
548 }
549 }

```

and step T7:

```

550 \tl_set_eq:Nc \l__hook_front_tl
551 { __hook_tl_cname:n { \l__hook_front_tl } }

```

This is step T8: If we haven't moved the code for all labels (i.e., if  $\l__hook_labels_int$  is still greater than zero) we have a loop and our partial order can't be flattened out.

```

552 }
553 \int_compare:nNnF \l__hook_labels_int = 0
554 {
555 \iow_term:x{=====}
556 \iow_term:x{Error:~ label~ rules~ are~ incompatible:}

```

This is not really the information one needs in the error case but will do for now ...

*FMi: fix*

```

557 __hook_debug_label_data:N \l__hook_work_prop
558 \iow_term:x{=====}
559 }

```

After we have added all hook code to #1 we finish it off with adding extra code for the top-level (#2) and for one time execution (#3). These should normally be empty. The top-level code is added with  $\__hook_tl_gput:Nn$  as that might change for a reversed hook (then top-level is the very first code chunk added). The next code is always added last.

```

560 \exp_args:NNo __hook_tl_gput:Nn #1 { \cs:w __hook_toplevel~#3 \cs_end: }
561 __hook_tl_gput_right:No #1 { \cs:w __hook_next~#3 \cs_end: }
562 }
563 \cs_generate_variant:Nn __hook_initialize_single:NNn { cc }

```

(End definition for  $\__hook_initialize_single:NNn$ .)

`\__hook_tl_gput:Nn` These append either on the right (normal hook) or on the left (reversed hook). This is setup up in `\__hook_initialize_hook_code:n`, elsewhere their behavior is undefined.

```
564 \cs_new:Npn __hook_tl_gput:Nn { \ERROR }
565 \cs_new:Npn __hook_clist_gput:NV { \ERROR }
```

(End definition for `\__hook_tl_gput:Nn` and `\__hook_clist_gput:NV`.)

`\__hook_apply_label_pair:nnn` This is the payload of steps T2 and T3 executed in the loop described above. This macro assumes #1 and #2 are ordered, which means that any rule pertaining the pair #1 and #2 is `\g__hook_<hook>_rule_#1#2_t1`, and not `\g__hook_<hook>_rule_#2#1_t1`. This also saves a great deal of time since we only need to check the order of the labels once.

The arguments here are `<label1>`, `<label2>`, `<hook>`, and `<hook-code-plist>`. We are about to apply the next rule and enter it into the data structure. `\__hook_apply_label_pair:nnn` will just call `\__hook_label_if_exist_apply:nnnF` for the `<hook>`, and if no rule is found, also try the `<hook>` name ?? denoting a default hook rule.

`\__hook_label_if_exist_apply:nnnF` will check if the rule exists for the given hook, and if so call `\__hook_apply_rule:nnn`.

```
566 \cs_new_protected:Npn __hook_apply_label_pair:nnn #1#2#3
567 {
```

Extra complication: as we use default rules and local hook specific rules we first have to check if there is a local rule and if that exist use it. Otherwise check if there is a default rule and use that.

```
568 __hook_label_if_exist_apply:nnnF {#1} {#2} {#3}
569 {
```

If there is no hook-specific rule we check for a default one and use that if it exists.

```
570 __hook_label_if_exist_apply:nnnF {#1} {#2} {??} { }
571 }
572 }
573 \cs_new_protected:Npn __hook_label_if_exist_apply:nnnF #1#2#3
574 {
575 \if_cs_exist:w g__hook_ #3 _rule_ #1 | #2 _t1 \cs_end:
```

What to do precisely depends on the type of rule we have encountered. If it is a `before` rule it will be handled by the algorithm but other types need to be managed differently. All this is done in `\__hook_apply_rule:nnnN`.

```
576 __hook_apply_rule:nnn {#1} {#2} {#3}
577 \exp_after:wN \use_none:n
578 \else:
579 \use:nn
580 \fi:
581 }
```

(End definition for `\__hook_apply_label_pair:nnn` and `\__hook_label_if_exist_apply:nnnF`.)

`\__hook_apply_rule:nnn` This is the code executed in steps T2 and T3 while looping through the matrix. This is part of step T3. We are about to apply the next rule and enter it into the data structure. The arguments are `<label1>`, `<label2>`, `<hook-name>`, and `<hook-code-plist>`.

```
582 \cs_new_protected:Npn __hook_apply_rule:nnn #1#2#3
583 {
584 \cs:w __hook_apply_
585 \cs:w g__hook_#3_reversed_t1 \cs_end: rule_
586 \cs:w g__hook_ #3 _rule_ #1 | #2 _t1 \cs_end: :nnn \cs_end:
```

```

587 {#1} {#2} {#3}
588 }

```

(End definition for `\_hook_apply_rule:nnn.`)

`\_hook_apply_rule_<:nnn` The most common cases are < and > so we handle that first. They are relations  $\prec$  and  $\succ$  in TAOCP, and they dictate sorting.

```

589 \cs_new_protected:cpn { __hook_apply_rule_<:nnn } #1#2#3
590 {
591 _hook_debug:n { __hook_msg_pair_found:nnn {#1} {#2} {#3} }
592 \tl_set:cx { __hook_tl_cname:n {#2} }
593 { \int_eval:n{ \cs:w __hook_tl_cname:n {#2} \cs_end: + 1 } }
594 \seq_put_right:cn{ __hook_seq_cname:n {#1} }{#2}
595 }
596 \cs_new_protected:cpn { __hook_apply_rule_>:nnn } #1#2#3
597 {
598 _hook_debug:n { __hook_msg_pair_found:nnn {#1} {#2} {#3} }
599 \tl_set:cx { __hook_tl_cname:n {#1} }
600 { \int_eval:n{ \cs:w __hook_tl_cname:n {#1} \cs_end: + 1 } }
601 \seq_put_right:cn{ __hook_seq_cname:n {#2} }{#1}
602 }

```

(End definition for `\_hook_apply_rule_<:nnn` and `\_hook_apply_rule_>:nnn.`)

`\_hook_apply_rule_xE:nnn` These relations make two labels incompatible within a hook. xE makes raises an error if the labels are found in the same hook, and xW makes it a warning.

```

603 \cs_new_protected:cpn { __hook_apply_rule_xE:nnn } #1#2#3
604 {
605 _hook_debug:n { __hook_msg_pair_found:nnn {#1} {#2} {#3} }
606 \msg_error:nnnnnn { hooks } { labels-incompatible }
607 {#1} {#2} {#3} { 1 }
608 \use:c { __hook_apply_rule_->:nnn } {#1} {#2} {#3}
609 \use:c { __hook_apply_rule_-<:nnn } {#1} {#2} {#3}
610 }
611 \cs_new_protected:cpn { __hook_apply_rule_xW:nnn } #1#2#3
612 {
613 _hook_debug:n { __hook_msg_pair_found:nnn {#1} {#2} {#3} }
614 \msg_warning:nnnnnn { hooks } { labels-incompatible }
615 {#1} {#2} {#3} { 0 }
616 }

```

(End definition for `\_hook_apply_rule_xE:nnn` and `\_hook_apply_rule_xW:nnn.`)

`\_hook_apply_rule_->:nnn` If we see  $\rightarrow$  we have to drop code for label #3 and carry on. We could do a little better and drop everything for that label since it doesn't matter where we sort in the empty code. However that would complicate the algorithm a lot with little gain.<sup>8</sup> So we still unnecessarily try to sort it in and depending on the rules that might result in a loop that is otherwise resolved. If that turns out to be a real issue, we can improve the code.

Here the code is removed from `\l__hook_cur_hook_t1` rather than #3 because the latter may be `??`, and the default hook doesn't store any code. Removing from `\l__hook_cur_hook_t1` makes default rules  $\rightarrow$  and  $\leftarrow$  work properly.

---

<sup>8</sup>This also has the advantage that the result of the sorting doesn't change which might otherwise (for unrelated chunks) if we aren't careful.

```

617 \cs_new_protected:cpn { __hook_apply_rule_->:nnn } #1#2#3
618 {
619 __hook_debug:n
620 {
621 __hook_msg_pair_found:nnn {#1} {#2} {#3}
622 \iow_term:x{-->~ Drop~ '#2'~ code~ from~
623 \iow_char:N \\ g_hook_ \l_hook_cur_hook_tl _code_prop ~
624 because~ of~ '#1' }
625 }
626 \prop_put:Nnn \l_hook_work_prop {#2} { }
627 }
628 \cs_new_protected:cpn { __hook_apply_rule_-<:nnn } #1#2#3
629 {
630 __hook_debug:n
631 {
632 __hook_msg_pair_found:nnn {#1} {#2} {#3}
633 \iow_term:x{-->~ Drop~ '#1'~ code~ from~
634 \iow_char:N \\ g_hook_ \l_hook_cur_hook_tl _code_prop ~
635 because~ of~ '#2' }
636 }
637 \prop_put:Nnn \l_hook_work_prop {#1} { }
638 }

```

(End definition for `\_hook\_apply\_rule\_>:nnn` and `\_hook\_apply\_rule\_<:nnn`.)

Reversed rules.

```
639 \cs_new_eq:cc { __hook_apply_rule_<:nnn } { __hook_apply_rule_>:nnn }
640 \cs_new_eq:cc { __hook_apply_rule_>:nnn } { __hook_apply_rule_<:nnn }
641 \cs_new_eq:cc { __hook_apply_rule_<:-nnn } { __hook_apply_rule_<-:nnn }
642 \cs_new_eq:cc { __hook_apply_rule_->:nnn } { __hook_apply_rule_->:nnn }
643 \cs_new_eq:cc { __hook_apply_rule_xE:nnn } { __hook_apply_rule_xE:nnn }
644 \cs_new_eq:cc { __hook_apply_rule_xW:nnn } { __hook_apply_rule_xW:nnn }
```

(End definition for `\__hook_apply_-rule_<:nnn` and others.)

A macro to avoid moving this many tokens around.

```
645 \cs_new_protected:Npn __hook_msg_pair_found:n #1#2#3
646 {
647 \iow_term:x{~ \str_if_eq:nnTF {#3} {??} {default} {~normal} ~
648 rule~ __hook_label_pair:nn {#1} {#2}:~}
649 \use:c { g__hook_#3_rule_ __hook_label_pair:nn {#1} {#2} _tl } ~
650 found}
651 }
```

(End definition for \\_\\_hook\\_msg\\_pair\\_found:nnn.)

```
__hook_debug_label_data:N
 652 \cs_new_protected:Npn __hook_debug_label_data:N #1 {
 653 \iow_term:x{Code~ labels~ for~ sorting:}
 654 \iow_term:x{\seq_use:Nnnn\l__hook_labels_seq {\and~}{,}{\and~} }
 655 \iow_term:x{^J Data~ structure~ for~ label~ rules:}
 656 \prop_map_inline:Nn #1
 657 {
 658 \iow_term:x{\#1~ =~ \tl_use:c{ __hook_tl_cname:n {\##1} }~ -~
 659 \seq_use:cnnn{ __hook_seq_cname:n {\##1} }{-->}{-->}{-->} }
```

```

660 }
661 }
662 \iow_term:x{ }
663 }

```

(End definition for `\_hook_debug_label_data:N`.)

`\hook_show:n`  
`\hook_log:n`

This writes out information about the hook given in its argument onto the `.log` file and the terminal, if `\show_hook:n` is used. Internally both share the same structure, except that at the end, `\hook_show:n` triggers TeX's prompt.

```

664 \cs_new_protected:Npn \hook_log:n #1
665 {
666 \cs_set_eq:NN _hook_log_cmd:x \iow_log:x
667 _hook_normalize_hook_args:Nn _hook_log:nN {#1} \tl_log:x
668 }
669 \cs_new_protected:Npn \hook_show:n #1
670 {
671 \cs_set_eq:NN _hook_log_cmd:x \iow_term:x
672 _hook_normalize_hook_args:Nn _hook_log:nN {#1} \tl_show:x
673 }
674 \cs_new_protected:Npn _hook_log_line:x #1
675 { _hook_log_cmd:x { >#1 } }
676 \cs_new_protected:Npn _hook_log_line_indent:x #1
677 { _hook_log_cmd:x { >\@spaces #1 } }
678 \cs_new_protected:Npn _hook_log:nN #1 #2
679 {
680 _hook_preamble_hook:n {#1}
681 _hook_log_cmd:x { ^^J ->-The~hook~'#1': }
682 \hook_if_exist:nF {#1}
683 { _hook_log_line:x { is-not-declared! } }
684 \hook_if_empty:nTF {#1}
685 { #2 { The~hook~is~empty } }
686 {
687 _hook_log_line:x { Code~chunks: }
688 \prop_if_empty:cTF { g__hook_#1_code_prop }
689 { _hook_log_line_indent:x { --- } }
690 {
691 \prop_map_inline:cn { g__hook_#1_code_prop }
692 { _hook_log_line_indent:x { ##1~->- \tl_to_str:n {##2} } }
693 }

```

If there is code in the top-level token list, print it:

```

694 _hook_log_line:x
695 {
696 Document-level-(top-level)-code
697 \hook_if_exist:nT {#1}
698 { ~(executed-_hook_if_reversed:nTF {#1} {first} {last}) :
699 }
700 _hook_log_line_indent:x
701 {
702 \tl_if_empty:cTF { __hook_toplevel~#1 }
703 { --- }
704 { -> ~ \exp_args:Nv \tl_to_str:n { __hook_toplevel~#1 } }
705 }

```

```

706 __hook_log_line:x { Extra~code~for~next~invocation: }
707 __hook_log_line_indent:x
708 {
709 \tl_if_empty:cTF { __hook_next~#1 }
710 { --- }

```

If the token list is not empty we want to display it but without the first tokens (the code to clear itself) so we call a helper command to get rid of them.

```

711 { ->~ \exp_args:Nv __hook_log_next_code:n { __hook_next~#1 } }
712 }

```

Loop through the rules in a hook and for every rule found, print it. If no rule is there, print ---. The boolean \l\_\_hook\_tmpa\_bool here indicates if the hook has no rules.

```

713 __hook_log_line:x { Rules: }
714 \bool_set_true:N \l__hook_tmpa_bool
715 __hook_list_rules:nn {#1}
716 {
717 \bool_set_false:N \l__hook_tmpa_bool
718 __hook_log_line_indent:x
719 {
720 ##2~ with~
721 \str_if_eq:nnT {##3} {??} { default~ }
722 relation~ ##1
723 }
724 }
725 \bool_if:NT \l__hook_tmpa_bool
726 { __hook_log_line_indent:x { --- } }

```

When the hook is declared (that is, the sorting algorithm is applied to that hook) and not empty

```

727 \bool_lazy_and:nnTF
728 { \hook_if_exist_p:n {#1} }
729 { ! \hook_if_empty_p:n {#1} }
730 {
731 __hook_log_line:x
732 {
733 Execution~order
734 \bool_if:NTF \l__hook_tmpa_bool
735 { __hook_if_reversed:nT {#1} { ~(after~reversal) } }
736 { ~(after~
737 __hook_if_reversed:nT {#1} { reversal~and~ }
738 applying~rules)
739 } :
740 }
741 #2 % \tl_show:n
742 {
743 \@spaces
744 \clist_if_empty:cTF { g__hook_#1_labels_clist }
745 { --- }
746 { \clist_use:cn {g__hook_#1_labels_clist} { ,~ } }
747 }
748 }
749 {
750 #2

```

```

751 {
752 Hook~ \hook_if_exist:nTF {#1}
753 {code-pool~empty} {not-declared}
754 }
755 }
756 }
757 }
```

To display the code for next invocation only (i.e., from `\AddToHookNext` we have to remove the first two tokens at the front which are `\tl_gclear:N` and the token list to clear.

```

758 \cs_new:Npn __hook_log_next_code:n #1
759 { \exp_args:No \tl_to_str:n { \use_none:nn #1 } }
```

`\__hook_log_next_code:n`

(End definition for `\hook_show:n` and others. These functions are documented on page 112.)

This macro takes a `\hook` and an `\inline function` and loops through each pair of `\label`s in the `\hook`, and if there is a relation between this pair of `\label`s, the `\inline function` is executed with `#1 = \relation`, `#2 = \label1 | \label2`, and `#3 = \hook` (the latter may be the argument `#1` to `\__hook_list_rules:nn`, or `??` if it is a default rule).

```

760 \cs_new_protected:Npn __hook_list_rules:nn #1 #2
761 {
762 \cs_set_protected:Npn __hook_tmp:w ##1 ##2 ##3 {#2}
763 \prop_map_inline:cn { g__hook_#1_code_prop }
764 {
765 \prop_map_inline:cn { g__hook_#1_code_prop }
766 {
767 __hook_if_label_case:nnnn {##1} {####1}
768 { \prop_map_break: }
769 { __hook_list_one_rule:nnn {##1} {####1} }
770 { __hook_list_one_rule:nnn {####1} {##1} }
771 {#1}
772 }
773 }
774 }
```

These two are quite similar to `\__hook_apply_label_pair:nnn` and `\__hook_label_if_exist_apply:nnnF`, respectively, but rather than applying the rule, they pass it to the `\inline function`.

```

775 \cs_new_protected:Npn __hook_list_one_rule:nnn #1#2#3
776 {
777 __hook_list_if_rule_exists:nnnF {#1} {#2} {#3}
778 { __hook_list_if_rule_exists:nnnF {#1} {#2} { ?? } { } }
779 }
780 \cs_new_protected:Npn __hook_list_if_rule_exists:nnnF #1#2#3
781 {
782 \if_cs_exist:w g__hook_ #3 _rule_ #1 | #2 _tl \cs_end:
783 \exp_args:Nv __hook_tmp:w
784 { g__hook_ #3 _rule_ #1 | #2 _tl } { #1 | #2 } {#3}
785 \exp_after:wN \use_none:nn
786 \fi:
787 \use:n
788 }
```

(End definition for `\_\_hook_list_rules:nn`, `\_\_hook_list_one_rule:nnn`, and `\_\_hook_list_if_rule_exists:nnnF`.)

`\_\_hook_debug_print_rules:n` A shorthand for debugging that prints similar to `\prop_show:N`.

```

789 \cs_new_protected:Npn __hook_debug_print_rules:n #1
790 {
791 \iow_term:n { The~hook~#1~contains~the~rules: }
792 \cs_set_protected:Npn __hook_tmp:w ##1
793 {
794 __hook_list_rules:nn {#1}
795 {
796 \iow_term:x
797 {
798 > ##1 {####2} ##1 => ##1 {####1}
799 \str_if_eq:nnT {####3} {??} { ~ (default) }
800 }
801 }
802 }
803 \exp_args:No __hook_tmp:w { \use:nn { ~ } { ~ } }
804 }
```

(End definition for `\_\_hook_debug_print_rules:n`.)

### 3.8 Specifying code for next invocation

`\hook_gput_next_code:nn`

```

%hook__hook_gput_next_code:nn
__hook_gput_next_do:nn
__hook_gput_next_do:Nnn
__hook_clear_next:n
```

```

805 \cs_new_protected:Npn \hook_gput_next_code:nn #1
806 {
807 __hook_normalize_hook_args:Nn __hook_gput_next_code:nn {#1} }
808 \cs_new_protected:Npn __hook_gput_next_code:nn #1 #2
809 {
810 __hook_declare:n {#1}
811 \hook_if_exist:nTF {#1}
812 {
813 __hook_gput_next_do:nn {#1} {#2} }
814 __hook_try_declarng_generic_next_hook:nn {#1} {#2} }
815 }
816 \cs_new_protected:Npn __hook_gput_next_do:nn #1
817 {
818 \exp_args:Nc __hook_gput_next_do:Nnn
819 { __hook_next~#1 } {#1}
820 }
```

First check if the “next code” token list is empty: if so we need to add a `\tl_gclear:c` to clear it, so the code lasts for one usage only. The token list is cleared early so that nested usages don’t get lost. `\tl_gclear:c` is used instead of `\tl_gclear:N` in case the hook is used in an expansion-only context, so the token list doesn’t expand before `\tl_gclear:N`: that would make an infinite loop. Also in case the main code token list is empty, the hook code has to be updated to add the next execution token list.

```

821 \cs_new_protected:Npn __hook_gput_next_do:Nnn #1 #2
822 {
823 \tl_if_empty:cT { __hook~#2 }
824 {
825 __hook_update_hook_code:n {#2} }
826 \tl_if_empty:NT #1
827 {
828 __hook_tl_gset:Nn #1 { __hook_clear_next:n {#2} } }
829 __hook_tl_gput_right:Nn #1
```

```

826 }
827 \cs_new_protected:Npn __hook_clear_next:n #1
828 { \cs_gset_eq:cN { __hook_next~#1 } \c_empty_tl }

```

(End definition for `\hook_gput_next_code:nn` and others. This function is documented on page 110.)

### 3.9 Using the hook

`\hook_use:n` as defined here is used in the preamble, where hooks aren't initialized by default. `\__hook_use_initialized:n` is also defined, which is the non-`\protected` version for use within the document. Their definition is identical, except for the `\__hook_preamble_hook:n` (which wouldn't hurt in the expandable version, but it would be an unnecessary extra expansion).

`\__hook_use_initialized:n` holds the expandable definition while in the preamble. `\__hook_preamble_hook:n` initializes the hook in the preamble, and is redefined to `\use_none:n` at `\begin{document}`.

Both versions do the same internally: check if the hook exist as given, and if so use it as quickly as possible. If it doesn't exist, the a call to `\__hook_use:wn` checks for file hooks.

At `\begin{document}`, all hooks are initialized, and any change in them causes an update, so `\hook_use:n` can be made expandable. This one is better not protected so that it can expand into nothing if containing no code. Also important in case of generic hooks that we do not generate a `\relax` as a side effect of checking for a csname. In contrast to the TeX low-level `\csname ... \endcsname` construct `\t1_if_exist:c` is careful to avoid this.

```

829 \cs_new_protected:Npn \hook_use:n #1
830 {
831 \tl_if_exist:cTF { __hook~#1 }
832 {
833 __hook_preamble_hook:n {#1}
834 \cs:w __hook~#1 \cs_end:
835 }
836 { __hook_use:wn #1 / \s__hook_mark {#1} }
837 }
838 \cs_new:Npn __hook_use_initialized:n #1
839 {
840 \if_cs_exist:w __hook~#1 \cs_end:
841 \else:
842 __hook_use_undefined:w
843 \fi:
844 \cs:w __hook~#1 __hook_use_end:
845 }
846 \cs_new:Npn __hook_use_undefined:w #1 #2 __hook~#3 __hook_use_end:
847 {
848 #1 % fi
849 __hook_use:wn #3 / \s__hook_mark {#3}
850 }
851 \cs_new_protected:Npn __hook_preamble_hook:n #1
852 { __hook_initialize_hook_code:n {#1} }
853 \cs_new_eq:NN __hook_use_end: \cs_end:

```

(End definition for `\hook_use:n` and others. This function is documented on page 110.)

`\_\_hook\_use:wn` `\_\_hook\_use:wn` does a quick check to test if the current hook is a file hook: those need a special treatment. If it is not, the hook does not exist. If it is, then `\_\_hook\_try_file_hook:n` is called, and checks that the current hook is a file-specific hook using `\_\_hook_if_file_hook:wTF`. If it's not, then it's a generic `file/` hook and is used if it exists.

If it is a file-specific hook, it passes through the same normalization as during declaration, and then it is used if defined. `\_\_hook_if_exist_use:n` checks if the hook exists, and calls `\_\_hook_preamble_hook:n` if so, then uses the hook.

```

854 \cs_new:Npn __hook_use:wn #1 / #2 \s__hook_mark #3
855 {
856 \str_if_eq:nnTF {#1} { file }
857 { __hook_try_file_hook:n {#3} }
858 { } % Hook doesn't exist
859 }
860 \cs_new_protected:Npn __hook_try_file_hook:n #1
861 {
862 __hook_if_file_hook:wTF #1 / / \s__hook_mark
863 {
864 \exp_args:Ne __hook_if_exist_use:n
865 { \exp_args:Ne __hook_file_hook_normalize:n {#1} }
866 }
867 { __hook_if_exist_use:n {#1} } % file/ generic hook (e.g. file/before)
868 }
869 \cs_new_protected:Npn __hook_if_exist_use:n #1
870 {
871 \tl_if_exist:cT { __hook~#1 }
872 {
873 __hook_preamble_hook:n {#1}
874 \cs:w __hook~#1 \cs_end:
875 }
876 }

```

(End definition for `\_\_hook_use:wn`, `\_\_hook_try_file_hook:n`, and `\_\_hook_if_exist_use:n`.)

`\hook_use_once:n` For hooks that can and should be used only once we have a special use command that remembers the hook name in `\g_\_hook_execute_immediately_prop`. This has the effect that any further code added to the hook is executed immediately rather than stored in the hook.

The code needs some gymnastics to prevent space trimming from the hook name, since `\hook_use:n` and `\hook_use_once:n` are documented to not trim spaces.

*PhO: Should this raise an error if the hook doesn't exist?*

```

877 \cs_new_protected:Npn \hook_use_once:n #1
878 {
879 \tl_if_exist:cT { __hook~#1 }
880 {
881 \tl_set:Nn \l__hook_return_tl {#1}
882 __hook_normalize_hook_args:Nn __hook_use_once_store:n
883 { \l__hook_return_tl }
884 \hook_use:n {#1}
885 }
886 }

```

```

887 \cs_new_protected:Npn __hook_use_once_store:n #1
888 { \prop_gput:Nnn \g__hook_execute_immediately_prop {#1} { } }

```

(End definition for `\hook_use_once:n`. This function is documented on page 110.)

### 3.10 Querying a hook

Simpler data types, like token lists, have three possible states; they can exist and be empty, exist and be non-empty, and they may not exist, in which case emptiness doesn't apply (though `\tl_if_empty:N` returns false in this case).

Hooks are a bit more complicated: they have four possible states. A hook may exist or not, and either way it may or may not be empty (even a hook that doesn't exist may be non-empty).

A hook is said to be empty when no code was added to it, either to its permanent code pool, or to its “next” token list. The hook doesn't need to be declared to have code added to its code pool (it may happen that a package *A* defines a hook `foo`, but it's loaded after package *B*, which adds some code to that hook. In this case it is important that the code added by package *B* is remembered until package *A* is loaded).

A hook is said to exist when it was declared with `\hook_new:n` or some variant thereof.

`\hook_if_empty_p:n` Test if a hook is empty (that is, no code was added to that hook). A  $\langle\text{hook}\rangle$  being empty means that all three of its `\g__hook_<hook>_code_prop`, its `\__hook_toplevel <hook>` and its `\__hook_next <hook>` are empty.

```

889 \prg_new_conditional:Npnn \hook_if_empty:n #1 { p , T , F , TF }
890 {
891 __hook_if_exist:nTF {#1}
892 {
893 \bool_lazy_and:nnTF
894 { \prop_if_empty_p:c { g__hook_#1_code_prop } }
895 {
896 \bool_lazy_and_p:nn
897 { \tl_if_empty_p:c { __hook_toplevel~#1 } }
898 { \tl_if_empty_p:c { __hook_next~#1 } }
899 }
900 { \prg_return_true: }
901 { \prg_return_false: }
902 }
903 { \prg_return_true: }
904 }

```

(End definition for `\hook_if_empty:nTF`. This function is documented on page 111.)

`\hook_if_exist_p:n` A canonical way to test if a hook exists. A hook exists if the token list that stores the sorted code for that hook, `\__hook <hook>`, exists. The property list `\g__hook_<hook>_code_prop` cannot be used here because often it is necessary to add code to a hook without knowing if such hook was already declared, or even if it will ever be (for example, in case the package that defines it isn't loaded).

```

905 \prg_new_conditional:Npnn \hook_if_exist:n #1 { p , T , F , TF }
906 {
907 \tl_if_exist:cTF { __hook~#1 }
908 { \prg_return_true: }
909 { \prg_return_false: }

```

```
910 }
```

(End definition for `\_hook_if_exist:nTF`. This function is documented on page 111.)

`\_hook_if_exist_p:n` An internal check if the hook has already been declared with `\_hook_declare:n`. This  
`\_hook_if_exist:nTF` means that the hook was already used somehow (a code chunk or rule was added to it), but it still wasn't declared with `\hook_new:n`.

```
911 \prg_new_conditional:Npnn _hook_if_exist:n #1 { p , T , F , TF }
912 {
913 \prop_if_exist:cTF { g_hook_#1_code_prop }
914 { \prg_return_true: }
915 { \prg_return_false: }
916 }
```

(End definition for `\_hook_if_exist:nTF`.)

`\_hook_if_reversed_p:n` An internal conditional that checks if a hook is reversed.

```
917 \prg_new_conditional:Npnn _hook_if_reversed:n #1 { p , T , F , TF }
918 {
919 \if_int_compare:w \cs:w g_hook_#1_reversed_tl \cs_end: 1 < 0 \exp_stop_f:
920 \prg_return_true:
921 \else:
922 \prg_return_false:
923 \fi:
924 }
```

(End definition for `\_hook_if_reversed:nTF`.)

### 3.11 Messages

```
925 \msg_new:nnnn { hooks } { labels-incompatible }
926 {
927 Labels-'#1'-and-'#2'-are-incompatible
928 \str_if_eq:nnF {#3} {??} { ~in-hook-'#3' } .-
929 \int_compare:nNnTF {#4} = { 1 }
930 { The~ code~ for~ both~ labels~ will~ be~ dropped. }
931 { You~ may~ see~ errors~ later. }
932 }
933 { LaTeX-found~two~incompatible~labels~in~the~same~hook.~
934 This~indicates~an~incompatibility~between~packages. }

935 \msg_new:nnnn { hooks } { exists }
936 { Hook-'#1'- has- already- been- declared. }
937 { There- already- exists- a- hook- declaration- with- this-
938 name.\\
939 Please- use- a- different- name- for- your- hook.}

940 \msg_new:nnn { hooks } { empty-label }
941 {
942 Empty~code~label~\msg_line_context:.-.
943 Using~'_hook_curname_or_default:'~-instead.
944 }

945 \msg_new:nnn { hooks } { no-default-label }
946 {
947 Missing~(empty)~default~label~\msg_line_context:. \\
```

```

948 This~command~was~ignored.
949 }
950 \msg_new:nnn { hooks } { unknown-rule }
951 { Unknown~ relationship~ '#3'~
952 between~ labels~ '#2'~ and~ '#4'~
953 \str_if_eq:nnF {#1} {??} { ~in-hook~'#1' }. ~
954 Perhaps~ a~ misspelling?
955 }
956 {
957 The~ relation~ used~ not~ known~ to~ the~ system.~ Allowed~ values~ are~
958 'before'~ or~ '<',~
959 'after'~ or~ '>',~
960 'incompatible-warning',~
961 'incompatible-error',~
962 'voids'~ or~
963 'unrelated'.
964 }
965 \msg_new:nnn { hooks } { misused-top-level }
966 {
967 Illegal~\iow_char:N \\AddToHook{#1}[top-level]{...}.\\
968 'top-level'~is~reserved~for~the~user's~document.
969 }
970 {
971 The~'top-level'~label~is~meant~for~user~code~only,~and~should~only~
972 be~used~(sparingly)~in~the~main~document.~Use~the~default~label~
973 '_hook_currname_or_default:'~for~this~\@cls@pkg,~or~another~
974 suitable~label.
975 }
976 \msg_new:nnn { hooks } { set-top-level }
977 {
978 You~cannot~change~the~default~label~#1~'top-level'.~Illegal~\\
979 \use:nn { ~ } { ~ } \iow_char:N \\#2{#3} \\
980 \msg_line_context:.
981 }
982 \msg_new:nnn { hooks } { ddhl-deprecated }
983 {
984 \iow_char:N \\DeclareDefaultHookLabel~is~deprecated.\\
985 Use~\iow_char:N \\SetDefaultHookLabel~instead.\\ \\
986 The~deprecated~name~will~be~removed~in~the~next~release.
987 }
988 \msg_new:nnn { hooks } { extra-pop-label }
989 {
990 Extra~\iow_char:N \\PopDefaultHookLabel. \\
991 This~command~will~be~ignored.
992 }
993 \msg_new:nnn { hooks } { missing-pop-label }
994 {
995 Missing~\iow_char:N \\PopDefaultHookLabel. \\
996 The~label~'#1'~was~pushed~but~never~popped.~Something~is~wrong.
997 }
998 \msg_new:nnn { hooks } { should-not-happen }
999 {

```

```

1000 ERROR!~This~should~not~happen.~#1 \\
1001 Please~report~at~https://github.com/latex3/latex2e.
1002 }
```

### 3.12 L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\epsilon$</sub> package interface commands

`\NewHook` Declaring new hooks ...

```

1003 \NewDocumentCommand \NewHook { m }{ \hook_new:n {#1} }
1004 \NewDocumentCommand \NewReversedHook { m }{ \hook_new_reversed:n {#1} }
1005 \NewDocumentCommand \NewMirroredHookPair { mm }{ \hook_new_pair:nn {#1}{#2} }
```

(End definition for `\NewHook`, `\NewReversedHook`, and `\NewMirroredHookPair`. These functions are documented on page 100.)

`\AddToHook`

```

1006 \NewDocumentCommand \AddToHook { m o +m }
1007 { \hook_gput_code:nnn {#1} {#2} {#3} }
```

(End definition for `\AddToHook`. This function is documented on page 102.)

`\AddToHookNext`

```

1008 \NewDocumentCommand \AddToHookNext { m +m }
1009 { \hook_gput_next_code:nn {#1} {#2} }
```

(End definition for `\AddToHookNext`. This function is documented on page 103.)

`\RemoveFromHook`

```

1010 \NewDocumentCommand \RemoveFromHook { m o }
1011 { \hook_gremove_code:nn {#1} {#2} }
```

(End definition for `\RemoveFromHook`. This function is documented on page 102.)

`\SetDefaultHookLabel`

`\PushDefaultHookLabel`

`\PopDefaultHookLabel`

`\DeclareDefaultHookLabel`

`\__hook_curr_name_push:n`

`\__hook_curr_name_push_aux:n`

`\__hook_curr_name_pop:`

`\__hook_end_document_label_check:`

The token list `\g__hook_hook_curr_name_tl` stores the name of the current package/file to be used as label for hooks. Providing a consistent interface is tricky, because packages can be loaded within packages, and some packages may not use `\SetDefaultHookLabel` to change the default label (in which case `\@currname` is used).

To pull that one off, we keep a stack that contains the default label for each level of input. The bottom of the stack contains the default label for the top-level (this stack should never go empty). If we're building the format, set the default label to be top-level:

```
1012 \tl_gset:Nn \g__hook_hook_curr_name_tl { top-level }
```

Then, in case we're in `\textrm{latexrelease}` we push something on the stack to support roll forward. But in some rare cases, `\textrm{latexrelease}` may be loaded inside another package (notably `\textrm{platexrelease}`), so we'll first push the top-level entry:

```
1013 \textrm{(\textrm{latexrelease})}\seq_gput_right:Nn \g__hook_name_stack_seq { top-level }
```

then we dissect the `\@currnamestack`, adding `\@currname` to the stack:

```

1014 \textrm{(\textrm{latexrelease})}\cs_set_protected:Npn __hook_tmp:w #1 #2 #3
1015 \textrm{(\textrm{latexrelease})} {
1016 \textrm{(\textrm{latexrelease})} \quark_if_recursion_tail_stop:n {#1}
1017 \textrm{(\textrm{latexrelease})} \seq_gput_right:Nn \g__hook_name_stack_seq {#1}
1018 \textrm{(\textrm{latexrelease})} __hook_tmp:w
1019 \textrm{(\textrm{latexrelease})} }
1020 \textrm{(\textrm{latexrelease})}\exp_after:wN __hook_tmp:w \@currnamestack
1021 \textrm{(\textrm{latexrelease})} \q_recursion_tail \q_recursion_tail
1022 \textrm{(\textrm{latexrelease})} \q_recursion_tail \q_recursion_stop
```

and finally set the default label to be the `\@currname`:

```
1023 \t1_gset:Nx \g_hook_curr_name_tl { \@currname }
```

Two commands keep track of the stack: when a file is input, `\_hook_curr_name_push:n` pushes the current default label to the stack, and sets the new default label in one go:

```
1024 \cs_new_protected:Npn _hook_curr_name_push:n #1
1025 { \exp_args:Nx _hook_curr_name_push_aux:n { _hook_make_name:n {#1} } }
1026 \cs_new_protected:Npn _hook_curr_name_push_aux:n #1
1027 {
1028 \tl_if_blank:nTF {#1}
1029 { \msg_error:nn { hooks } { no-default-label } }
1030 {
1031 \str_if_eq:nnTF {#1} { top-level }
1032 {
1033 \msg_error:nnnn { hooks } { set-top-level }
1034 { to } { PushDefaultHookLabel } {#1}
1035 }
1036 {
1037 \seq_gpush:NV \g_hook_name_stack_seq \g_hook_curr_name_tl
1038 \t1_gset:Nn \g_hook_curr_name_tl {#1}
1039 }
1040 }
1041 }
```

and when an input is over, the topmost item of the stack is popped, since the label will not be used again, and `\g_hook_curr_name_tl` is updated to the now topmost item of the stack:

```
1042 \cs_new_protected:Npn _hook_curr_name_pop:
1043 {
1044 \seq_gpop:NNTF \g_hook_name_stack_seq \l_hook_return_tl
1045 { \t1_gset_eq:NN \g_hook_curr_name_tl \l_hook_return_tl }
1046 { \msg_error:nn { hooks } { extra-pop-label } }
1047 }
```

At the end of the document we want to check if there was no `\_hook_curr_name_push:` without a matching `\_hook_curr_name_pop:` (not a critical error, but it might indicate that something else is not quite right):

```
1048 \t1_gput_right:Nn \@kernel@after@enddocument@afterlastpage
1049 { _hook_end_document_label_check: }
1050 \cs_new_protected:Npn _hook_end_document_label_check:
1051 {
1052 \seq_gpop:NNT \g_hook_name_stack_seq \l_hook_return_tl
1053 {
1054 \msg_error:nnx { hooks } { missing-pop-label }
1055 { \g_hook_curr_name_tl }
1056 \t1_gset_eq:NN \g_hook_curr_name_tl \l_hook_return_tl
1057 _hook_end_document_label_check:
1058 }
1059 }
```

The token list `\g_hook_curr_name_tl` is but a mirror of the top of the stack. Now define a wrapper that replaces the top of the stack with the argument, and updates `\g_hook_curr_name_tl` accordingly.

```
1060 \NewDocumentCommand \SetDefaultHookLabel { m }
```

```

1061 {
1062 \seq_if_empty:NTF \g__hook_name_stack_seq
1063 {
1064 \msg_error:nnnn { hooks } { set-top-level }
1065 { for } { SetDefaultHookLabel } {#1}
1066 }
1067 { \exp_args:Nx __hook_set_default_label:n { __hook_make_name:n {#1} } }
1068 }
1069 \cs_new_protected:Npn __hook_set_default_label:n #1
1070 {
1071 \str_if_eq:nnTF {#1} { top-level }
1072 {
1073 \msg_error:nnnn { hooks } { set-top-level }
1074 { to } { SetDefaultHookLabel } {#1}
1075 }
1076 { \tl_gset:Nn \g__hook_hook_curr_name_tl {#1} }
1077 }
1078 \NewDocumentCommand \DeclareDefaultHookLabel { m }
1079 {
1080 \msg_error:nn { hooks } { ddhl-deprecated }
1081 \SetDefaultHookLabel {#1}
1082 }

The label is only automatically updated with \onefilewithoptions (\usepackage and \documentclass), but some packages, like TikZ, define package-like interfaces, like \usetikzlibrary that are wrappers around \input, so they inherit the default label currently in force (usually top-level, but it may change if loaded in another package). To provide a package-like behaviour also for hooks in these files, we provide high-level access to the default label stack.

```

```

1083 \NewDocumentCommand \PushDefaultHookLabel { m }
1084 { __hook_curr_name_push:n {#1} }
1085 \NewDocumentCommand \PopDefaultHookLabel { }
1086 { __hook_curr_name_pop: }

```

The current label stack holds the labels for all files but the current one (more or less like \currnamestack), and the current label token list, \g\_\_hook\_hook\_curr\_name\_tl, holds the label for the current file. However \pushfilename happens before \currname is set, so we need to look ahead to get the \currname for the label. \expl3 also requires the current file in \pushfilename, so here we abuse \expl@push@filename@aux@@ to do \\_\_hook\_curr\_name\_push:n.

```

1087 \cs_gset_protected:Npn \expl@push@filename@aux@@ #1#2#3
1088 {
1089 __hook_curr_name_push:n {#3}
1090 \str_gset:Nx \g_file_curr_name_str {#3}
1091 #1 #2 {#3}
1092 }

```

(End definition for \SetDefaultHookLabel and others. These functions are documented on page 105.)

**\UseHook** Avoid the overhead of `xparse` and its protection that we don't want here (since the hook should vanish without trace if empty)!

```

1093 \cs_new:Npn \UseHook { \hook_use:n }
1094 \cs_new:Npn \UseOneTimeHook { \hook_use_once:n }

```

(End definition for \UseHook and \UseOneTimeHook. These functions are documented on page 101.)

```

\ShowHook
\LogHook 1095 \cs_new_protected:Npn \ShowHook { \hook_show:n }
1096 \cs_new_protected:Npn \LogHook { \hook_log:n }

```

(End definition for `\ShowHook` and `\LogHook`. These functions are documented on page 108.)

```

\DebugHooksOn
\DebugHooksOff 1097 \cs_new_protected:Npn \DebugHooksOn { \hook_debug_on: }
1098 \cs_new_protected:Npn \DebugHooksOff { \hook_debug_off: }

```

(End definition for `\DebugHooksOn` and `\DebugHooksOff`. These functions are documented on page 109.)

```

\DeclareHookRule
1099 \NewDocumentCommand \DeclareHookRule { m m m m }
1100 { \hook_gset_rule:nnnn {#1}{#2}{#3}{#4} }

```

(End definition for `\DeclareHookRule`. This function is documented on page 106.)

`\DeclareDefaultHookRule` This declaration is only supported before `\begin{document}`.

```

1101 \NewDocumentCommand \DeclareDefaultHookRule { m m m }
1102 { \hook_gset_rule:nnnn {??}{#1}{#2}{#3} }
1103 @onlypreamble\DeclareDefaultHookRule

```

(End definition for `\DeclareDefaultHookRule`. This function is documented on page 107.)

`\ClearHookRule` A special setup rule that removes an existing relation. Basically `@@_rule_gclear:nnn` plus fixing the property list for debugging.

*FMi: Need an L3 interface, or maybe it should get dropped?*

```

1104 \NewDocumentCommand \ClearHookRule { m m m }
1105 { \hook_gset_rule:nnnn {#1}{#2}{unrelated}{#3} }

```

(End definition for `\ClearHookRule`. This function is documented on page 107.)

`\IfHookExistsTF` Here we avoid the overhead of `xparse`, since `\IfHookEmptyTF` is used in `\end` (that is, every L<sup>A</sup>T<sub>E</sub>X environment). As a further optimisation, use `\let` rather than `\def` to avoid one expansion step.

```

1106 \cs_new_eq:NN \IfHookExistsTF \hook_if_exist:nTF
1107 \cs_new_eq:NN \IfHookEmptyTF \hook_if_empty:nTF

```

(End definition for `\IfHookExistsTF` and `\IfHookEmptyTF`. These functions are documented on page 108.)

### 3.13 Internal commands needed elsewhere

Here we set up a few horrible (but consistent) L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  names to allow for internal commands to be used outside this module. We have to unset the `@@` since we want double “at” sign in place of double underscores.

```

1108 <@=>

\@expl@@@initialize@all@@
 \@expl@@@hook@curr@name@pop@@
1109 \cs_new_eq:NN \@expl@@@initialize@all@@
1110 __hook_initialize_all:
1111 \cs_new_eq:NN \@expl@@@hook@curr@name@pop@@
1112 __hook_curr_name_pop:

(End definition for \@expl@@@initialize@all@@ and \@expl@@@hook@curr@name@pop@@.)
1113 \ExplSyntaxOff

```

Rolling back here doesn’t undefine the interface commands as they may be used in packages without rollback functionality. So we just make them do nothing which may or may not work depending on the code usage.

```

1114 </2ekernel | latexrelease>
1115 <latexrelease>\EndIncludeInRelease
1116 <latexrelease>\IncludeInRelease{0000/00/00}%
1117 <latexrelease> {\NewHook}{The hook management}%
1118 <latexrelease>
1119 <latexrelease>\def\NewHook#1{}
1120 <latexrelease>\def\NewReversedHook#1{}
1121 <latexrelease>\def\NewMirroredHookPair#1#2{}
1122 <latexrelease>
1123 <latexrelease>\long\def\AddToHookNext#1#2{}
1124 <latexrelease>
1125 <latexrelease>\def\AddToHook#1{\@gobble@AddToHook@args}
1126 <latexrelease>\providecommand\@gobble@AddToHook@args[2]{}{ }
1127 <latexrelease>
1128 <latexrelease>\def\RemoveFromHook#1{\@gobble@RemoveFromHook@arg}
1129 <latexrelease>\providecommand\@gobble@RemoveFromHook@arg[1]{}{ }
1130 <latexrelease>
1131 <latexrelease>\def \UseHook #1{}
1132 <latexrelease>\def \UseOneTimeHook #1{}
1133 <latexrelease>\def \ShowHook #1{}
1134 <latexrelease>\let \DebugHooksOn \empty
1135 <latexrelease>\let \DebugHooksOff\empty
1136 <latexrelease>
1137 <latexrelease>\def \DeclareHookRule #1#2#3#4{}
1138 <latexrelease>\def \DeclareDefaultHookRule #1#2#3{}
1139 <latexrelease>\def \ClearHookRule #1#2#3{}

```

If the hook management is not provided we make the test for existence false and the test for empty true in the hope that this is most of the time reasonable. If not a package would need to guard against running in an old kernel.

```

1140 <latexrelease>\long\def \IfHookExistsTF #1#2#3{#3}
1141 <latexrelease>\long\def \IfHookEmptyTF #1#2#3{#2}
1142 <latexrelease>
1143 <latexrelease>\EndIncludeInRelease

```

# File h

## ltalloc.dtx

### 1 Counters

This section deals with counter and other variable allocation.

1 `(*2ekernel)`

The following are from plain TEX:

\z@ A zero dimen or number. It's more efficient to write `\parindent\z@` than `\parindent 0pt`.

\@ne The number 1.

\m@ne The number -1.

\tw@ The number 2.

\sixt@@n The number 16.

\@m The number 1000.

\@MM The number 20000.

\@xxxii The constant 32.

2 `\chardef\@xxxii=32`

(End definition for `\@xxxii`.)

\@Mi Constants 10001–10004.

\@Mii 3 `\mathchardef\@Mi=10001`

\@Miii 4 `\mathchardef\@Mii=10002`

\@Miv 5 `\mathchardef\@Miii=10003`

6 `\mathchardef\@Miv=10004`

(End definition for `\@Mi` and others.)

\@tempcnta Scratch count registers used by IATEX kernel commands.

\@tempcntb 7 `\newcount\@tempcnta`

8 `\newcount\@tempcntb`

(End definition for `\@tempcnta` and `\@tempcntb`.)

\if@tempswa General boolean switch used by IATEX kernel commands.

9 `\newif\if@tempswa`

(End definition for `\if@tempswa`.)

\@tempdima Scratch dimen registers used by IATEX kernel commands.

\@tempdimb 10 `\newdimen\@tempdima`

\@tempdimc 11 `\newdimen\@tempdimb`

12 `\newdimen\@tempdimc`

(End definition for `\@tempdima`, `\@tempdimb`, and `\@tempdimc`.)

\@tempboxa Scratch box register used by L<sup>A</sup>T<sub>E</sub>X kernel commands.  
13 \newbox\@tempboxa  
*(End definition for \@tempboxa.)*

\@tempskipa Scratch skip registers used by L<sup>A</sup>T<sub>E</sub>X kernel commands.  
\@tempskipb  
14 \newskip\@tempskipa  
15 \newskip\@tempskipb  
*(End definition for \@tempskipa and \@tempskipb.)*

\@temptokena Scratch token register used by L<sup>A</sup>T<sub>E</sub>X kernel commands.  
16 \newtoks\@temptokena  
*(End definition for \@temptokena.)*

\@flushglue Glue used for \right- & \leftskip = 0pt plus 1fil  
17 \newskip\@flushglue \@flushglue = 0pt plus 1fil  
*(End definition for \@flushglue.)*  
18 ⟨/2ekernel⟩

# File i

## ltcntrl.dtx

### 1 Program control structure

This section defines a number of control structure macros, such as while-loops and for-loops.

*Historical L<sup>A</sup>T<sub>E</sub>X 2.09 comments (not necessarily accurate any more):*

```
1 {*2ekernel}
2 \message{control,}

\@whilenum TEST \do {BODY}
\@whiledim TEST \do {BODY} : These implement the loop
 while TEST do BODY od
 where TEST is a TeX \ifnum or \ifdim test, respectively.
 They are optimized for the normal case of TEST initially false.

\@whilesw SWITCH \fi {BODY} : Implements the loop
 while SWITCH do BODY od
 Optimized for normal case of SWITCH initially false.

\@for NAME := LIST \do {BODY} : Assumes that LIST expands to A1,A2,
... ,An .
Executes BODY n times, with NAME = Ai on the i-th iteration.
Optimized for the normal case of n = 1. Works for n=0.

\@tfor NAME := LIST \do {BODY}
 if, before expansion, LIST = T1 ... Tn where each Ti is a
 token or {...}, then executes BODY n times, with NAME = Ti
 on the i-th iteration. Works for n=0.
```

NOTES: 1. These macros use no \@temp sequences.  
2. These macros do not work if the body contains anything that looks syntactically to TeX like an improperly balanced \if \else \fi.

```
\@whilenum TEST \do {BODY} ==
BEGIN
 if TEST
 then BODY
 \@iwhilenum{TEST \relax BODY}
END

\@iwhilenum {TEST BODY} ==
BEGIN
 if TEST
 then BODY
 \@nextwhile = def(\@iwhilenum)
```

```

 else \cnextwhile = def(\@whilenoop)
 fi
 \cnextwhile {TEST BODY}
END

\@whilesw SWITCH \fi {BODY} ==
BEGIN
 if SWITCH
 then BODY
 \@iwhilesw {SWITCH BODY}\fi
 fi
END

\@iwhilesw {SWITCH BODY} \fi ==
BEGIN
 if SWITCH
 then BODY
 \cnextwhile = def(\@iwhilesw)
 else \cnextwhile = def(\@whileswnoop)
 fi
 \cnextwhile {SWITCH BODY} \fi
END

```

*End of historical L<sup>A</sup>T<sub>E</sub>X 2.09 comments.*

```

\@whilenoop
\@whilenum
\@iwhilenum
3 \long\def\@whilenum#1\do #2{\ifnum #1\relax #2\relax\@iwhilenum{#1\relax
4 #2\relax}\fi}
5 \long\def\@iwhilenum#1{\ifnum #1\expandafter\@iwhilenum
6 \else\expandafter\@gobble\fi{#1}}

```

*(End definition for \@whilenoop, \@whilenum, and \@iwhilenum.)*

```

\@whiledim
\@iwhiledim
7 \long\def\@whiledim#1\do #2{\ifdim #1\relax#2\@iwhiledim{#1\relax#2}\fi}
8 \long\def\@iwhiledim#1{\ifdim #1\expandafter\@iwhiledim
9 \else\expandafter\@gobble\fi{#1}}

```

*(End definition for \@whiledim and \@iwhiledim.)*

```

\@whileswnoop
\@whilesw
10 \long\def\@whilesw#1\fi{#2\@iwhilesw{#1#2}\fi\fi}
\@iwhilesw
11 \long\def\@iwhilesw#1\fi{#1\expandafter\@iwhilesw
12 \else\@gobbletwo\fi{#1}\fi}

```

(End definition for \@whilesnoop, \@whilesw, and \@iwhilesw.)

Historical L<sup>A</sup>T<sub>E</sub>X 2.09 comments (not necessarily accurate any more):

```
\@for NAME := LIST \do {BODY} ==
 BEGIN \@forloop expand(LIST),\@nil,\@nil \@@ NAME {BODY} END

\@forloop CAR, CARCDR, CDRCDR \@@ NAME {BODY} ==
 BEGIN
 NAME = CAR
 if def(NAME) = def(\@nnil)
 else BODY;
 NAME = CARCDR
 if def(NAME) = def(\@nnil)
 else BODY
 \@iforloop CDRCDR \@@ NAME \do {BODY}
 fi
 fi
 END

\@iforloop CAR, CDR \@@ NAME {BODY} =
 NAME = CAR
 if def(NAME) = def(\@nnil)
 then \@nextwhile = def(\@fornoop)
 else BODY ;
 \@nextwhile = def(\@iforloop)
 fi
 \@nextwhile name cdr {body}

\@tfor NAME := LIST \do {BODY}
 = \@tforloop LIST \@nil \@@ NAME {BODY}

\@tforloop car cdr \@@ name {body} =
 name = car
 if def(name) = def(\@nnil)
 then \@nextwhile == \@fornoop
 else body ;
 \@nextwhile == \@forloop
 fi
 \@nextwhile name cdr {body}
```

End of historical L<sup>A</sup>T<sub>E</sub>X 2.09 comments.

\@nnil

<sup>13</sup> \def\@nnil{\@nil}

(End definition for \@nnil.)

\@empty

<sup>14</sup> \def\@empty{}

(End definition for \@empty.)

```

\@fornoop
15 \long\def\@fornoop#1\@@#2#3{%
(End definition for \@fornoop.)}

\@for
16 \long\def\@for#1:=#2\do#3{%
17 \expandafter\def\expandafter\@fortmp\expandafter{#2}%
18 \ifx\@fortmp\empty \else
19 \expandafter\@forloop#2,\@nil,\@nil\@@#1{#3}\fi}
(End definition for \@for.)

\@forloop
20 \long\def\@forloop#1,#2,#3\@@#4#5{\def#4{#1}\ifx #4\@nnil \else
21 #5\def#4{#2}\ifx #4\@nnil \else#5\@iforloop #3\@@#4{#5}\fi\fi}
(End definition for \@forloop.)

\@iforloop
22 \long\def\@iforloop#1,#2\@@#3#4{\def#3{#1}\ifx #3\@nnil
23 \expandafter\@fornoop \else
24 #4\relax\expandafter\@iforloop\fi#2\@@#3{#4}}
(End definition for \@iforloop.)

\@tfor
25 \def\@tfor#1:={\@tfctr#1 }
26 \long\def\@tfctr#1#2\do#3{\def\@fortmp{#2}\ifx\@fortmp\space\else
27 \@tforloop#2\@nil\@nil\@@#1{#3}\fi}
28 \long\def\@tforloop#1#2\@@#3#4{\def#3{#1}\ifx #3\@nnil
29 \expandafter\@fornoop \else
30 #4\relax\expandafter\@tforloop\fi#2\@@#3{#4}}
(End definition for \@tfor.)

\@break@tfor Break out of a \@tfor loop. This should be called inside the scope of an \if. See
\@iffilenameonpath for an example.
31 \long\def\@break@tfor#1\@@#2#3{\fi\fi}
(End definition for \@break@tfor.)

\@removeelement Removes an element from a comma-separated list and puts it into a control se-
quence, called as \@removeelement{\langle element\rangle}{\langle list\rangle}{\langle cs\rangle}. Due to the implemen-
tation method the \langle element\rangle is not allowed to contain braces.
32 \def\@removeelement#1#2#3{%
33 \def\reserved@a##1,#1##2\reserved@a{##1,##2\reserved@b}%
34 \def\reserved@b##1,\reserved@b##2\reserved@b{%
35 \ifx,##1\empty\else##1\fi}%
36 \edef#3{%
37 \expandafter\reserved@b\reserved@a,#2,\reserved@b,#1,\reserved@a}}
(End definition for \@removeelement.)
38 </2ekernel>

```

# File j

## lterror.dtx

### 1 Error handling and tracing

This section defines L<sup>A</sup>T<sub>E</sub>X's error commands.

```
1 {*2ekernel}
```

The ‘2ekernel’ code ensures that a \usepackage{autoerr} is essentially ignored if a ‘full’ format is being used that has the error messages already in the format.

These days we don't support autoloading approach any longer, but this part bit is kept in case it is used in old documents.

```
2 \expandafter\let\csname ver@autoerr.sty\endcsname\fmtversion
```

#### 1.1 General commands

\MessageBreak This command prints a new-line inside a message, followed by a continuation line begun with \cmsg@continuation. Normally it is defined to be \relax, but inside messages, it is let to \message@break.

```
3 \let\MessageBreak\relax
```

(End definition for \MessageBreak.)

\GenericInfo This takes two arguments: a continuation and a message, and sends the result to the log file.

```
4 \DeclareRobustCommand{\GenericInfo}[2]{%
5 \begingroup
6 \def\MessageBreak{^^J#1}%
7 \set@display@protect
8 \immediate\write\m@ne{#2\on@line.}%
9 \endgroup
10 }
```

(End definition for \GenericInfo.)

\GenericWarning This takes two arguments: a continuation and a message, and sends the result to the screen.

```
11 \DeclareRobustCommand{\GenericWarning}[2]{%
12 \begingroup
13 \def\MessageBreak{^^J#1}%
14 \set@display@protect
15 \immediate\write\@unused{^^J#2\on@line.^^J}%
16 \endgroup
17 }
```

(End definition for \GenericWarning.)

- \GenericError This macro takes four arguments: a continuation, an error message, where to go for further information, and the help information. It displays the error message, and sets the error help (the result of typing `h` to the prompt), and does a horrible hack to turn the last context line (which by default is the only context line) into just three dots. This could be made more efficient.

```

18 \bgroup
19 \lccode`\@`\
20 \lccode`\-=`\
21 \lccode`\}`\
22 \lccode`\{`\
23 \lccode`\T`=\T%
24 \lccode`\H`=\H%
25 \catcode`\ =11\relax%
26 \lowercase{%
27 \egroup%

```

Unfortunately TeX versions older than 3.141 have a bug which means that `^^J` does not force a linebreak in `\message` and `\errmessage` commands. So for these old TeX's we use `\typeout` to produce the message, and then have an empty `\errmessage` command. This causes an extra line of the form

To appear on the terminal, but if you do not like it, you can always upgrade your TeX! In order for your format to use this version, you must define the macro `\@TeXversion` to be the version number, e.g., 3.14 of the underlying TeX. See the comments in `ltdircheck.dtx`.

```

28 \dimen@\ifx\@TeXversion\undefined\else\@TeXversion\fi\p@%
29 \ifdim\dimen@>3.14\p@%

```

First the ‘standard case’.

```

30 \DeclareRobustCommand{\GenericError}[4]{%
31 \begingroup%
32 \immediate\write\@unused{}%
33 \def\MessageBreak{^^J}%
34 \set@display@protect%
35 \edef%
36 % %<-----do not delete this space!----->%
37 \err@ %
38 {{#4}}%
39 \errhelp%
40 % %<-----do not delete this space!----->%
41 \err@ %
42 \let%
43 % %<-----do not delete this space!----->%
44 \err@ %
45 \empty%
46 \def\MessageBreak{^^J#1}%
47 \def~{\errmessage{%
48 #2.^^J^^J%
49 #3^^J%
50 Type H <return> for immediate help%
51 % %<-----do not delete this space!----->%
52 \err@ %

```

```

53 } } %
54 ~%
55 \endgroup}%
56 \else%
 Secondly the version for old TEX's.
57 \DeclareRobustCommand{\GenericError}[4]{%
58 \begingroup%
59 \immediate\write\@unused{ }%
60 \def\MessageBreak{^ }%
61 \set@display@protect%
62 \edef%
63 % %<-----do not delete this space!----->%
64 \err@ %
65 {{#4}}%
66 \errhelp%
67 % %<-----do not delete this space!----->%
68 \err@ %
69 \let%
70 % %<-----do not delete this space!----->%
71 \err@ %
72 \errmessage%
73 \def\MessageBreak{^ J#1}%
74 \def~{\typeout{! } %
75 #2.^ J^ J%
76 #3^ J%
77 Type H <return> for immediate help.)%
78 % %<-----do not delete this space!----->%
79 \err@ %
80 {}}%
81 ~%
82 \endgroup}%
83 \fi}%

```

(End definition for `\GenericError`.)

|                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>\PackageError</code><br><code>\PackageWarning</code><br><code>\PackageWarningNoLine</code><br><code>\PackageInfo</code><br><code>\ClassError</code><br><code>\ClassWarning</code><br><code>\ClassWarningNoLine</code><br><code>\ClassInfo</code> | These commands are intended for use by package and class writers, to give information to authors. The syntax is: <pre> \PackageError{&lt;package&gt;}{&lt;error&gt;}{&lt;help&gt;} \PackageWarning{&lt;package&gt;}{&lt;warning&gt;} \PackageWarningNoLine{&lt;package&gt;}{&lt;warning&gt;} \PackageInfo{&lt;package&gt;}{&lt;info&gt;} </pre> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

and similarly for classes. The `Error` commands print the `<error>` message, and present the interactive prompt; if the author types `h`, then the `<help>` information is displayed. The `Warning` commands produce a warning but do not present the interactive prompt. The `WarningNoLine` commands do the same, but don't print the input line number. The `Info` commands write the message to the `log` file. Within the messages, the command `\MessageBreak` can be used to break a line, `\protect` can be used to protect command names, and `\space` is a space, for example:

```
\newcommand{\foo}{FOO}
\PackageWarning{ethel}{%
 Your hovercraft is full of eels,\MessageBreak
 and \protect\foo\space is \foo}
```

produces:

```
Package ethel warning: Your hovercraft is full of eels,
(ethel) and \foo is FOO on input line 54.

84 \gdef\PackageError#1#2#3{%
85 \GenericError{%
86 (#1)\@spaces\@spaces\@spaces\@spaces
87 }{%
88 Package #1 Error: #2%
89 }{%
90 See the #1 package documentation for explanation.%}
91 }{#3}%
92 }

93 \def\PackageWarning#1#2{%
94 \GenericWarning{%
95 (#1)\@spaces\@spaces\@spaces\@spaces
96 }{%
97 Package #1 Warning: #2%
98 }{%
99 }
100 \def\PackageWarningNoLine#1#2{%
101 \PackageWarning{#1}{#2\@gobble}%
102 }
103 \def\PackageInfo#1#2{%
104 \GenericInfo{%
105 (#1) \@spaces\@spaces\@spaces
106 }{%
107 Package #1 Info: #2%
108 }{%
109 }
110 \gdef\ClassError#1#2#3{%
111 \GenericError{%
112 (#1) \space\@spaces\@spaces\@spaces
113 }{%
114 Class #1 Error: #2%
115 }{%
116 See the #1 class documentation for explanation.%}
117 }{#3}%
118 }

119 \def\ClassWarning#1#2{%
120 \GenericWarning{%
121 (#1) \space\@spaces\@spaces\@spaces
122 }{%
123 Class #1 Warning: #2%
124 }{%
125 }
126 \def\ClassWarningNoLine#1#2{%
```

```

127 \ClassWarning{#1}{#2\@gobble}%
128 }
129 \def\ClassInfo#1#2{%
130 \GenericInfo{%
131 (#1) \space\space\@spaces\@spaces
132 }{%
133 Class #1 Info: #2%
134 }%
135 }

(End definition for \PackageError and others.)

\@latex@error Errors and other info, for use in the LATEX core.
\@latex@warning
\@latex@warning@no@line
\@latex@info
\@latex@info@no@line
136 \gdef\@latex@error#1#2{%
137 \GenericError{%
138 \space\space\space\@spaces\@spaces\@spaces
139 }{%
140 LaTeX Error: #1%
141 }{%
142 See the LaTeX manual or LaTeX Companion for explanation.%
143 }{#2}%
144 }

145 \def\@latex@warning#1{%
146 \GenericWarning{%
147 \space\space\space\@spaces\@spaces\@spaces
148 }{%
149 LaTeX Warning: #1%
150 }%
151 }

152 \def\@latex@warning@no@line#1{%
153 \@latex@warning{#1\@gobble}%
154 }

155 \def\@latex@info#1{%
156 \GenericInfo{%
157 \@spaces\@spaces\@spaces
158 }{%
159 LaTeX Info: #1%
160 }%
161 }

162 \def\@latex@info@no@line#1{%
163 \@latex@info{#1\@gobble}%
\@font@warning and \@font@info are defined later since they have to be redefined
by the tracefnt package.

def\@font@warning#1{%
 \GenericWarning{%
 {(font)}\@spaces\@spaces}%
 {Font Warning: #1}%
}

def\@font@info#1{%
 \GenericInfo{%
 (font)\space\@spaces
 }{%
}

```

```

 Font Info: #1%
}
}

(End definition for \c@errorcontextlines.)
```

\c@errorcontextlines \errorcontextlines as a L<sup>A</sup>T<sub>E</sub>X counter, so that it may be manipulated with \setcounter (once it is defined :-)

```

163 \let\c@errorcontextlines\errorcontextlines
164 \c@errorcontextlines=-1

(End definition for \c@errorcontextlines.)
```

\on@line The message ‘ on input line *n*’.

```

165 \def\on@line{ on input line \the\inputlineno}

(End definition for \on@line.)
```

\@warning \@@warning \c@latexerr Older L<sup>A</sup>T<sub>E</sub>X messages. For the moment, these \let to the new message commands. They may be changed later, once only obsolete packages and classes contain them.

```

166 \let@\warning\c@latex@warning
167 \let@\@@warning\c@latex@warning@no@line
168 \global\let@\c@latexerr\c@latex@error

(End definition for \@warning, \@warning, and \c@latexerr.)
```

\@spaces Four spaces.

```

169 \def\@spaces{\space\space\space\space}
```

(End definition for \@spaces.)

## 1.2 Specific errors

\@eha The more common error help messages.

```

170 \gdef\@ehaf{%
\@ehc Your command was ignored.\MessageBreak
\@ehd Type \space I <command> <return> \space to replace it %
with another command,\MessageBreak
or \space <return> \space to continue without it.%
\gdef\@ehbf{%
176 You've lost some text. \space \@ehc}%
\gdef\@ehcf{%
178 Try typing \space <return> %
\space to proceed.\MessageBreak
180 If that doesn't work, type \space X <return> \space to quit.%
\gdef\@ehd{%
182 You're in trouble here. \space\@ehc}
```

(End definition for \@eha and others.)

|                |                                                                                                                                                                                                                                                                                          |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| \@notdefinable | Error message generated in \@ifdefinable from calls to one of the commands \newcommand, \newlength or \newtheorem specifying an already-defined command name or one that begins \end....                                                                                                 |
|                | <pre> 183 \gdef\@notdefinable{% 184   \@latex@error{% 185     Command \@backslashchar reserved@a\space 186     already defined.\MessageBreak 187     Or name \@backslashchar\@qend... illegal, 188     see p.192 of the manual}\@eha} </pre> <p>(End definition for \@notdefinable.)</p> |
| \@nolnerr      | Generated by \newline and \\ when called in vertical mode.                                                                                                                                                                                                                               |
|                | <pre> 189 \gdef\@nolnerr{% 190   \@latex@error{There's no line here to end}\@eha} </pre> <p>(End definition for \@nolnerr.)</p>                                                                                                                                                          |
| \@nocounterr   | Generated by \setcounter, \addtocounter or \newcounter if applied to an undefined counter $\langle cnt \rangle$ .                                                                                                                                                                        |
| \@nocnterr     | Obsolete error message generated in L <sup>A</sup> T <sub>E</sub> X2.09 by \setcounter, \addtocounter or \newcounter for undefined counter. DO NOT use for L <sup>A</sup> T <sub>E</sub> X2 <sub>e</sub> it MIGHT vanish! Use \@nocounterr{\langle cnt \rangle} instead.                 |
|                | <pre> 191 \gdef\@nocnterr#1{% 192   \@latex@error{No counter '#1' defined}\@eha} 193 \gdef\@nocnterr{\@nocnterr?} </pre> <p>(End definition for \@nocounterr and \@nocnterr.)</p>                                                                                                        |
| \@ctrerr       | Called when trying to print the value of a counter numbered by letters that's greater than 26.                                                                                                                                                                                           |
|                | <pre> 194 \gdef\@ctrerr{% 195   \@latex@error{Counter too large}\@ehb} </pre> <p>(End definition for \@ctrerr.)</p>                                                                                                                                                                      |
| \@nodocument   | Error produced if paragraphs are typeset in the preamble.                                                                                                                                                                                                                                |
|                | <pre> 196 \gdef\@nodocument{% 197   \@latex@error{Missing \protect\begin{document}}}\@ehd} </pre> <p>(End definition for \@nodocument.)</p>                                                                                                                                              |
| \@badend       | Called by \end that doesn't match its \begin. RmS 1992/08/24: added code to \@badend to display position of non-matching \begin. FMi 1993/01/14: missing space added.                                                                                                                    |
|                | <pre> 198 \gdef\@badend#1{% 199   \@latex@error{\protect\begin{@currenvir}\@currenvline 200   \space ended by \protect\end{#1}}}\@eha} </pre> <p>(End definition for \@badend.)</p>                                                                                                      |
| \@badmath      | Called by \[, \], \( or \) when used in wrong mode.                                                                                                                                                                                                                                      |
|                | <pre> 201 \gdef\@badmath{% 202   \@latex@error{Bad math environment delimiter}}\@eha} </pre>                                                                                                                                                                                             |

(End definition for \@badmath.)

- \@toodeep Called by a list environment nested more than six levels deep, or an enumerate or itemize nested more than four levels.

```
203 \gdef\@toodeep{%
204 \@latex@error{Too deeply nested}\@ehd}
```

(End definition for \@toodeep.)

- \@badpoptabs Called by \endtabbing when not enough \poptabs have occurred, or by \poptabs when too many have occurred.

```
205 \gdef\@badpoptabs{%
206 \@latex@error{\protect\pushtabs\space and \protect\poptabs
207 \space don't match}\@ehd}
```

(End definition for \@badpoptabs.)

- \@badtab Called by \>, \+ , \- or \< when stepping to an undefined tab.

```
208 \gdef\@badtab{%
209 \@latex@error{Undefined tab position}\@ehd}
```

(End definition for \@badtab.)

- \@preamerr This error is special: it appears in places where we normally have to \protect expansions. However, to prevent a protection of the error message itself (which would result in the message getting printed not issued on the terminal) we need to locally reset \protect to \relax.

```
210 \gdef\@preamerr#1{%
211 \begingroup
212 \let\protect\relax
213 \@latex@error{\ifcase #1 Illegal character\or
214 Missing @-exp\or Missing p-arg\fi\space
215 in array arg}\@ehd
216 \endgroup}
```

(End definition for \@preamerr.)

- \@badlinearg Occurs in \line and \vector command when a bad slope argument is encountered.

```
217 \gdef\@badlinearg{%
218 \@latex@error{%
219 Bad \protect\line\space or \protect\vector
220 \space argument}\@ehb}
```

(End definition for \@badlinearg.)

- \@parmoderr Occurs in a float environment or a \marginpar when encountered in inner vertical mode.

```
221 \gdef\@parmoderr{%
222 \@latex@error{Not in outer par mode}\@ehb}
```

(End definition for \@parmoderr.)

- \@fltovf Occurs in float environment or \marginpar when there are no more free boxes for storing floats.

```
223 \gdef\@fltovf{%
224 \@latex@error{Too many unprocessed floats}\@ehb}
```

(End definition for \@fltovf.)

\@latexbug Occurs in output routine. This is bad news.

```
225 \gdef\@latexbug{%
226 \@latex@error{This may be a LaTeX bug}{Call for help}}
```

(End definition for \@latexbug.)

\@badcrerr This error was removed and replaced by \@nolnerr.

```
227 \%def\@badcrerr {\@latex@error{Bad use of \protect\\}\@ehc}
```

(End definition for \@badcrerr.)

\@noitemerr \addvspace or \addpenalty was called when not in vmode. Probably caused by a missing \item.

```
228 \gdef\@noitemerr{%
229 \@latex@error{Something's wrong--perhaps a missing %
230 \protect\item}\@ehc}
```

(End definition for \@noitemerr.)

\@notprerr A command that can be used only in the preamble appears after the command \begin{document}.

```
231 \gdef\@notprerr{%
232 \@latex@error{Can be used only in preamble}\@eha}
```

(End definition for \@notprerr.)

\@inmatherr Issued by commands that don't work correctly within math (like \item). There is no real error recovery happening, e.g., the user might get additional errors afterwards.

```
233 \gdef\@inmatherr#1{%
234 \relax
235 \ifmmode
236 \@latex@error{Command \protect#1 invalid in math mode}\@ehc
237 \fi}
```

(End definition for \@inmatherr.)

\@invalidchar An error for use with invalid characters. This is commented out, since we decided to use catcode 15 instead.

```
238 \%def\@invalidchar{\@latex@error{Invalid character in input}\@ehc}
```

(End definition for \@invalidchar.)

As well as the above error commands some error messages are directly coded to save space. The messages already present in L<sup>A</sup>T<sub>E</sub>X2.09 include:

Environment --- undefined

Issued by \begin for undefined environment.

Tab overflow

Occurs in \= when maximum number of tabs exceeded.

\< in mid line

Occurs in \< when it appears in middle of line.

Float(s) lost

In output routine, caused by a float environment or \marginpar occurring in inner vertical mode.

### 1.3 Tracing

The **trace** package implements the commands `\traceon` and `\traceoff` that work similar to `\tracingall` but skip certain code blocks that produce a lot of tracing output being of no interest during debugging (for example loading a font). Code blocks that should be hidden during tracing need to be surrounded by the macros `\conditionally@traceoff` and `\conditionally@traceon`.

For the kernel code the **trace** package then redefines a number of macros to include this tracing support.

However, in order to allow any macro package to react to `\traceon` we also provide dummy definitions for the two commands in the kernel so that they can be used by external packages without the need to distinguish between **trace** being loaded or not.

`\conditionally@traceon` These are only dummy definitions. For details see the **trace** package.  
`\conditionally@traceoff`

239 `\let\conditionally@traceon\@empty`  
240 `\let\conditionally@traceoff\@empty`

*(End definition for `\conditionally@traceon` and `\conditionally@traceoff`.)*

241 `\langle/2ekernel\rangle`

# File k

## ltpar.dtx

### 1 Paragraphs

This section of the kernel declares the commands used to set `\par` and `\everypar` whenever their function needs to be changed for a long time.

#### 1.1 Implementation

There are two situations in which `\par` may be changed:

- Long-term changes, in which the new value is to remain in effect until the current environment is left. The environments that change `\par` in this way are the following:
  - All list environments (itemize, quote, etc.)
  - Environments that turn `\par` into a noop: tabbing, array and tabular.
- Temporary changes, in which `\par` is restored to its previous value the next time it is executed. The following are all such uses.
  - `\end` when preceded by `\@endparenv`, which is called by `\endtrivlist`
  - The mechanism for avoiding page breaks and getting the spacing right after section heads.

`\@setpar` To permit the proper interaction of these two situations, long-term changes are made by the `\@setpar{\{VAL\}}` command. Its function is:

To set `\par`. It `\def`'s `\par` and `\@par` to `\{VAL\}`.

`\@restorepar` Short-term changes are made by the usual `\def\par` commands. The original values are restored after a short-term change by the `\@restorepar` commands.

`\@@par` `\@@par` always is defined to be the original TeX `\par`.

`\everypar` `\everypar` is changed only for the short term. Whenever `\everypar` is set non-null, it should restore itself to null when executed.

The following commands change `\everypar` in this way:

- `\item`
- `\end` when preceded by `\@endparenv`, which is called by `\endtrivlist`
- `\minipage`

When dealing with `\par` and `\everypar` remember the following two warnings:

1. Commands that make short-term changes to `\par` and `\everypar` must take account of the possibility that the new commands and the ones that do the restoration may be executed inside a group. In particular, `\everypar` is executed inside a group whenever a new paragraph begins with a left brace. The `\everypar` command that restores its definition should be local to the current group (in case the command is inside a minipage used inside someplace where `\everypar` has been redefined).

Thus, if `\everypar` is redefined to do an `\everypar{}` it could take several executions of `\everypar` before the restoration “holds”. This usually causes no problem. However, to prevent the extra executions from doing harm, use a global switch to keep anything harmful in the new `\everypar` from being done twice.

2. Commands that change `\everypar` should remember that `\everypar` might be supposed to set the following switches false:

- `@nobreak`
- `@minipage`

they should do the setting if necessary.

```
1 {*2ekernel}
2 \message{par ,}
```

`\@setpar` Initiate a long-term change to `\par`.  
`\@par` 3 `\def\@setpar#1{\def\par{\def\@par{#1}}}`

The default definition of `\@par` will ensure that if `\@restorepar` defines `\par` to execute `\@par` it will redefine itself to the primitive `\@@par` after one iteration.

```
4 \def\@par{\let\par\@@par\par}
```

*(End definition for `\@setpar` and `\@par`.)*

`\@restorepar` Restore from a short-term change to `\par`.  
5 `\def\@restorepar{\def\par{\@par}}`  
6 `/{/2ekernel}`

*(End definition for `\@restorepar`.)*

# File 1

## ltspacex.dtx

### 1 Spacing

This section deals with spacing, and line- and page-breaking.

#### 1.1 User Commands

```
\nopagebreak [i] : i = 0,...,4.
 Default argument = 4. Puts a penalty into the vertical list output as follows:
0 : penalty = 0
1 : penalty = \@lowpenalty
2 : penalty = \@medpenalty
3 : penalty = \@highpenalty
4 : penalty = 10000
\pagebreak [i] : same as except negatives of its penalty
\linebreak [i] : analog of the above
\nolinebreak [i] : analog of the above
\samepage : inhibits page breaking most places by setting the following penalties to 10000:
 \interlinepenalty
 \postdisplaypenalty
 \interdisplaylinepenalty
 \begin{parpenalty}
 \end{parpenalty}
 \itempenalty
 \secpenalty
 \interfootnotelinepenalty
\ : initially defined to be \newline
 \\[length] : initially defined to be \vspace{length}\\newline
Note: * adds a \vadjust{\penalty 10000}
 OBSOLETE COMMANDS (which never made it into the manual):
 \obeycr : defines <CR> == \\relax
 \restorecr : restores <CR> to its usual meaning.
```

#### 1.2 Chris' comments

There are several aspects of the handling of space in horizontal mode that are inconsistent or do not work well in some cases. These are largely concerned with ignoring the effect of space tokens that would otherwise typeset an inter-word space.

Negating the effect of such space tokens is achieved by two mechanisms:

- `\unskip` is used to remove the glue just added by a space that has already had its effect; it is sometimes invoked after an `\ifdim` test on `\lastskip` (see below);
- `\ignorespaces` is used to ignore space-tokens yet to come.

The test done on `\lastskip` is sometimes for equality with zero and sometimes for being positive. Recall also that the test is only on the natural length of the glue and that no glue cannot be distinguished from glue whose natural length is zero: to summarise, a pretty awful test. It is not clear why these tests are not all the same; I think that they should all be for equality. One place where `\unskip` is often used is just before a `\par` (which itself internally does an `\unskip`) and one bit of code (in `\@item`) even has two `\unskips` before a `\par`. These uses may be fossil code but if they are necessary, maybe `\@killglue` would be even safer.

Such removal of glue by `\unskip` may sometimes have the wrong result, removing not the glue from a space-token but other explicit glue; this is sometimes not what is intended.

A common way to prevent such removal is to add an `\hskip\z@` after the glue that should not be removed. This protects that glue against one `\unskip` with no test but not against more than one. It does work for ‘tested `\unskips`’. This is used by `\hspace*` but not by `\hspace`; this is inconsistent as the star is supposed to prevent removal only at the beginning of a line, not at the end, or in a tabular, etc.

If this reason for removing glue were the only consideration then a tested-`\unskip` and protection by `\hskip\z@` would suffice but would need to be consistently implemented.

However, the class of invisibles, commands and environments tries to be even cleverer: one of these tries to leave only one inter-word space whenever there is one before it and one after it; and it does this quite well.

But problems can arise when there is not a space-token on both sides of it; in particular, when an invisible appears at the beginning or end of a piece of text the method still leaves one space token whereas usually in these cases it should leave none.

Also, the current rules do not work well when more than one such command appears consecutively, separated by space-tokens; it leaves glue between every other invisible.

There is also a question about what these commands should do when they occur next to spaces that do not come from space tokens but, for example, from `\hspace`. Should they still produce ‘just one space’? If so, which one? It is good to note that the manual is sufficiently cautious about invisibles that we are not obliged to make anything work.

Another interesting side-road to explore is whether the space-tokens either side of an `\hspace{...}` should be ignored.

One alternative to the current algorithm that is often suggested is that all glue around the invisible should be consolidated into a space after it (usually without stating how much glue should be put there). The command `\nolinebreak` is implemented this way (and `\linebreak` should also be). This does not work correctly for the following common case:

```
... some text
\index{some-word}
some-word and more text.
```

This is optimal coding since it is normal to index a word that gets split across a page-break on its starting page. This would, on the other hand, fix another common (and documented) failure of the current system: when the invisible is the last thing in a paragraph the space before it is not removed and, worse, it is also hidden from the paragraph-ending mechanism so that an ‘empty’ line can be created at the end of the paragraph.

Another deficiency (I think) of the current system is that the following is treated as having the `\index` command between the paragraphs, which is probably not what the author intended (since there is no empty line after it).

```
\index{beginnings}
Beginnings of paragraphs ...
```

I know of no algorithm that will handle satisfactorily even all the most common cases; note that it could be that the best algorithm may be different for different invisibles since, for example, the common uses and expected behaviour of `\index`, `\marginpar`, `\linebreak`, `\pagebreak` and `\vspace` are somewhat different. [For example, is `\vspace` ever used in the middle of a paragraph?]

One method that can (and is) used to make invisible commands produce no space when used at the beginning of text is to put in some glue that is nearly enough the same as no glue or glue of zero length in all respects except for the precise test for not being exactly equal to zero; examples of such glue are `\hskip 1sp` and, possibly better but more complex, `\hskip -1sp \hskip 1sp`. However, this only works when it is known that user-supplied text is about to start.

Some similar concerns apply to the handling of space and penalties in vertical mode; there is an extra hurdle here as `\unskip` does not work on the main vertical list. The complexity of the tests done by `\addvspace` have never been explained.

The implementation of space hacks etc for vertical mode is another major area that needs further attention; my earlier experiments did not produce much improvement over the current unsatisfactory situation.

One particular problem is what happens when the following very natural coding is used (part of the problem here is that this looks like an hmode problem, but it is not):

```
... end of text.

\begin{enumerate}
 \item \label{item:xxx} Item text.
\end{enumerate}
```

### 1.3 Some immediate actions

- Fix bug in `\linebreak`.
- Fix bug in `\*\*`.
- Reimplement `\\"`, etc, removing extra `\vadjusts` and getting better error trapping (this seems to involve a lot more tokens).
- Investigate whether `\\"`, etc need to be errors in vmode; I think that they could be noops (maybe with a warning).
- Make all(?) `\unskip`s include test for zero skip (rather than other tests or no test).
- Consider replacing `\hskip 1sp` by something better (here called an ‘infinitesimal’ skip).
- Look at all `\hskip\z@` (or similar) to see if they should be changed to an ‘infinitesimal’ skip.

- Resolve the inconsistency between `\hspace` and `\hspace*`.
- Remove unnecessary `\unskip`s.
- Investigate and rationalise the ‘newline’ code.
- Find better algorithms for all sorts of things or, easier(?), fix TeX itself.

## 1.4 The code

```

1 {*2ekernel}
2 \message{spacing,}
3 ⟨/2ekernel⟩
4 ⟨*2ekernel | latexrelease⟩
5 ⟨latexrelease⟩\IncludeInRelease{2019/10/01}%
6 ⟨latexrelease⟩ {\pagebreak}{Make commands robust}%

\pagebreak
\nopagebreak
7 \DeclareRobustCommand\pagebreak{\@testopt{\@no@pgbk-}4}
8 \DeclareRobustCommand\nopagebreak{\@testopt{\@no@pgbk4}{}}

(End definition for \pagebreak and \nopagebreak.)

\linebreak
\nolinebreak
9 \DeclareRobustCommand\linebreak{\@testopt{\@no@lnbk-}4}
10 \DeclareRobustCommand\nolinebreak{\@testopt{\@no@lnbk4}{}}

(End definition for \linebreak and \nolinebreak.)

\samepage
11 \DeclareRobustCommand\samepage{\interlinepenalty\@M
12 \postdisplaypenalty\@M
13 \interdisplaylinepenalty\@M
14 \beginparpenalty\@M
15 \endparpenalty\@M
16 \itempenalty\@M
17 \secpenalty\@M
18 \interfootnotelinepenalty\@M}

(End definition for \samepage.)

19 ⟨/2ekernel | latexrelease⟩
20 ⟨latexrelease⟩\EndIncludeInRelease
21 ⟨latexrelease⟩\IncludeInRelease{0000/00/00}%
22 ⟨latexrelease⟩ {\pagebreak}{Make commands robust}%
23 ⟨latexrelease⟩
24 ⟨latexrelease⟩\kernel@make@fragile\pagebreak
25 ⟨latexrelease⟩\kernel@make@fragile\nopagebreak
26 ⟨latexrelease⟩\kernel@make@fragile\linebreak
27 ⟨latexrelease⟩\kernel@make@fragile\nolinebreak
28 ⟨latexrelease⟩\kernel@make@fragile\samepage
29 ⟨latexrelease⟩
30 ⟨latexrelease⟩\EndIncludeInRelease
31 {*2ekernel}

```

```

\@no@pgbk
32 \def\@no@pgbk #1[#2]{%
33 \ifvmode
34 \penalty #1\@getpen{#2}%
35 \else
36 \@bsphack
37 \vadjust{\penalty #1\@getpen{#2}}%
38 \@esphack
39 \fi}

```

(End definition for \@no@pgbk.)

```

\@no@lnbk
40 \def\@no@lnbk #1[#2]{%
41 \ifvmode
42 \@nolnerr
43 \else
44 \tempskipa\lastskip
45 \unskip
46 \penalty #1\@getpen{#2}%
47 \ifdim\tempskipa>\z@
48 \hskip\tempskipa
49 \ignorespaces
50 \fi
51 \fi}

```

(End definition for \@no@lnbk.)

\ The purpose of the new code is to fix a few bugs; however, it also attempts to optimize the following, in order of priority:

1. efficient execution of plain \\;
2. efficient execution of \\[...];
3. memory use;
4. name-space use.

The changes should make no difference to the typeset output. It appears to be safe to use \reserved@e and \reserved@f here (other reserved macros are somewhat disastrous).

These changes made \\newline even less robust than it had been, so now it is explicitly robust, like \\.

The internal definition of the ‘normal’ definition of \\.

```

\@normalcr
52 </2ekernel>
53 <*2ekernel | latexrelease>
54 <latexrelease> \IncludeInRelease{2020/02/02}%
55 <latexrelease> {\@normalcr}{Make robust}%
56 \protected\def\@normalcr{%
57 \let \reserved@e \relax
58 \let \reserved@f \relax
59 \@ifstar{\let \reserved@e \vadjust \let \reserved@f \nobreak
60 \xnewline}%
61 \xnewline}

```

```

62 \let\\@normalcr
63 </2ekernel | latexrelease>
64 <latexrelease>\EndIncludeInRelease
65 <latexrelease>\IncludeInRelease{0000/00/00}%
66 <latexrelease> {\@normalcr}{\Make robust}%
67 <latexrelease>
68 <latexrelease>\DeclareRobustCommand\\{%
69 <latexrelease> \let \reserved@e \relax
70 <latexrelease> \let \reserved@f \relax
71 <latexrelease> \@ifstar{\let \reserved@e \vadjust \let \reserved@f \nobreak
72 <latexrelease> \xnewline}%
73 <latexrelease> \xnewline}
74 <latexrelease>\expandafter\let\expandafter\@normalcr
75 <latexrelease> \csname\expandafter\gobble\string\\ \endcsname
76 <latexrelease>
77 <latexrelease>\EndIncludeInRelease
78 {*2ekernel}

```

(*End definition for \\ and \@normalcr.*)

**\@vspace@calcify** Helper command to produce a \vskip that is first run through \setlength. This way the calc package can operate on the argument value.

```

79 </2ekernel>
80 {*2ekernel | latexrelease>
81 <latexrelease>\IncludeInRelease{2020/10/01}%
82 <latexrelease> {\@vspace@calcify}{Add calc support}%
83 \def\@vspace@calcify#1{\begingroup\setlength\skip@{#1}\vskip\skip@\endgroup}
84 </2ekernel | latexrelease>
85 <latexrelease>\EndIncludeInRelease
86 <latexrelease>\IncludeInRelease{0000/00/00}%
87 <latexrelease> {\@vspace@calcify}{Add calc support}%
88 <latexrelease>
89 <latexrelease>\let\@vspace@calcify\@undefined
90 <latexrelease>\EndIncludeInRelease
91 {*2ekernel}

```

(*End definition for \@vspace@calcify.*)

**\newline** A simple form of the ‘normal’ definition of \\.

```
92 \DeclareRobustCommand\newline{\@normalcr\relax}
```

(*End definition for \newline.*)

**\@xnewline**

```

93 \def\@xnewline{\@ifnextchar[%] bracket matching
94 \newline
95 {\@gnewline\relax}}

```

(*End definition for \@xnewline.*)

**\@newline**

```

96 </2ekernel>
97 {*2ekernel | latexrelease>
98 <latexrelease>\IncludeInRelease{2020/10/01}%

```

```

99 <{latexrelease} {\@newline}{\newline calc support}%
100 \def\@newline[#1]{\let \reserved@e \vadjust
101 \gnewline {\@vspace@calcify{#1}}}
102 </2ekernel | latexrelease>
103 <{latexrelease}\EndIncludeInRelease
104 <{latexrelease}\IncludeInRelease{0000/00/00}%
105 <{latexrelease} {\@newline}{\newline calc support}%
106 <{latexrelease}>
107 <{latexrelease}\def\@newline[#1]{\let \reserved@e \vadjust
108 <{latexrelease} \gnewline {\vskip #1}}
109 <{latexrelease}\EndIncludeInRelease
110 <{*2ekernel}>

```

(End definition for `\@newline`.)

`\@gnewline` The `\nobreak` added to prevent null lines when `\\" ends an overfull line. Change made 24 May 89 as suggested by Frank Mittelbach and Rainer Schöpf`

```

111 \def\@gnewline #1{%
112 \ifvmode
113 \nolnerr
114 \else
115 \unskip \reserved@e {\reserved@f#1}\nobreak \hfil \break
116 \fi}

```

(End definition for `\@gnewline`.)

`\@getpen`

```

117 \def\@getpen#1{\ifcase #1 \z@ \or \clowpenalty\or
118 \medpenalty \or \chighpenalty
119 \else \z@\fi}

```

(End definition for `\@getpen`.)

`\if@nobreak` Switch used to avoid page breaks caused by `\label` after a section heading, etc. It should be **GLOBALLY** set true after the `\nobreak` and **globally** set false by the next invocation of `\everypar`.

Commands that reset `\everypar` should globally set it false if appropriate.

```

120 \def\@nobreakfalse{\global\let\if@nobreak\iffalse}
121 \def\@nobreaktrue {\global\let\if@nobreak\iftrue}
122 \z@\nobreakfalse

```

(End definition for `\if@nobreak`.)

`\@savsk` Registers used to save the space factor and last skip.

```

123 \newdimen\@savsk
124 \newcount\@savsf

```

(End definition for `\@savsk` and `\@savsf`.)

\@bsphack \@bsphack and \@esphack used by macros such as \index and \begin{@float} ... \end{@float} that want to be invisible — i.e., not leave any extra space when used in the middle of text. Such a macro should begin with \@bsphack and end with \@esphack. The macro in question should not create any text, nor change the mode.

Before giving the current definition we give an extended definition that is currently not used (because it doesn't work as advertised:-)

These are generalised hacks which attempt to do sensible things when ‘invisible commands’ appear in vmode too.

They need to cope with space in both hmode (plus spacefactor) and vmode, and also cope with breaks etc. In vmode this means ensuring that any following \addvspace, etc sees the correct glue in \lastskip.

In fact, these improved versions should be used for other cases of ‘whatsits, thingies etc’ which should be invisible. They are only for commands, not environments (see notes on \@Esphack).

BTW, anyone know why the standard hacks are surrounded by \ifmmode\else rather than simply \ifhmode?

And are there any cases where saving the spacefactor is essential? I have some extensions where it is, but it does not appear to be so in the standard uses.

```
def \@bsphack{%
 \relax \ifvmode
 \@savsk \lastskip
 \ifdim \lastskip=\z@
 \else
 \vskip -\lastskip
 \fi
\else
 \ifhmode
 \@savsk \lastskip
 \@savsf \spacefactor
 \fi
\fi
```

I think that, in vmode, it is the safest to put in a \nobreak immediately after such things since writes, inserts etc followed by glue give valid breakpoints and, in general, it is possible to create breaks but impossible to destroy them.

```
def \@esphack{%
 \relax \ifvmode
 \nobreak
 \ifdim \@savsk=\z@
 \else
 \vskip\@savsk
 \fi
\else
 \ifhmode
 \spacefactor \@savsf
 \ifdim \@savsk>\z@
 \ignorespaces
 \fi
 \fi
```

```

\fi
\fi
```

For the moment we are going to ignore the vertical versions until they are correct.

```

125 \def\@bsphack{%
126 \relax
127 \ifhmode
128 \@savsk\lastskip
129 \@savsf\spacefactor
130 \fi}
```

(End definition for `\@bsphack`.)

- `\@esphack` Companion to `\@bsphack`. If this command is not properly paired with `\@bsphack` one might end up with a low-level TeX error: “BAD spacefactor”. One possible cause is calling `\@bsphack` in vertical mode, then doing something that gets you (sometimes) into horizontal mode and finally calling `\@esphack`. Even if no error is generated that is wrong, because `\@esphack` will then use the saved values for `\@savsk` and `\@savsf` from some earlier invocation of `\@bsphack` which will have nothing to do with the current situation.

```

131 </2ekernel>
132 <latexrelease>\IncludeInRelease{2018/10/10}%
133 <latexrelease> {\@esphack}{hyphenation and nobreak after space hack}%
134 <*2ekernel | latexrelease>
135 \def\@esphack{%
136 \relax
137 \ifhmode
138 \spacefactor\@savsf
139 \ifdim\@savsk>\z@
140 \ifdim\lastskip=\z@
141 \nobreak \hskip\z@skip
142 \fi
143 \ignorespaces
144 \fi
145 \else
146 \ifvmode
147 \if\nobreak\nobreak\else\if\noskipsec\nobreak\fi\fi
148 \fi
149 \fi}%
150 </2ekernel | latexrelease>
151 <latexrelease>\EndIncludeInRelease
152 <latexrelease>\IncludeInRelease{2015/10/01}%
153 <latexrelease> {\@esphack}{hyphenation and nobreak after space hack}%
154 <latexrelease>\def\@esphack{%
155 <latexrelease> \relax
156 <latexrelease> \ifhmode
157 <latexrelease> \spacefactor\@savsf
158 <latexrelease> \ifdim\@savsk>\z@
159 <latexrelease> \ifdim\lastskip=\z@
160 <latexrelease> \nobreak \hskip\z@skip
161 <latexrelease> \fi
162 }
```

```

162 〈\latexrelease〉 \ignorespaces
163 〈\latexrelease〉 \fi
164 〈\latexrelease〉 \fi}%
165 〈\latexrelease〉\EndIncludeInRelease
166 〈\latexrelease〉\IncludeInRelease{2015/01/01}%
167 〈\latexrelease〉 {\@esphack}{hyphenation and nobreak after space hack}%
168 〈\latexrelease〉\def\@esphack{%
169 〈\latexrelease〉 \relax
170 〈\latexrelease〉 \ifhmode
171 〈\latexrelease〉 \spacefactor\@savsf
172 〈\latexrelease〉 \ifdim\@savsk>\z@
173 〈\latexrelease〉 \nobreak \hskip\z@skip
174 〈\latexrelease〉 \ignorespaces
175 〈\latexrelease〉 \fi
176 〈\latexrelease〉 \fi}%
177 〈\latexrelease〉\EndIncludeInRelease
178 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
179 〈\latexrelease〉 {\@esphack}{hyphenation and nobreak after space hack}%
180 〈\latexrelease〉\def\@esphack{%
181 〈\latexrelease〉 \relax
182 〈\latexrelease〉 \ifhmode
183 〈\latexrelease〉 \spacefactor\@savsf
184 〈\latexrelease〉 \ifdim\@savsk>\z@
185 〈\latexrelease〉 \ignorespaces
186 〈\latexrelease〉 \fi
187 〈\latexrelease〉 \fi}%
188 〈\latexrelease〉\EndIncludeInRelease
189 {2ekernel}

```

(*End definition for \@esphack.*)

\@Eshack A variant of \@esphack that sets the @ignore switch to true (as \@esphack used to do previously). This is currently used only for floats and similar environments. w

```

190 {/2ekernel}
191 〈\latexrelease〉\IncludeInRelease{2015/01/01}%
192 〈\latexrelease〉 {\@Eshack}{hyphenation after space hack}%
193 {2ekernel | \latexrelease}
194 \def\@Eshack{%
195 \relax
196 \ifhmode
197 \spacefactor\@savsf
198 \ifdim\@savsk>\z@
199 \nobreak \hskip\z@skip
200 \@ignoretrue
201 \ignorespaces
202 \fi
203 \fi}%
204 {/2ekernel | \latexrelease}
205 〈\latexrelease〉\EndIncludeInRelease
206 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
207 〈\latexrelease〉 {\@Eshack}{hyphenation after space hack}%
208 〈\latexrelease〉\def\@Eshack{%
209 〈\latexrelease〉 \relax
210 〈\latexrelease〉 \ifhmode

```

```

211 〈latexrelease〉 \spacefactor\@savsf
212 〈latexrelease〉 \ifdim\@savsk>\z@
213 〈latexrelease〉 \ignorespacestrue
214 〈latexrelease〉 \ignorespaces
215 〈latexrelease〉 \fi
216 〈latexrelease〉 \fi}%
217 〈latexrelease〉\EndIncludeInRelease
218 {*2ekernel}

```

(End definition for \@EspHack.)

\@vbsphack Another variant which is useful for invisible things which should not live in vmode (this is how some people feel about marginals).

If it occurs in vmode then it enters hmode and ensures that \@savsk is nonzero so that the \ignorespaces is put in later. It is not used at present.

```

\def \@vbsphack{ %
 \relax \ifvmode
 \leavevmode
 \@savsk 1sp
 \@savsf \spacefactor
 \else
 \ifhmode
 \@savsk \lastskip
 \@savsf \spacefactor
 \fi
 \fi
}

```

(End definition for \@vbsphack.)

## 1.5 Vertical spacing

L<sup>A</sup>T<sub>E</sub>X supports the plain T<sub>E</sub>X commands \smallskip, \medskip and \bigskip. However, it redefines them using \vspace instead of \skip.

Extra vertical space is added by the command \addvspace{\<skip>}, which adds a vertical skip of <skip> to the document. The sequence \addvspace{\<s1>} \addvspace{\<s2>} is equivalent to \addvspace{\<maximum of s1, s2>}.

\addvspace should be used only in vertical mode, and gives an error if it's not. The \addvspace command does *not* add vertical space if @minipage is true. The minipage environment uses this to inhibit the addition of extra vertical space at the beginning.

Penalties are put into the vertical list with the \addpenalty{\<penalty>} command. It works properly when \addpenalty and \addvspace commands are mixed.

The @nobreak switch is set true used when in vertical mode and no page break should occur. (Right now, it is used only by the section heading commands to inhibit page breaking after a heading.)

```

\addvspace{SKIP} ==
BEGIN
 if vmode
 then if @minipage

```

```

 else if \lastskip =0
 then \vskip SKIP
 else if \lastskip < SKIP
 then \vskip -\lastskip
 \vskip SKIP
 else if SKIP < 0 and \lastskip >= 0
 then \vskip -\lastskip
 \vskip \lastskip + SKIP
 fi fi fi fi
 else useful error message (CAR).
fi
END

```

\@xaddvskip Internal macro for \vspace handling the case that space has previously been added.

```

219 \def\@xaddvskip{%
220 \ifdim\lastskip<\@tempskipb
221 \vskip-\lastskip
222 \vskip\@tempskipb
223 \else
224 \ifdim\@tempskipb<\z@
225 \ifdim\lastskip<\z@
226 \else
227 \advance\@tempskipb\lastskip
228 \vskip-\lastskip
229 \vskip \@tempskipb
230 \fi
231 \fi
232 \fi}

```

(End definition for \@xaddvskip.)

\addvspace Add vertical space taking into account space already added, as described above.

```

233 </2ekernel>
234 {*2ekernel | latexrelease>
235 <latexrelease>\IncludeInRelease{2020/10/01}%
236 <latexrelease> {\addvspace}{\addvspace calc support}%
237 \def\addvspace#1{%
238 \ifvmode
239 \if@minipage\else
240 \ifdim \lastskip =\z@
241 \vspace@calcify{#1}%
242 \else
243 \setlength\@tempskipb{#1}%
244 \vskip\@xaddvskip
245 \fi
246 \fi
247 \else
248 \noitemerr
249 \fi}
250 </2ekernel | latexrelease>
251 <latexrelease>\EndIncludeInRelease
252 <latexrelease>\IncludeInRelease{0000/00/00}%
253 <latexrelease> {\addvspace}{\addvspace calc support}%

```

```

254 〈\latexrelease〉
255 〈\latexrelease〉\def\addvspace#1{%
256 〈\latexrelease〉 \ifvmode
257 〈\latexrelease〉 \if@minipage\else
258 〈\latexrelease〉 \ifdim \lastskip =\z@
259 〈\latexrelease〉 \vskip #1\relax
260 〈\latexrelease〉 \else
261 〈\latexrelease〉 \tempskipb#1\relax
262 〈\latexrelease〉 \xaddvskip
263 〈\latexrelease〉 \fi
264 〈\latexrelease〉 \fi
265 〈\latexrelease〉 \else
266 〈\latexrelease〉 \noitemerr
267 〈\latexrelease〉 \fi}
268 〈\latexrelease〉\EndIncludeInRelease
269 {*/2ekernel}

```

(End definition for `\addvspace`.)

### `\addpenalty`

```

270 〈/2ekernel〉
271 〈\latexrelease〉\IncludeInRelease{2015/01/01}%
272 〈\latexrelease〉 {\addpenalty}{\addpenalty}%
273 {*/2ekernel | latexrelease}

```

Fix provided by Donald (though the original fix was not good enough). In 2005 Plamen Tanovski discovered that this fix wasn't good enough either as the `\vskip` kept getting bigger if several `\addpenalty` commands followed each other. Donald kindly send a new fix.

```

274 \def\addpenalty#1{%
275 \ifvmode
276 \if@minipage
277 \else
278 \if@nobreak
279 \else
280 \ifdim\lastskip=\z@
281 \penalty#1\relax
282 \else
283 \tempskipb\lastskip

```

We have to make sure the final `\vskip` seen by TeX is the correct one, namely `\tempskipb`. However we may have to adjust for `\prevdepth` when placing the penalty but that should not affect the skip we pass on to TeX.

```

284 \begingroup
285 \tempskipa\tempskipb
286 \advance \tempskipb
287 \ifdim\prevdepth>\maxdepth\maxdepth\else

```

If `\prevdepth` is -1000pt due to `\nointerlineskip` we better not add it!

```

288 \ifdim \prevdepth = -\@m\p@ \z@ \else \prevdepth \fi
289 \fi
290 \vskip -\tempskipb
291 \penalty#1%
292 \ifdim\tempskipa=\tempskipb

```

Do nothing if the `\prevdepth` check made no adjustment.

293               `\else`

Combine the prevdepth adjustment into a single skip.

294               `\advance\@tempskipb -\@tempskipa`  
295               `\vskip \@tempskipb`  
296               `\fi`

The final skip is always the specified length.

297               `\vskip \@tempskipa`  
298               `\endgroup`  
299               `\fi`  
300               `\fi`  
301               `\fi`  
302               `\else`  
303               `\@noitemerr`  
304               `\fi} %`  
  
305 `//2ekernel | latexrelease)`  
306 `\langle latexrelease\rangle\EndIncludeInRelease`  
307 `\langle latexrelease\rangle\IncludeInRelease{0000/00/00}%`  
308 `\langle latexrelease\rangle \{\addpenalty\}{\addpenalty}%`  
309 `\langle latexrelease\rangle\def\addpenalty#1{%`  
310 `\langle latexrelease\rangle \ifvmode`  
311 `\langle latexrelease\rangle \if@minipage`  
312 `\langle latexrelease\rangle \else`  
313 `\langle latexrelease\rangle \if@nobreak`  
314 `\langle latexrelease\rangle \else`  
315 `\langle latexrelease\rangle \ifdim\lastskip=\z@`  
316 `\langle latexrelease\rangle \penalty#1\relax`  
317 `\langle latexrelease\rangle \else`  
318 `\langle latexrelease\rangle \@tempskipb\lastskip`  
319 `\langle latexrelease\rangle \vskip -\lastskip`  
320 `\langle latexrelease\rangle \penalty#1%`  
321 `\langle latexrelease\rangle \vskip\@tempskipb`  
322 `\langle latexrelease\rangle \fi`  
323 `\langle latexrelease\rangle \fi`  
324 `\langle latexrelease\rangle \fi`  
325 `\langle latexrelease\rangle \else`  
326 `\langle latexrelease\rangle \@noitemerr`  
327 `\langle latexrelease\rangle \fi} %`  
328 `\langle latexrelease\rangle\EndIncludeInRelease`  
329 `(*2ekernel)`

(End definition for `\addpenalty`.)

`\vspace` The new code for these commands depends on the following facts:

`\@vspace`  
`\@vspacer`

- The value of `prevdepth` is changed only when a box or rule is created and added to a vertical list;
- The value of `prevdepth` is used only when a box is created and added to a vertical list;
- The value of `prevdepth` is always local to the building of one vertical list.

330 `\DeclareRobustCommand\vspace{\@ifstar\@vspacer\@vspace}`

```

331 </2ekernel>
332 <*2ekernel | latexrelease>
333 <latexrelease>\IncludeInRelease{2020/10/01}%
334 <latexrelease> {\@vspace}{Support calc in \vspace}%

We support calc syntax in the argument and therefore use \setlength.

335 \def\@vspace #1{%
336 \ifvmode
337 \@vspace@calcify{#1}%
338 \vskip\z@skip
339 \else
340 \@bsphack
341 \vadjust{\@restorepar
342 \@vspace@calcify{#1}%
343 \vskip\z@skip
344 }%
345 \@esphack
346 \fi}
347 \def\@vspacer#1{%
348 \ifvmode
349 \dimen@\prevdepth
350 \hrule\@height\z@
351 \nobreak
352 \@vspace@calcify{#1}%
353 \vskip\z@skip
354 \prevdepth\dimen@
355 \else
356 \@bsphack
357 \vadjust{\@restorepar
358 \hrule\@height\z@
359 \nobreak
360 \@vspace@calcify{#1}%
361 \vskip\z@skip}%
362 \@esphack
363 \fi}
364 </2ekernel | latexrelease>
365 <latexrelease>\EndIncludeInRelease
366 <latexrelease>\IncludeInRelease{0000/00/00}%
367 <latexrelease> {\@vspace}{Support calc in \vspace}%
368 <latexrelease>
369 <latexrelease>\def\@vspace #1{%
370 <latexrelease> \ifvmode
371 <latexrelease> \vskip #1
372 <latexrelease> \vskip\z@skip
373 <latexrelease> \else
374 <latexrelease> \@bsphack
375 <latexrelease> \vadjust{\@restorepar
376 <latexrelease> \vskip #1
377 <latexrelease> \vskip\z@skip
378 <latexrelease> }%
379 <latexrelease> \@esphack
380 <latexrelease> \fi}
381 <latexrelease>\def\@vspacer#1{%
382 <latexrelease> \ifvmode

```

```

383 〈\latexrelease〉 \dimen@\prevdepth
384 〈\latexrelease〉 \hrule \@height\z@
385 〈\latexrelease〉 \nobreak
386 〈\latexrelease〉 \vskip #1
387 〈\latexrelease〉 \vskip\z@skip
388 〈\latexrelease〉 \prevdepth\dimen@
389 〈\latexrelease〉 \else
390 〈\latexrelease〉 \@bsphack
391 〈\latexrelease〉 \vadjust{\@restorepar
392 〈\latexrelease〉 \hrule \@height\z@
393 〈\latexrelease〉 \nobreak
394 〈\latexrelease〉 \vskip #1
395 〈\latexrelease〉 \vskip\z@skip}%
396 〈\latexrelease〉 \@esphack
397 〈\latexrelease〉 \fi}
398 〈\latexrelease〉\EndIncludeInRelease
399 {*2ekernel}

```

(End definition for `\vspace`, `\@vspace`, and `\@vspace@`.)

```

\smallskip
\medskip 400 \def\smallskip{\vspace\smallskipamount}
\bigskip 401 \def\medskip{\vspace\medskipamount}
402 \def\bigskip{\vspace\bigskipamount}

```

(End definition for `\smallskip`, `\medskip`, and `\bigskip`.)

```

\smallskipamount
\medskipamount 403 \newskip\smallskipamount \smallskipamount=3pt plus 1pt minus 1pt
\bigskipamount 404 \newskip\medskipamount \medskipamount =6pt plus 2pt minus 2pt
405 \newskip\bigskipamount \bigskipamount =12pt plus 4pt minus 4pt

```

(End definition for `\smallskipamount`, `\medskipamount`, and `\bigskipamount`.)

## 1.6 Horizontal space (and breaks)

`\nobreakdashes` This idea is borrowed from the `amsmath` package but here we define a robust command.

This command is a low-level command designed for use only before hyphens or dashes (such as `-`, `--`, or `---`).

It could probably be better implemented: it may need its own private token register and temporary command.

Setting the hyphen in a box and then unboxing it means that the normal penalty will not be added after it—and if the penalty is not there a break will not be taken (unless an explicit penalty or glue follows, thus the final `\nobreak`).

Note that even if it is not followed by a `'`, it still leaves vmode and sets the space-factor; so use it carefully!

```

406 \DeclareRobustCommand{\nobreakdashes}{%
407 \leavevmode
408 \toks@{}%
409 \def\reserved@a##1{\toks@\expandafter{\the\toks@-}%
410 \futurelet\@let@token \reserved@b}%
411 \def\reserved@b {\ifx\@let@token -%
412 \expandafter\reserved@a

```

```

413 \else
414 \setbox\z@ \hbox{\the\toks@\nobreak}%
415 \unhbox\z@
416 \spacefactor\sfcod\`-
417 \fi}%
418 \futurelet\@let@token \reserved@b
419 }

```

(End definition for `\nobreakdashes`.)

`\nobreakspace  
  \@xobeysp`

This is a robust command that produces a horizontal space at which, in paragraph-mode, a line-break is not possible. We then define an active `\~` to expand to it since this is the documented behaviour of `\~`. One reason for introducing this is that some 8-bit input encodings have a slot for such a space and we do not want to use active characters as the L<sup>A</sup>T<sub>E</sub>X internal commands.

The braces in the definition of `\~` are needed to ensure that a following space is preserved when reading to/from internal files.

We need to keep `\@xobeysp` as it is widely used; so here it is let to the non-robust command `\nobreakspace`.

```

420 \DeclareRobustCommand{\nobreakspace}{%
421 \leavevmode\nobreak\ }
422 \catcode '\~=13
423 \def~{\nobreakspace{}}
424 \expandafter\let\expandafter\@xobeysp\csname nobreakspace \endcsname

```

(End definition for `\nobreakspace` and `\@xobeysp`.)

- Placed before a `\.`, makes it a sentence-ending period. Does the right thing for other punctuation marks as well. Does this by setting spacefactor to 1000.

```

425 </2ekernel>
426 <latexrelease>\IncludeInRelease{2015/01/01}%
427 <latexrelease> {\@}{Space after \@}%
428 <*2ekernel | latexrelease>
429 \def\@{\spacefactor\@m}%
430 </2ekernel | latexrelease>
431 <latexrelease>\EndIncludeInRelease
432 <latexrelease>\IncludeInRelease{0000/00/00}%
433 <latexrelease> {\@}{Space after \@}%
434 <latexrelease>\def\@{\spacefactor\@m}%
435 <latexrelease>\EndIncludeInRelease
436 <*2ekernel>

```

(End definition for `\@.`)

`\hspace`

```
437 \DeclareRobustCommand\hspace{\@ifstar\@hspacer\@hspace}
```

(End definition for `\hspace`.)

```

\@hspace
 438 </2ekernel>
 439 {*2ekernel | latexrelease}
 440 <latexrelease>\IncludeInRelease{2020/10/01}%
 441 <latexrelease> {\@hskip}{Support calc with \hskip}%
 442 \def\@hskip#1{\begin{group}\setlength\skip@{\#1}\hskip\skip@\endgroup}
 443 </2ekernel | latexrelease>
 444 <latexrelease>\EndIncludeInRelease
 445 <latexrelease>\IncludeInRelease{0000/00/00}%
 446 <latexrelease> {\@hskip}{Support calc with \hskip}%
 447
 448 <latexrelease>
 449 <latexrelease>\def\@hskip#1{\hskip #1\relax}
 450 <latexrelease>\EndIncludeInRelease
 451 {*2ekernel}

```

(End definition for \@hskip.)

\@hspacer Extra \hskip Opt added 1985/17/12 to guard against a following \unskip \relax added 13 Oct 88 for usual TeX lossage replaced both changes by \hskip\z@skip 27 Nov 91

```

 452 \def\@hspacer#1{\vrule \width\z@\nobreak
 453 \hskip\#1\z@skip}

```

(End definition for \@hspacer.)

\fill

```

 454 \newskip\fill
 455 \fill = 0pt plus 1fill

```

(End definition for \fill.)

\stretch

```

 456 \def\stretch#1{\z@ \oplus #1fill\relax}

```

(End definition for \stretch.)

```

 457 </2ekernel>
 458 {*2ekernel | latexrelease}
 459 <latexrelease>\IncludeInRelease{2018/12/01}%
 460 <latexrelease> {\thinspace}{Start LR-mode}%

```

\enspace

```

 461 \DeclareRobustCommand\enspace{\leavevmode@ifvmode\kern.5em }

```

(End definition for \enspace.)

\leavevmode@ifvmode Leave vmode but only if we are really in vmode, otherwise the expansion is empty (which is not the case with the default definition).

```

 462 \protected\def\leavevmode@ifvmode{\ifvmode\expandafter\indent\fi}

```

```

(End definition for \leavevmode@ifvmode.)

463 </2ekernel | latexrelease>
464 <latexrelease>\EndIncludeInRelease
465 <latexrelease>\IncludeInRelease{0000/00/00}%
466 <latexrelease> {\thinspace}{Start LR-mode}%
467 <latexrelease>\def\thinspace{\kern .16667em }
468 <latexrelease>\def\negthinspace{\kern-.16667em }
469 <latexrelease>\def\enspace{\kern.5em }
470 <latexrelease>\let\leavevmode@ifvmode@\undefined
471 <latexrelease>\EndIncludeInRelease
472 <*2ekernel>
```

```

\enskip
\quad 473 \def\enskip{\hskip.5em\relax}
\quad 474 \def\quad{\hskip1em\relax}
\quad 475 \def\quad{\hskip2em\relax}
```

(End definition for \enskip, \quad, and \quad.)

For Unicode engines, make the Unicode soft hyphen an active character defined as \-.

```

476 \ifx\Umathcode\@undefined\else
477 \catcode "AD=13
478 \def^^ad{\-}
479 \fi
```

\obeycr The following definitions will probably get deleted or moved to compatibility mode soon.  
\restorecr
480 {\catcode`^^M=13 \gdef\obeycr{\catcode`^^M13 \def^^M{\relax}%
481 @gobblecr}%
482 {\catcode`^^M=13 \gdef@gobblecr{@ifnextchar
483 @gobble\ignorespaces}%
484 \gdef\restorecr{\catcode`^^M5 }}

(End definition for \obeycr and \restorecr.)

```
485 </2ekernel>
```

# File m

## ltlogos.dtx

### 1 Logos

Various logos are defined here.

- \TeX The \TeX logo, adjusted so that a full stop after the logo counts as ending a sentence.

```
1 {*2ekernel}
2 \DeclareRobustCommand{\TeX}{\kern-.1667em\lower.5ex\hbox{E}\kern-.125emX\@}
```

(End definition for \TeX.)

- \LaTeX The \LaTeX logo.

```
3 \DeclareRobustCommand{\LaTeX}{\kern-.36em%
4 {\sbox{z@T}%
5 \vbox to\ht{z@}{\hbox{\check@mathfonts%
6 \fontsize\sf@size\z@%
7 \math@fontsfalse\selectfont%
8 A}%
9 \vss}%
10 }%
11 \kern-.15em%
12 \TeX}
```

(End definition for \LaTeX.)

- \LaTeXe The \LaTeX<sub>2ε</sub> logo as proposed by A-W designers.

```
13 \DeclareRobustCommand{\LaTeXe}{\mbox{\m@th%
14 \if b\expandafter\@car\f@series\@nil\boldmath\fi%
15 \LaTeX\kern.15em\textstyle\varepsilon\}}%
16 \end{2ekernel}
```

(End definition for \LaTeXe.)

# File n

## ltfiles.dtx

### 1 File Handling

The following user commands are defined in this part:

|                    |                                                                                                                                                                                                                         |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| \document          | (ie \begin{document})                                                                                                                                                                                                   |
| \nofiles           | Reads in the .AUX files and \catcode's @ to 12.                                                                                                                                                                         |
| \includeonly       | Suppresses all file output by setting \@filesw false.<br>\{NAME1, ... ,NAMEn\}                                                                                                                                          |
| \include           | Causes only parts NAME1, ... ,NAMEn to be read by their \include commands. Works by setting partsw true and setting \@partlist to NAME1, ... ,NAMEn.<br>\{NAME\}                                                        |
| \input             | Does an \input NAME unless \@partsw is true and NAME is not in \@partlist. If \@filesw is true, then it directs .AUX output to NAME.AUX, including a checkpoint at the end.<br>\{NAME\}                                 |
| \IfFileExists      | The same as TeX's \input, except it allows optional braces around the file name. In LATEX 2 <sub>E</sub> , it also avoids the primitive 'missing file' error, if the file can not be found.<br>\{NAME\}\{then\}\{else\} |
| \InputIfFileExists | If the file exists on the system, execute then otherwise execute else.<br>\{NAME\}\{then\}\{else\}                                                                                                                      |

If the file exists on the system, execute *then* and input *NAME* otherwise execute *else*.

*Historical LATEX 2.09 comments (not necessarily accurate any more):*

```
1 {*2ekernel}
2 \message{files,}

VARIABLES, SWITCHES AND INTERNAL COMMANDS:
 \@mainaux : Output file number for main .AUX file.
 \@partaux : Output file number for current part's .AUX file.
 \@auxout : Either \@mainout or \@partout, depending on
 which .AUX file output goes to.
 \@input{foo} : If file foo exists, then \input's it,
 otherwise types a warning message.
 @filesw : Switch – set false if no .AUX, .TOC, .IDX etc
 files are to be written
 @partsw : Set true by a \includeonly command.
 \@partlist : Set to the argument of the \includeonly command.

 \cp@FOO : The checkpoint for \include'd file FOO.TEX, written
 by \@writeckpt at the end of file FOO.AUX
```

```
\includeonly{FILELIST} ==
BEGIN
 \@partsw := T
```

```

\@partlist := FILELIST
END

\include{FILE} ==
BEGIN
 \clearpage
 if \@files w = T
 then \immediate\write\@mainaux{\string\@input{FILE.AUX}}
 fi
 if \@parts w = T
 then \@tempswa := F
 \reserved@b == FILE
 for \reserved@a := \@partlist
 do if eval(\reserved@a) = eval(\reserved@b)
 then \@tempswa := T fi
 od
 fi

 if \@tempswa = T
 then \@auxout := \@partaux
 if \@files w = T
 then \immediate\openout\@partaux{FILE.AUX}
 \immediate\write\@partaux{\relax}
 fi
 \input{FILE.TEX}
 \clearpage
 \@writeckpt{FILE}
 if @files w then \closeout\@partaux fi
 \@auxout := \@mainaux
 else \cp@FILE
 fi
END

\@writeckpt{FILE} ==
BEGIN
 if \@files w = T
 \immediate\write on file \@partaux:
 \@setckpt{FILE}{% }
 for \reserved@a := \cl@ckpt
 do \immediate\write on file \@partaux:
 \global\string\setcounter
 {eval(\reserved@a)}{eval(\c@eval(\reserved@a))}%
 od
 \immediate\write on file \@partaux: %
 fi
END

\@setckpt{FILE}{LIST} ==
BEGIN
 G \cp@FILE := LIST

```

```

END

INITIALIZATION
\@tempswa := T

End of historical LATEX 2.09 comments.

\@inputcheck Allocate read stream for testing and output stream.
\@unused 3 \newread\@inputcheck
 4 \newwrite\@unused

(End definition for \@inputcheck and \@unused.)

\@mainaux
\@partaux 5 \newwrite\@mainaux
 6 \newwrite\@partaux

(End definition for \@mainaux and \@partaux.)

\if@filesw
\if@partsw 7 \newif\if@filesw \@fileswtrue
 8 \newif\if@partsw \@partswfalse

(End definition for \if@filesw and \if@partsw.)

\@clubpenalty This stores the current normal (non-infinite) value of \clubpenalty; it should therefore
be reset whenever the normal value is changed (as in the bibliography in the standard
styles).
 9 \newcount\@clubpenalty
 10 \@clubpenalty \clubpenalty

(End definition for \@clubpenalty.)

\document
 11 </2ekernel>
 12 <latexrelease>\IncludeInRelease{2020/10/01}%
 13 <latexrelease> {\document}{Added hook to load l3backend code}%
 14 {*2ekernel | latexrelease}
 15 \def\document{%

We do cancel the grouping as part of the \begin handling (this is now done inside
\begin instead) so that the env//env/begin hook is not hidden inside \begingroup
... \endgroup.
 16 % \endgroup
 17 \UseOneTimeHook{begindocument/before}%
 18 \@kernel@after@begindocument@before

```

Added hook to load l3backend code:

```
19 \ExplSyntaxOn
20 \ifx\@unusedoptionlist\empty\else
21 \@latex@warning@no@line{Unused global option(s):`^J%
22 \spaceskip[\@unusedoptionlist]}%
23 \fi
24 \colht\textheight
25 \colroom\textheight \vsize\textheight
26 \columnwidth\textwidth
27 \clubpenalty\clubpenalty
28 \if@twocolumn
29 \advance\columnwidth -\columnsep
30 \divide\columnwidth\tw@ \hsize\columnwidth \firstcolumntrue
31 \fi
32 \hsize\columnwidth \linewidth\hsize
33 \begingroup\@floatplacement\@dblfloatplacement
34 \makeatletter\let\@writefile\gobbletwo
35 \global\let\@multiplelabels\relax
36 \input{\jobname.aux}%
37 \endgroup
38 \if@files
39 \immediate\openout\mainaux\jobname.aux
40 \immediate\write\mainaux{\relax}%
41 \fi
```

Dateline 1991/03/26: FMi added \process@table to support NFSS; This will also work with old lfonts if no other style defines \process@table. The following line forces the initialization of the math fonts.

```
42 \process@table
43 \let\glb@currsize\empty % Force math initialization.
44 \normalsize
45 \everypar{}%
```

So that punctuation in headings is not disturbed by verbatim or other local changes to the space factor codes, save the document default here. This will be locally reset by the output routine. For special cases a class may want to define \normalsfcodes directly, in case that definition will be used. (This is an old bug, problem existed in L<sup>A</sup>T<sub>E</sub>X2.0x and plain T<sub>E</sub>X.)

```
46 \ifx\normalsfcodes\empty
47 \ifnum\sfcodes`.=\@m
48 \let\normalsfcodes\frenchspacing
49 \else
50 \let\normalsfcodes\nonfrenchspacing
51 \fi
52 \fi
```

For similar reasons also save the default language, this will be reset locally in the output routine. In particular it allows hyphenation in the page head even if the page break happens in verbatim. If this has already been set by a package, set to the value of \language at this point.

```
53 \ifx\document@default@language\@ne
54 \chardef\document@default@language\language
55 \fi
```

Way back in 1991 (08/26) FMi & RmS set the `\@noskipsec` switch to true in the preamble and to false here. This was done to trap lists and related text in the preamble but it does not catch everything; hence Change 1.1g was introduced.

```
56 \@noskipsecfalse
57 \let \@refundefined \relax
```

Just before disabling the preamble commands we execute the begin document hook which contains any code contributed by `\AtBeginDocument`. Also disable the gathering of the file list, if no `\listfiles` has been issued. `\AtBeginDocument` is redefined at this point so that and such commands that get into the hook do not chase their tail...

```
58 \@kernel@before@begindocument
59 \UseOneTimeHook{begindocument}%
60 \@kernel@after@begindocument
```

Most of the following assignments will be done globally in case the user adds something like `\begin{multicols}` to the document hook, i.e. starts are group in `\begin{document}`.

Since a value of exactly 0pt for `\topskip` causes `\twocolumn[]` to misbehave, we add this check, hoping that it will not cause any problems elsewhere.

```
61 \ifdim\topskip<1sp\global\topskip 1sp\relax\fi
62 \global@\maxdepth\maxdepth
63 \global\let@\begindocumenthook\@undefined
64 \ifx\@listfiles\@undefined
65 \global\let@\filelist\relax
66 \global\let@\addtofilelist\@gobble
67 \fi
```

At the very end we disable all preamble commands. This has to happen after the begin document hooks was executed so that this hook can still use such commands.

```
68 \gdef\do##1{\global\let ##1\@notprerr}%
69 \@preamblecmds
```

The next line saves tokens and also allows `\@nодocument` to be used directly to trap preamble errors.

```
70 \global\let \@nодocument \relax
```

The next line is a pure safety measure in case a do list is ever expanded at the wrong place. In addition it will save a few tokens to get rid of the above definition.

```
71 \global\let\do\noexpand
72 \UseOneTimeHook{begindocument/end}%
```

Use of the hook might mean that we are already in horizontal mode, so ignore the space after `\begin{document}`.

```
73 \ignorespaces
```

The `begindocument` hook already existed in the kernel since 1994 under the name `\atbegindocumenthook` the additional ones are originally from the `etoolbox` package under the names `\@endpreamblehook` `\afterpreamble`.

```
74 \NewHook{begindocument}
75 \NewHook{begindocument/before}
76 \NewHook{begindocument/end}
```

```
\@kernel@after@begindocument@before
\@kernel@before@begindocument
\@kernel@after@begindocument
```

Above we used two kernel only hooks to be run after the public `begindocument/before` and after `begindocument` hooks.

In `\@kernel@after@begindocument@before` we already place one action: drop the fast execution code for the `env/document/begin` hook. That hook marks the end of the preamble and should therefore only be run once. In a normal document that is anyway the case (so the code would just sit there taking up space afterwards, which these days is rather harmless), however, in more complicated scenarios where several full documents are combined to a single document it might get applied several times with harmful effects. We therefore explicitly drop it at this point. the coing is somewhat obscure due to the name of the macro which requires constructing.

```
77 \edef \@kernel@after@begindocument@before {%
78 \let\expandafter\noexpand\csname
79 __hook env/document/begin\endcsname
80 \noexpand\@empty}
81 \let \@kernel@before@begindocument \@empty
82 \let \@kernel@after@begindocument \@empty
83 </2ekernel | latexrelease>
84 <latexrelease>\EndIncludeInRelease
85 <latexrelease>\IncludeInRelease{2017/04/15}%
86 <latexrelease> {\document}{Save language for hyphenation}%
87 <latexrelease>
88 <latexrelease>\def\document{\endgroup
89 <latexrelease> \ifx\@unusedoptionlist\@empty\else
90 <latexrelease> \@latex@warning@no@line{Unused global option(s):`^J}%
91 <latexrelease> \@spaces[\@unusedoptionlist]}%
92 <latexrelease> \fi
93 <latexrelease> \@colht\textheight
94 <latexrelease> \@colroom\textheight \vsize\textheight
95 <latexrelease> \columnwidth\textwidth
96 <latexrelease> \clubpenalty\clubpenalty
97 <latexrelease> \if@twocolumn
98 <latexrelease> \advance\columnwidth -\columnsep
99 <latexrelease> \divide\columnwidth\tw@ \hsize\columnwidth \if@firstcolumntrue
100 <latexrelease> \fi
101 <latexrelease> \hsize\columnwidth \linewidth\hsize
102 <latexrelease> \begingroup\@floatplacement\@dblfloatplacement
103 <latexrelease> \makeatletter\let\@writefile\gobbletwo
104 <latexrelease> \global\let\@multiplelabels\relax
105 <latexrelease> \input{\jobname.aux}%
106 <latexrelease> \endgroup
107 <latexrelease> \if@files
108 <latexrelease> \immediate\openout\@mainaux\jobname.aux
109 <latexrelease> \immediate\write\@mainaux{\relax}%
110 <latexrelease> \fi
111 <latexrelease> \process@table
112 <latexrelease> \let\glb@currsize\@empty % Force math initialization.
113 <latexrelease> \normalsize
114 <latexrelease> \everypar{}%
115 <latexrelease> \ifx\normalsfcodes\@empty
116 <latexrelease> \ifnum\sfcode`.=\@m
117 <latexrelease> \let\normalsfcodes\frenchspacing
```

```

118 〈latexrelease〉 \else
119 〈latexrelease〉 \let\ normalsf codes\nonfrenchspacing
120 〈latexrelease〉 \fi
121 〈latexrelease〉 \fi
122 〈latexrelease〉 \ifx\document@default@language\m@ne
123 〈latexrelease〉 \chardef\document@default@language\language
124 〈latexrelease〉 \fi
125 〈latexrelease〉 \@noskipsecfalse
126 〈latexrelease〉 \let \refundefined \relax
127 〈latexrelease〉 \let\AtBeginDocument\@firstofone
128 〈latexrelease〉 \begindocumenthook
129 〈latexrelease〉 \ifdim\topskip<1sp\global\topskip 1sp\relax\fi
130 〈latexrelease〉 \global\@maxdepth\maxdepth
131 〈latexrelease〉 \global\let\@begindocumenthook\@undefined
132 〈latexrelease〉 \ifx\@listfiles\@undefined
133 〈latexrelease〉 \global\let\@filelist\relax
134 〈latexrelease〉 \global\let\@addtofilelist\@gobble
135 〈latexrelease〉 \fi
136 〈latexrelease〉 \gdef\do##1{\global\let ##1\@notprerr}%
137 〈latexrelease〉 \preamblecmds
138 〈latexrelease〉 \global\let \nodocument \relax
139 〈latexrelease〉 \global\let\do\noexpand
140 〈latexrelease〉 \ignorespaces}
141 〈latexrelease〉\EndIncludeInRelease
142 〈latexrelease〉
143 〈latexrelease〉\IncludeInRelease{0000/00/00}%
144 〈latexrelease〉 {\document}{Save language for hyphenation}
145 〈latexrelease〉\def\document{\endgroup
146 〈latexrelease〉 \ifx\@unusedoptionlist\@empty\else
147 〈latexrelease〉 \@latex@warning@no@line{Unused global option(s):`^J%
148 〈latexrelease〉 \@spaces[\@unusedoptionlist]}%
149 〈latexrelease〉 \fi
150 〈latexrelease〉 \colht\textheight
151 〈latexrelease〉 \colroom\textheight \vsize\textheight
152 〈latexrelease〉 \columnwidth\textwidth
153 〈latexrelease〉 \clubpenalty\clubpenalty
154 〈latexrelease〉 \if@twocolumn
155 〈latexrelease〉 \advance\columnwidth -\columnsep
156 〈latexrelease〉 \divide\columnwidth\tw@ \hsize\columnwidth
157 〈latexrelease〉 \firstcolumntrue
158 〈latexrelease〉 \fi
159 〈latexrelease〉 \hsize\columnwidth \linewidth\hsize
160 〈latexrelease〉 \begingroup\@floatplacement\@dblfloatplacement
161 〈latexrelease〉 \makeatletter\let\@writefile\@gobbletwo
162 〈latexrelease〉 \global\let \multiplelabels \relax
163 〈latexrelease〉 \input{\jobname.aux}%
164 〈latexrelease〉 \endgroup
165 〈latexrelease〉 \if@filesw
166 〈latexrelease〉 \immediate\openout\mainaux\jobname.aux
167 〈latexrelease〉 \immediate\write\mainaux{\relax}%
168 〈latexrelease〉 \fi
169 〈latexrelease〉 \process@table
170 〈latexrelease〉 \let\glb@currsize\@empty
171 〈latexrelease〉 \normalsize

```

```

172 〈latexrelease〉 \everypar{}%
173 〈latexrelease〉 \ifx\normalsfcodes\@empty
174 〈latexrelease〉 \ifnum\sfcodes`.=\@m
175 〈latexrelease〉 \let\normalsfcodes\frenchspacing
176 〈latexrelease〉 \else
177 〈latexrelease〉 \let\normalsfcodes\nonfrenchspacing
178 〈latexrelease〉 \fi
179 〈latexrelease〉 \fi
180 〈latexrelease〉 \noskipsecfalse
181 〈latexrelease〉 \let\@refundefined\relax
182 〈latexrelease〉 \let\AtBeginDocument\@firstofone
183 〈latexrelease〉 \begindocumenthook
184 〈latexrelease〉 \ifdim\topskip<1sp\global\topskip 1sp\relax\fi
185 〈latexrelease〉 \global\@maxdepth\maxdepth
186 〈latexrelease〉 \global\let\@begindocumenthook\@undefined
187 〈latexrelease〉 \ifx\@listfiles\@undefined
188 〈latexrelease〉 \global\let\@filelist\relax
189 〈latexrelease〉 \global\let\@addtofilelist\@gobble
190 〈latexrelease〉 \fi
191 〈latexrelease〉 \gdef\do##1{\global\let ##1\@notprerr}%
192 〈latexrelease〉 \preamblecmds
193 〈latexrelease〉 \global\let\@nodocument\relax
194 〈latexrelease〉 \global\let\do\noexpand
195 〈latexrelease〉 \ignorespaces}
196 〈latexrelease〉 \EndIncludeInRelease
197 〈*2ekernel〉

198 \onlypreamble\document

```

(End definition for `\document` and others.)

- `\normalsfcodes` The setting of `\@empty` is just a flag. This command may be defined in a class or package file. If it is still `\@empty` at `\begin{document}` it will be defined to be `\frenchspacing` or `\nonfrenchspacing`, depending on which of those appears to be in effect at that point.

```
199 \let\normalsfcodes\@empty
```

(End definition for `\normalsfcodes`.)

- `\nofiles` Set `\@fileswfalse` which suppresses the places where L<sup>A</sup>T<sub>E</sub>X makes `\immediate` writes. The `\makeindex` and `\makeglossary` are disabled. `\protected@write` is redefined not to write to the file specified, but rather to write a blank line to the log file. This ensures that a `\whatsit` node is still created, and so spacing is not affected by the `\nofiles` command; to ensure this more generally, the `\if@nobreak` test is needed.

```

200 \def\nofiles{%
201 \@fileswfalse
202 \typeout{No auxiliary output files.^~J}%
203 \long\def\protected@write##1##2##3{%
204 {\write\m@ne{}}\if@nobreak\ifvmode\nobreak\fi\fi}%
205 \let\makeindex\relax
206 \let\makeglossary\relax
207 \onlypreamble\nofiles

```

(End definition for `\nofiles`.)

`\protected@write` This takes three arguments: an output stream, some initialization code, and some text to write. It then writes this, with appropriate handling of `\protect` and `\thepage`.

```

208 \long\def \protected@write#1#2#3{%
209 \begingroup
210 \let\thepage\relax
211 #2%
212 \let\protect\@unexpandable@protect
213 \edef\reserved@a{\write#1{#3}}%
214 \reserved@a
215 \endgroup
216 \if nobreak\ifvmode\nobreak\fi\fi
217 }

```

(End definition for `\protected@write`.)

```
218 \let\@auxout=\@mainaux
```

`\include` In the definition of `\include`, `\def\reserved@c` changed to `\edef\reserved@c` to be consistent with the `\edef` in `\includeonly`. (Suggested by Rainer Schöpf & Frank Mittelbach. Change made 20 Jul 88.)

Changed definition of `\include` to allow space at end of file name — otherwise, typing `\include{foo }` would cause L<sup>A</sup>T<sub>E</sub>X to overwrite `foo.tex`. Change made 24 May 89, suggested by Rainer Schöpf and Frank Mittelbach

Made `\include` check for being used inside an `\include`'d file, as this will not work and cause surprising results.

```

219 </2ekernel>
220 {*2ekernel | latexrelease}
221 <latexrelease> \IncludeInRelease{2020/10/01}%
222 <latexrelease> {\includeonly}{Spaces in file names}%
223 \def\include#1{\relax
224 \ifnum\@auxout=\@partaux
225 \@latex@error{\string\include\space cannot be nested}\@eha
226 \else

```

Here the normalisation will add `.tex` for all files, (it uses the same normalisation as the hooks), so we need to remove that manually. `\@strip@tex@ext` does that.

```

227 \set@curr@file{#1}%
228 \edef\@curr@file{\@strip@tex@ext\@curr@file}%

```

For historical reasons `\@include` expects an argument delimited by a space. This is kept (though unnecessary now) to avoid errors in other packages that use `\@include` directly.

```

229 \expandafter\@include\expandafter{\@curr@file} % deliberate space
230 \fi}

```

Here in `\includeonly` we also need to strip `.tex` after normalisation:

```

231 \def\includeonly#1{%
232 \@partswtrue

```

Because the argument to `\includeonly` is a comma-separated list of filenames where there may be comma's preceding some of the filenames or trailing them. Therefore we need to take the list apart, remove the unwanted spaces while leaving the spaces *in* the filenames intact.

```

233 \let\@partlist\@empty
234 \@for\reserved@a:=#1 \do

```

```

235 {%
236 \expandafter\set@curr@file\expandafter{\reserved@a}%
237 \ifx\@partlist\@empty
238 \edef\@partlist{\@strip@tex@ext\@curr@file}%
239 \else
240 \edef\@partlist{\@partlist,\@strip@tex@ext\@curr@file}%
241 \fi
242 }%
243 }
244 \onlypreamble\includeonly

```

(End definition for `\include` and `\includeonly`.)

`\@strip@tex@ext` These macros take a (`\detokenized` file name and remove any `.tex` extension). Extra care is taken to not remove the string `.tex` from the middle of a file name: it is only removed if it's the very last thing in the file name.

```

245 \def\reserved@a#1{%
246 \def\@strip@tex@ext##1{%
247 \expandafter\@strip@tex@ext@aux
248 ##1\@nil\@nil
249 #1\@nil\relax\@nnil}%
250 \def\@strip@tex@ext@aux##1#1\@nil##2\@nnil{%
251 \ifx\relax##2\@empty
252 \expandafter\@cdr\expandafter\@empty\@cdr{}##1%
253 \else##1\fi}%
254 \expandafter\reserved@a
255 \expandafter{\detokenize{.tex}}
256
```

(End definition for `\@strip@tex@ext` and `\@strip@tex@ext@aux`.)

```

257 \end{macro}
258 \end{macro}
259 \end{macro}
260 \end{macro}
261 \end{macro}
262 \end{macro}
263 \end{macro}
264 \end{macro}
265 \end{macro}
266 \end{macro}
267 \end{macro}
268 \end{macro}
269 \end{macro}
270 \end{macro}
271 \end{macro}
272 \end{macro}
273 \end{macro}
274 \end{macro}
275 \end{macro}
276 \end{macro}
277 \end{macro}
278 \end{macro}
279 \end{macro}
280 \end{macro}

```

```

281 〈\latexrelease〉\def\includeonly#1{%
282 〈\latexrelease〉 \c@partswtrue
283 〈\latexrelease〉 \edef\c@partlist{\zap@space#1 \c@empty}%
284 〈\latexrelease〉
285 〈\latexrelease〉\def\include#1{\relax
286 〈\latexrelease〉 \ifnum\c@auxout=\c@partaux
287 〈\latexrelease〉 \c@latex@error{`string`\include\space cannot be nested}\c@eha
288 〈\latexrelease〉 \else \c@include#1 \fi}
289 〈\latexrelease〉
290 〈\latexrelease〉\EndIncludeInRelease
291 {*2ekernel}

\c@include

292 </2ekernel>
293 {*2ekernel | \latexrelease}
294 〈\latexrelease〉\IncludeInRelease{2020/10/01}%
295 〈\latexrelease〉 \c@include{Spaces in file names and hooks}%

296 \def\c@include#1 {%
297 \clearpage
298 \if@cfilesw
299 \immediate\write\c@mainaux{\string\c@input{#1.aux}}%
300 \fi
301 \c@tempswattrue
302 \if@cpartsw
303 \c@tempswafalse
304 \edef\reserved@c{\c@partlist\do
305 {\c@ifx\reserved@c\reserved@b\c@tempswattrue\fi}%
306 \fi
307 \if@ctempswa
308 \let\c@auxout\c@partaux
309 \if@cfilesw
310 \immediate\openout\c@partaux "#1.aux"
311 \immediate\write\c@partaux{\relax}%
312 \fi
313 \fi

```

Now before going to the hooks we need to set \CurrentFile:

```

314 %-----%
315 \c@filehook\c@set\c@CurrentFile

```

Execute the `before` hooks just after we switched the .aux file ...

```

316 \UseHook{include/before}%
317 \UseHook{include/before/#1}%
318 %-----%
319 \c@input{\c@CurrentFile.tex}%
320 %-----%
... then end hooks ...
321 \UseHook{include/end/#1}%
322 \UseHook{include/end}%
323 %-----%
324 \clearpage
325 %-----%

```

... and after the `\clearpage` the `after` hooks followed by another `\clearpage` just in case new material got added (after all we need to be in well defined state after the `\include`).

```

326 \UseHook{include/after/#1}%
327 \UseHook{include/after}%
328 \clearpage
329 %-----
330 \@writeckpt{#1}%
331 \if@filesw
332 \immediate\closeout\@partaux
333 \fi
334 \else

```

If the file is not included, reset `\deadcycles`, so that a long list of non-included files does not generate an ‘Output loop’ error.

```

335 \deadcycles\z@%
336 \nameuse{cp@#1}%
337 \fi
338 \let\@auxout\@mainaux}
339 \end{IncludeInRelease}
340 (/2ekernel | latexrelease)

341 \begin{IncludeInRelease}[0000/00/00]%
342 \end{IncludeInRelease} {\\@include}{Spaces in file names}%
343 \def\@include#1 {%
344 \clearpage
345 \if@filesw
346 \immediate\write\@mainaux{\string\@input{#1.aux}}%
347 \fi
348 \tempswattrue
349 \if@partsw
350 \tempswafalse
351 \edef\reserved@b{#1}%
352 \for\reserved@a:=\partlist\do
353 {\ifx\reserved@a\reserved@b\tempswattrue\fi}%
354 \fi
355 \tempswa
356 \let\@auxout\@partaux
357 \if@filesw
358 \immediate\openout\@partaux #1.aux
359 \immediate\write\@partaux{\relax}%
360 \fi
361 \input{#1.tex}%
362 \clearpage
363 \writeckpt{#1}%
364 \if@filesw
365 \immediate\closeout\@partaux
366 \fi
367 \else
368 \deadcycles\z@%
369 \nameuse{cp@#1}%
370 \fi
371 \let\@auxout\@mainaux}
372 \end{IncludeInRelease}

```

```

374 {*2ekernel}

(End definition for \@include.)

\@writeckpt
375 \def\@writeckpt#1{%
376 \if@files
377 \immediate\write\@partaux{\string\@setckpt{#1}\@charlb}%
378 {\let\@elt\@wckptelt \cl@ckpt}%
379 \immediate\write\@partaux{\@charrb}%
380 \fi}
381
(End definition for \@writeckpt.)
```

```

\@wckptelt
381 \def\@wckptelt#1{%
382 \immediate\write\@partaux{%
383 \string\setcounter{#1}{\the\@nameuse{c@#1}}}}
384
(End definition for \@wckptelt.)
```

```

\@setckpt RmS 93/08/31: introduced \@setckpt
384 \def\@setckpt#1{\global\@namedef{cp@#1}}
385
(End definition for \@setckpt.)
```

\@charlb The following defines \@charlb and \@charrb to be { and }, respectively with \catcode 11.

```

385 {\catcode`[=1 \catcode`]=2
386 \catcode`[=11 \catcode`}=11
387 \gdef\@charlb[{}]
388 \gdef\@charrb[]}
389]% }brace matching
```

(End definition for \@charlb and \@charrb.)

## 1.1 Safe Input Macros

\@curr@file File name handling is done by generating a csname from the provided file name (which means that UTF-8 octets gets turned into strings as this is what happens if they appear in a csname due to the code in `utf8.def`). By setting \escapchar to -1 we ensure that we don't get a backslash in front. As a result we end up with all characters as catcode 12 (plus spaces). We then sometimes add quotes around the construct (removing any existing inner quotes. Sometimes we only remove the quotes if they have been supplied by the user. There is clearly some room for improvement.

A side effect of the new code is that we will see quotes around file name displays where there haven't been any before.

For compatibility with existing code using `{abc}.tex` or `{one.two}.png` an initial brace group is discarded before expansion and \string is applied. The content of the brace group is discarded. This means that a leading space will be lost unless protected (by { } or " " or \space) but filenames with a space are hopefully rare.

The definition below is from 2019 and only used during kernel bootstrapping, later on in `ltfilehook.dtx` it will get overwritten.

```

390 \def\set@curr@file#1{%
391 \begingroup
392 \escapechar\m@ne
393 \xdef@\curr@file{%
394 \expandafter\expandafter\expandafter\unquote@name
395 \expandafter\expandafter\expandafter{%
396 \expandafter\string
397 \csname@\firstofone#1\@empty\endcsname}}%
398 \endgroup
399 }

(End definition for \curr@file and \set@curr@file.)
```

\quote@name Quoting spaces

```

\quote@@name
\unquote@name
a b c -> "a b c"
"a b c" -> "a b c"
a" "b" "c -> "a b c"
 -> ""

400 </2ekernel>
401 <*2ekernel | latexrelease>
402 <| latexrelease>\IncludeInRelease{2019/10/01}%
403 <| latexrelease> {\quote@name}{Quote file names}%
404 \def\quote@name#1{"\quote@@name#1\@gobble"}%
405 \def\quote@@name#1"#1\quote@@name}
```

and removing quotes ...

```

406 \def\unquote@name#1{\quote@@name#1\@gobble}"}

(End definition for \quote@name, \quote@@name, and \unquote@name.)
```

\IfFileExists

```

407 \DeclareRobustCommand\IfFileExists[1]{%
408 \set@curr@file{#1}%
409 \expandafter\IfFileExists@\expandafter{\curr@file}}
```

(End definition for \IfFileExists.)

\IfFileExists@ Argument #1 is \curr@file so catcode 12 string with no quotes.

```

410 \long\def \IfFileExists@#1#2#3{%
411 \openin\@inputcheck"#1" %
412 \ifeof\@inputcheck
413 \ifx\input@path\@undefined
414 \def\reserved@a{#3}%
415 \else
416 \def\reserved@a{\@iffilenonpath{#1}{#2}{#3}}%
417 \fi
418 \else
419 \closein\@inputcheck
420 \edef\@filef@nd{"#1" }%
421 \def\reserved@a{#2}%
422 \fi
423 \reserved@a}
```

(End definition for \IfFileExists@.)

\@iffilenamepath If the file is not found by \openin, and \input@path is defined, look in all the directories specified in \input@path.

```

424 \long\def\@iffilenamepath#1{%
425 \let\reserved@a\@secondoftwo
426 \expandafter\@tfor\expandafter\reserved@b\expandafter
427 :\expandafter=\input@path\do{%
428 \openin\@inputcheck\expandafter\quote@name\expandafter{\reserved@b#1} %
429 \ifeof\@inputcheck\else
430 \edef\@filef@und{\expandafter\quote@name\expandafter{\reserved@b#1} }%
431 \let\reserved@a\@firstoftwo%
432 \closein\@inputcheck
433 \@break@tfor
434 \fi}%
435 \reserved@a}

(End definition for \@iffilenamepath.)

436 </2ekernel | latexrelease>
437 <latexrelease>\EndIncludeInRelease
438 <latexrelease>\IncludeInRelease{0000/00/00}%
439 <latexrelease> {\quote@name}{Quote file names}%
440 <latexrelease>
441 <latexrelease>\let\quote@name\@undefined
442 <latexrelease>\let\quote@@name\@undefined
443 <latexrelease>\let\unquote@name\@undefined
444 <latexrelease>
445 <latexrelease>\let\IfFileExists@\@undefined
446 <latexrelease>
447 <latexrelease>\long\def \IfFileExists#1#2#3{%
448 <latexrelease> \openin\@inputcheck#1 %
449 <latexrelease> \ifeof\@inputcheck
450 <latexrelease> \ifx\input@path\@undefined
451 <latexrelease> \def\reserved@a{#3}%
452 <latexrelease> \else
453 <latexrelease> \def\reserved@a{\@iffilenamepath{#1}{#2}{#3}}%
454 <latexrelease> \fi
455 <latexrelease> \else
456 <latexrelease> \closein\@inputcheck
457 <latexrelease> \edef\@filef@und{#1 }%
458 <latexrelease> \def\reserved@a{#2}%
459 <latexrelease> \fi
460 <latexrelease> \reserved@a
461 <latexrelease>
462 <latexrelease>\long\def\@iffilenamepath#1{%
463 <latexrelease> \let\reserved@a\@secondoftwo
464 <latexrelease> \expandafter\@tfor\expandafter\reserved@b\expandafter
465 <latexrelease> :\expandafter=\input@path\do{%
466 <latexrelease> \openin\@inputcheck\reserved@b#1 %
467 <latexrelease> \ifeof\@inputcheck\else
468 <latexrelease> \edef\@filef@und{\reserved@b#1 }%
469 <latexrelease> \let\reserved@a\@firstoftwo%
470 <latexrelease> \closein\@inputcheck
471 <latexrelease> \@break@tfor
472 <latexrelease> \fi}%
473 <latexrelease> \reserved@a}

```

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <pre> 474  ⟨latexrelease⟩ 475  ⟨latexrelease⟩\EndIncludeInRelease 476  ⟨*2ekernel⟩ </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| \InputIfFileExists | <p>Now define \InputIfFileExists to input #1 if it seems to exist. Immediately prior to the input, #2 is executed. If the file #1 does not exist, execute '#3'.</p> <p>This here is a temporary definition for the kernel. The real one comes somewhat later in the file <code>ltfilehook.dtx</code>.</p> <pre> 477  \DeclareRobustCommand \InputIfFileExists[2]{% 478    \IfFileExists{#1}{% 479      {% 480        \expandafter\@swaptwoargs\expandafter 481        {\@filef@und}{#2\@addtofilelist{#1}\@@input}}} </pre> <p>(End definition for \InputIfFileExists.)</p>                                                                                              |
| \@swaptwoargs      | <p>Swap two arguments and return them unbraced (like \@firstoftwo etc).</p> <pre> 482  ⟨/2ekernel⟩ 483  ⟨*2ekernel   latexrelease⟩ 484  ⟨latexrelease⟩\IncludeInRelease{2019/10/01}% 485  ⟨latexrelease⟩ {\@swaptwoargs}{Don't lose the file name}% 486  \long\def\@swaptwoargs#1#2{#2#1}  487  ⟨/2ekernel   latexrelease⟩ 488  ⟨latexrelease⟩\EndIncludeInRelease 489  ⟨latexrelease⟩\IncludeInRelease{0000/00/00}% 490  ⟨latexrelease⟩ {\@swaptwoargs}{Don't lose the file name}% 491  ⟨latexrelease⟩\let\@swaptwoargs\@undefined 492  ⟨latexrelease⟩\EndIncludeInRelease 493  ⟨*2ekernel⟩ </pre> <p>(End definition for \@swaptwoargs.)</p>                           |
| \input             | <p>Input a file: if the argument is given in braces use safe input macros, otherwise use TeX's primitive \input command (which is called \@@input in L<sup>A</sup>T<sub>E</sub>X).</p> <pre> 494  \def\input{\@ifnextchar\bgroup\@iinput\@@input} </pre> <p>(End definition for \input.)</p>                                                                                                                                                                                                                                                                                                                                                                             |
| \@iinput           | <p>Define \@iinput (i.e., \input) in terms of \InputIfFileExists.</p> <p>Changes to \@iinput: adapt to the changes to \@missingfileerror.</p> <pre> 495  ⟨/2ekernel⟩ 496  ⟨*2ekernel   latexrelease⟩ 497  ⟨latexrelease⟩\IncludeInRelease{2020/10/01}% 498  ⟨latexrelease⟩ {\@iinput}{Change in file error handling}% 499  \def\@iinput#1{% 500    \InputIfFileExists{#1}{}% 501    {\filename@parse\@curr@file 502     \edef\reserved@a{\noexpand\@missingfileerror 503       {\filename@area\filename@base}% 504       {\ifx\filename@ext\relax tex\else\filename@ext\fi}{}} </pre> <p>This line now just sets \@missingfile@⟨part⟩:</p> <pre> 505  \reserved@a </pre> |

Now here we have to use it. The file here is guaranteed to exist, because `\@missingfileerror` ensures so, but we have to use `\InputIfFileExists` because it executes the file hooks.

```

506 \edef\reserved@a{\noexpand\@iinput{%
507 \@missingfile@area\@missingfile@base.\@missingfile@ext}}%
508 \reserved@a}%
509
```

`//2ekernel | latexrelease`

```

510 \end{IncludeInRelease}

511 \end{latexrelease}\IncludeInRelease[2019/10/01]%
512 \end{latexrelease} {\@iinput}{Quote file names}%
513 \end{latexrelease}
514 \end{latexrelease}\def\@iinput#1{%
515 \end{latexrelease} \InputIfFileExists{#1}{}%
516 \end{latexrelease} {\filename@parse@\curr@file
517 \end{latexrelease} \edef\reserved@a{\noexpand\@missingfileerror
518 \end{latexrelease} {\filename@area\filename@base}}%
519 \end{latexrelease} {\ifx\filename@ext\relax\text\else\filename@ext\fi}}%
520 \end{latexrelease} \reserved@a}%
521 \end{IncludeInRelease}

522 \end{latexrelease}\IncludeInRelease[0000/00/00]%
523 \end{latexrelease} {\@iinput}{Quote file names}%
524 \end{latexrelease}\def\@iinput#1{%
525 \end{latexrelease} \InputIfFileExists{#1}{}%
526 \end{latexrelease} {\filename@parse{#1}%
527 \end{latexrelease} \edef\reserved@a{\noexpand\@missingfileerror
528 \end{latexrelease} {\filename@area\filename@base}}%
529 \end{latexrelease} {\ifx\filename@ext\relax\text\else\filename@ext\fi}}%
530 \end{latexrelease} \reserved@a}%
531 \end{IncludeInRelease}
532
```

(End definition for `\@iinput`.)

`\@input` Define `\@input` in terms of `\IfFileExists`. So this is a ‘safe input’ command, but the files input are not listed by `\listfiles`.

We don’t want `.aux`, `.toc` files etc be listed by `\listfiles`. However, something like `.bb1` probably should be listed and thus should be implemented not by `\@input`.

```

533 \def\@input#1{%
534 \IfFileExists{#1}{\@input\@filef@und}{\typeout{No file #1.}}}

```

(End definition for `\@input`.)

`\@input@` Version of `\@input` that does add the file to `\@filelist`.

```

535 \def\@input@#1{\InputIfFileExists{#1}{}{\typeout{No file #1.}}}

```

(End definition for `\@input@`.)

`\@missingfileerror` This ‘error’ command avoids TeX’s primitive missing file loop.

Missing file error. Prompt for a new filename, offering a default extension.

Changes to `\@missingfileerror`: rather than trying to input the file by force, now `\@missingfileerror` just returns three `\@missingfile@<part>` and the caller macro is responsible for doing the right thing with it.

```

536
```

`//2ekernel`

```

537
```

`(*2ekernel | latexrelease)`

```
538 <latexrelease>\IncludeInRelease{2020/10/01}%
539 <latexrelease> {\@missingfileerror}{Do not load missing file immediately}%
540 \gdef\@missingfileerror#1#2{%
541 \typeout{^^J! LaTeX Error: File '#1.#2' not found.^^J^^J}%
542 Type X to quit or <RETURN> to proceed,^^J%
543 or enter new name. (Default extension: #2)^^J}%
544 \message{Enter file name: }%
545 {\endlinechar\m@ne
546 \global\read\m@ne to\@gtempa}%
547 \ifx\@gtempa\@empty
```

If the user answers with `<return>`, fallback to the `.tex` file (previously it did nothing).

```
548 \let\@missingfile@area\@empty
549 \let\@missingfile@base\@empty
550 \def\@missingfile@ext{tex}%
551 \else
```

Use `\batchmode\read-1 to <tl>` to end the TeX run, same as `expl3` does (it was `\batchmode\@@end` before).

```
552 \def\reserved@b{\batchmode\read-1 to \reserved@a}%
553 \def\reserved@a{x}\ifx\reserved@a\@gtempa\reserved@b\fi
554 \def\reserved@X{\ifx\reserved@a\@gtempa\reserved@b\fi
555 \filename@parse\@gtempa
556 \edef\filename@ext{%
557 \ifx\filename@ext\relax\#2\else\filename@ext\fi}%
558 \edef\reserved@a{%
```

Only check `\IfFileExists` (it was `\InputIfFileExists`).

```
559 \noexpand\IfFileExists
560 {\filename@area\filename@base.\filename@ext} {%
```

If the file exists, define \@missingfile@\{part\}.

```

561 {\def\noexpand\@missingfile@area{\filename@area}%
562 \def\noexpand\@missingfile@base{\filename@base}%
563 \def\noexpand\@missingfile@ext {\filename@ext}}}%
564 {\noexpand\@missingfileerror
565 {\filename@area\filename@base}{\filename@ext}}}%
566 \reserved@a
567 \fi
568 }
569 </2ekernel | latexrelease>
570 \latexrelease\EndIncludeInRelease

571 \latexrelease\IncludeInRelease{0000/00/00}%
572 \latexrelease{\@missingfileerror}{Do not load missing file immediately}%
573 \latexrelease
574 \latexrelease\gdef\@missingfileerror#1#2{%
575 \latextypeout{^^J! LaTeX Error: File '#1.#2' not found.^^J^^J}%
576 \latextypeout{Type X to quit or <RETURN> to proceed,^^J}%
577 \latextypeout{or enter new name. (Default extension: #2)^^J}%
578 \latextypeout{\message{Enter file name: }}%
579 \latextypeout{\endlinechar\m@ne
580 \global\read\m@ne to\gtempa}%
581 \ifx\gtempa\empty
582 \else
583 \def\reserved@a{x}\ifx\reserved@a\gtempa\batchmode\@end\fi

```

```

584 〈\latexrelease〉 \def\reserved@a{X}\ifx\reserved@a\@gtempa\batchmode\@end\fi
585 〈\latexrelease〉 \filename@parse\@gtempa
586 〈\latexrelease〉 \edef\filename@ext{%
587 \ifx\filename@ext\relax#2\else\filename@ext\fi}%
588 〈\latexrelease〉 \edef\reserved@a{%
589 \noexpand\InputIfFileExists
590 {\filename@area\filename@base.\filename@ext}%
591 {}%
592 {\noexpand\@missingfileerror
593 {\filename@area\filename@base}{\filename@ext}}}%
594 〈\latexrelease〉 \reserved@a
595 〈\latexrelease〉 \fi}
596 〈\latexrelease〉
597 〈\latexrelease〉\EndIncludeInRelease
598 {*2ekernel}

(End definition for \@missingfileerror.)

```

- \@obsoletefile For compatibility with L<sup>A</sup>T<sub>E</sub>X 2.09 document styles, we distribute files called `article.sty`, `book.sty`, `report.sty`, `slides.sty` and `letter.sty`. These use the command `\@obsoletefile`, which produces a warning message.
- ```

599 \def\@obsoletefile#1#2{%
600   \@latex@warning@no@line{inputting '#1' instead of obsolete '#2'}}%
601 \onlypreamble\@obsoletefile

```

1.2 Listing files

A list of files input so far. The initial value of `\@gobble` eats the comma before the first file name.

```
602 \let\@filelist\@gobble
```

Add to the list of files input so far. This ‘real’ definition is only used for ‘cfg’ files during initex. An initial definition of `\@gobble` has already been set.

```
603 \%def\@addtofilelist#1{\xdef\@filelist{\@filelist,#1}}
```

A preamble command to cause `\end{document}` to list files input from the main file.

```

\listfiles
604 \def\listfiles{%
605   \let\listfiles\relax
606   \def\@listfiles##1##2##3##4##5##6##7##8##9\@{}{%
607     \def\reserved@d{\%}
608     \@tfor\reserved@c:=##1##2##3##4##5##6##7##8\do{%
609       \ifx\reserved@c\reserved@d
610         \edef\filename@area{\filename@area}%
611       \fi}%
612     \def\@dofilelist{%
613       \typeout{^^J *File List*}%
614       \@for\currname:=\@filelist\do{%
615         \filename@parse\currname
616         \edef\reserved@a{%
617           \filename@base.%}
618           \ifx\filename@ext\relax tex\else\filename@ext\fi}%
619       \expandafter\let\expandafter\reserved@b

```

```

620           \csname ver@\reserved@a\endcsname
621           \expandafter\expandafter\expandafter@listfiles\expandafter
622               \filename@area\filename@base\\\\\\\\\\\\\\\\\\\\\\@@
623           \typeout{%
624               \filename@area\reserved@a
625               \ifx\reserved@b\relax\else\@spaces\reserved@b\fi}%
626           \typeout{ ****~^J}}}

```

The `\@filelist` will be de-activated if `\listfiles` does not appear in the preamble. `\begin{document}` contains code equivalent to the following:

```

\AtBeginDocument{%
  \ifx\@listfiles\undefined
    \let\@filelist\relax
    \let\@addtofilelist\@gobble
  \fi}

627  \@onlypreamble\listfiles

\@dofilelist 628 \let\@dofilelist\relax
629  ⟨/2ekernel⟩

(End definition for \@obsoletefile and others.)

```

File o

ltoutenc.dtx

1 Font encodings

This section of the kernel contains commands for declaring encoding-specific commands, such as accents. It also contains the code for some of the encoding files, including `omlenc.def`, `omsenc.def`, `t1enc.def` and `ot1enc.def` files, which define the OLM, OMS, T1 and OT1 encodings, and the `fontenc` package for selecting encodings.

The `fontenc` package has options for encodings, of which the last option is the default encoding. For example, to use the OT2, OT3 and T1 encodings, with T1 as the default, you say:

```
\usepackage[OT2,OT3,T1]{fontenc}
```

The standard kernel set-up loads font encoding files and selects an encoding as follows.

```
\input {omlenc.def}
\input {t1enc.def}
\input {ot1enc.def}
\input {omsenc.def}
\fontencoding{OT1}
```

Note that the files in the standard `inputenc` package depend on this behaviour of the kernel.

The syntax for declaring encoding-specific commands is:

```
\DeclareTextCommand{\command}{{\encoding}}
[{\number} [{\default}]] {{\commands}}
```

This command is like `\newcommand`, except that it defines a command which is specific to one encoding. The resulting command is always robust, even if its definition is fragile. For example, the definition of `\l` in the OT1 encoding is:

```
\DeclareTextCommand{\l}{OT1}{{\@xxxii 1}}
```

`\DeclareTextCommand` takes the same optional arguments as `\newcommand`.

```
\ProvideTextCommand{\command}{{\encoding}}
[{\number} [{\default}]] {{\commands}}
```

This acts like `\DeclareTextCommand`, but does nothing if the command is already defined.

```
\DeclareTextSymbol{\command}{{\encoding}}{\slot}
```

This command defines a text symbol, with a particular slot in that encoding. The commands:

```
\DeclareTextSymbol{\ss}{OT1}{25}
\DeclareTextCommand{\ss}{OT1}{\char25 }
```

have the same effect, but the `\DeclareTextSymbol` is faster.

```
\DeclareTextAccent{\command}{{\encoding}}{\slot}
```

This command declares a text accent. The commands:

```
\DeclareTextAccent{"}{OT1}{127}
\DeclareTextCommand{"}{OT1}{\add@accent {127}}
```

have the same effect.

```
\DeclareTextComposite{<command>}
{<encoding>}{<argument>}{<slot>}
```

This command declares a composite letter, for example in the T1 encoding '\{a} is slot 225, which is declared by:

```
\DeclareTextComposite{'}{T1}{a}{225}
```

The *command* will normally have been declared with `\DeclareTextAccent`, or as a one-argument `\DeclareTextCommand`.

`\DeclareTextComposite` is the most common example of using the more general declaration `\DeclareTextCompositeCommand`, which can define a composite to be an arbitrary piece of text.

```
\DeclareTextCompositeCommand{<command>}
{<encoding>}{<argument>}{<text>}
```

For example, in the OT1 encoding Å has a hand-crafted definition this is declared as follows

```
\DeclareTextCompositeCommand{r}{OT1}{A}
{\leavevmode\setbox\z@\hbox{!}\dimen@\ht\z@\advance\dimen@-1ex%
\rlap{\raise.67\dimen\hbox{\char23}}A}
```

The *command* will normally have been declared with `\DeclareTextAccent`, or as a one-argument `\DeclareTextCommand`.

The commands defined using the above declarations can be used in two ways. Normally they are used by just calling the command in the appropriate encoding, for example `\ss`. However, sometimes you may wish to use a command in an encoding where it is not defined. If the command has no arguments, then you can use it in another encoding by calling `\UseTextSymbol`:

```
\UseTextSymbol{<encoding>}{<command>}
```

For example, `\UseTextSymbol{OT1}{\ss}` has the same effect as:

```
{\fontencoding{OT1}\selectfont\ss}
```

If the command has one argument then you can use it in another encoding by calling `\UseTextAccent`:

```
\UseTextAccent{<encoding>}{<command>}{<text>}
```

For example, if the current encoding is OT2 then `\UseTextAccent{OT1}{'}{a}` has the same effect as:

```
{\fontencoding{OT1}\selectfont'\{\fontencoding{OT2}\selectfont a\}}
```

You can also declare a default definition for a text command, which will be used if the current encoding has no appropriate definition. Such use will also set the definition for this command in the current encoding to equal this default definition; this makes subsequent uses of the command much faster.

```
\DeclareTextCommandDefault{\command}{\definition}
```

For example, the default definition of the command `\textonequarter` (which produces the fraction $\frac{1}{4}$) could be built using math mode:

```
\DeclareTextCommandDefault{\textonequarter}{\ensuremath {\frac{1}{4}}}
```

There is a matching `\Provide` command which will not override an existing default definition:

```
\ProvideTextCommandDefault{\command}{\definition}
```

The most common use for these commands is to use symbols from other encodings, so there are some optimizations provided:

```
\DeclareTextSymbolDefault{\command}{\encoding}
\DeclareTextAccentDefault{\command}{\encoding}
```

are short for:

```
\DeclareTextCommandDefault{\command}
  {\UseTextSymbol{\encoding}{\command}}
\DeclareTextCommandDefault[1]{\command}
  {\UseTextAccent{\encoding}{\command}{{#1}}}
```

For example, to make OT1 the default encoding for `\ss` and `\'` you say:

```
\DeclareTextSymbolDefault{\ss}{OT1}
\DeclareTextAccentDefault{\'}{OT1}
```

Note that you can use these commands on any zero- or one-argument commands declared with `\DeclareText*` or `\ProvideText*`, not just those defined using `\DeclareTextSymbol` or `\DeclareTextAccent`.

1.1 Removing encoding-specific commands

In some cases encoding definitions are given to provide some limited support since nothing better is available, for example, the definition for `\textdollar` in OT1 is a hack since \$ and £ actually share the same slot in this encoding. Thus if such a glyph becomes available in a different encoding (e.g., TS1) one would like to get rid of the flaky one and make the default definition point to the new encoding. In such a case defining

```
\DeclareTextSymbol{\textdollar}{TS1}{36}
\DeclareTextSymbolDefault{\textdollar}{TS1}
```

is not enough since if typesetting in OT1 L^AT_EX will still find the encoding specific-definition for OT1 and therefore ignore the new default. Therefore to ensure that in this case the TS1 version is used we have to remove the OT1 declaration:

```
\UndeclareTextCommand{\textdollar}{OT1}
```

Since the \$ sign is a proper glyph in the T1 encoding there is no point removing its definition and forcing L^AT_EX to pick up the TS1 version if typesetting in this encoding. However, assume you want to use the variant dollar sign, i.e., \$ for your dollars. In that case you have to get rid of the T1 declaration as well, e.g., the following would do that for you:

```
\UndeclareTextCommand{\textdollar}{OT1}
\UndeclareTextCommand{\textdollar} {T1}
\DeclareTextCommandDefault{\textdollar}
  {\UseTextSymbol{TS1}\textdollaroldstyle}
```

1.2 The order of declarations

If an encoding-specific command is defined for more than one encoding, then it will execute fastest in the encoding in which it was defined last since its top-level definition will be set up to execute in that encoding without any overhead.

For this reason the file `fonttext.ltx` currently first loads the definitions for the T1 encoding and then those for the OT1 encoding so that typesetting in OT1 is optimized since that is (still) the default. However, when T1 is explicitly requested (via `\usepackage[T1]{fontenc}`) the top-level definitions are automatically changed to favour T1 since its declarations are reloaded in the process.

For the same reason default declarations should never come last since they are implemented as a special encoding themselves (with the name ?). Specifying them last would simply mean to make those encoding-specific commands equally inefficient in all encodings. Therefore the `textcomp` package, for example, first sets up all defaults to point to TS1 and then declares the commands in the TS1 encoding.

1.3 Docstrip modules

This .dtx file is be used to generate several related files containing font encoding definitions. The mutually exclusive docstrip options are listed here.

T1	generates <code>t1enc.def</code> for the Cork encoding.
TS1	generates <code>ts1enc.def</code> for the Text Companion encoding.
TS1sty	generates <code>textcomp.sty</code> , package that sets up use of the Text Companion encoding.
OT1	generates <code>ot1enc.def</code> for Knuth's CM encoding.
OMS	generates <code>omsenc.def</code> for Knuth's math symbol encoding.
OML	generates <code>omlenc.def</code> for Knuth's math letters encoding.
OT4	generates <code>ot4enc.def</code> for the Polish extension to the OT1 encoding, created by B. Jackowski and M. Ry��ko for use with the Polish version of Computer Modern and Computer Concrete.
TU	generates <code>tuenc.def</code> for Unicode font encoding.
package	generates <code>fontenc.sty</code> for selecting encodings.
2ekernel	for the kernel commands.

1.4 Definitions for the kernel

1.4.1 Declaration commands

This section contains definitions for commands such as accents which depend on the current encoding. These commands will usually be kept in `.def` files, for example `ot1enc.def` contains the definitions for the OT1 encoding.

```
1  {*2ekernel}
2  \message{font encodings,}
Far too many macros in one block here!
```

```
\DeclareTextCommand
\ProvideTextCommand
\DeclareTextSymbol
  @dec@text@cmd
\chardef@text@cmd
  @changed@cmd
  @changed@x
\TextSymbolUnavailable
  @inmathwarn
```

If you say:

```
\DeclareTextCommand{\foo}{T1}...
```

then `\foo` is defined to be `\T1-cmd \foo \T1\foo`, where `\T1\foo` is *one* control sequence, not two! We then call `\newcommand` to define `\T1\foo`.

```
3  \def\DeclareTextCommand{%
4    @dec@text@cmd\newcommand}
5  \def\ProvideTextCommand{%
6    @dec@text@cmd\providecommand}
7  \def@dec@text@cmd#1#2#3{%
8    \expandafter\def\expandafter#2%
9      \expandafter{%
10        \csname#3-cmd\expandafter\endcsname
11        \expandafter#2%
12        \csname#3\string#2\endcsname
13      }%
14  \let@\if definable\@rc@\if definable
15  \expandafter#1\csname#3\string#2\endcsname}
```

This command was introduced to fix a major bug in `@dec@text@cmd` without changing that command itself. This was thought to be necessary because it is defined in more than one package. (Perhaps the more serious bug is to put complex low-level commands like this in packages?)

The problem it solves is that whereas both `\newcommand` and `\providecommand` (used just above) both handle the resetting of `\if definable` (following its disabling in `@dec@text@cmd`), the primitive `\chardef` neither needs the disabling, nor does the resetting.

```
16 \def\chardef@text@cmd{%
17   \let@\if definable\@rc@\if definable
18   \chardef
19 }
20 \def\DeclareTextSymbol#1#2#3{%
21   @dec@text@cmd\chardef@text@cmd#1{#2}#3\relax
22 }
```

The declarations are only available before `\begin{document}`.

```
23 \onlypreamble\DeclareTextCommand
24 \onlypreamble\DeclareTextSymbol
```

The sneaky bit in all this is what `\T1-cmd \foo \T1\foo` does. There are five possibilities, depending on the current values of `\protect`, `\cf@encoding` and `\ifmmode`:

- If `\protect` is `\@typeset@protect` and `\cf@encoding` is T1, then we execute `\T1\foo`. This should be the normal behaviour, and is optimized for speed.
- If `\protect` is `\@typeset@protect`, `\cf@encoding` is (say) OT1, and `\OT1\foo` is defined, then we execute `\OT1\foo`.
- If `\protect` is `\@typeset@protect`, `\cf@encoding` is (say) OT1, we're in text mode, and `\OT1\foo` is undefined, then we define `\OT1\foo` to be the default value of `\foo`, and execute `\OT1\foo`.
- If `\protect` is `\@typeset@protect`, `\cf@encoding` is (say) OT1, we're in math mode, and `\OT1\foo` is undefined, then we execute the default value of `\foo`. (This is necessary so that things like `X_\copyright` work properly.)
- If `\protect` is not `\@typeset@protect` then we execute `\noexpand\foo`. For example, if we are writing to a file, then this results in `\foo` being written. If we are in a `\mark`, then `\foo` will be put in the mark—since `\foo` is robust, it will then survive all the things which may happen to it whilst it's a `\mark`.

So after all that, we will either execute the appropriate definition of `\foo` for the current encoding, or we will execute `\noexpand\foo`.

The default value of `\foo` is `\?\foo` if it is defined, and an error message otherwise.

When the encoding is changed from T1 to OT1, `\T1-cmd` is defined to be `\@changed@cmd` and `\OT1-cmd` is defined to be `\@current@cmd`. This means that the test for what the current encoding is can be performed quickly.

```

25 \def\@current@cmd#1{%
26   \ifx\protect\@typeset@protect
27     \cinmathwarn#1%
28   \else
29     \noexpand#1\expandafter\@gobble
30   \fi}
31 \def\@changed@cmd#1#2{%
32   \ifx\protect\@typeset@protect
33     \cinmathwarn#1%
34     \expandafter\ifx\csname\cf@encoding\string#1\endcsname\relax
35       \expandafter\ifx\csname ?\string#1\endcsname\relax
36         \expandafter\def\csname ?\string#1\endcsname{%
37           \TextSymbolUnavailable#1%
38         }%
39       \fi
40     \global\expandafter\let
41       \csname\cf@encoding\string#1\expandafter\endcsname
42       \csname ?\string#1\endcsname
43     \fi
44     \csname\cf@encoding\string#1%
45       \expandafter\endcsname
46   \else
47     \noexpand#1%
48   \fi}
49 \gdef\TextSymbolUnavailable#1{%
50   \@latex@error{%
51     Command \protect#1 unavailable in encoding \cf@encoding%
52   }\@eha}

```

The command `\@inmathwarn` produces a warning message if we are currently in math mode. Note that since this command is used inside text commands, it can't call `\relax` before the `\ifmmode`. This means that it is possible for the warning to fail to be issued at the beginning of a row of an `\halign` whose template enters math mode. This is probably a bad feature, but there's not much that can be done about it, since adding a `\relax` would break ligatures and kerning between text symbols.

A more efficient solution would be to make `\@inmathwarn` and `\@inmatherr` equal to `\empty` and `\relax` by default, and to have `\everymath` reset them to their usual definitions. This is left for future investigation (for example it may break some third party code).

```
53 \def\@inmathwarn#1{%
54   \ifmmode
55     \@latex@warning{Command \protect#1 invalid in math mode}%
56   \fi}
```

(End definition for `\DeclareTextCommand` and others.)

`\DeclareTextCommandDefault`
`\ProvideTextCommandDefault`

These define commands with encoding ?.

Note that `\DeclareTextCommandDefault` can only be used in the preamble, but that the `\Provide` version is allowed in inputenc .def files, so is allowed anywhere.

```
57 \def\DeclareTextCommandDefault#1{%
58   \DeclareTextCommand#1?}

59 \def\ProvideTextCommandDefault#1{%
60   \ProvideTextCommand#1?}

61 \@onlypreamble\DeclareTextCommandDefault
62 %\@onlypreamble\ProvideTextCommandDefault
```

They require `\?-cmd` to be initialized as `\@changed@cmd`.

```
63 \expandafter\let\csname?-cmd\endcsname\@changed@cmd
```

(End definition for `\DeclareTextCommandDefault` and `\ProvideTextCommandDefault`.)

`\DeclareTextAccent`

This is just a disguise for defining a TeX `\accent` command.

```
64 \def\DeclareTextAccent#1#2#3{%
65   \DeclareTextCommand#1{#2}{\add@accent{#3}}}

66 \@onlypreamble\DeclareTextAccent
```

(End definition for `\DeclareTextAccent`.)

`\add@accent`

To save space this code is shared between all text accents that are set using the `\accent` primitive. The argument is pre-set in a box so that any font loading that is needed is already done within the box. This is needed because font-loading involves grouping and that would prevent the accent mechanism from working so that the accent would not be positioned over the argument. Declarations that change the font should be allowed (only low-level ones are at present) inside the argument of an accent command, but not size changes, as they involve `\setbox` operations which also inhibit the mechanism of the `\accent` primitive.

Note that the whole process is within a group. For a detailed discussion of this reimplementation and its deficiencies, see pr/3160.

```
67 \def\add@accent#1#2{\hmode@\bgroup}
```

Turn off the group in `\UseTextSymbol` in case this is used inside the argument of `\add@accent`.

```
68   \let\hmode@start@before@group\@firstofone
69   \setbox\@tempboxa\hbox{\#2%
```

When presetting the argument in a box we record its `\spacefactor` for later use after the accent got typeset. This way something like `\`A` gets the spacefactor of `A` (i.e., 999) rather than the default value of 1000.

```
70   \global\mathchardef\accent@spacefactor\spacefactor}%
```

The accent primitive doesn't allow things `\begingroup` to interfere between accent and base character. Therefore we need to avoid that (they are some hidden inside `\maybe@load@fontshape`). As we don't have to load the fontshape in this case (as that happened in the box above if necessary, we simply disable that part of the code temporarily. We also ignore `\ignorespaces` which has the same issue and may show up as part of `\normalfont` if that is used.

```
71   \let\maybe@load@fontshape\relax
72   \let\ignorespaces\relax
73   \accent#1 #2\egroup\spacefactor\accent@spacefactor}
```

Default definition for `\accent@spacefactor` prevents a horrible death of the above macro inside an unprotected `\edef`.

```
74 \let\accent@spacefactor\relax
```

(End definition for `\add@accent`.)

```
\hmode@bgroup
75 \def\hmode@bgroup{\leavevmode\bgroup}
```

(End definition for `\hmode@bgroup`.)

```
\DeclareTextCompositeCommand
  \DeclareTextComposite
    \text@composite
    \text@composite@x
      \strip@args
```

Another amusing game to play with `\expandafter`, `\csname`, and `\string`. When you say `\DeclareTextCompositeCommand{\foo}{T1}{a}{bar}`, we look to see if the expansion of `\T1\foo` begins with `\text@composite`, and if it doesn't, we redefine `\T1\foo` to be:

```
#1 -> \text@composite \T1\foo #1\empty \text@composite {...}
```

where `...` is the previous definition of `\T1\foo`. Finally, we define `\T1\foo-a` to expand to `bar`.

```
76 </2ekernel>
77 <latexrelease>\IncludeInRelease{2017/04/15}{\DeclareTextCompositeCommand}
78 <latexrelease>                                {test for undeclared accent}%
79 (*2ekernel | latexrelease)
80 \def\DeclareTextCompositeCommand#1#2#3#4{%
81   \expandafter\let\expandafter\reserved@a\csname#2\string#1\endcsname
82   \ifx\reserved@a\relax
83     \DeclareTextCommand#1{#2}{%
84       \@latex@error{\string#1 undeclared in encoding #2}\@eha}%
85     \@latex@info{Composite with undeclared \string#1 in encoding #2}%
86     \expandafter\let\expandafter\reserved@a\csname#2\string#1\endcsname
87   \fi
88   \expandafter\expandafter\expandafter\ifx
89   \expandafter\@car\reserved@a\relax\relax\@nil \text@composite \else
90     \edef\reserved@b##1{%
```

```

91 \def\expandafter\noexpand
92     \csname#2\string#\endcsname####1{%
93     \noexpand\@text@composite
94         \expandafter\noexpand\csname#2\string#\endcsname
95             ####1\noexpand\empty\noexpand\@text@composite
96                 {##1}}}%
97 \expandafter\reserved@b\expandafter{\reserved@a{##1}}%
98 \fi
99 \expandafter\def\csname\expandafter\string\csname
100 #2\endcsname\string#1-\string#3\empty\endcsname{#4}%
101 }
102 </2ekernel | latexrelease>
103 <latexrelease>\EndIncludeInRelease
104 <latexrelease>\IncludeInRelease{0000/00/00}{\DeclareTextCompositeCommand}
105 <latexrelease>                                {test for undeclared accent}%
106 <latexrelease>\def\DeclareTextCompositeCommand#1#2#3#4{%
107 <latexrelease> \expandafter\let\expandafter\reserved@a
108 <latexrelease>                               \csname#2\string#\endcsname
109 <latexrelease> \expandafter\expandafter\expandafter\ifx
110 <latexrelease> \expandafter\@car\reserved@a\relax\relax\@nil
111 <latexrelease> \expandafter\@text@composite \else
112 <latexrelease> \edef\reserved@b{##1}%
113 <latexrelease> \def\expandafter\noexpand
114 <latexrelease>     \csname#2\string#\endcsname####1{%
115 <latexrelease>     \noexpand\@text@composite
116 <latexrelease>         \expandafter\noexpand\csname#2\string#\endcsname
117 <latexrelease>             ####1\noexpand\empty\noexpand\@text@composite
118 <latexrelease>                 {##1}}%}
119 <latexrelease> \expandafter\reserved@b\expandafter{\reserved@a{##1}}%
120 <latexrelease> \fi
121 <latexrelease> \expandafter\def\csname\expandafter\string\csname
122 <latexrelease> #2\endcsname\string#1-\string#3\empty\endcsname{#4}%
123 <latexrelease>\EndIncludeInRelease
124 <*2ekernel>
125 <onlypreamble\DeclareTextCompositeCommand

```

This all works because:

```
\@text@composite \T1\foo A\@empty \@text@composite {...}
```

expands to `\\"T1\foo-A` if `\\"T1\foo-A` has been defined, and `\{\dots\}` otherwise.

Note that `\@text@composite` grabs the first token of the argument and puts just that in the csname. This is so that `\'{\textit{e}}` will work—it checks whether `\T1`-\textit{e}` is defined (which presumably it isn't) and so expands to `\{accent 1 \textit{e}\}`.

This trick won't always work, for example `\'{{\itshape e}}` will expand to (with spaces added for clarity):

```
\csname \string \T1\` - \string {\itshape e} \empty \endcsname
```

which will die pretty horribly. Unfortunately there's not much can be done about this if we're going to use \csname lookups as a fast way of accessing composites.

This has an unfortunate ‘misfeature’ though, which is that in the T1 encoding, `\'{aa}` produces á. This is not the expected behaviour, and should perhaps be fixed if the fix doesn’t affect performance too badly.

Finally, it's worth noting that the `\@empty` is used in `\@text@composite` so that accents will work even when the argument is empty. If you say `\'{}{}` then this looks up `\\"{}T1\'{} - \string \endcsname`, which ought to be `\relax`, and so all is well. If we didn't include the `\@empty`, then `\'{}{}` would expand to:

```
\csname \string \T1\'{} - \string \endcsname
```

so the `\endcsname` would be `\string`'ed and the whole of the rest of the document would be put inside the `\csname`. This would not be good.

```
126 \def\@text@composite#1#2#3\@text@composite{%
127   \expandafter\@text@composite@x
128   \csname\string#1-\string#2\endcsname}
```

Originally the `\@text@composite@x` macro had two arguments and if #1 was not `\relax` it was executed, otherwise #2 was executed. All this happened within the `\ifx` code so that neither #1 nor #2 could have picked up any additional arguments from the input stream. This has now been changed using the typical `\@firstoftwo / \@secondoftwo` coding. This way the final expansion will happen without any `\else` or `\fi` intervening in the case that we need to get a further token from the input stream.

```
129 \def\@text@composite@x#1{%
130   \ifx#1\relax
131     \expandafter\@secondoftwo
132   \else
133     \expandafter\@firstoftwo
134   \fi
135   #1}
```

The command `\DeclareTextComposite` uses `\DeclareTextCompositeCommand` to declare a command which expands out to a single glyph.

```
136 \catcode\z@=11\relax
137 \def\DeclareTextComposite#1#2#3#4{%
138   \def\reserved@a{\DeclareTextCompositeCommand#1{#2}{#3}}%
139   \bgroup
140     \lccode\z@#4%
141     \lowercase{%
142       \egroup
143       \reserved@a ^^@}}
144 \catcode\z@=15\relax
145 \onlypreamble\DeclareTextComposite
```

(End definition for `\DeclareTextCompositeCommand` and others.)

```
146 </2ekernel>
147 (*2ekernel | latexrelease)
148 (latexrelease)\IncludeInRelease{2019/10/01}%
149 (latexrelease)           {\UseTextAccent}{Make commands robust}%
```

`\UseTextAccent` These fragile commands access glyphs from different encodings. They use grotty low-level calls to the font selection scheme for speed, and in order to make sure that `\UseTextSymbol` doesn't do anything which you're not allowed to do between an `\accent` and its glyph.

For a detailed discussion of this reimplementation and its deficiencies, see pr/3160.

```

150 \DeclareRobustCommand*\UseTextAccent[3]{%
151   \hmode@start@before@group
152   {%
153     \let\hmode@start@before@group\@firstofone
154     \let\@curr@enc\cf@encoding
155     \use@text@encoding{#1}%
156     #2{\use@text@encoding\@curr@enc#3}%
157   }%
158 \DeclareRobustCommand*\UseTextSymbol[2]{%
159   \hmode@start@before@group
160   {%
161     \def\@wrong@font@char{\MessageBreak
162       for \noexpand\symbol`\'{#2}}%
163     \use@text@encoding{#1}%
164     #2%
165   }%
166 }
167 </2ekernel | latexrelease>
168 <latexrelease>\EndIncludeInRelease
169 <latexrelease>\IncludeInRelease{0000/00/00}%
170 <latexrelease>          {\UseTextAccent}{Make commands robust}%
171 <latexrelease>
172 <latexrelease>\kernel@make@fragile\UseTextAccent
173 <latexrelease>\kernel@make@fragile\UseTextSymbol
174 <latexrelease>
175 <latexrelease>\EndIncludeInRelease
176 <*2ekernel>

```

Switch to a different text encoding without any grouping for use in \UseTextAccent or \UseTextSymbol (and for \oldstylenums).

```

177 \def\@use@text@encoding#1{%
178   \edef\f@encoding{#1}%
179   \xdef\font@name{%
180     \csname\curr@fontshape/\f@size\endcsname}%
181   \pickup@font
182   \font@name
183   \@@enc@update}%

```

(End definition for \UseTextAccent, \UseTextSymbol, and \@use@text@encoding.)

\hmode@start@before@group The \hmode@start@before@group starts hmode and should be immediately followed by an explicit \{...\}. Its purpose is to ensure that hmode is started before this group is opened. Inside \add@accent and \UseTextAccent it is redefined to remove this group so that it doesn't conflict with the \accent primitive.

For a detailed discussion see pr/3160.

```

184 \let\hmode@start@before@group\leavevmode

```

(End definition for \hmode@start@before@group.)

\DeclareTextSymbolDefault Some syntactic sugar. Again, these should probably be optimized for speed.

```
185 \def\DeclareTextSymbolDefault#1#2{%
186   \DeclareTextCommandDefault#1{\UseTextSymbol{#2}{#1}}
187 \def\DeclareTextAccentDefault#1#2{%
188   \DeclareTextCommandDefault#1{\UseTextAccent{#2}{#1}}
189 \onlypreamble\DeclareTextSymbolDefault
190 \onlypreamble\DeclareTextAccentDefault
```

(End definition for `\DeclareTextSymbolDefault` and `\DeclareTextAccentDefault`.)

\UndeclareTextCommand This command safely removes an encoding specific declaration for a given encoding. It is helpful if one intends to use the default definition always and therefore wants to get rid of a declaration for some specific encoding.

```
191 \def\UndeclareTextCommand#1#2{%
```

If there is no declaration for the current encoding do nothing. (This makes a hash table entry but without eTeX we can't do anything about that).

```
192 \expandafter\ifx\csname#2\string#1\endcsname\relax
193 \else
```

Else: throw away that declaration.

```
194 \global\expandafter\let\csname#2\string#1\endcsname
195 \undefined
```

But this is unfortunately not enough, we have to take a look at the top-level definition of the encoding specific command which for a command `\foo` would look similar to `\T1-cmd \foo \T1\foo` (three tokens).

Of course, instead of `\T1` one could see a different encoding name; which one depends the encoding for which `\foo` was declared last.

Now assume we have just removed the declaration for `\foo` in `\T1` and the top-level of `\foo` expands to the above. Then we better change that pretty fast otherwise we do get an “undefined csname error” when we try to typeset `\foo` within `\T1` instead of getting the default definition for `\foo`. And what is the best way to change that top-level definition? Well, the only “encoding” we know for sure will still be around is the default encoding denoted by `?`.

Thus in case the last token of the top-level expansion is now undefined we change the declaration to look like `\?-cmd \foo \?\foo` which is done by the following (readable?) code:

```
196 \expandafter\expandafter\expandafter
197 \ifx\expandafter\@thirdofthree#1\@undefined
198   \expandafter\gdef\expandafter#1\expandafter
199     {\csname ?-cmd\expandafter\endcsname\expandafter
200       #1\csname?\string#1\endcsname}%
201   \fi
202 \fi
203 }
204 \onlypreamble\UndeclareTextCommand
```

(End definition for `\UndeclareTextCommand`.)

1.4.2 Hyphenation

```
\patterns
\@@patterns
\hyphenation
\@@hyphenation
205 \%\\let\\@@patterns\\patterns
206 \%\\let\\@@hyphenation\\hyphenation
207 \%\\def\\patterns{%
208 %   \\bgroup
209 %     \\let\\protect\\empty
210 %     \\let\\@typeset\\protect\\empty
211 %     \\let\\@changed@x\\@changed@x@mouth
212 %   \\afterassignment\\egroup
213 %   \\@@patterns
214 %}
215 \%\\def\\hyphenation{%
216 %   \\bgroup
217 %     \\let\\protect\\empty
218 %     \\let\\@typeset\\protect\\empty
219 %     \\let\\@changed@x\\@changed@x@mouth
220 %   \\afterassignment\\egroup
221 %   \\@@hyphenation
222 %}
```

(End definition for `\patterns` and others.)

1.4.3 Miscellania

- \a The `\a` command is used to access the accent commands even when they have been redefined (for example by the `tabbing` environment). Its internal name is `\@tabacckludge`.
The `\string` within the `\csname` guards against something like ' being active at the point of use.

```
223 \\def\\@tabacckludge#1{\\expandafter\\@changed@cmd
224                                     \\csname\\string#1\\endcsname\\relax}
225 \\let\\a=\\@tabacckludge
```

(End definition for `\a`.)

1.4.4 Default encodings

We define the default encodings for most commands to be either OT1, OML or OMS. These defaults are in the kernel and therefore fonts with these encodings must be available unless these defaults are redefined elsewhere. Recall that the standard kernel loads the encoding files for these encodings, and also that for the T1 encoding.

The naming conventions in the kernel are not what we would use if we were starting from scratch... Those defined by DEK (like `\ae` and `\ss`) or by the TeX Users Group Technical Working Group on multi-lingual typesetting (like `\th` and `\ng`) have short names. Those which were added to the kernel in 1993 and early 1994 are named after their Adobe glyph names (like `\guillemotleft` and `\quotedblbase`). Unfortunately, this naming scheme won't work for all glyphs, since some names (like `\space`) are already used, and some (like `\endash`) are very likely to be defined by users. So we're now using the naming scheme of `\text` followed by the Adobe name, (like `\textendash` and `\textsterling`). Except that some glyphs don't have Adobe names, so we're using the names used by fontinst for those (like `\textcompwordmark`). Sigh.

Some accents from OT1:

```
226 \DeclareTextAccentDefault{\\"}{OT1}
227 \DeclareTextAccentDefault{\'}{OT1}
228 \DeclareTextAccentDefault{\.{}}{OT1}
229 \DeclareTextAccentDefault{\=}{OT1}
230 \DeclareTextAccentDefault{\H}{OT1}
231 \DeclareTextAccentDefault{\^}{OT1}
232 \DeclareTextAccentDefault{\`}{OT1}
233 \DeclareTextAccentDefault{\b}{OT1}
234 \DeclareTextAccentDefault{\c}{OT1}
235 \DeclareTextAccentDefault{\d}{OT1}
236 \DeclareTextAccentDefault{\r}{OT1}
237 \DeclareTextAccentDefault{\u}{OT1}
238 \DeclareTextAccentDefault{\v}{OT1}
239 \DeclareTextAccentDefault{\~}{OT1}
```

Some symbols from OT1:

```
240 \% \DeclareTextSymbolDefault{\AA}{OT1}
241 \DeclareTextSymbolDefault{\AE}{OT1}
242 \DeclareTextSymbolDefault{\L}{OT1}
243 \DeclareTextSymbolDefault{\OE}{OT1}
244 \DeclareTextSymbolDefault{\O}{OT1}
245 \% \DeclareTextSymbolDefault{\aa}{OT1}
246 \DeclareTextSymbolDefault{\ae}{OT1}
247 \DeclareTextSymbolDefault{\i}{OT1}
248 \DeclareTextSymbolDefault{\j}{OT1}

249 \DeclareTextSymbolDefault{\ij}{OT1}
250 \DeclareTextSymbolDefault{\IJ}{OT1}

251 \DeclareTextSymbolDefault{\l}{OT1}
252 \DeclareTextSymbolDefault{\oe}{OT1}
253 \DeclareTextSymbolDefault{\o}{OT1}
254 \DeclareTextSymbolDefault{\ss}{OT1}
255 \DeclareTextSymbolDefault{\textdollar}{OT1}
256 \DeclareTextSymbolDefault{\textemdash}{OT1}
257 \DeclareTextSymbolDefault{\textendash}{OT1}
258 \DeclareTextSymbolDefault{\textexclamdown}{OT1}
259 \% \DeclareTextSymbolDefault{\texthphenchar}{OT1}
260 \% \DeclareTextSymbolDefault{\texthphen}{OT1}
261 \DeclareTextSymbolDefault{\textquestiondown}{OT1}
262 \DeclareTextSymbolDefault{\textquotedblleft}{OT1}
263 \DeclareTextSymbolDefault{\textquotedblright}{OT1}
264 \DeclareTextSymbolDefault{\textquotleft}{OT1}
265 \DeclareTextSymbolDefault{\textquotright}{OT1}
266 \DeclareTextSymbolDefault{\textsterling}{OT1}
```

Some symbols from OMS:

```
267 \DeclareTextSymbolDefault{\textasteriskcentered}{OMS}
268 \DeclareTextSymbolDefault{\textbackslash}{OMS}
269 \DeclareTextSymbolDefault{\textbar}{OMS}
270 \DeclareTextSymbolDefault{\textbardbl}{OMS}
271 \DeclareTextSymbolDefault{\textbraceleft}{OMS}
272 \DeclareTextSymbolDefault{\textbraceright}{OMS}
273 \DeclareTextSymbolDefault{\textbullet}{OMS}
```

```

274 \DeclareTextSymbolDefault{\textdaggerdbl}{OMS}
275 \DeclareTextSymbolDefault{\textdagger}{OMS}
276 \DeclareTextSymbolDefault{\textparagraph}{OMS}
277 \DeclareTextSymbolDefault{\textperiodcentered}{OMS}
278 \DeclareTextSymbolDefault{\textsection}{OMS}
279 \DeclareTextAccentDefault{\textcircled}{OMS}

```

Some symbols from OML:

```

280 \DeclareTextSymbolDefault{\textless}{OML}
281 \DeclareTextSymbolDefault{\textgreater}{OML}
282 \DeclareTextAccentDefault{\t}{OML}

```

Some defaults we can fake.

The interface for defining \copyright changed, it used to use `\expandafter` to add braces at the appropriate points.

```

283 \DeclareTextCommandDefault{\textcopyright}{\textcircled{c}}
284 % \expandafter\def\expandafter
285 %           \copyright\expandafter{\expandafter{\copyright}}
286 \DeclareTextCommandDefault{\textasciicircum}{\^{}}
287 \DeclareTextCommandDefault{\textasciitilde}{\~{}}
288 \DeclareTextCommandDefault{\textunderscore}{%
289   \leavevmode \kern.06em\vbox{\hrule\@width.3em}}

```

There is no good reason anymore to fake `\textcompwordmark`.

```

290 \% \DeclareTextCommandDefault{\textcompwordmark}{\leavevmode\kern\z@}
291 \DeclareTextSymbolDefault{\textcompwordmark}{T1}
292 \DeclareTextCommandDefault{\textvisiblespace}{%
293   \mbox{\kern.06em\vrule\@height.3ex}%
294   \vbox{\hrule\@width.3em}%
295   \hbox{\vrule\@height.3ex}}

```

Using `\fontdimen3` in the next definition is some sort of a kludge (since it is the interword stretch) but it makes the ellipsis come out right in mono-spaced fonts too (since there it is zero).

```

296 \DeclareTextCommandDefault{\textellipsis}{%
297   .\kern\fontdimen3\font
298   .\kern\fontdimen3\font
299   .\kern\fontdimen3\font}
300 \% \DeclareTextCommandDefault{\textregistered}{\textcircled{\scshape r}}
301 \DeclareTextCommandDefault{\textregistered}{\textcircled{%
302   \check@mathfonts\fontsize\sf@size\z@\math@fontsfalse\selectfont R}}
303 \DeclareTextCommandDefault{\texttrademark}{\textsuperscript{TM}}
304 \DeclareTextCommandDefault{\SS}{\SS}
305 \DeclareTextCommandDefault{\textordfeminine}{\textsuperscript{a}}
306 \DeclareTextCommandDefault{\textordmasculine}{\textsuperscript{o}}

```

1.4.5 Math material

Some commands can be used in both text and math mode:

```
307 \DeclareRobustCommand{\$}{\ifmmode\mathdollar\else\textrm{\$}\fi}
```

We use `\protected` not `\DeclareRobustCommand` so that `\bigl\{` etc. works inside `\protected@edef`.

```
308 \protected\def{\{\ifmmode\lbrace\else\textrm{\{}fi\}}
309 \protected\def{\}\ifmmode\rbrace\else\textrm{\}}fi\}
310 \DeclareRobustCommand{\P}{\ifmmode\mathparagraph\else\textrm{\P}\fi}
311 \DeclareRobustCommand{\S}{\ifmmode\mathsection\else\textrm{\S}\fi}
312 \DeclareRobustCommand{\dag}{\ifmmode\dagger\else\textrm{\dag}\fi}
313 \DeclareRobustCommand{\ddag}{\ifmmode\ddagger\else\textrm{\ddagger}\fi}
```

For historical reasons `\copyright` needs {} around the definition in maths.

```
314 \DeclareRobustCommand{\_}{%
315   \ifmmode\nfss@text{\textunderscore}\else\textrm{\_}\fi}
316 \DeclareRobustCommand{\copyright}{%
317   \ifmmode{\nfss@text{\textcopyright}}\else\textrm{\copyright}\fi}
318 \DeclareRobustCommand{\pounds}{%
319   \ifmmode\mathsterling\else\textrm{\pounds}\fi}
320 \DeclareRobustCommand{\dots}{%
321   \ifmmode\mathellipsis\else\textrm{\dots}\fi}
322 \let\ldots\dots
```

Default definition of the commabelow accent.

```
323 </2ekernel>
324 <texrel>\IncludeInRelease{2015/10/01}{\textcommabelow}{comma accent}%
325 (*2ekernel | texrel)
326 \DeclareTextCommandDefault{\textcommabelow}[1]
327   {\hmode@bgroup\oalign{\null#1\crcr\hidewidth\raise-.31ex
328     \hbox{\check@mathfonts\fontsize\ssf@size\z@
329       \math@fontsfalse\selectfont,\hidewidth}\egroup}
330 <texrel>\EndIncludeInRelease
331 </2ekernel | texrel>
332 <texrel>\IncludeInRelease{0000/00/00}{\textcommabelow}{comma accent}%
333 <texrel>\let\textcommabelow\@undefined
334 <texrel>\expandafter
335 <texrel> \let\csname\string\T1\string\c-G\endcsname\@undefined
336 <texrel>\expandafter
337 <texrel> \let\csname\string\T1\string\c-K\endcsname\@undefined
338 <texrel>\expandafter
339 <texrel> \let\csname\string\T1\string\c-k\endcsname\@undefined
340 <texrel>\expandafter
341 <texrel> \let\csname\string\T1\string\c-L\endcsname\@undefined
342 <texrel>\expandafter
343 <texrel> \let\csname\string\T1\string\c-l\endcsname\@undefined
344 <texrel>\expandafter
345 <texrel> \let\csname\string\T1\string\c-N\endcsname\@undefined
346 <texrel>\expandafter
347 <texrel> \let\csname\string\T1\string\c-n\endcsname\@undefined
348 <texrel>\expandafter
349 <texrel> \let\csname\string\T1\string\c-R\endcsname\@undefined
```

```

350  \let\csname\string\T1\string\c-r\endcsname\@undefined
351  \let\csname\string\T1\string\c-r\endcsname\@undefined
352  \EndIncludeInRelease
      Default definition of the commaabove accent(E.G.).
353  \IncludeInRelease{2016/02/01}{\textcommablock}{comma above}%
354  {*2ekernel | latexrelease}
355  \DeclareTextCommandDefault{\textcommablock}[1]{%
356    \hmode@bgroup
357    \oalign{%
358      \hidewidth
359      \raise.7ex\hbox{%
360        \check@mathfonts\fontsize\ssf@size\z@\math@fontsfalse\selectfont'%
361      }%
362      \hidewidth\crcr
363      \null#1\crcr
364    }%
365    \egroup
366  }
367  \EndIncludeInRelease
368  (/2ekernel | latexrelease)
369  \IncludeInRelease{0000/00/00}{\textcommablock}{comma above}%
370  \let\textcommablock\@undefined
371  \expandafter
372  \let\csname\string\OT1\string\c-g\endcsname\@undefined
373  \expandafter
374  \let\csname\string\T1\string\c-g\endcsname\@undefined
375  \EndIncludeInRelease

```

1.5 Definitions for the OT1 encoding

The definitions for the ‘TEX text’ (OT1) encoding.

Declare the encoding.

```

376  {*OT1}
377  \DeclareFontEncoding{OT1}{}{}
```

Declare the accents.

```

378  \DeclareTextAccent{"}{OT1}{127}
379  \DeclareTextAccent{'}{OT1}{19}
380  \DeclareTextAccent{.}{OT1}{95}
381  \DeclareTextAccent{=}{OT1}{22}
382  \DeclareTextAccent{`}{OT1}{94}
383  \DeclareTextAccent{'}{OT1}{18}
384  \DeclareTextAccent{`~}{OT1}{126}
385  \DeclareTextAccent{H}{OT1}{125}
386  \DeclareTextAccent{u}{OT1}{21}
387  \DeclareTextAccent{v}{OT1}{20}
388  \DeclareTextAccent{r}{OT1}{23}
```

Some accents have to be built by hand: Note that `\oalign` and `\o@align` must be inside a group. In these definitions we no longer use the helper function `\sh@ft` from plain.tex since that now has two incompatible definitions.

```

389  \DeclareTextCommand{\b}{OT1}[1]
390    {\hmode@bgroup\o@align{\relax#1\crcr\hidewidth\ltx@sh@ft{-3ex}}%
```

```

391      \vbox to .2ex{\hbox{\char22}\vss}\hidewidth}\egroup}
392 \DeclareTextCommand{\c}{OT1}[1]
393   {\leavevmode\setbox\z@\hbox{\#1}\ifdim\ht\z@=1ex\accent24 #1%
394   \else{\ooalign{\unhbox\z@\crcr\hidewidth\char24\hidewidth}}\fi}
395 \DeclareTextCommand{\d}{OT1}[1]
396   {\hmode@bgroup
397   \o@lign{\relax#1\crcr\hidewidth\ltx@sh@ft{-1ex}.\hidewidth}\egroup}
    Declare the text symbols.

398 \DeclareTextSymbol{\AE}{OT1}{29}
399 \DeclareTextSymbol{\OE}{OT1}{30}
400 \DeclareTextSymbol{\O}{OT1}{31}
401 \DeclareTextSymbol{\ae}{OT1}{26}
402 \DeclareTextSymbol{\i}{OT1}{16}
403 \DeclareTextSymbol{\j}{OT1}{17}
404 \DeclareTextSymbol{\oe}{OT1}{27}
405 \DeclareTextSymbol{\o}{OT1}{28}
406 \DeclareTextSymbol{\ss}{OT1}{25}
407 \DeclareTextSymbol{\textemdash}{OT1}{124}
408 \DeclareTextSymbol{\textendash}{OT1}{123}

```

Using the ligatures helps with OT1 fonts that have \textexclandown and \textquestiondown in unusual positions.

```

409 \% \DeclareTextSymbol{\textexclandown}{OT1}{60}
410 \% \DeclareTextSymbol{\textquestiondown}{OT1}{62}
411 \DeclareTextCommand{\textexclandown}{OT1}{!`}
412 \DeclareTextCommand{\textquestiondown}{OT1}{?`}
413 \% \DeclareTextSymbol{\texthyphenchar}{OT1}{`-}
414 \% \DeclareTextSymbol{\texthyphen}{OT1}{`-}
415 \DeclareTextSymbol{\textquotedblleft}{OT1}{92}
416 \DeclareTextSymbol{\textquotedblright}{OT1}{`}
417 \DeclareTextSymbol{\textquotelleft}{OT1}{`'}
418 \DeclareTextSymbol{\textquoteright}{OT1}{`}

```

Some symbols which are faked from others:

```

419 \% \DeclareTextCommand{\aa}{OT1}
420 \%   {{\`{a}}}
421 \DeclareTextCommand{\L}{OT1}
422   {\leavevmode\setbox\z@\hbox{L}\hb@xt@wd\z@{\hss\xxxii L}}
423 \DeclareTextCommand{\l}{OT1}
424   {\hmode@bgroup\xxxii l\egroup}
425 \% \DeclareTextCommand{\AA}{OT1}
426 \%   {{\`{A}}}
427 \%   \rlap{\raise.67\dimen@\hbox{\char23}}A}

```

In the OT1 encoding Å has a hand-crafted definition, so we have here the first recorded explicit use of \DeclareTextCompositeCommand.

```

428 \DeclareTextCompositeCommand{\r}{OT1}{A}
429   {\leavevmode\setbox\z@\hbox{!}\dimen@\ht\z@\advance\dimen@-1ex%
430   \rlap{\raise.67\dimen@\hbox{\char23}}A}

```

The dutch language uses the letter 'ij'. It is available in T1 encoded fonts, but not in the OT1 encoded fonts. Therefor we fake it for the OT1 encoding.

```

431 \DeclareTextCommand{\ij}{OT1}{%
432   \nobreak\hskip\z@skip i\kern-0.02em j\nobreak\hskip\z@skip}
433 \DeclareTextCommand{\IJ}{OT1}{%

```

```
434 \nobreak\hskip\z@skip I\kern-0.02em J\nobreak\hskip\z@skip}
```

In the OT1 encoding, £ and \$ share a slot.

```
435 \DeclareTextCommand{\textdollar}{OT1}{\hmode@bgroup
436   \ifdim \fontdimen1ne\font >\z@
437     \slshape
438   \else
439     \upshape
440   \fi
441   \char`\$\egroup}
442 \DeclareTextCommand{\textsterling}{OT1}{\hmode@bgroup
443   \ifdim \fontdimen1ne\font >\z@
444     \itshape
445   \else
446     \fontshape{ui}\selectfont
447   \fi
448   \char`\$\egroup}
```

Here we are adding some more composite commands to the OT1 encoding. This makes the use of certain accents with i compatible with their use with the T1 encoding; this enables them to become true L^AT_EX internal representations. However, it will make these accents work a little less fast since a check will always be made for the existence of a composite.

```
449 \DeclareTextComposite{\.{OT1}{i}{`i}}
450 \DeclareTextComposite{\.{OT1}{i}{`i}}
451 \DeclareTextCompositeCommand{\.{OT1}{i}{`@tabacckludge`i}}
452 \DeclareTextCompositeCommand{\.{OT1}{i}{`@tabacckludge`i}}
453 \DeclareTextCompositeCommand{\.{OT1}{i}{`^i}}
454 \DeclareTextCompositeCommand{\.{OT1}{i}{`"i}}
```

T1 encoding is given more extensive set of overloads for \c. But here we just adjust \c{g}.

```
455 \ifx{textcommabove}\undefined\else
456 \DeclareTextCompositeCommand{\c}{OT1}{g}{\textcommabove{g}}
457 \fi
458 {/OT1}
```

1.6 Definitions for the T1 encoding

The definitions for the ‘Extended T_EX text’ (T1) encoding.

Declare the encoding.

```
459 {*T1}
460 \DeclareFontEncoding{T1}{}{}
```

Declare the accents.

```
461 \DeclareTextAccent{\`}{T1}{0}
462 \DeclareTextAccent{\'}{T1}{1}
463 \DeclareTextAccent{\^}{T1}{2}
464 \DeclareTextAccent{\~}{T1}{3}
465 \DeclareTextAccent{\"}{T1}{4}
466 \DeclareTextAccent{\H}{T1}{5}
467 \DeclareTextAccent{\r}{T1}{6}
468 \DeclareTextAccent{\v}{T1}{7}
```

```

469 \DeclareTextAccent{\u}{T1}{8}
470 \DeclareTextAccent{\=}{T1}{9}
471 \DeclareTextAccent{\.}{T1}{10}

```

Some accents have to be built by hand. Note that `\ooalign` and `\o@ign` must be inside a group. In these definitions we no longer use the helper function `\sh@ft` from plain.tex since that now has two incompatible definitions.

```

472 \DeclareTextCommand{\b}{T1}[1]
473   {\hmode@bgroup\o@ign{\relax#1\crcr\hidewidth\ltx@sh@ft{-3ex}%
474     \vbox to .2ex{\hbox{\char9}\vss\hidewidth}\egroup}
475 \DeclareTextCommand{\c}{T1}[1]
476   {\leavevmode\setbox\z@\hbox{\#1}\ifdim\ht\z@=1ex\accent11 #1%
477     \else{\ooalign{\unhbox\z@\crcr
478       \hidewidth\char11\hidewidth}}\fi}
479 \DeclareTextCommand{\d}{T1}[1]
480   {\hmode@bgroup
481     \o@ign{\relax#1\crcr\hidewidth\ltx@sh@ft{-1ex}.\hidewidth}\egroup}
482 \DeclareTextCommand{\k}{T1}[1]
483   {\hmode@bgroup\ooalign{\null#1\crcr\hidewidth\char12}\egroup}
484 \DeclareTextCommand{\texttoggonekcentered}{T1}[1]
485   {\hmode@bgroup\ooalign{%
486     \null#1\crcr\hidewidth\char12\hidewidth}\egroup}

```

Some symbols are constructed.

Slot 24 contains a small circle intended for construction of these two glyphs.

```

487 \DeclareTextCommand{\textperthousand}{T1}
488   {\%\char 24 } % space or ‘relax as delimiter?
489 \DeclareTextCommand{\textpertenthousand}{T1}
490   {\%\char 24\char 24 } % space or ‘relax as delimiter?

```

For Maltese, `\Hwithstroke` and `\hwithstroke` are needed.

```

491 \DeclareTextCommand{\Hwithstroke}{T1}
492   {%
493     \hmode@bgroup
494     \vphantom{H}%
495     \sbox\z@{H}%
496     \ooalign{%
497       H\cr
498       \hidewidth
499       \vrule
500         height \dimexpr 0.7\ht\z@+0.1ex\relax
501         depth -0.7\ht\z@
502         width 0.8\wd\z@
503       \hidewidth\cr
504     }%
505     \egroup
506   }
507 \DeclareTextCommand{\hwithstroke}{T1}
508   {%
509     \hmode@bgroup
510     \vphantom{h}%
511     \sbox\z@{h}%
512     \ooalign{%
513       h\cr

```

```

514      \kern0.075\wd\z@ 
515      \vrule
516          height \dimexpr 0.7\ht\z@+0.1ex\relax
517          depth -0.7\ht\z@
518          width 0.4\wd\z@
519          \hidewidth\cr
520      }%
521      \egroup
522 }

```

Declare the text symbols.

```

523 \%Declarationsymbol{\AA}{T1}{197}
524 \Declarationsymbol{\AE}{T1}{198}
525 \Declarationsymbol{\DH}{T1}{208}
526 \Declarationsymbol{\DJ}{T1}{208}
527 \Declarationsymbol{\L}{T1}{138}
528 \Declarationsymbol{\NG}{T1}{141}
529 \Declarationsymbol{\OE}{T1}{215}
530 \Declarationsymbol{\O}{T1}{216}
531 \Declarationsymbol{\SS}{T1}{223}
532 \Declarationsymbol{\TH}{T1}{222}
533 \%Declarationsymbol{\aa}{T1}{229}
534 \Declarationsymbol{\ae}{T1}{230}
535 \Declarationsymbol{\dh}{T1}{240}
536 \Declarationsymbol{\dj}{T1}{158}

537 \Declarationsymbol{\guillemetleft}{T1}{19}
538 \Declarationsymbol{\guillemetright}{T1}{20}
539 % old Adobe names
540 \Declarationsymbol{\guillemotleft}{T1}{19}
541 \Declarationsymbol{\guillemotright}{T1}{20}

542 \Declarationsymbol{\guilsinglleft}{T1}{14}
543 \Declarationsymbol{\guilsinglright}{T1}{15}
544 \Declarationsymbol{\i}{T1}{25}
545 \Declarationsymbol{\j}{T1}{26}
546 \Declarationsymbol{\ij}{T1}{188}
547 \Declarationsymbol{\IJ}{T1}{156}
548 \Declarationsymbol{\l}{T1}{170}
549 \Declarationsymbol{\ng}{T1}{173}
550 \Declarationsymbol{\oe}{T1}{247}
551 \Declarationsymbol{\o}{T1}{248}
552 \Declarationsymbol{\quotedblbase}{T1}{18}
553 \Declarationsymbol{\quotesinglbase}{T1}{13}
554 \Declarationsymbol{\ss}{T1}{255}
555 \Declarationsymbol{\textasciicircum}{T1}{`^}
556 \Declarationsymbol{\textasciitilde}{T1}{`~}
557 \Declarationsymbol{\textbackslash}{T1}{`\\}
558 \Declarationsymbol{\textbar}{T1}{`|}
559 \Declarationsymbol{\textbraceleft}{T1}{`\{}}
560 \Declarationsymbol{\textbraceright}{T1}{`\}`}
561 \Declarationsymbol{\textcompwordmark}{T1}{23}
562 \Declarationsymbol{\textdollar}{T1}{`\$}
563 \Declarationsymbol{\textemdash}{T1}{22}
564 \Declarationsymbol{\textendash}{T1}{21}

```

```

565 \DeclareTextSymbol{\textexclamdown}{T1}{189}
566 \DeclareTextSymbol{\textgreater}{T1}{`>}
567 \% \DeclareTextSymbol{\texthyphenchar}{T1}{127}
568 \% \DeclareTextSymbol{\texthyphen}{T1}{`-}
569 \DeclareTextSymbol{\textless}{T1}{`<}
570 \DeclareTextSymbol{\textquestiondown}{T1}{190}
571 \DeclareTextSymbol{\textquotedblleft}{T1}{16}
572 \DeclareTextSymbol{\textquotedblright}{T1}{17}
573 \DeclareTextSymbol{\textquotedbl}{T1}{`"}
574 \DeclareTextSymbol{\textquotel}{T1}{``}
575 \DeclareTextSymbol{\textquoter}{T1}{``}
576 \DeclareTextSymbol{\textsection}{T1}{159}
577 \DeclareTextSymbol{\textsterling}{T1}{191}
578 \DeclareTextSymbol{\textunderscore}{T1}{95}
579 \DeclareTextSymbol{\textvisiblespace}{T1}{32}
580 \DeclareTextSymbol{\th}{T1}{254}

Declare the composites.

581 \DeclareTextComposite{\.}{T1}{i}{`i}
582 \DeclareTextComposite{\.}{T1}{\i}{`i}

"80 = 128
583 \DeclareTextComposite{\u}{T1}{A}{128}
584 \DeclareTextComposite{\k}{T1}{A}{129}
585 \DeclareTextComposite{\'}{T1}{C}{130}
586 \DeclareTextComposite{\v}{T1}{C}{131}
587 \DeclareTextComposite{\v}{T1}{D}{132}
588 \DeclareTextComposite{\v}{T1}{E}{133}
589 \DeclareTextComposite{\k}{T1}{E}{134}
590 \DeclareTextComposite{\u}{T1}{G}{135}

"88 = 136
591 \DeclareTextComposite{\'}{T1}{L}{136}
592 \DeclareTextComposite{\v}{T1}{L}{137}
593 \DeclareTextComposite{\'}{T1}{N}{139}
594 \DeclareTextComposite{\v}{T1}{N}{140}
595 \DeclareTextComposite{\H}{T1}{O}{142}
596 \DeclareTextComposite{\'}{T1}{R}{143}

"90 = 144
597 \DeclareTextComposite{\v}{T1}{R}{144}
598 \DeclareTextComposite{\'}{T1}{S}{145}
599 \DeclareTextComposite{\v}{T1}{S}{146}
600 \DeclareTextComposite{\c}{T1}{S}{147}
601 \DeclareTextComposite{\v}{T1}{T}{148}
602 \DeclareTextComposite{\c}{T1}{T}{149}
603 \DeclareTextComposite{\H}{T1}{U}{150}
604 \DeclareTextComposite{\r}{T1}{U}{151}

"98 = 152
605 \DeclareTextComposite{\"}{T1}{Y}{152}
606 \DeclareTextComposite{\'}{T1}{Z}{153}
607 \DeclareTextComposite{\v}{T1}{Z}{154}
608 \DeclareTextComposite{\.}{T1}{Z}{155}
609 \DeclareTextComposite{\.}{T1}{I}{157}

```

```

"A0 = 160
610 \DeclareTextComposite{\u}{T1}{a}{160}
611 \DeclareTextComposite{\k}{T1}{a}{161}
612 \DeclareTextComposite{\'}{T1}{c}{162}
613 \DeclareTextComposite{\v}{T1}{c}{163}
614 \DeclareTextComposite{\v}{T1}{d}{164}
615 \DeclareTextComposite{\v}{T1}{e}{165}
616 \DeclareTextComposite{\k}{T1}{e}{166}
617 \DeclareTextComposite{\u}{T1}{g}{167}

"A8 = 168
618 \DeclareTextComposite{\'}{T1}{l}{168}
619 \DeclareTextComposite{\v}{T1}{l}{169}
620 \DeclareTextComposite{\'}{T1}{n}{171}
621 \DeclareTextComposite{\v}{T1}{n}{172}
622 \DeclareTextComposite{\H}{T1}{o}{174}
623 \DeclareTextComposite{\'}{T1}{r}{175}

"B0 = 176
624 \DeclareTextComposite{\v}{T1}{r}{176}
625 \DeclareTextComposite{\'}{T1}{s}{177}
626 \DeclareTextComposite{\v}{T1}{s}{178}
627 \DeclareTextComposite{\c}{T1}{s}{179}
628 \DeclareTextComposite{\v}{T1}{t}{180}
629 \DeclareTextComposite{\c}{T1}{t}{181}
630 \DeclareTextComposite{\H}{T1}{u}{182}
631 \DeclareTextComposite{\r}{T1}{u}{183}

"B8 = 184
632 \DeclareTextComposite{\"}{T1}{y}{184}
633 \DeclareTextComposite{\'}{T1}{z}{185}
634 \DeclareTextComposite{\v}{T1}{z}{186}
635 \DeclareTextComposite{\.}{T1}{z}{187}

"C0 = 192
636 \DeclareTextComposite{\'}{T1}{A}{192}
637 \DeclareTextComposite{\'}{T1}{A}{193}
638 \DeclareTextComposite{\^}{T1}{A}{194}
639 \DeclareTextComposite{\~}{T1}{A}{195}
640 \DeclareTextComposite{\"}{T1}{A}{196}
641 \DeclareTextComposite{\r}{T1}{A}{197}
642 \DeclareTextComposite{\c}{T1}{C}{199}

"C8 = 200
643 \DeclareTextComposite{\'}{T1}{E}{200}
644 \DeclareTextComposite{\'}{T1}{E}{201}
645 \DeclareTextComposite{\^}{T1}{E}{202}
646 \DeclareTextComposite{\\"}{T1}{E}{203}
647 \DeclareTextComposite{\'}{T1}{I}{204}
648 \DeclareTextComposite{\'}{T1}{I}{205}
649 \DeclareTextComposite{\^}{T1}{I}{206}
650 \DeclareTextComposite{\\"}{T1}{I}{207}

"D0 = 208
651 \DeclareTextComposite{\~}{T1}{N}{209}
652 \DeclareTextComposite{\'}{T1}{O}{210}

```

```

653 \DeclareTextComposite{\'}{T1}{0}{211}
654 \DeclareTextComposite{\^}{T1}{0}{212}
655 \DeclareTextComposite{\~}{T1}{0}{213}
656 \DeclareTextComposite{\"}{T1}{0}{214}

"D8 = 216
657 \DeclareTextComposite{\`}{T1}{U}{217}
658 \DeclareTextComposite{\'}{T1}{U}{218}
659 \DeclareTextComposite{\^}{T1}{U}{219}
660 \DeclareTextComposite{\"}{T1}{U}{220}
661 \DeclareTextComposite{\'}{T1}{Y}{221}

"E0 = 224
662 \DeclareTextComposite{\`}{T1}{a}{224}
663 \DeclareTextComposite{\'}{T1}{a}{225}
664 \DeclareTextComposite{\^}{T1}{a}{226}
665 \DeclareTextComposite{\~}{T1}{a}{227}
666 \DeclareTextComposite{\"}{T1}{a}{228}
667 \DeclareTextComposite{\r}{T1}{a}{229}
668 \DeclareTextComposite{\c}{T1}{c}{231}

"E8 = 232
669 \DeclareTextComposite{\`}{T1}{e}{232}
670 \DeclareTextComposite{\'}{T1}{e}{233}
671 \DeclareTextComposite{\^}{T1}{e}{234}
672 \DeclareTextComposite{\\"}{T1}{e}{235}
673 \DeclareTextComposite{\`}{T1}{i}{236}
674 \DeclareTextComposite{\'}{T1}{i}{236}
675 \DeclareTextComposite{\^}{T1}{i}{237}
676 \DeclareTextComposite{\'}{T1}{i}{237}
677 \DeclareTextComposite{\~}{T1}{i}{238}
678 \DeclareTextComposite{\^}{T1}{i}{238}
679 \DeclareTextComposite{\\"}{T1}{i}{239}
680 \DeclareTextComposite{\\"}{T1}{i}{239}

"F0 = 240
681 \DeclareTextComposite{\~}{T1}{n}{241}
682 \DeclareTextComposite{\`}{T1}{o}{242}
683 \DeclareTextComposite{\'}{T1}{o}{243}
684 \DeclareTextComposite{\^}{T1}{o}{244}
685 \DeclareTextComposite{\~}{T1}{o}{245}
686 \DeclareTextComposite{\\"}{T1}{o}{246}

"F8 = 248
687 \DeclareTextComposite{\`}{T1}{u}{249}
688 \DeclareTextComposite{\'}{T1}{u}{250}
689 \DeclareTextComposite{\^}{T1}{u}{251}
690 \DeclareTextComposite{\\"}{T1}{u}{252}
691 \DeclareTextComposite{\'}{T1}{y}{253}

692 \DeclareTextCompositeCommand{\k}{T1}{o}{\textogonekcentered{o}}
693 \DeclareTextCompositeCommand{\k}{T1}{0}{\textogonekcentered{0}}

694 \ifx\textcommababove\@undefined\else
695 \DeclareTextCompositeCommand{\c}{T1}{g}{\textcommababove{g}}
696 \fi

```

```

697 \ifx\textcommabelow\@undefined\else
698 \DeclareTextCompositeCommand{\c}{T1}{G}{\textcommabelow{G}}
699 \DeclareTextCompositeCommand{\c}{T1}{K}{\textcommabelow{K}}
700 \DeclareTextCompositeCommand{\c}{T1}{k}{\textcommabelow{k}}
701 \DeclareTextCompositeCommand{\c}{T1}{L}{\textcommabelow{L}}
702 \DeclareTextCompositeCommand{\c}{T1}{l}{\textcommabelow{l}}
703 \DeclareTextCompositeCommand{\c}{T1}{N}{\textcommabelow{N}}
704 \DeclareTextCompositeCommand{\c}{T1}{n}{\textcommabelow{n}}
705 \DeclareTextCompositeCommand{\c}{T1}{R}{\textcommabelow{R}}
706 \DeclareTextCompositeCommand{\c}{T1}{r}{\textcommabelow{r}}
707 \fi
708 
```

1.7 Definitions for the OMS encoding

The definitions for the ‘ $\text{T}_{\text{E}}\text{X}$ math symbol’ (OMS) encoding. Even though this is meant to be a math font, it includes some of the standard $\text{L}\text{A}\text{T}_{\text{E}}\text{X}$ text symbols.

Declare the encoding.

```

709 {*OMS}
710 \DeclareFontEncoding{OMS}{}{}

```

Declare the symbols. Note that slot 13 has in places been named \Orb : please root out and destroy this impurity wherever you find it!

```

711 \DeclareTextSymbol{\textasteriskcentered}{OMS}{3} % "03
712 \DeclareTextSymbol{\textbackslash}{OMS}{110} % "6E
713 \DeclareTextSymbol{\textbar}{OMS}{106} % "6A
714 \DeclareTextSymbol{\textbardbl}{OMS}{107} % "6B
715 \DeclareTextSymbol{\textbraceleft}{OMS}{102} % "66
716 \DeclareTextSymbol{\textbraceright}{OMS}{103} % "67
717 \DeclareTextSymbol{\textbullet}{OMS}{15} % "0F
718 \DeclareTextSymbol{\textdaggerdbl}{OMS}{122} % "7A
719 \DeclareTextSymbol{\textdagger}{OMS}{121} % "79
720 \DeclareTextSymbol{\textparagraph}{OMS}{123} % "7B
721 \DeclareTextSymbol{\textperiodcentered}{OMS}{1} % "01
722 \DeclareTextSymbol{\textsection}{OMS}{120} % "78
723 \DeclareTextSymbol{\textbigcircle}{OMS}{13} % "0D
724 \DeclareTextCommand{\textcircled}{OMS}[1]{\hmode@bgroup
725   \oalign{\hfil\raise .07ex\hbox {\upshape#1}\hfil\crcr
726     \char 13 % "0D
727   }%
728 \egroup}
729 
```

1.8 Definitions for the OML encoding

The definitions for the ‘ $\text{T}_{\text{E}}\text{X}$ math italic’ (OML) encoding. Even though this is meant to be a math font, it includes some of the standard $\text{L}\text{A}\text{T}_{\text{E}}\text{X}$ text symbols.

Declare the encoding.

```

731 {*OML}
732 \DeclareFontEncoding{OML}{}{}

```

Declare the symbols.

```
733 \DeclareTextSymbol{\textless}{OML}{`<}
734 \DeclareTextSymbol{\textgreater}{OML}{`>}
735 \DeclareTextAccent{\t}{OML}{127} % "7F
736{/OML}
```

1.9 Definitions for the OT4 encoding

These definitions are for the Polish extension to the ‘TeX text’ (OT1) encoding. This encoding was created by B. Jackowski and M. Ryćko for use with the Polish version of Computer Modern and Computer Concrete. In positions 0–127 it is identical to OT1 but it contains some additional characters in the upper half. The L^AT_EX support was developed by Mariusz Olko.

The PL fonts that use it are available as follows:

Metafont sources <ftp://ftp.gust.org.pl/TeX/language/polish/pl-mf.zip>;
Font files <ftp://ftp.gust.org.pl/TeX/language/polish/pl-tfm.zip>.
Declare the encoding.

```
737 {*OT4}
738 \DeclareFontEncoding{OT4}{}{}
739 \DeclareFontSubstitution{OT4}{cmr}{m}{n}
```

Declare the accents.

```
740 \DeclareTextAccent{"}{OT4}{127}
741 \DeclareTextAccent{'}{OT4}{19}
742 \DeclareTextAccent{.}{OT4}{95}
743 \DeclareTextAccent{=}{OT4}{22}
744 \DeclareTextAccent{^}{OT4}{94}
745 \DeclareTextAccent{`}{OT4}{18}
746 \DeclareTextAccent{~}{OT4}{126}
747 \DeclareTextAccent{H}{OT4}{125}
748 \DeclareTextAccent{u}{OT4}{21}
749 \DeclareTextAccent{v}{OT4}{20}
750 \DeclareTextAccent{r}{OT4}{23}
```

The ogonek accent is available only under a e A & E. But we have to provide some definition for \k. Some other accents have to be built by hand as in OT1:

```
751 \DeclareTextCommand{\k}{OT4}[1]{%
752   \TextSymbolUnavailable{\k#1}#1}
```

In these definitions we no longer use the helper function \sh@ft from plain.tex since that now has two incompatible definitions.

```
753 \DeclareTextCommand{\b}{OT4}[1]
754   {\hmode@bgroup\o@align{\relax#1\crcr\hidewidth\ltx@sh@ft{-3ex}%
755   \vbox to.2ex{\hbox{\char22}\vss}\hidewidth}\egroup}
756 \DeclareTextCommand{\c}{OT4}[1]
757   {\leavevmode\setbox\z@\hbox{\ifdim\ht\z@=1ex\accent24 #1%
758   \else\ooalign{\unhbox\z@\crcr\hidewidth\char24\hidewidth}\fi}}
759 \DeclareTextCommand{\d}{OT4}[1]
760   {\hmode@bgroup
761   \o@align{\relax#1\crcr\hidewidth\ltx@sh@ft{-1ex}.\hidewidth}\egroup}
```

Declare the text symbols.

```
762 \DeclareTextSymbol{\AE}{OT4}{29}
763 \DeclareTextSymbol{\OE}{OT4}{30}
764 \DeclareTextSymbol{\O}{OT4}{31}
765 \DeclareTextSymbol{\L}{OT4}{138}
766 \DeclareTextSymbol{\ae}{OT4}{26}

767 \DeclareTextSymbol{\guillemetleft}{OT4}{174}
768 \DeclareTextSymbol{\guillemetright}{OT4}{175}
769 % old Adobe names
770 \DeclareTextSymbol{\guillemotleft}{OT4}{174}
771 \DeclareTextSymbol{\guillemotright}{OT4}{175}

772 \DeclareTextSymbol{\i}{OT4}{16}
773 \DeclareTextSymbol{\j}{OT4}{17}
774 \DeclareTextSymbol{\l}{OT4}{170}
775 \DeclareTextSymbol{\o}{OT4}{28}
776 \DeclareTextSymbol{\oe}{OT4}{27}
777 \DeclareTextSymbol{\quotedblbase}{OT4}{255}
778 \DeclareTextSymbol{\ss}{OT4}{25}
779 \DeclareTextSymbol{\textemdash}{OT4}{124}
780 \DeclareTextSymbol{\textendash}{OT4}{123}
781 \DeclareTextSymbol{\textexclamdown}{OT4}{60}
782 %\DeclareTextSymbol{\texthyphenchar}{OT4}{`-}
783 %\DeclareTextSymbol{\texthyphen}{OT4}{`-}
784 \DeclareTextSymbol{\textquestiondown}{OT4}{62}
785 \DeclareTextSymbol{\textquotedblleft}{OT4}{92}
786 \DeclareTextSymbol{\textquotedblright}{OT4}{`}
787 \DeclareTextSymbol{\textquotleft}{OT4}{`}
788 \DeclareTextSymbol{\textquotright}{OT4}{`}
```

Definition for Å as in OT1:

```
789 \DeclareTextCompositeCommand{\r}{OT4}{A}
790   {\leavevmode\setbox\z@hbox{!}\dimen@\ht\z@advance\dimen@-1ex%
791    \rlap{\raise.67\dimen\hbox{\char23}}A}
```

In the OT4 encoding, £ and \$ share a slot.

```
792 \DeclareTextCommand{\textdollar}{OT4}{\hmode@bgroup
793   \ifdim \fontdimen\onefont >\z@
794     \slshape
795   \else
796     \upshape
797   \fi
798   \char`\$\egroup}
799 \DeclareTextCommand{\textsterling}{OT4}{\hmode@bgroup
800   \ifdim \fontdimen\onefont >\z@
801     \itshape
802   \else
803     \fontshape{ui}\selectfont
804   \fi
805   \char`\$\egroup}
```

Declare the composites.

```
806 \DeclareTextComposite{\k}{OT4}{A}{129}
807 \DeclareTextComposite{\'}{OT4}{C}{130}
808 \DeclareTextComposite{\k}{OT4}{E}{134}
```

```

809 \DeclareTextComposite{\'}{OT4}{N}{139}
810 \DeclareTextComposite{\'}{OT4}{S}{145}
811 \DeclareTextComposite{\'}{OT4}{Z}{153}
812 \DeclareTextComposite{\.}{OT4}{Z}{155}
813 \DeclareTextComposite{\k}{OT4}{a}{161}
814 \DeclareTextComposite{\'}{OT4}{c}{162}
815 \DeclareTextComposite{\k}{OT4}{e}{166}
816 \DeclareTextComposite{\'}{OT4}{n}{171}
817 \DeclareTextComposite{\'}{OT4}{s}{177}
818 \DeclareTextComposite{\'}{OT4}{z}{185}
819 \DeclareTextComposite{\.}{OT4}{z}{187}
820 \DeclareTextComposite{\'}{OT4}{O}{211}
821 \DeclareTextComposite{\'}{OT4}{o}{243}
822 /OT4

```

1.10 Definitions for the TS1 encoding

```

823 <*TS1>
824 \DeclareFontEncoding{TS1}{}{}
825 \DeclareFontSubstitution{TS1}{cmr}{m}{n}

```

Some accents have to be built by hand. Note that `\ooalign` and `\o@lign` must be inside a group.

```

826 \DeclareTextCommand{\capitalcedilla}{TS1}[1]
827   {\hmode@bgroup
828     \ooalign{\null#1\crcr\hidewidth\char11\hidewidth}\egroup}
829 \DeclareTextCommand{\capitalogonek}{TS1}[1]
830   {\hmode@bgroup
831     \ooalign{\null#1\crcr\hidewidth\char12\hidewidth}\egroup}

```

Accents for capital letters.

These commands can be used by the end user either directly or through definitions of the type

```
\DeclareTextCompositeCommand{\'}{T1}{X}{\capitalacute X}
```

None of the latter definitions are provided by default, since they are probably rarely used.

```

"00 = 0
832 \DeclareTextAccent{\capitalgrave}{TS1}{0}
833 \DeclareTextAccent{\capitalacute}{TS1}{1}
834 \DeclareTextAccent{\capitalcircumflex}{TS1}{2}
835 \DeclareTextAccent{\capitaltilde}{TS1}{3}
836 \DeclareTextAccent{\capitaldieresis}{TS1}{4}
837 \DeclareTextAccent{\capitalhungarumlaut}{TS1}{5}
838 \DeclareTextAccent{\capitalring}{TS1}{6}
839 \DeclareTextAccent{\capitalcaron}{TS1}{7}
"08 = 8
840 \DeclareTextAccent{\capitalbreve}{TS1}{8}
841 \DeclareTextAccent{\capitalmacron}{TS1}{9}
842 \DeclareTextAccent{\capitaldotaccent}{TS1}{10}

```

Tie accents.

The tie accent was borrowed from the `cmmi` font. The `tc` fonts now provide four tie accents, the first two are done in the classical way with assymetric glyphs hanging out of

their boxes; the new ties are centered in their boxes like all other accents. They need a name: please tell us if you know what to call them.

```
" =  
843 \DeclareTextAccent{\t}{TS1}{26}  
844 \DeclareTextAccent{\capitaltie}{TS1}{27}  
845 \DeclareTextAccent{\newtie}{TS1}{28}  
846 \DeclareTextAccent{\capitalnewtie}{TS1}{29}  
  
    Compund word marks.  
    The text companion fonts contain two compound word marks of different heights,  
one has cap_height, the other asc_height.  
847 \DeclareTextSymbol{\textcapitalcompwordmark}{TS1}{23}  
848 \DeclareTextSymbol{\textascendercompwordmark}{TS1}{31}  
  
    The text companion symbols.  
849 \DeclareTextSymbol{\textquotestraightbase}{TS1}{13}  
  
"10 = 16  
850 \DeclareTextSymbol{\textquotestraightdblbase}{TS1}{18}  
851 \DeclareTextSymbol{\texttwelveudash}{TS1}{21}  
852 \DeclareTextSymbol{\textthreequartersemdash}{TS1}{22}  
  
"18 = 24  
853 \DeclareTextSymbol{\textleftarrow}{TS1}{24}  
854 \DeclareTextSymbol{\textrightarrow}{TS1}{25}  
  
"20 = 32  
855 \DeclareTextSymbol{\textblank}{TS1}{32}  
856 \DeclareTextSymbol{\textdollar}{TS1}{36}  
857 \DeclareTextSymbol{\textquotesingle}{TS1}{39}  
  
"28 = 40  
858 \DeclareTextSymbol{\textasteriskcentered}{TS1}{42}  
  
Note that '054 is a comma and '056 is a full stop: these make numbers using oldstyle  
digits easier to input.  
859 \DeclareTextSymbol{\textdblhyphen}{TS1}{45}  
860 \DeclareTextSymbol{\textfractionsolidus}{TS1}{47}  
  
    Oldstyle digits.  
    "30 = 48  
861 \DeclareTextSymbol{\textzerooldstyle}{TS1}{48}  
862 \DeclareTextSymbol{\textoneoldstyle}{TS1}{49}  
863 \DeclareTextSymbol{\texttwooldstyle}{TS1}{50}  
864 \DeclareTextSymbol{\textthreeoldstyle}{TS1}{51}  
865 \DeclareTextSymbol{\textfouroldstyle}{TS1}{52}  
866 \DeclareTextSymbol{\textfiveoldstyle}{TS1}{53}  
867 \DeclareTextSymbol{\textsixoldstyle}{TS1}{54}  
868 \DeclareTextSymbol{\textsevenoldstyle}{TS1}{55}  
  
"38 = 56  
869 \DeclareTextSymbol{\texteightoldstyle}{TS1}{56}  
870 \DeclareTextSymbol{\textnineoldstyle}{TS1}{57}
```

More text companion symbols.

```
871 \DeclareTextSymbol{\textlangle}{TS1}{60}
872 \DeclareTextSymbol{\textminus}{TS1}{61}
873 \DeclareTextSymbol{\textrangle}{TS1}{62}
```

"48 = 72

```
874 \DeclareTextSymbol{\textmho}{TS1}{77}
```

The big circle is here to define the command `\textcircled`. Formerly it was taken from the `cmsy` font.

```
875 \DeclareTextSymbol{\textbigcircle}{TS1}{79}
876 \DeclareTextCommand{\textcircled}{TS1}[1]{\hmode@bgroup
877   \oalign{%
878     \hfil \raise .07ex\hbox {\upshape#1}\hfil \crcr
879     \char 79 \% '117 = "4F
880   }%
881 \egroup}
```

More text companion symbols.

"50 = 80

```
882 \DeclareTextSymbol{\textohm}{TS1}{87}
```

"58 = 88

```
883 \DeclareTextSymbol{\textlbrackdbl}{TS1}{91}
884 \DeclareTextSymbol{\textrbrackdbl}{TS1}{93}
885 \DeclareTextSymbol{\textuparrow}{TS1}{94}
886 \DeclareTextSymbol{\textdownarrow}{TS1}{95}
```

"60 = 96

```
887 \DeclareTextSymbol{\textasciigrave}{TS1}{96}
888 \DeclareTextSymbol{\textborn}{TS1}{98}
889 \DeclareTextSymbol{\textdivorced}{TS1}{99}
890 \DeclareTextSymbol{\textdied}{TS1}{100}
```

"68 = 104

```
891 \DeclareTextSymbol{\textleaf}{TS1}{108}
892 \DeclareTextSymbol{\textmarried}{TS1}{109}
893 \DeclareTextSymbol{\textmusicalnote}{TS1}{110}
```

"78 = 120

```
894 \DeclareTextSymbol{\texttildelow}{TS1}{126}
```

This glyph, `\textdblhyphenchar` is hanging, like the `hyphenchar` of the `ec` fonts.

```
895 \DeclareTextSymbol{\textdblhyphenchar}{TS1}{127}
```

"80 = 128

```
896 \DeclareTextSymbol{\textasciibreve}{TS1}{128}
897 \DeclareTextSymbol{\textasciicaron}{TS1}{129}
```

This next glyph is *not* the same as `\textquotedbl`.

```
898 \DeclareTextSymbol{\textacutedbl}{TS1}{130}
899 \DeclareTextSymbol{\textgravedbl}{TS1}{131}
900 \DeclareTextSymbol{\textdagger}{TS1}{132}
901 \DeclareTextSymbol{\textdaggerdbl}{TS1}{133}
902 \DeclareTextSymbol{\textbardbl}{TS1}{134}
903 \DeclareTextSymbol{\textperthousand}{TS1}{135}
```

```

"88 = 136
904 \DeclareTextSymbol{\textbullet}{TS1}{136}
905 \DeclareTextSymbol{\textcelsius}{TS1}{137}
906 \DeclareTextSymbol{\textdollaroldstyle}{TS1}{138}
907 \DeclareTextSymbol{\textcentoldstyle}{TS1}{139}
908 \DeclareTextSymbol{\textflorin}{TS1}{140}
909 \DeclareTextSymbol{\textcolonmonetary}{TS1}{141}
910 \DeclareTextSymbol{\textwon}{TS1}{142}
911 \DeclareTextSymbol{\textnaira}{TS1}{143}

"90 = 144
912 \DeclareTextSymbol{\textguarani}{TS1}{144}
913 \DeclareTextSymbol{\textpeso}{TS1}{145}
914 \DeclareTextSymbol{\textlira}{TS1}{146}
915 \DeclareTextSymbol{\textrecipe}{TS1}{147}
916 \DeclareTextSymbol{\textinterrobang}{TS1}{148}
917 \DeclareTextSymbol{\textinterrobangdown}{TS1}{149}
918 \DeclareTextSymbol{\textdong}{TS1}{150}
919 \DeclareTextSymbol{\texttrademark}{TS1}{151}

"98 = 152
920 \DeclareTextSymbol{\textpertenthousand}{TS1}{152}
921 \DeclareTextSymbol{\textpilcrow}{TS1}{153}
922 \DeclareTextSymbol{\textbaht}{TS1}{154}
923 \DeclareTextSymbol{\textnumero}{TS1}{155}

This next name may change. For the following sign we know only a german name, which
is abzüglich. The meaning is something like “commercial minus”. An ASCII ersatz is ./. 
(dot slash dot). The temporary English name is \textdiscount.

924 \DeclareTextSymbol{\textdiscount}{TS1}{156}
925 \DeclareTextSymbol{\textestimated}{TS1}{157}
926 \DeclareTextSymbol{\textopenbullet}{TS1}{158}
927 \DeclareTextSymbol{\textservicemark}{TS1}{159}

"A0 = 160
928 \DeclareTextSymbol{\textlquill}{TS1}{160}
929 \DeclareTextSymbol{\textrquill}{TS1}{161}
930 \DeclareTextSymbol{\textcent}{TS1}{162}
931 \DeclareTextSymbol{\textsterling}{TS1}{163}
932 \DeclareTextSymbol{\textcurrency}{TS1}{164}
933 \DeclareTextSymbol{\textyen}{TS1}{165}
934 \DeclareTextSymbol{\textbrokenbar}{TS1}{166}
935 \DeclareTextSymbol{\textsection}{TS1}{167}

"A8 = 168
936 \DeclareTextSymbol{\textasciidieresis}{TS1}{168}
937 \DeclareTextSymbol{\textcopyright}{TS1}{169}
938 \DeclareTextSymbol{\textordfeminine}{TS1}{170}
939 \DeclareTextSymbol{\textcopyleft}{TS1}{171}
940 \DeclareTextSymbol{\textlnot}{TS1}{172}

The meaning of the circled-P is “sound recording copyright”.

941 \DeclareTextSymbol{\textcircledP}{TS1}{173}
942 \DeclareTextSymbol{\textregistered}{TS1}{174}
943 \DeclareTextSymbol{\textasciimacron}{TS1}{175}

```

```

944 \DeclareTextSymbol{\textdegree}{TS1}{176}
945 \DeclareTextSymbol{\textpm}{TS1}{177}
946 \DeclareTextSymbol{\texttwosuperior}{TS1}{178}
947 \DeclareTextSymbol{\textthreesuperior}{TS1}{179}
948 \DeclareTextSymbol{\textasciacute}{TS1}{180}
949 \DeclareTextSymbol{\textmu}{TS1}{181} % micro sign
950 \DeclareTextSymbol{\textparagraph}{TS1}{182}
951 \DeclareTextSymbol{\textperiodcentered}{TS1}{183}

"B0 = 176
944 \DeclareTextSymbol{\textdegree}{TS1}{176}
945 \DeclareTextSymbol{\textpm}{TS1}{177}
946 \DeclareTextSymbol{\texttwosuperior}{TS1}{178}
947 \DeclareTextSymbol{\textthreesuperior}{TS1}{179}
948 \DeclareTextSymbol{\textasciacute}{TS1}{180}
949 \DeclareTextSymbol{\textmu}{TS1}{181} % micro sign
950 \DeclareTextSymbol{\textparagraph}{TS1}{182}
951 \DeclareTextSymbol{\textperiodcentered}{TS1}{183}

"B8 = 184
952 \DeclareTextSymbol{\textreferencemark}{TS1}{184}
953 \DeclareTextSymbol{\textonesuperior}{TS1}{185}
954 \DeclareTextSymbol{\textordmasculine}{TS1}{186}
955 \DeclareTextSymbol{\textsurd}{TS1}{187}
956 \DeclareTextSymbol{\textonequarter}{TS1}{188}
957 \DeclareTextSymbol{\textonehalf}{TS1}{189}
958 \DeclareTextSymbol{\textthreequarters}{TS1}{190}
959 \DeclareTextSymbol{\texteuro}{TS1}{191}

"E0 = 208
960 \DeclareTextSymbol{\texttimes}{TS1}{214}

"F0 = 240
961 \DeclareTextSymbol{\textdiv}{TS1}{246}
962 </TS1>

```

1.11 Definitions for the TU encoding

The TU encoding was originally introduced in the contributed package `fontspec` as a Unicode encoding for XeTeX and LuaTeX.

Normally for these engines, the input consists of Unicode characters encoded in UTF-8. There is therefore little need to use the traditional (ASCII) encoding-specific commands

However, sometimes (e.g. for backwards compatibility) it can be useful to access these Unicode characters via such ASCII-based markup. The commands provided here cover the characters in the T1 and TS1 encodings, but specified in Unicode position. Almost all the command names have been mechanically extracted from the `inputenc` UTF-8 support, which is essentially doing a reverse mapping from UTF-8 data to L^AT_EX L^IC_R commands.

A few additional names for character which were supported in the original `fontspec` version of this file have also been added, even though they are not currently in the default `inputenc` UTF-8 declarations.

```
963 (*TU)
```

In the base interface the Unicode encoding is always known as TU. But we parameterise the encoding name to allow for modelling differences in Unicode support by different fonts.

```
964 \providetcommand\UnicodeEncodingName{TU}
```

As the Unicode encoding, TU, is only currently available with XeTeX or LuaTeX, we detect these engines first, and make adjustments for the differing font loading syntax. For other engines, we issue a warning then abort this file, switching back to T1 encoding.

```

965 \begingroup\expandafter\expandafter\expandafter\endgroup
966 \expandafter\ifx\csname XeTeXrevision\endcsname\relax
967 \begingroup\expandafter\expandafter\expandafter\endgroup
968 \expandafter\ifx\csname directlua\endcsname\relax

```

Not LuaTeX or XeTeX, abort with a warning.

```

969 \PackageWarningNoLine{fontenc}
970   {\UnicodeEncodingName\space
971     encoding is only available with XeTeX and LuaTeX.\MessageBreak
972     Defaulting to T1 encoding}
973   \def\encodingdefault{T1}
974   \expandafter\expandafter\expandafter\endinput
975 \else

```

LuaTeX. For LuaTeX 1.10+, define a Lua function to disable any handing by the font code. Otherwise we reload the font without TeX ligatures.

```

976 \def\UnicodeFontTeXLigatures{+tlig;}
977 \ifnum\luatexversion<110
978   \def\reserved@a#1{%
979     \def\@remove@tlig##1{\@remove@tlig@@#1\@nil#1\@nil\relax}
980     \def\@remove@tlig@@#1#1{\@remove@tlig@@#1}
981     \edef\reserved@b{\detokenize{+tlig;}}
982     \expandafter\reserved@a\expandafter{\reserved@b}
983     \def\@remove@tlig@@#1\@nil#2\relax{#1}
984   \def\remove@tlig#1{%
985     \begingroup
986     \font\remove@tlig
987     \expandafter\@remove@tlig\expandafter{\fontname\font}%
988     \remove@tlig
989     \char#1\relax
990     \endgroup
991   }
992 \else
993   \newluafunction{\remove@tlig@@@}

```

Now we can define the function. Mostly we just have to insert a protected glyph node, which is a glyph node with subtype 256. But we have to keep track of the current mode to avoid inserting the glyph into a vlist.

```

994 \now@and@everyjob{\directlua{
995   local rawchar_func = token.create'\remove@tlig@@@'.index
996   local forcehmode = tex.forcehmode
997   local put_next = token.put_next
998   local glyph_id = node.id'glyph'
999   local rawchar_token = token.new(rawchar_func, token.command_id'lua_call')
1000   lua.get_functions_table()[rawchar_func] = function()
1001     local mode = tex.nest.top.mode
1002     if mode == 1 or mode == -1 then
1003       put_next(rawchar_token)
1004       return forcehmode(true)

```

```

1005         end
1006         local n = node.new(glyph_id, 256)
1007         n.font = font.current()
1008         n.char = token.scan_int()
1009         return node.write(n)
1010     end
1011     token.set_lua('remove@tlig@@@', rawchar_func, 'global', 'protected')
1012 }

```

Now `\remove@tlig` can be implemented almost as in XeTeX.

```

1013     \def\remove@tlig#1{\remove@tlig@@@#1\relax}
1014     \fi
1015     \fi
1016 \else

```

XeTeX

```

1017 \def\UnicodeFontTeXLigatures[mapping=tex-text;]
1018 \def\remove@tlig#1{\XeTeXglyph\numexpr\XeTeXcharglyph#1\relax}
1019 \fi
1020 \def\UnicodeFontFile#1#2{[#1]:#2"}
1021 \def\UnicodeFontName#1#2{#1:#2"}

```

Declare the encoding

```
1022 \DeclareFontEncoding\UnicodeEncodingName{}{}
```

Declare accent command to use a postspended combining character rather than the TeX `\accent` primitive

```

1023 \def\add@unicode@accent#1#2{%
1024   \if\relax\detokenize{#2}\relax^\^a0\else#2\fi
1025   \char#1\relax}
1026 \def\DeclareUnicodeAccent#1#2#3{%
1027   \DeclareTextCommand{#1}{#2}{\add@unicode@accent{#3}}%
1028 }

```

Wrapper around `\DeclareTextCompositeCommand` that uses the declared composite if it exists in the current font or falls back to the default definition for the TU accent if not.

```

1029 {
1030   \catcode\z@=11\relax
1031   \gdef\DeclareUnicodeComposite#1#2#3{%
1032     \def\reserved@a##1##2{%
1033       \DeclareTextCompositeCommand{#1}\UnicodeEncodingName{#2}{%
1034         \iffontchar\font#3 ##2%
1035           \else ##1\fi}%
1036         \expandafter\expandafter\expandafter\extract@default@composite
1037         \csname\UnicodeEncodingName\string#1\endcsname{#2}\@nil
1038       \bgroup
1039         \lccode\z@#3 %
1040         \lowercase{\egroup
1041           \expandafter\reserved@a\expandafter{\reserved@b}{^\^@}}%
1042     }

```

```

1043 \def\extract@default@composite#1{%
1044   \ifx@\text@composite#1%
1045     \expandafter\extract@default@composite@a
1046   \else
1047     \expandafter\extract@default@composite@b\expandafter#1%
1048   \fi}
1049 \def\extract@default@composite@a#1\@text@composite#2\@nil{%
1050   \def\reserved@b{#2}}
1051 \def\extract@default@composite@b#1#2\@nil{%
1052   \def\reserved@b{#1#2}}
1053 \DeclareTextCommand{\textquotesingle}{\UnicodeEncodingName{%
1054   \remove@tlig{"0027}}}
1055 \DeclareTextCommand{\textasciigrave}{\UnicodeEncodingName{%
1056   \remove@tlig{"0060}}}
1057 \DeclareTextCommand{\textquotedbl}{\UnicodeEncodingName{%
1058   \remove@tlig{"0022}}}
1059 \DeclareTextSymbol{\textdollar}{\UnicodeEncodingName{"0024}}
1060 \DeclareTextSymbol{\textless}{\UnicodeEncodingName{"003C}}
1061 \DeclareTextSymbol{\textgreater}{\UnicodeEncodingName{"003E}}
1062 \DeclareTextSymbol{\textbackslash}{\UnicodeEncodingName{"005C}}
1063 \DeclareTextSymbol{\textasciicircum}{\UnicodeEncodingName{"005E}}
1064 \DeclareTextSymbol{\textunderscore}{\UnicodeEncodingName{"005F}}
1065 \DeclareTextSymbol{\textbraceleft}{\UnicodeEncodingName{"007B}}
1066 \DeclareTextSymbol{\textbar}{\UnicodeEncodingName{"007C}}
1067 \DeclareTextSymbol{\textbraceright}{\UnicodeEncodingName{"007D}}
1068 \DeclareTextSymbol{\textasciitilde}{\UnicodeEncodingName{"007E}}
1069 \DeclareTextSymbol{\textexclamdown}{\UnicodeEncodingName{"00A1}}
1070 \DeclareTextSymbol{\textcent}{\UnicodeEncodingName{"00A2}}
1071 \DeclareTextSymbol{\textsterling}{\UnicodeEncodingName{"00A3}}
1072 \DeclareTextSymbol{\textcurrency}{\UnicodeEncodingName{"00A4}}
1073 \DeclareTextSymbol{\textyen}{\UnicodeEncodingName{"00A5}}
1074 \DeclareTextSymbol{\textbrokenbar}{\UnicodeEncodingName{"00A6}}
1075 \DeclareTextSymbol{\textsection}{\UnicodeEncodingName{"00A7}}
1076 \DeclareTextSymbol{\textasciidieresis}{\UnicodeEncodingName{"00A8}}
1077 \DeclareTextSymbol{\textcopyright}{\UnicodeEncodingName{"00A9}}
1078 \DeclareTextSymbol{\textordfeminine}{\UnicodeEncodingName{"00AA}}
1079 \DeclareTextSymbol{\guillemetleft}{\UnicodeEncodingName{"00AB}}
1080 % old Adobe name
1081 \DeclareTextSymbol{\guillemotleft}{\UnicodeEncodingName{"00AB}}
1082 \DeclareTextSymbol{\textlnot}{\UnicodeEncodingName{"00AC}}
1083 \DeclareTextSymbol{\textregistered}{\UnicodeEncodingName{"00AE}}
1084 \DeclareTextSymbol{\textasciimacron}{\UnicodeEncodingName{"00AF}}
1085 \DeclareTextSymbol{\textdegree}{\UnicodeEncodingName{"00B0}}
1086 \DeclareTextSymbol{\textpm}{\UnicodeEncodingName{"00B1}}
1087 \DeclareTextSymbol{\texttwosuperior}{\UnicodeEncodingName{"00B2}}
1088 \DeclareTextSymbol{\textthreesuperior}{\UnicodeEncodingName{"00B3}}
1089 \DeclareTextSymbol{\textasciacute}{\UnicodeEncodingName{"00B4}}
1090 \DeclareTextSymbol{\textmu}{\UnicodeEncodingName{"00B5}}
1091 \DeclareTextSymbol{\textparagraph}{\UnicodeEncodingName{"00B6}}
1092 \DeclareTextSymbol{\textperiodcentered}{\UnicodeEncodingName{"00B7}}
1093 \DeclareTextSymbol{\textonesuperior}{\UnicodeEncodingName{"00B9}}
1094 \DeclareTextSymbol{\textordmasculine}{\UnicodeEncodingName{"00BA"}}

```

```

1095 \DeclareTextSymbol{\guillemetright}          \UnicodeEncodingName{"00BB}
1096 % old Adobe name
1097 \DeclareTextSymbol{\guillemotright}          \UnicodeEncodingName{"00BB}
1098 \DeclareTextSymbol{\textonequarter}           \UnicodeEncodingName{"00BC}
1099 \DeclareTextSymbol{\textonehalf}              \UnicodeEncodingName{"00BD}
1100 \DeclareTextSymbol{\textthreequarters}        \UnicodeEncodingName{"00BE}
1101 \DeclareTextSymbol{\textquestiondown}         \UnicodeEncodingName{"00BF}
1102 \DeclareTextSymbol{\AE}                      \UnicodeEncodingName{"00C6}
1103 \DeclareTextSymbol{\DH}                      \UnicodeEncodingName{"00D0}
1104 \DeclareTextSymbol{\textttimes}               \UnicodeEncodingName{"00D7}
1105 \DeclareTextSymbol{\O}                       \UnicodeEncodingName{"00D8}
1106 \DeclareTextSymbol{\TH}                      \UnicodeEncodingName{"00DE}
1107 \DeclareTextSymbol{\ss}                      \UnicodeEncodingName{"00DF}
1108 \DeclareTextSymbol{\ae}                      \UnicodeEncodingName{"00E6}
1109 \DeclareTextSymbol{\dh}                      \UnicodeEncodingName{"00F0}
1110 \DeclareTextSymbol{\textdiv}                 \UnicodeEncodingName{"00F7}
1111 \DeclareTextSymbol{\o}                       \UnicodeEncodingName{"00F8}
1112 \DeclareTextSymbol{\th}                      \UnicodeEncodingName{"00FE}
1113 \DeclareTextSymbol{\DJ}                      \UnicodeEncodingName{"0110}
1114 \DeclareTextSymbol{\dj}                      \UnicodeEncodingName{"0111}
1115 \DeclareTextSymbol{\i}                       \UnicodeEncodingName{"0131}
1116 \DeclareTextSymbol{\IJ}                      \UnicodeEncodingName{"0132}
1117 \DeclareTextSymbol{\ij}                      \UnicodeEncodingName{"0133}
1118 \DeclareTextSymbol{\L}                       \UnicodeEncodingName{"0141}
1119 \DeclareTextSymbol{\l}                       \UnicodeEncodingName{"0142}
1120 \DeclareTextSymbol{\NG}                      \UnicodeEncodingName{"014A}
1121 \DeclareTextSymbol{\ng}                      \UnicodeEncodingName{"014B}
1122 \DeclareTextSymbol{\OE}                      \UnicodeEncodingName{"0152}
1123 \DeclareTextSymbol{\oe}                      \UnicodeEncodingName{"0153}
1124 \DeclareTextSymbol{\textflorin}              \UnicodeEncodingName{"0192}
1125 \DeclareTextSymbol{\j}                       \UnicodeEncodingName{"0237}
1126 \DeclareTextSymbol{\textasciicaron}          \UnicodeEncodingName{"02C7}
1127 \DeclareTextSymbol{\textasciibreve}          \UnicodeEncodingName{"02D8}
1128 \DeclareTextSymbol{\textacutedbl}            \UnicodeEncodingName{"02DD}
1129 \DeclareTextSymbol{\textgravedbl}            \UnicodeEncodingName{"02F5}
1130 \DeclareTextSymbol{\texttildebelow}          \UnicodeEncodingName{"02F7}
1131 \DeclareTextSymbol{\textbaht}                \UnicodeEncodingName{"0E3F}
1132 \DeclareTextSymbol{\SS}                     \UnicodeEncodingName{"1E9E}
1133 \DeclareTextSymbol{\textcompwordmark}        \UnicodeEncodingName{"200C}
1134 \DeclareTextSymbol{\textendash}              \UnicodeEncodingName{"2013}
1135 \DeclareTextSymbol{\textemdash}              \UnicodeEncodingName{"2014}
1136 \DeclareTextSymbol{\textbardbl}              \UnicodeEncodingName{"2016}
1137 \DeclareTextSymbol{\textquotelleft}          \UnicodeEncodingName{"2018}
1138 \DeclareTextSymbol{\textquoteright}          \UnicodeEncodingName{"2019}
1139 \DeclareTextSymbol{\quotesinglbase}          \UnicodeEncodingName{"201A}
1140 \DeclareTextSymbol{\textquotedblleft}         \UnicodeEncodingName{"201C}
1141 \DeclareTextSymbol{\textquotedblright}        \UnicodeEncodingName{"201D}
1142 \DeclareTextSymbol{\quotedblbase}            \UnicodeEncodingName{"201E}
1143 \DeclareTextSymbol{\textdagger}               \UnicodeEncodingName{"2020}
1144 \DeclareTextSymbol{\textdaggerdbl}            \UnicodeEncodingName{"2021}
1145 \DeclareTextSymbol{\textbullet}               \UnicodeEncodingName{"2022}
1146 \DeclareTextSymbol{\textellipsis}            \UnicodeEncodingName{"2026}
1147 \DeclareTextSymbol{\textperthousand}          \UnicodeEncodingName{"2030}
1148 \DeclareTextSymbol{\textpertenthousand}       \UnicodeEncodingName{"2031}

```

```

1149 \DeclareTextSymbol{\guilsinglleft}          \UnicodeEncodingName{"2039}
1150 \DeclareTextSymbol{\guilsinglright}         \UnicodeEncodingName{"203A}
1151 \DeclareTextSymbol{\textreferencemark}        \UnicodeEncodingName{"203B}
1152 \DeclareTextSymbol{\textinterrobang}          \UnicodeEncodingName{"203D}
1153 \DeclareTextSymbol{\textfractionsolidus}       \UnicodeEncodingName{"2044}
1154 \DeclareTextSymbol{\textlquill}                \UnicodeEncodingName{"2045}
1155 \DeclareTextSymbol{\textrquill}               \UnicodeEncodingName{"2046}
1156 \DeclareTextSymbol{\textddiscount}            \UnicodeEncodingName{"2052}
1157 \DeclareTextSymbol{\textcolonmonetary}         \UnicodeEncodingName{"20A1}
1158 \DeclareTextSymbol{\textlira}                  \UnicodeEncodingName{"20A4}
1159 \DeclareTextSymbol{\textnaira}                 \UnicodeEncodingName{"20A6}
1160 \DeclareTextSymbol{\textwon}                   \UnicodeEncodingName{"20A9}
1161 \DeclareTextSymbol{\textdong}                 \UnicodeEncodingName{"20AB}
1162 \DeclareTextSymbol{\texteuro}                  \UnicodeEncodingName{"20AC}
1163 \DeclareTextSymbol{\textpeso}                 \UnicodeEncodingName{"20B1}
1164 \DeclareTextSymbol{\textcelsius}              \UnicodeEncodingName{"2103}
1165 \DeclareTextSymbol{\textnumero}               \UnicodeEncodingName{"2116}
1166 \DeclareTextSymbol{\textcircledP}              \UnicodeEncodingName{"2117}
1167 \DeclareTextSymbol{\textrecip}                \UnicodeEncodingName{"211E}
1168 \DeclareTextSymbol{\textservicemark}          \UnicodeEncodingName{"2120}
1169 \DeclareTextSymbol{\texttrademark}            \UnicodeEncodingName{"2122}
1170 \DeclareTextSymbol{\textohm}                  \UnicodeEncodingName{"2126}
1171 \DeclareTextSymbol{\textmho}                  \UnicodeEncodingName{"2127}
1172 \DeclareTextSymbol{\textestimated}            \UnicodeEncodingName{"212E}
1173 \DeclareTextSymbol{\textleftarrow}             \UnicodeEncodingName{"2190}
1174 \DeclareTextSymbol{\textuparrow}                \UnicodeEncodingName{"2191}
1175 \DeclareTextSymbol{\textrightarrow}            \UnicodeEncodingName{"2192}
1176 \DeclareTextSymbol{\textdownarrow}             \UnicodeEncodingName{"2193}
1177 \DeclareTextSymbol{\textminus}                \UnicodeEncodingName{"2212}
1178

1179 \DeclareTextSymbol{\Hwithstroke}              \UnicodeEncodingName{"0126}
1180 \DeclareTextSymbol{\hwithstroke}              \UnicodeEncodingName{"0127}

Not all fonts have U+2217 but using U+002A requires some adjustment.

1181 \DeclareTextCommand{\textasteriskcentered}\UnicodeEncodingName{%
1182   \iffontchar\font"2217 \char"2217 \else
1183     \begingroup
1184       \fontsize
1185         {\the\dimexpr1.2\dimexpr\f@size pt\relax}%
1186         {\f@baselineskip}%
1187       \selectfont
1188       \raisebox{-0.6ex}{[\dimexpr\height-0.6ex] [0pt]{*}}%
1189     \endgroup
1190   \fi
1191 }

1192 \DeclareTextSymbol{\textsurd}                \UnicodeEncodingName{"221A}
1193 \DeclareTextSymbol{\textlangle}               \UnicodeEncodingName{"2329}
1194 \DeclareTextSymbol{\textrangle}               \UnicodeEncodingName{"232A}
1195 \DeclareTextSymbol{\textblank}                \UnicodeEncodingName{"2422}
1196 \DeclareTextSymbol{\textvisible-space}        \UnicodeEncodingName{"2423}
1197 \DeclareTextSymbol{\textopenbullet}            \UnicodeEncodingName{"25E6}
1198 \DeclareTextSymbol{\textbigcircle}            \UnicodeEncodingName{"25EF}
1199 \DeclareTextSymbol{\textmusicalnote}          \UnicodeEncodingName{"266A}

```

```

1200 \DeclareTextSymbol{\textmarried}          \UnicodeEncodingName{"26AD}
1201 \DeclareTextSymbol{\textdivorced}         \UnicodeEncodingName{"26AE}
1202 \DeclareTextSymbol{\textinterrobangdown} \UnicodeEncodingName{"2E18}

Accents must be declared before the composites that use them.

1203 \DeclareUnicodeAccent{\'}                  \UnicodeEncodingName{"0300}
1204 \DeclareUnicodeAccent{\'}                  \UnicodeEncodingName{"0301}
1205 \DeclareUnicodeAccent{\^}                 \UnicodeEncodingName{"0302}
1206 \DeclareUnicodeAccent{\~}                 \UnicodeEncodingName{"0303}
1207 \DeclareUnicodeAccent{\=}                 \UnicodeEncodingName{"0304}
1208 \DeclareUnicodeAccent{\u}                 \UnicodeEncodingName{"0306}
1209 \DeclareUnicodeAccent{\.}                 \UnicodeEncodingName{"0307}
1210 \DeclareUnicodeAccent{\"}                 \UnicodeEncodingName{"0308}
1211 \DeclareUnicodeAccent{\r}                 \UnicodeEncodingName{"030A}
1212 \DeclareUnicodeAccent{\H}                 \UnicodeEncodingName{"030B}
1213 \DeclareUnicodeAccent{\v}                 \UnicodeEncodingName{"030C}
1214 \DeclareUnicodeAccent{\b}                 \UnicodeEncodingName{"0332}
1215 \DeclareUnicodeAccent{\d}                 \UnicodeEncodingName{"0323}
1216 \DeclareUnicodeAccent{\c}                 \UnicodeEncodingName{"0327}
1217 \DeclareUnicodeAccent{\k}                 \UnicodeEncodingName{"0328}
1218 \DeclareTextCommand{\textcommabelow}      \UnicodeEncodingName[1]
1219   {\hmode@bgroup\oalign{\null#1\crcr\hidewidth\raise-.31ex
1220     \hbox{\check@mathfonts\fontsize\ssf@size\z@
1221       \math@fontsfalse\selectfont,\}\hidewidth}\egroup}
1222 \DeclareUnicodeComposite{\`{}}            {\{"005E}}
1223 \DeclareUnicodeComposite{\~{}}            {\ {"007E}}
1224 \DeclareUnicodeComposite{\'}              {\A\ {"00C0}}
1225 \DeclareUnicodeComposite{\'}              {\A\ {"00C1}}
1226 \DeclareUnicodeComposite{\^{\ }}        {\A\ {"00C2}}
1227 \DeclareUnicodeComposite{\~{\ }}        {\A\ {"00C3}}
1228 \DeclareUnicodeComposite{\\"{\ }}        {\A\ {"00C4}}
1229 \DeclareUnicodeComposite{\r{\ }}        {\A\ {"00C5}}
1230 \DeclareUnicodeComposite{\c{\ }}        {\C\ {"00C7}}
1231 \DeclareUnicodeComposite{\'{\ }}        {\E\ {"00C8}}
1232 \DeclareUnicodeComposite{\'{\ }}        {\E\ {"00C9}}
1233 \DeclareUnicodeComposite{\~{\ }}        {\E\ {"00CA}}
1234 \DeclareUnicodeComposite{\\"{\ }}        {\E\ {"00CB}}
1235 \DeclareUnicodeComposite{\'{\ }}        {\I\ {"00CC}}
1236 \DeclareUnicodeComposite{\'{\ }}        {\I\ {"00CD}}
1237 \DeclareUnicodeComposite{\^{\ }}        {\I\ {"00CE}}
1238 \DeclareUnicodeComposite{\\"{\ }}        {\I\ {"00CF}}
1239 \DeclareUnicodeComposite{\~{\ }}        {\N\ {"00D1}}
1240 \DeclareUnicodeComposite{\'{\ }}        {\O\ {"00D2}}
1241 \DeclareUnicodeComposite{\'{\ }}        {\O\ {"00D3}}
1242 \DeclareUnicodeComposite{\^{\ }}        {\O\ {"00D4}}
1243 \DeclareUnicodeComposite{\~{\ }}        {\O\ {"00D5}}
1244 \DeclareUnicodeComposite{\\"{\ }}        {\O\ {"00D6}}
1245 \DeclareUnicodeComposite{\'{\ }}        {\U\ {"00D9}}
1246 \DeclareUnicodeComposite{\'{\ }}        {\U\ {"00DA}}
1247 \DeclareUnicodeComposite{\~{\ }}        {\U\ {"00DB}}
1248 \DeclareUnicodeComposite{\\"{\ }}        {\U\ {"00DC}}
1249 \DeclareUnicodeComposite{\'{\ }}        {\Y\ {"00DD}}
1250 \DeclareUnicodeComposite{\'{\ }}        {\a\ {"00E0}}
1251 \DeclareUnicodeComposite{\'{\ }}        {\a\ {"00E1"}}

```

```

1252 \DeclareUnicodeComposite{\^}{\a}{00E2}
1253 \DeclareUnicodeComposite{\~}{\a}{00E3}
1254 \DeclareUnicodeComposite{\`}{\a}{00E4}
1255 \DeclareUnicodeComposite{\r}{\a}{00E5}
1256 \DeclareUnicodeComposite{\c}{\c}{00E7}
1257 \DeclareUnicodeComposite{\'}{\e}{00E8}
1258 \DeclareUnicodeComposite{\'}{\e}{00E9}
1259 \DeclareUnicodeComposite{\^}{\e}{00EA}
1260 \DeclareUnicodeComposite{\~}{\e}{00EB}
1261 \DeclareUnicodeComposite{\`}{\i}{00EC}
1262 \DeclareUnicodeComposite{\'}{\i}{00ED}
1263 \DeclareUnicodeComposite{\'}{\i}{00ED}
1264 \DeclareUnicodeComposite{\'}{\i}{00EE}
1265 \DeclareUnicodeComposite{\~}{\i}{00EE}
1266 \DeclareUnicodeComposite{\~}{\i}{00EF}
1267 \DeclareUnicodeComposite{\~}{\i}{00EF}
1268 \DeclareUnicodeComposite{\~}{\n}{00F1}
1269 \DeclareUnicodeComposite{\~}{\o}{00F2}
1270 \DeclareUnicodeComposite{\'}{\o}{00F3}
1271 \DeclareUnicodeComposite{\'}{\o}{00F4}
1272 \DeclareUnicodeComposite{\~}{\o}{00F5}
1273 \DeclareUnicodeComposite{\~}{\o}{00F6}
1274 \DeclareUnicodeComposite{\~}{\u}{00F9}
1275 \DeclareUnicodeComposite{\'}{\u}{00FA}
1276 \DeclareUnicodeComposite{\'}{\u}{00FB}
1277 \DeclareUnicodeComposite{\~}{\u}{00FC}
1278 \DeclareUnicodeComposite{\~}{\y}{00FD}
1279 \DeclareUnicodeComposite{\'}{\y}{00FF}
1280 \DeclareUnicodeComposite{\~}{\y}{0100}
1281 \DeclareUnicodeComposite{\=}{\a}{0101}
1282 \DeclareUnicodeComposite{\=}{\a}{0102}
1283 \DeclareUnicodeComposite{\u}{\a}{0103}
1284 \DeclareUnicodeComposite{\u}{\a}{0104}
1285 \DeclareUnicodeComposite{\k}{\a}{0105}
1286 \DeclareUnicodeComposite{\k}{\c}{0106}
1287 \DeclareUnicodeComposite{\'}{\c}{0107}
1288 \DeclareUnicodeComposite{\~}{\c}{0108}
1289 \DeclareUnicodeComposite{\~}{\c}{0109}
1290 \DeclareUnicodeComposite{\.}{\c}{010A}
1291 \DeclareUnicodeComposite{\.}{\c}{010B}
1292 \DeclareUnicodeComposite{\v}{\c}{010C}
1293 \DeclareUnicodeComposite{\v}{\c}{010D}
1294 \DeclareUnicodeComposite{\v}{\d}{010E}
1295 \DeclareUnicodeComposite{\v}{\d}{010F}
1296 \DeclareUnicodeComposite{\v}{\e}{0112}
1297 \DeclareUnicodeComposite{\=}{\e}{0113}
1298 \DeclareUnicodeComposite{\=}{\e}{0114}
1299 \DeclareUnicodeComposite{\u}{\e}{0115}
1300 \DeclareUnicodeComposite{\u}{\e}{0116}
1301 \DeclareUnicodeComposite{\.}{\e}{0117}
1302 \DeclareUnicodeComposite{\.}{\e}{0118}
1303 \DeclareUnicodeComposite{\k}{\e}{0119}
1304 \DeclareUnicodeComposite{\k}{\e}{011A}
1305 \DeclareUnicodeComposite{\v}{\e}{011A}

```

```

1306 \DeclareUnicodeComposite{\v} {e}{"011B}
1307 \DeclareUnicodeComposite{\^} {G}{"011C}
1308 \DeclareUnicodeComposite{\u} {g}{"011D}
1309 \DeclareUnicodeComposite{\u} {G}{"011E}
1310 \DeclareUnicodeComposite{\u} {g}{"011F}
1311 \DeclareUnicodeComposite{\.} {G}{"0120}
1312 \DeclareUnicodeComposite{\.} {g}{"0121}
1313 \DeclareUnicodeComposite{\c} {G}{"0122}
1314 \DeclareUnicodeComposite{\c} {g}{"0123}
1315 \DeclareUnicodeComposite{\^} {H}{"0124}
1316 \DeclareUnicodeComposite{\~} {h}{"0125}
1317 \DeclareUnicodeComposite{\~} {I}{"0128}
1318 \DeclareUnicodeComposite{\~} {\i {"0129}}
1319 \DeclareUnicodeComposite{\~} {\i {"0129}}
1320 \DeclareUnicodeComposite{\=} {\i {"012A}}
1321 \DeclareUnicodeComposite{\=} {\i {"012B}}
1322 \DeclareUnicodeComposite{\=} {\i {"012B}}
1323 \DeclareUnicodeComposite{\u} {\i {"012C}}
1324 \DeclareUnicodeComposite{\u} {\i {"012D}}
1325 \DeclareUnicodeComposite{\u} {\i {"012D}}
1326 \DeclareUnicodeComposite{\k} {\i {"012E}}
1327 \DeclareUnicodeComposite{\k} {\i {"012F}}
1328 \DeclareUnicodeComposite{\k} {\i {"012F}}
1329 \DeclareUnicodeComposite{\.} {\i {"0130}}
1330 \DeclareUnicodeComposite{\^} {\j {"0134}}
1331 \DeclareUnicodeComposite{\^} {\j {"0135}}
1332 \DeclareUnicodeComposite{\^} {\j {"0135}}
1333 \DeclareUnicodeComposite{\c} {\K {"0136}}
1334 \DeclareUnicodeComposite{\c} {\k {"0137}}
1335 \DeclareUnicodeComposite{\'} {\L {"0139}}
1336 \DeclareUnicodeComposite{\'} {\l {"013A}}
1337 \DeclareUnicodeComposite{\c} {\L {"013B}}
1338 \DeclareUnicodeComposite{\c} {\l {"013C}}
1339 \DeclareUnicodeComposite{\v} {\L {"013D}}
1340 \DeclareUnicodeComposite{\v} {\l {"013E}}
1341 \DeclareUnicodeComposite{\'} {\N {"0143}}
1342 \DeclareUnicodeComposite{\'} {\n {"0144}}
1343 \DeclareUnicodeComposite{\c} {\N {"0145}}
1344 \DeclareUnicodeComposite{\c} {\n {"0146}}
1345 \DeclareUnicodeComposite{\v} {\N {"0147}}
1346 \DeclareUnicodeComposite{\v} {\n {"0148}}
1347 \DeclareUnicodeComposite{\=} {\O {"014C}}
1348 \DeclareUnicodeComposite{\=} {\o {"014D}}
1349 \DeclareUnicodeComposite{\u} {\O {"014E}}
1350 \DeclareUnicodeComposite{\u} {\o {"014F}}
1351 \DeclareUnicodeComposite{\H} {\O {"0150}}
1352 \DeclareUnicodeComposite{\H} {\o {"0151}}
1353 \DeclareUnicodeComposite{\'} {\R {"0154}}
1354 \DeclareUnicodeComposite{\'} {\r {"0155}}
1355 \DeclareUnicodeComposite{\c} {\R {"0156}}
1356 \DeclareUnicodeComposite{\c} {\r {"0157}}
1357 \DeclareUnicodeComposite{\v} {\R {"0158}}
1358 \DeclareUnicodeComposite{\v} {\r {"0159}}
1359 \DeclareUnicodeComposite{\'} {\S {"015A}}

```

```

1360 \DeclareUnicodeComposite{\'} {s}{"015B}
1361 \DeclareUnicodeComposite{\^} {S}{"015C}
1362 \DeclareUnicodeComposite{\~} {s}{"015D}
1363 \DeclareUnicodeComposite{\c} {S}{"015E}
1364 \DeclareUnicodeComposite{\c} {s}{"015F}
1365 \DeclareUnicodeComposite{\v} {S}{"0160}
1366 \DeclareUnicodeComposite{\v} {s}{"0161}
1367 \DeclareUnicodeComposite{\c} {T}{"0162}
1368 \DeclareUnicodeComposite{\c} {t}{"0163}
1369 \DeclareUnicodeComposite{\v} {T}{"0164}
1370 \DeclareUnicodeComposite{\v} {t}{"0165}
1371 \DeclareUnicodeComposite{\~} {U}{"0168}
1372 \DeclareUnicodeComposite{\~} {u}{"0169}
1373 \DeclareUnicodeComposite{\=} {U}{"016A}
1374 \DeclareUnicodeComposite{\=} {u}{"016B}
1375 \DeclareUnicodeComposite{\u} {U}{"016C}
1376 \DeclareUnicodeComposite{\u} {u}{"016D}
1377 \DeclareUnicodeComposite{\r} {U}{"016E}
1378 \DeclareUnicodeComposite{\r} {u}{"016F}
1379 \DeclareUnicodeComposite{\H} {U}{"0170}
1380 \DeclareUnicodeComposite{\H} {u}{"0171}
1381 \DeclareUnicodeComposite{\k} {U}{"0172}
1382 \DeclareUnicodeComposite{\k} {u}{"0173}
1383 \DeclareUnicodeComposite{\^} {W}{"0174}
1384 \DeclareUnicodeComposite{\^} {w}{"0175}
1385 \DeclareUnicodeComposite{\~} {Y}{"0176}
1386 \DeclareUnicodeComposite{\~} {y}{"0177}
1387 \DeclareUnicodeComposite{\"} {Y}{"0178}
1388 \DeclareUnicodeComposite{\'} {Z}{"0179}
1389 \DeclareUnicodeComposite{\'} {z}{"017A}
1390 \DeclareUnicodeComposite{\.} {Z}{"017B}
1391 \DeclareUnicodeComposite{\.} {z}{"017C}
1392 \DeclareUnicodeComposite{\v} {Z}{"017D}
1393 \DeclareUnicodeComposite{\v} {z}{"017E}
1394 \DeclareUnicodeComposite{\v} {A}{"01CD}
1395 \DeclareUnicodeComposite{\v} {a}{"01CE}
1396 \DeclareUnicodeComposite{\v} {I}{"01CF}
1397 \DeclareUnicodeComposite{\v} {\i {"01D0}}
1398 \DeclareUnicodeComposite{\v} {i}{"01D0}
1399 \DeclareUnicodeComposite{\v} {O}{"01D1}
1400 \DeclareUnicodeComposite{\v} {o}{"01D2}
1401 \DeclareUnicodeComposite{\v} {U}{"01D3}
1402 \DeclareUnicodeComposite{\v} {u}{"01D4}
1403 \DeclareUnicodeComposite{\=} {\AE{"01E2}}
1404 \DeclareUnicodeComposite{\=} {\ae{"01E3}}
1405 \DeclareUnicodeComposite{\v} {G}{"01E6}
1406 \DeclareUnicodeComposite{\v} {g}{"01E7}
1407 \DeclareUnicodeComposite{\v} {K}{"01E8}
1408 \DeclareUnicodeComposite{\v} {k}{"01E9}
1409 \DeclareUnicodeComposite{\k} {O}{"01EA}
1410 \DeclareUnicodeComposite{\k} {o}{"01EB}
1411 \DeclareUnicodeComposite{\v} {\j {"01F0}}
1412 \DeclareUnicodeComposite{\v} {j}{"01F0}
1413 \DeclareUnicodeComposite{\'} {G}{"01F4}

```

```

1414 \DeclareUnicodeComposite{\'} {g}{"01F5}
1415 \DeclareUnicodeComposite{\textcommabelow}{S}{"0218}
1416 \DeclareUnicodeComposite{\textcommabelow}{s}{"0219}
1417 \DeclareUnicodeComposite{\textcommabelow}{T}{"021A}
1418 \DeclareUnicodeComposite{\textcommabelow}{t}{"021B}
1419 \DeclareUnicodeComposite{\=} {Y}{"0232}
1420 \DeclareUnicodeComposite{\=} {y}{"0233}
1421 \DeclareUnicodeComposite{\.}{B}{"1E02}
1422 \DeclareUnicodeComposite{\.}{b}{"1E03}
1423 \DeclareUnicodeComposite{\d}{B}{"1E04}
1424 \DeclareUnicodeComposite{\d}{b}{"1E05}
1425 \DeclareUnicodeComposite{\d}{D}{"1E0C}
1426 \DeclareUnicodeComposite{\d}{d}{"1E0D}
1427 \DeclareUnicodeComposite{\=} {G}{"1E20}
1428 \DeclareUnicodeComposite{\=} {g}{"1E21}
1429 \DeclareUnicodeComposite{\d}{H}{"1E24}
1430 \DeclareUnicodeComposite{\d}{h}{"1E25}
1431 \DeclareUnicodeComposite{\d}{K}{"1E32}
1432 \DeclareUnicodeComposite{\d}{k}{"1E33}
1433 \DeclareUnicodeComposite{\d}{L}{"1E36}
1434 \DeclareUnicodeComposite{\d}{l}{"1E37}
1435 \DeclareUnicodeComposite{\d}{M}{"1E42}
1436 \DeclareUnicodeComposite{\d}{m}{"1E43}
1437 \DeclareUnicodeComposite{\d}{N}{"1E46}
1438 \DeclareUnicodeComposite{\d}{n}{"1E47}
1439 \DeclareUnicodeComposite{\d}{R}{"1E5A}
1440 \DeclareUnicodeComposite{\d}{r}{"1E5B}
1441 \DeclareUnicodeComposite{\d}{S}{"1E62}
1442 \DeclareUnicodeComposite{\d}{s}{"1E63}
1443 \DeclareUnicodeComposite{\d}{T}{"1E6C}
1444 \DeclareUnicodeComposite{\d}{t}{"1E6D}
1445 \DeclareUnicodeComposite{\d}{V}{"1E7E}
1446 \DeclareUnicodeComposite{\d}{v}{"1E7F}
1447 \DeclareUnicodeComposite{\d}{W}{"1E88}
1448 \DeclareUnicodeComposite{\d}{w}{"1E89}
1449 \DeclareUnicodeComposite{\d}{Z}{"1E92}
1450 \DeclareUnicodeComposite{\d}{z}{"1E93}
1451 \DeclareUnicodeComposite{\d}{A}{"1EA0}
1452 \DeclareUnicodeComposite{\d}{a}{"1EA1}
1453 \DeclareUnicodeComposite{\d}{E}{"1EB8}
1454 \DeclareUnicodeComposite{\d}{e}{"1EB9}
1455 \DeclareUnicodeComposite{\d}{I}{"1ECA}
1456 \DeclareUnicodeComposite{\d}{i}{"1ECB}
1457 \DeclareUnicodeComposite{\d}{O}{"1ECC}
1458 \DeclareUnicodeComposite{\d}{o}{"1ECD}
1459 \DeclareUnicodeComposite{\d}{U}{"1EE4}
1460 \DeclareUnicodeComposite{\d}{u}{"1EE5}
1461 \DeclareUnicodeComposite{\d}{Y}{"1EF4}
1462 \DeclareUnicodeComposite{\d}{y}{"1EF5}
1463 

```

2 Package files

This file now also contains some packages that provide access to the more specialised encodings.

2.1 The fontenc package

This package allows authors to specify which encodings they will use. For each encoding FOO, the package looks to see if the encoding FOO has already been declared. If it has not, the file `fooenc.def` is loaded. The default encoding is set to be FOO.

In addition the package at the moment contains extra code to extend the `\@uclclist` (list of upper/lower case pairs) for encodings that involve cyrillic characters. THIS IS A TEMPORARY SOLUTION and will not stay this way forever (or so we hope) but right now we are missing a proper interface for this and didn't wanted to rush it.

1464 `<*package>`

Here we define a macro that extends the `\@uclclist` if needed and afterwards turns itself in a noop.

```
1465 \def\update@uclc@with@cyrillic{%
1466   \expandafter\def\expandafter@\uclclist\expandafter
1467   { \uclclist
1468     \cyla\CYRA\cyrabhch\CYRABHCH\cyrabhchdsc\CYRABHCHDSC\cyrabhdze
1469     \CYRABHDZE\cyrabhha\CYRABHHA\cyrae\CYRAE\cyrb\CYRB\cyrbyus
1470     \CYRBYUS\cycr\CYRC\cyrch\CYRCH\cyrchldsc\CYRCHLDSC\cyrchrdsc
1471     \CYRCHRDSC\cyrchvcrs\CYRCHVCRS\cyrd\CYRD\cyrdelta\CYRDELTA
1472     \cyrdje\CYRDJE\cyrdze\CYRDZE\cyrdzhe\CYRDZHE\cyre\CYRE\cyreps
1473     \CYREPS\cyrerev\CYREREV\cyrery\CYRERY\cyrf\CYRF\cyrfita
1474     \CYRFITA\cyrg\CYRG\cyrgdsc\CYRGDSC\cyrgdschcrs\CYRGDSCHCRS
1475     \cyrgchcrs\CYRGHCRS\cyrghk\CYRGHK\cyrgup\CYRGUP\cyrh\CYRH
1476     \cyrhdsc\CYRHDSC\cyrhhcrs\CYRHHCRS\cyrrhk\CYRHHK\cyrrhdsn
1477     \CYRHRDSN\cyri\CYRI\cyrie\CYRIE\cyrii\CYRII\cyrishrt\CYRISHRT
1478     \cyrishrtsc\CYRISHRTDSC\cyrizh\CYRIZH\cyrje\CYRJE\cyrk\CYRK
1479     \cyrkbeak\CYRKBEAK\cyrkdesc\CYRKDSC\cyrkhcrs\CYRKHCRS\cyrkhk
1480     \CYRKHK\cyrkvcrs\CYRKVCRS\cyrl\CYRL\cyrldesc\CYRLDSC\cyrlh
1481     \CYRLHK\cyrlje\CYRLJE\cyrm\CYRM\cyrmdesc\CYRMDSC\cyrmhk\CYRMHK
1482     \cyrn\CYRN\cyrndsc\CYRNDS\cyrng\CYRNG\cyrnhk\CYRNHK\cyrnje
1483     \CYRNJE\cyrnlhk\CYRNLHK\cyro\CYRO\cyrotld\CYROTLD\cyrp\CYRP
1484     \cyrphk\CYRPHK\cyrq\CYRQ\cyrr\CYRR\cyrrdesc\CYRRDSC\cyrrhk
1485     \CYRRHK\cyrrtck\CYRRTICK\crys\CYRS\crysacrs\CYRSACRS
1486     \cryscha\CYRSCHWA\crysdesc\CYRSDSC\cyrsemisftsn\CYRSEMISFTSN
1487     \crysftsn\CYRSFTSN\cyrsh\CYRSH\cyrshch\CYRSHCH\cyrshha\CYRSHHA
1488     \cyrt\CYRT\cyrtdesc\CYRTDSC\cyrtetse\CYRTETSE\cyrtshe\CYRTSHE
1489     \cyru\CYRU\cyrushrt\CYRUSHRT\cyrv\CYRV\cyrw\CYRW\ciry\CYRY
1490     \carya\CYRYA\carya\CYRYAT\carya\carya\CYRYHCRS\carya\CYRYI\carya
1491     \CYRYO\carya\CYRYU\carya\CYRZ\carya\CYRZdesc\CYRZDSC\carya\CYRZH
1492     \carya\carya\CYRZHDSC}%
1493   \let\update@uclc@with@cyrillic\relax
1494 }
```

Here we process each option:

```
1495 \DeclareOption*{%
1496   \let\encodingdefault\CurrentOption
```

From 2020/02/02 release onward we only load the encoding files if they haven't be loaded already. To check this we look if `\T@encoding` is already defined. If not we load (indicated by setting the switch `@tempswa` to true and we always load if we run in an older format (or rather in a rollback situation).

```

1497     \@tempswafalse
1498     \@ifl@t@r\fmtversion{2020/02/02}%
1499         {\expandafter\ifx\csname T@\CurrentOption\endcsname\relax
1500             \@tempswatrue\fi}%
1501         {\@tempswatrue}%

```

Load if necessary:

```

1502     \if@tempswa
1503         \edef\reserved@f{%
1504             \lowercase{\def\noexpand\reserved@f{\CurrentOption enc.def}}}%
1505         \reserved@f
1506         \InputIfFileExists\reserved@f
1507             {}{\PackageError{fontenc}%
1508                 {Encoding file '\reserved@f' not found.%}
1509                 \MessageBreak
1510                 You might have misspelt the name of the encoding}%
1511                 {Necessary code for this encoding was not
1512                  loaded.\MessageBreak
1513                  Thus calling the encoding later on will
1514                  produce further error messages.}%
1515         \let\reserved@f\relax

```

In case the current encoding is one of a list of known cyrillic ones we extend the `\@uclclist`:

```

1516     \expandafter\in@\expandafter{\CurrentOption}%
1517                     {T2A,T2B,T2C,X2,LCY,OT2}%
1518     \ifin@

```

But only if it hasn't already been extended. This might happen if there are several calls to fontenc loading one of the above encodings. If we don't do this check the `\@uclclist` gets unnecessarily big, slowing down the processing at runtime.

```

1519     \expandafter\in@\expandafter\cyra\expandafter
1520                     {\@uclclist}%
1521     \ifin@
1522     \else
1523         \update@uclc@with@cyrillic
1524     \fi
1525     \fi
1526 \fi
1527 }

```

`\ProcessOptions*`

We select the new font encoding default (i.e., the last encoding specified in the option list. But this encoding may not work with the current `\f@shape`, e.g., LY1 is not defined for `cmtt` and therefore packages switching to LY1 usually also change `\rmdefault`. But that only applies at `\begin{document}` so we get a spurious warning if we use what L^AT_EX previously used:

```

1529 \%fontencoding\encodingdefault\selectfont

```

So instead we do this here:

```
1530 \usefont\encodingdefault\familydefault\seriesdefault\shapedefault
```

To save some space we get rid of the macro extending the \@uclclist (might have happened already).

```
1531 \let\update@uclc@with@cyrillic\relax
```

Finally we pretend that the fontenc package wasn't read in. This allows for using it several times, e.g., in a class file and in the preamble (at the cost of not getting any version info). That kind of hackery shows that using a general purpose package just for loading an encoding is not the right kind of interface for setting up encodings — it will get replaced at some point in the future.

```
1532 \let\@elt\relax
1533 \xdef\@fontenc@load@list{\@fontenc@load@list
1534   \@elt{\csname opt@fontenc.sty\endcsname}}
1535 \global\expandafter\let\csname ver@fontenc.sty\endcsname\relax
1536 \global\expandafter\let\csname opt@fontenc.sty\endcsname\relax
1537 \global\let\@ifl@ter@@\@ifl@ter
1538 \def\@ifl@ter#1#2#3#4#5{\global\let\@ifl@ter\@ifl@ter@@}
1539 
```

File p

ltcounts.dtx

1 Counters and Lengths

Commands for defining and using counters. This file defines:

```
\newcounter      To define a new counter.  
\setcounter    To set the value of counters.  
\addtocounter Increase the counter #1 by the number #2.  
\stepcounter   Increase a counter by one.  
\refstepcounter Increase a counter by one, also setting the value used by \label.  
\value         For accessing the value of the counter as a TeX number (as opposed to \the<counter>) which expands to the printed representation of <counter>  
\arabic{<counter>}: 1, 2, 3, ...  
\roman{<counter>}: i, ii, iii, ...  
\Roman{<counter>}: I, II, III, ...  
\alph{<counter>}: a, b, c, ...  
\Alpha{<counter>}: A, B, C, ...  
\fnsymbol{<counter>}: *, †, ‡, ...  
\counterwithin{<counter>}{<within-counter>}: Resets <counter> whenever <within-counter> is stepped. Also redefines \the<counter> command to produce \the<within-counter>. \arabic{<counter>} Star form omits redefining the print representation.  
\counterwithout{<counter>}{<within-counter>}: Removes <counter> from the reset list of <within-counter>. Also redefines \the<counter> command to produce \arabic{<counter>}. Star form omits redefining the print representation.  
¹ {*2ekernel}
```

1.1 Environment Counter Macros

An environment foo has an associated counter defined by the following control sequences:

\c@foo Contains the counter's numerical value. It is defined by
\newcount\foocount.

\thefoo Macro that expands to the printed value of \foocount. For example, if sections are numbered within chapters, and section headings look like

Section II-3. The Nature of Counters
then \thesection might be defined by:

\def\thesection
{\@Roman{\c@chapter}-\arabic{\c@section}}

\p@foo Macro that expands to a printed 'reference prefix' of counter foo. Any \ref to a value created by counter foo will produce the expansion of \p@foo\thefoo when the \label command is executed. See file ltxref.dtx for an extension of this mechanism.

\cl@foo List of counters to be reset when foo stepped. Has format
\@elt{counterA}\@elt{counterB}\@elt{counterC}.

NOTE:

\thefoo and \p@foo must be defined in such a way that \edef\bar{\thefoo} or \edef\bar{\p@foo} defines \bar so that it will evaluate to the counter value at the

time of the `\edef`, even after `\foocounter` and any other counters have been changed. This will happen if you use the standard commands `\@arabic`, `\@Roman`, etc.

The following commands are used to define and modify counters.

`\refstepcounter{<foo>}`

Same as `\stepcounter`, but it also defines `\currentreference` so that a subsequent `\label{<bar>}` command causes `\ref{<bar>}` to generate the current value of counter `<foo>`.

`\@definecounter{<foo>}`

Initializes counter `{<foo>}` (with empty reset list), defines `\p@foo` and `\thefoo` to be null. Also adds `<foo>` to `\cl@ckpt` – the reset list of a dummy counter `@ckpt` used for taking checkpoints for the `\include` system.

`\@addtoreset{<foo>}{<bar>}` : Adds counter `<foo>` to the list of counters `\cl@bar` to be reset when counter `<bar>` is stepped.

`\@removefromreset{<foo>}{<bar>}` : Removes counter `<foo>` to the list of counters `\cl@bar` to be reset when counter `<bar>` is stepped.

`\setcounter` `\setcounter{<foo>}{<val>}` : Globally sets `\foocounter` equal to `<val>`.

```

2 \def\setcounter#1#2{%
3   \@ifundefined{c@#1}%
4     {\@nocounterr{#1}}%
5     {\global\csname c@#1\endcsname#2\relax}}
```

(End definition for `\setcounter`.)

`\addtocounter` `\addtocounter{<foo>}{<val>}` Globally increments `\foocounter` by `<val>`.

```

6 \def\addtocounter#1#2{%
7   \@ifundefined{c@#1}%
8     {\@nocounterr{#1}}%
9     {\global\advance\csname c@#1\endcsname #2\relax}}
```

(End definition for `\addtocounter`.)

`\newcounter` `\newcounter{<newctr>}[<oldctr>]` Defines `<newctr>` to be a counter, which is reset when counter `<oldctr>` is stepped. If `<newctr>` already defined produces ‘`c@newctr already defined`’ error.

```

10 \def\newcounter#1{%
11   \expandafter\@ifdefinable \csname c@#1\endcsname
12     {\@definecounter{#1}}%
13     {\@ifnextchar[\{\@newctr{#1}\}{}}}
```

(End definition for `\newcounter`.)

`\value` `\value{<ctr>}` produces the value of counter `<ctr>`, for use with a `\setcounter` or `\addtocounter` command.

```
14 \def\value#1{\csname c@#1\endcsname}
```

(End definition for `\value`.)

`\@newctr`

```

15 \def\@newctr#1[#2]{%
16   \@ifundefined{c@#2}{\@nocounterr{#2}}{\@addtoreset{#1}{#2}}}
```

(End definition for `\@newctr`.)

```

\stepcounter \stepcounterfoo Globally increments counter \c@FOO and resets all subsidiary counters.
17 \def\stepcounter#1{%
18   \addtocounter{#1}\@ne
19   \begingroup
20     \let\@elt\@stpelt
21     \csname cl@#1\endcsname
22   \endgroup}

(End definition for \stepcounter.)

\@stpelt Rather than resetting the “within” counter to zero we set it to -1 and then run
\stepcounter that moves it to 0 and also initiates resetting the next level down.
23 </2ekernel>
24 <latexrelease>\IncludeInRelease{2015/01/01}{\@stpelt}
25 <latexrelease>                                {Reset nested counters}%
26 {*2ekernel | latexrelease}
27 \def\@stpelt#1{\global\csname c@#1\endcsname \m@ne\stepcounter{#1}%
28 <latexrelease>\EndIncludeInRelease
29 </2ekernel | latexrelease>
30 <latexrelease>\IncludeInRelease{0000/00/00}{\@stpelt}
31 <latexrelease>                                {Reset nested counters}%
32 <latexrelease>\def\@stpelt#1{\global\csname c@#1\endcsname \z@}%
33 <latexrelease>\EndIncludeInRelease
34 {*2ekernel}

(End definition for \@stpelt.)

\cl@ckpt
35 \def\cl@ckpt{\@elt{page}}


(End definition for \cl@ckpt.)

\@definecounter
36 \def\@definecounter#1{\expandafter\newcount\csname c@#1\endcsname
37   \setcounter{#1}\z@
38   \global\expandafter\let\csname cl@#1\endcsname\@empty
39   \addtoreset{#1}{\@ckpt}%
40   \global\expandafter\let\csname p@#1\endcsname\@empty
41   \expandafter
42   \gdef\csname the#1\expandafter\endcsname\expandafter
43     {\expandafter\@arabic\csname c@#1\endcsname}}


(End definition for \@definecounter.)

\@addtoreset
44 \def\@addtoreset#1#2{\expandafter\@cons\csname cl@#2\endcsname {{#1}}}

(End definition for \@addtoreset.)

45 </2ekernel>

\@removefromreset
46 <latexrelease>\IncludeInRelease{2018-04-01}%
47 <latexrelease>                                {\@removefromreset}{Add interfaces}%
48 {*2ekernel | latexrelease}

```

```
49 \def\@removefromreset#1#2{%
```

Even through this is internal and the programmer should know what he/she is doing we test here if counter #2 is defined. If not, the execution would run into a tight loop.

```
50 \@ifundefined{c@#2}\relax
51 {\begingroup
52   \expandafter\let\csname c@#1\endcsname\@removefromreset
53   \def\@elt##1{%
54     \expandafter\ifx\csname c##1\endcsname\@removefromreset
55     \else
56       \noexpand\@elt{##1}%
57     \fi}%
58   \expandafter\xdef\csname cl@#2\endcsname
59   {\csname cl@#2\endcsname}%
60 }\endgroup}
```

(*End definition for \@removefromreset.*)

\@ifbothcounters Test if arg #1 and #2 are counters and if so execute #3.

```
61 \def\@ifbothcounters#1#2#3{%
62   \@ifundefined{c@#1}{\@nocounterr{#1}}%
63   {%
64     \@ifundefined{c@#2}{\@nocounterr{#2}}%
65     {%
66       both counter and within are defined
67       #3}}}
```

(*End definition for \@ifbothcounters.*)

\counterwithout

```
67 \def\counterwithout {\@ifstar\counterwithout@s\counterwithout@x}
68 \def\counterwithout@s#1#2{%
69   \@ifbothcounters{#1}{#2}{\@removefromreset{#1}{#2}}}
70 \def\counterwithout@x#1#2{%
71   \@ifbothcounters{#1}{#2}{%
72     {\@removefromreset{#1}{#2}}%
73     \expandafter
74     \gdef\csname the#1\expandafter\endcsname\expandafter
75     {\expandafter
76      \arabic\csname c@#1\endcsname}}}
```

(*End definition for \counterwithout.*)

\counterwithin

```
77 \def\counterwithin{\@ifstar\counterwithin@s\counterwithin@x}
78 \def\counterwithin@s#1#2{%
79   \@ifbothcounters{#1}{#2}{\@addtoreset{#1}{#2}}}
80 \def\counterwithin@x#1#2{%
81   \@ifbothcounters{#1}{#2}{%
82     {\@addtoreset{#1}{#2}}%
83     \expandafter
84     \gdef\csname the#1\expandafter\endcsname\expandafter
85     {\csname the#2\expandafter\endcsname\expandafter
86      .\expandafter
87      \arabic\csname c@#1\endcsname}}}
```

```

(End definition for \counterwithin.)  

88 </2ekernel | latexrelease>  

89 <latexrelease>\EndIncludeInRelease  

90 <latexrelease>\IncludeInRelease{0000-00-00}  

91 <latexrelease>                                {\@removefromreset}{Add interfaces}%
92 <latexrelease>\let \@removefromreset \undefined  

93 <latexrelease>\let \@ifbothcounters \undefined  

94 <latexrelease>\let \counterwithout \undefined  

95 <latexrelease>\let \counterwithout@s \undefined  

96 <latexrelease>\let \counterwithout@x \undefined  

97 <latexrelease>\let \counterwithin \undefined  

98 <latexrelease>\let \counterwithin@s \undefined  

99 <latexrelease>\let \counterwithin@x \undefined  

100 <latexrelease>\EndIncludeInRelease  

101 {*2ekernel}

```

Numbering commands for definitions of `\theCOUNTER` and `\list` arguments.
All commands can now be used in text and math mode.

\arabic Representation of `\langle counter \rangle` as arabic numerals. Changed 29 Apr 86 to make it print the obvious thing it COUNTER not positive.

```
102 \def\arabic#1{\expandafter\@arabic\csname c@\#1\endcsname}
```

(End definition for \arabic.)

\roman Representation of `\langle counter \rangle` as lower-case Roman numerals.

```
103 \def\roman#1{\expandafter\@roman\csname c@\#1\endcsname}
```

(End definition for \roman.)

\Roman Representation of `\langle counter \rangle` as upper-case Roman numerals.

```
104 \def\Roman#1{\expandafter\@Roman\csname c@\#1\endcsname}
```

(End definition for \Roman.)

\alph Representation of `\langle counter \rangle` as a lower-case letter: 1 = a, 2 = b, etc.

```
105 \def\alph#1{\expandafter\@alph\csname c@\#1\endcsname}
```

(End definition for \alph.)

\Alph Representation of `\langle counter \rangle` as an upper-case letter: 1 = A, 2 = B, etc.

```
106 \def\Alph#1{\expandafter\@Alph\csname c@\#1\endcsname}
```

(End definition for \Alph.)

\fnsymbol Representation of `\langle COUNTER \rangle` as a footnote symbol: 1 = *, 2 = †, etc.

```
107 \def\fnsymbol#1{\expandafter\@fnsymbol\csname c@\#1\endcsname}
```

(End definition for \fnsymbol.)

\@arabic \@arabic\FOOcounter Representation of \FOOcounter as arabic numerals.

```
108 \def\@arabic#1{\number #1} %% changed 29 Apr 86
```

(End definition for \@arabic.)

```

\@roman  \@roman\FOOcounter Representation of \FOOcounter as lower-case Roman numerals.
109 \def\@roman#1{\romannumeral #1}
(End definition for \@roman.)

\@Roman  \@Roman\FOOcounter Representation of \FOOcounter as upper-case Roman numerals.
110 \def\@Roman#1{\expandafter\@slowromancap\romannumeral #1@}
(End definition for \@Roman.)

\@slowromancap Fully expandable macro to change a roman number to uppercase.
111 \def\@slowromancap#1{\ifx @#1% then terminate
112   \else
113     \if i#1I\else\if v#1V\else\if x#1X\else\if l#1L\else\if
114       c#1C\else\if d#1D\else \if m#1M\else#1\fi\fi\fi\fi\fi\fi\fi\fi
115     \expandafter\@slowromancap
116   \fi
117 }
(End definition for \@slowromancap.)

\@alph  \@alph\FOOcounter Representation of \FOOcounter as a lower-case letter: 1 = a, 2 =
b, etc.
118 \def\@alph#1{%
119   \ifcase#1\or a\or b\or c\or d\or e\or f\or g\or h\or i\or j\or
120   k\or l\or m\or n\or o\or p\or q\or r\or s\or t\or u\or v\or w\or x\or
121   y\or z\else\@ctrerr\fi}
(End definition for \@alph.)

\@Alph  \@Alph\FOOcounter Representation of \FOOcounter as an upper-case letter: 1 = A, 2
= B, etc.
122 \def\@Alph#1{%
123   \ifcase#1\or A\or B\or C\or D\or E\or F\or G\or H\or I\or J\or
124   K\or L\or M\or N\or O\or P\or Q\or R\or S\or T\or U\or V\or W\or X\or
125   Y\or Z\else\@ctrerr\fi}
(End definition for \@Alph.)

\@fnsymbol Typesetting old fashioned footnote symbols. This can be done both in text or math mode now.
This macro is another example of an ever recurring problem in TEX: Determining if something is text-mode or math-mode. It is imperative for the decision between text and math to be delayed until the actual typesetting is done as the code in question may go through an \edef or \write where an \ifmmode test would be executed prematurely. Hence in the implementation below, \@fnsymbol is not robust in itself but the parts doing the actual typesetting are.
In the case of \@fnsymbol we make use of the robust command \TextOrMath which takes two arguments and typesets the first if in text-mode and the second if in math-mode. Note that in order for this command to make the correct decision, it must insert a \relax token if run under regular TEX, which ruins any kerning between the preceding characters and whatever awaits typesetting. If you use eTEX as engine for LATEX (as recommended) this unfortunate side effect is not present.

```

```

126  </2ekernel>
127  <texreleas>\IncludeInRelease{2015/01/01}{\@fnsymbol}{Use \TextOrMath}%
128  {*2ekernel | latexrelease}
129  \def\@fnsymbol#1{%
130      \ifcase#1\or \TextOrMath{textasteriskcentered } \or
131      \TextOrMath{textdagger }\dagger \or
132      \TextOrMath{textdaggerdbl }\ddagger \or
133      \TextOrMath{textsection }\mathsection \or
134      \TextOrMath{textparagraph }\mathparagraph \or
135      \TextOrMath{textbardbl }\textbar \or
136      \TextOrMath{\textasteriskcentered }\textasteriskcentered \or
137      \TextOrMath{\textdagger }\textdagger \or
138      \TextOrMath{\textdaggerdbl }\textdaggerdbl \else
139      \@ctrerr \fi
140  }%
141  </2ekernel | latexrelease>
142  <texreleas>\EndIncludeInRelease
143  <texreleas>\IncludeInRelease{0000/00/00}{\@fnsymbol}{Use \TextOrMath}%
144  <texreleas>\def\@fnsymbol#1{\ensuremath{%
145  <texreleas>\ifcase#1\or *\or \dagger \or \ddagger \or \mathsection \or
146  <texreleas>\mathparagraph \or \textbar \or **\or \dagger\dagger
147  <texreleas>\or \ddagger\ddagger \else\@ctrerr\fi}%
148  <texreleas>\EndIncludeInRelease
149  {*2ekernel}

```

(End definition for `\@fnsymbol`.)

`\TextOrMath` When using regular TeX, we make this command robust so that it always selects the correct branch in an `\ifmmode` switch with the usual disadvantage of ruining kerning. For the application we use it for here that shouldn't matter. The alternative would be to mimic `\IeC` from `inputenc` but then it will have the disadvantage of choosing the wrong branch if appearing at the beginning of an alignment cell. However, users of eTeX will be pleasantly surprised to get the best of both worlds and no bad side effects.

First some code for checking if we are running eTeX but making sure not to permanently turn `\protected` into `\relax`.

```

150  </2ekernel>
151  <texreleas>\IncludeInRelease{2015/01/01}{\TextOrMath}{\TextOrMath}%
152  {*2ekernel | latexrelease}
153  \begingroup\expandafter\expandafter\expandafter\endgroup
154  \expandafter\ifx\csname protected\endcsname\relax

```

In case of ordinary TeX we define `\TextOrMath` as a robust command but make sure it always grabs its arguments. If we didn't do this it might very well gobble spaces in the input stream.

```

155  \DeclareRobustCommand\TextOrMath{%
156  \ifmmode \expandafter\@secondoftwo
157  \else \expandafter\@firstoftwo \fi
158  \protected\edef\TextOrMath#1#2{\TextOrMath{#1}{#2}}
159  \else

```

For eTeX the situation is similar. The robust macro is a hidden one so that we again avoid problems of gobbling spaces in the input.

```

160  \protected\expandafter\def\csname TextOrMath\space\endcsname{%
161  \ifmmode \expandafter\@secondoftwo

```

```

162     \else      \expandafter\@firstoftwo \fi}
163 \edef\TextOrMath#1#2{%
164   \expandafter\noexpand\csname TextOrMath\space\endcsname
165   {#1}{#2}}
166 \fi
167 </2ekernel | latexrelease>
168 <latexrelease>\EndIncludeInRelease
169 <latexrelease>\IncludeInRelease{0000/00/00}{\TextOrMath}{\TextOrMath}%
170 <latexrelease>\let\TextOrMath\@undefined
171 <latexrelease>\EndIncludeInRelease
172 <*2ekernel>

(End definition for \TextOrMath.)

173 </2ekernel>

```

File q

ltlength.dtx

1 Lengths

```
\newlength      Declare #1 to be a new length command.  
\setlength     Set the length command, #1, to the value #2.  
\addtolength   Increase the value of the length command, #1, by the value #2.  
\settowidth    Set the length, #1 to the width of a box containing #2.  
\settoheight   Set the length, #1 to the height of a box containing #2.  
\settodepth    Set the length, #1 to the depth of a box containing #2.  
               1 <*2ekernel>  
               2 \message{lengths,}  
  
\newlength  
               3 \def\newlength#1{\@ifdefinable#1{\newskip#1}}  
  
(End definition for \newlength.)  
  
\setlength  
               4 </2ekernel>  
               5 <latexrelease>\IncludeInRelease{2015/01/01}%  
               6 <latexrelease>          {\setlength}{Using \setlength with \dimen0}%  
               7 <*2ekernel | latexrelease>  
               8 \def\setlength#1#2{#1 #2\relax}  
               9 </2ekernel | latexrelease>  
              10 <latexrelease>\EndIncludeInRelease  
              11 <latexrelease>\IncludeInRelease{0000/00/00}%  
              12 <latexrelease>          {\setlength}{Using \setlength with \dimen0}%  
              13 <latexrelease>\def\setlength#1#2{#1#2\relax}  
              14 <latexrelease>\EndIncludeInRelease  
              15 <*2ekernel>  
  
(End definition for \setlength.)  
  
\addtolength \relax added 24 Mar 86  
               16 \def\addtolength#1#2{\advance#1 #2\relax}  
  
(End definition for \addtolength.)  
  
\settoheight  The obvious analogs of \settowidth.  
\settodepth   17 \def\@settodim#1#2#3{\setbox\@tempboxa\hbox{\{#3\}}#2#1\@tempboxa  
\settowidth    Clear the memory afterwards (which might be a lot).  
               18 \setbox\@tempboxa\box\voidb@x  
               19 \DeclareRobustCommand\settoheight{\@settodim\ht}  
               20 \DeclareRobustCommand\settodepth {\@settodim\dp}  
               21 \DeclareRobustCommand\settowidth {\@settodim\wd}  
  
(End definition for \settoheight and others.)
```

`\@settopoint` This macro takes the contents of the skip register that is supplied as its argument and removes the fractional part to make it a whole number of points. This can be used in class files to avoid values like 345.4666666pt when calculating a dimension.

```
22 \def\@settopoint#1{\divide#1\p@\multiply#1\p@}
23 </2ekernel>
```

(End definition for `\@settopoint`.)

File r

ltfssbas.dtx

This file contains the main implementation of the ‘low level’ font selection commands. See other parts of the L^AT_EX distribution, or *The L^AT_EX Companion* for higher level documentation of the L^AT_EX ‘New’ Font Selection Scheme.

Warning: The macro documentation is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

1 Preliminary macros

We define a number of macros that will be used later.

`\@nomath` `\@nomath` is used by most macros that will have no effect in math mode. It issues a warning message.

```
1 (*2ekernel)
2 \def\@nomath#1{\relax\ifmmode
3   \@font@warning{Command \noexpand#1invalid in math mode}\fi}
```

(End definition for `\@nomath`.)

`\no@alphabet@error` The macro `\no@alphabet@error` is called whenever the user requests a math *alphabet* that is not available in the current *version*. In math mode an error message is produced otherwise the command keeps silent. The argument is the name of the control sequence that identifies the math *alphabet*. The `\relax` at the beginning is necessary to prevent T_EX from scanning too far in certain situations.

```
4 \gdef\no@alphabet@error#1{\relax \ifmmode
5   \@latex@error{Math\space alphabet\space identifier\space
6     \noexpand#1is\space undefined\space in\space math\space
7     version\space ‘\math@version’}%
8   {Your\space requested\space math\space alphabet\space
9     is\space undefined\space in\space the\space current\space
10    math\space version.^^JCheck\space the\space spelling\space
11    or\space use\space the\space \noexpand\SetMathAlphabet\space
12    command.}%
13 \fi}
```

(End definition for `\no@alphabet@error`.)

`\new@mathgroup` `\mathgroup` We also give a new name to `\newfam` and `\fam` to avoid verbal confusion (see the introduction).⁹

```
14 \%def\new@mathgroup{\alloc@8\mathgroup\chardef\sixt@n}
15 \let\mathgroup\fam
16 \%let\newfam\new@mathgroup
17 \onlypreamble\new@mathgroup
```

(End definition for `\new@mathgroup` and `\mathgroup`.)

⁹For the same reason it seems advisable to `\let\fam` and `\newfam` equal to `\relax`, but this is commented out to retain compatibility to existing style files.

2 Macros for setting up the tables

```
\DeclareFontShape{  
18  \def\DeclareFontShape{\begingroup  
First we restore the catcodes of all characters used in the syntax.  
19    \nfss@catcodes  
We use \expandafter \endgroup to restore catcode in case something goes wrong with  
the argument parsing (suggested by Tim Van Zandt)  
20    \expandafter\endgroup  
21    \DeclareFontShape@}  
(End definition for \DeclareFontShape.)  
  
\DeclareFontShape@  
22  </2ekernel>  
23  <*2ekernel | latexrelease>  
24  <latexrelease> \IncludeInRelease{2020/02/02}%  
25  <latexrelease>           {\DeclareFontShape@}{Maybe drop one m}%  
26  \def\DeclareFontShape@#1#2#3#4#5#6{  
27    \expandafter\ifx\csname #1#2\endcsname\relax  
28      \@latex@error{Font family '#1#2' unknown}\@eha  
29    \else  
If the series value is incorrectly specified with an extra "m", e.g., "mc" instead of just  
"c", drop the surplus "m" but keep the "m" if it is by its own. In that case also issue a  
warning that the declaration needs correction.  
For this we compare the given value #3 with one where we may have dropped an "m".  
If nothing has changes, fine. Otherwise there was a wrong value which is now corrected  
in \reservedb so we use that and also issue a warning.  
30    \edef\reserved@a{#3}%  
31    \series@maybe@drop@one@m\reserved@a\reserved@b  
32    \ifx\reserved@a\reserved@b\else  
33      \@latex@warning{Font shape declaration has incorrect series  
34        value '#3'.\MessageBreak It should not contain an 'm'!  
35        Please correct it.\MessageBreak Found}%">  
36    \fi  
37    \expandafter  
38      \xdef\csname#1/#2/\reserved@b/#4\endcsname  
39      {\expandafter\noexpand\csname #5\endcsname}%">  
40 %  
Most of the time #6 is empty so using \let to \empty saves on space compared to using  
\def. That's really one of the old space saving techniques and probably not necessary  
these days.  
41    \def\reserved@a{#6}%  
42    \global  
43    \expandafter\let\csname#5\expandafter\endcsname  
44      \ifx\reserved@a\empty  
45        \empty  
46      \else  
47        \reserved@a  
48      \fi  
49    \fi  
50  }
```

```

51  </2ekernel | latexrelease>
52  <latexrelease>\EndIncludeInRelease
53  <latexrelease>\IncludeInRelease{0000/00/00}%
54  <latexrelease>                                {\DeclareFontShape@}{Maybe drop one m}%
55  <latexrelease>
56  <latexrelease>\def\DeclareFontShape@#1#2#3#4#5#6{%
57  <latexrelease>    \expandafter\ifx\csname #1#2\endcsname\relax
58  <latexrelease>        \@latex@error{Font family '#1+#2' unknown}\@eha
59  <latexrelease>    \else
60  <latexrelease>        \expandafter
61  <latexrelease>            \xdef\csname#1/#2/#3/#4\endcsname{\expandafter\noexpand
62  <latexrelease>                            \csname #5\endcsname}%
63  <latexrelease>    \def\reserved@a{#6}%
64  <latexrelease>    \global
65  <latexrelease>    \expandafter\let\csname#5\expandafter\endcsname
66  <latexrelease>        \ifx\reserved@a\empty
67  <latexrelease>            \empty
68  <latexrelease>        \else
69  <latexrelease>            \reserved@a
70  <latexrelease>        \fi
71  <latexrelease>    \fi
72  <latexrelease> }
73  <latexrelease>\EndIncludeInRelease
74  <*2ekernel>

```

(*End definition for \DeclareFontShape@.*)

\DeclareFixedFont Define a direct font switch that avoids all overhead.

```

75  \def\DeclareFixedFont#1#2#3#4#5#6{%
76  \begingroup
77  \math@fontsfalse
78  \every@math@size{}%
79  \fontsize{#6}\z@
80  \usefont{#2}{#3}{#4}{#5}%
81  \global\expandafter\let\expandafter#1\the\font
82  \endgroup
83  }

```

(*End definition for \DeclareFixedFont.*)

\do@subst@correction

```

84  \def\do@subst@correction{%
85  \xdef\subst@correction{%
86  \font@name
87  \global\expandafter\font
88  \csname \curr@fontshape/\f@size\endcsname
89  \noexpand\fontname\font
90  \relax}%

```

Calling \subst@correction after the current group means calling it after we have loaded the substitution font which is done inside a group.

```

91  \aftergroup\subst@correction
92  }

```

(*End definition for \do@subst@correction.*)

```
\DeclareFontFamily
```

```
93 \def\DeclareFontFamily#1#2#3{%
```

If we want fast checking for the encoding scheme we can just check for `\T@..` being defined.

```
94 % \@tempswafalse
95 % \def\reserved@b{#1}%
96 % \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
97 %     \ifx\reserved@b\reserved@c \@tempswatrue\fi}%
98 % \cdp@list
99 % \if@tempswa
100 \ifundefined{T@#1}%
101 {%
102     \@latex@error{Encoding scheme '#1' unknown}\@eha
103 }%
104 {%
```

Now we have to define the macro `\(#1)+(#2)` to contain #3. But since most of the time #3 will be empty we use `\let` in a tricky way rather than a simple `\def` since this will save internal memory. We store the argument #3 in a temporary macro `\reserved@a`.

```
105 \def\reserved@a{#3}%
```

We compare `\reserved@a` with `\empty`. If these two are the same we `\let` the ‘extra’ macro equal to `\empty` which is not the same as doing a `\let` to `\reserved@a` — the latter would blow one extra memory location rather than reusing the one from `\empty`.

```
106 \global
107 \expandafter\let\csname #1+#2\expandafter\endcsname
108     \ifx \reserved@a\empty
109         \empty
110     \else \reserved@a
111     \fi
112 {%
113 }
```

(End definition for `\DeclareFontFamily`.)

`\cdp@list` We initialize the code page list to be empty.

```
114 \let\cdp@list\empty
115 \onlypreamble\cdp@list
```

(End definition for `\cdp@list`.)

```
\cdp@elt
```

```
116 \let\cdp@elt\relax
117 \onlypreamble\cdp@elt
```

(End definition for `\cdp@elt`.)

```
\DeclareFontEncoding
```

```
118 \def\DeclareFontEncoding{%
```

First we start with ignoring all blanks and newlines since every surplus space in the second or third argument will come out in a weird place in the document.

```

119  \begingroup
120  \nfss@catcodes
121  \expandafter\endgroup
122  \DeclareFontEncoding@}
123  \onlypreamble\DeclareFontEncoding

124 \def\DeclareFontEncoding#1#2#3{%
125   \expandafter
126   \ifx\csname T#1\endcsname\relax
127     \def\cdp@elt{\noexpand\cdp@elt}%
128     \xdef\cdp@list{\cdp@list\cdp@elt{#1}%
129       {\default@family}{\default@series}%
130       {\default@shape}}%

```

To support encoding dependent commands (like accents) we initialise the command $\langle encoding \rangle$ -cmd to be $\@changed@cmd$. (See `ltoutenc.dtx` for details.)

```

131   \expandafter\let\csname#1-cmd\endcsname\@changed@cmd
132 \else
133   \@font@info{Redeclaring font encoding #1}%
134 \fi
135 \global\@namedef{T#1}{#2}%
136 \global\@namedef{M#1}{\default@M#3}%

```

Keep a record of the last encoding being declared:

```

137 \xdef\LastDeclaredEncoding{#1}%
138 }
139 \onlypreamble\DeclareFontEncoding@

```

(End definition for `\DeclareFontEncoding`.)

`\LastDeclaredEncoding` The last encoding being declared by `\DeclareFontEncoding`.

```
140 \def\LastDeclaredEncoding{}%
```

(End definition for `\LastDeclaredEncoding`.)

`\DeclareFontSubstitution`

```

141 \def\DeclareFontSubstitution#1#2#3#4{%
142   \expandafter
143   \ifx\csname T#1\endcsname\relax
144     \@latex@error{Encoding scheme '#1' unknown}\@eha
145   \else
146     \begingroup

```

We loop through the `\cdp@list` and rebuild it anew in `\toks@` thereby replacing the defaults for the encoding in question with the new defaults. It is important to store the encoding to test against expanded in `\reserved@a` since it might just be `\LastDeclaredEncoding` that is passed as #1.

```

147   \edef\reserved@a{#1}%
148   \toks@{%
149   \def\cdp@elt##1##2##3##4{%
150     \def\reserved@b{##1}%
151     \ifx\reserved@a\reserved@b

```

Here we use the new defaults but we use ##1 (i.e., the encoding name already stored previously) since we know that it is expanded.

```

152     \addto@hook\toks@{\cdp@elt{##1}{##2}{##3}{##4}}%
153     \else
154         \addto@hook\toks@{\cdp@elt{##1}{##2}{##3}{##4}}%
155         \fi}%
156         \cdp@list
157         \xdef\cdp@list{\the\toks@}%
158     \endgroup
159     \global
160     \cnamedef{D@#1}{%
161         \def\default@family{#2}%
162         \def\default@series{#3}%
163         \def\default@shape{#4}%
164     }%
165     \fi
166 }
167 \onlypreamble\DeclareFontSubstitution

```

(End definition for \DeclareFontSubstitution.)

\DeclareFontEncodingDefaults

```

168 \def\DeclareFontEncodingDefaults#1#2{%
169   \ifx\relax#1\else
170     \ifx\default@T\empty\else
171       \@font@info{Overwriting encoding scheme text defaults}%
172     \fi
173     \gdef\default@T{#1}%
174   \fi
175   \ifx\relax#2\else
176     \ifx\default@M\empty\else
177       \@font@info{Overwriting encoding scheme math defaults}%
178     \fi
179     \gdef\default@M{#2}%
180   \fi
181 }
182 \onlypreamble\DeclareFontEncodingDefaults

```

(End definition for \DeclareFontEncodingDefaults.)

\default@T

\default@M

```

183 \let\default@T\empty
184 \let\default@M\empty

```

(End definition for \default@T and \default@M.)

\DeclarePreloadSizes

```

185 \def\DeclarePreloadSizes#1#2#3#4#5{%
186   \@ifundefined{T@#1}{%
187     {\@latex@error{Encoding scheme '#1' unknown}\@eha}%
188   }%

```

Don't know at the moment what this group here does!

```
189 \begingroup
```

We define a macro `\reserved@f`¹⁰ that grabs the next *size* and loads the corresponding font. This is done by delimiting `\reserved@f`'s only argument by the token `,` (comma).

```
190 \def\reserved@f##1,{%
```

The end of the list will be detected when there are no more elements, i.e. when `\reserved@f`'s argument is empty. The trick used here is explained in Appendix D of the *TeXbook*: if the argument is empty the `\if` will select the first clause and `\let \reserved@f` equal to `\relax`. (We use the `>` character here since it cannot appear in font file names.)

```
191     \if>##1>%
192         \let\reserved@f\relax
193     \else
```

Otherwise, we define `\font@name` appropriately and call `\pickup@font` to do the work. Note that the requested `\curr@fontshape` combination must have been defined, or you will get an error. The definition of `\font@name` is carried out globally to be consistent with the rest of the code in this file.

```
194     \xdef\font@name{\csname#1/#2/#3/#4/#1\endcsname}%
195     \pickup@font
```

Now we forget the name of the font just loaded. More precisely, we set the corresponding control sequence to `\relax`. This means that later on, when the font is first used, the macro `\define@newfont` is called again to execute the 'extra' macro for this font.

```
196     \global\expandafter\let\font@name\relax
197 \fi
```

Finally we call `\reserved@f` again to process the next *size*. If `\reserved@f` was `\let` equal to `\relax` this will end the macro.

```
198 \reserved@f}%
```

We finish with reinserting the list of sizes after the `\reserved@f` macro and appending an empty element so that the end of the list is recognized properly.

```
199     \reserved@f#5,%
200     \endgroup
201     }%
202 }
203 @onlypreamble\DeclarePreloadSizes
```

(End definition for `\DeclarePreloadSizes`.)

`\ifmath@fonts` We need a switch to decide if we have to switch math fonts. For this purpose we provide `\ifmath@fonts` that can be set to true or false by the `\S@...` macros depending on if math fonts are provided for this size or not. The default is of course to switch all fonts.

```
204 \newif\ifmath@fonts \math@fontstrue
```

(End definition for `\ifmath@fonts`.)

¹⁰We cannot use `\@tempa` since it is needed in `\pickup@font`.

\DeclareMathSizes \DeclareMathSizes takes the text size, math text size, math script size, and math scriptscript size as arguments and defines the right \S@... macro.

```

205 \def\DeclareMathSizes{%
206   \@ifstar{\@DeclareMathSizes\math@fontsfalse}{%
207     {\@DeclareMathSizes{}}}
208   \onlypreamble\DeclareMathSizes

```

(End definition for \DeclareMathSizes and \DeclareMathSizes*.)

\@DeclareMathSizes This modification by Michael J. Downes on comp.text.tex on 2002/10/17 allows the user to have settings such as

```

\DeclareMathSizes{9.5dd}{9.5dd}{7.4dd}{6.6dd}.

```

```

209 </2ekernel>
210 <latexrelease>\IncludeInRelease{2015/01/01}{\@DeclareMathSizes}%
211 <latexrelease>                                {Arbitrary units in \DeclareMathSizes}%
212 <*2ekernel | latexrelease>
213 \def\@DeclareMathSizes #1#2#3#4#5{%
214   \@defaultunits\dimen@ #2pt\relax\@nnil
215   \if $#3$%
216     \expandafter\let\csname S@\strip@pt\dimen@\endcsname\math@fontsfalse
217   \else
218     \@defaultunits\dimen@ii #3pt\relax\@nnil
219     \@defaultunits\@tempdima #4pt\relax\@nnil
220     \@defaultunits\@tempdimb #5pt\relax\@nnil
221     \toks@{\#1}%
222     \expandafter\xdef\csname S@\strip@pt\dimen@\endcsname{%
223       \gdef\noexpand\tf@size{\strip@pt\dimen@ii}%
224       \gdef\noexpand\sf@size{\strip@pt\@tempdima}%
225       \gdef\noexpand\ssf@size{\strip@pt\@tempdimb}%
226       \the\toks@
227     }%
228   \fi
229 }%
230 </2ekernel | latexrelease>
231 <latexrelease>\EndIncludeInRelease
232 <latexrelease>\IncludeInRelease{0000/00/00}{\@DeclareMathSizes}%
233 <latexrelease>                                {Arbitrary units in \DeclareMathSizes}%
234 <latexrelease>\def\@DeclareMathSizes#1#2#3#4#5{%
235   \@defaultunits\dimen@#2pt\relax\@nnil
236   \if $#3$%
237     \expandafter \let
238     \csname S@\strip@pt\dimen@\endcsname
239     \math@fontsfalse
240   \else
241     \expandafter \gdef
242     \csname S@\strip@pt\dimen@\endcsname
243     {\gdef\tf@size{\#3}\gdef\sf@size{\#4}%
244      \gdef\ssf@size{\#5}%
245     #1%
246   \fi}%
247   \expandafter \gdef
248   \csname S@\strip@pt\dimen@\endcsname
249   {\gdef\tf@size{\#3}\gdef\sf@size{\#4}%
      \gdef\ssf@size{\#5}%
    }%
250 <latexrelease>\EndIncludeInRelease
251 <*2ekernel>

```

```
250 \onlypreamble\@DeclarMathSizes
```

(End definition for \@DeclarMathSizes.)

3 Selecting a new font

3.1 Macros for the user

```
\fontencoding  
\f@encoding
```

As we said in the introduction a font is described by four parameters. We first define macros to specify the wanted *family*, *series*, or *shape*. These are simply recorded in internal macros `\f@family`, `\f@series`, and `\f@shape`, resp. We use `\edef`'s so that the arguments can also be macros.

```
251 \DeclareRobustCommand\fontencoding[1]{%  
252     \expandafter\ifx\csname T@\#1\endcsname\relax  
253         \@latex@error{Encoding scheme '#1' unknown}\@eha  
254     \else  
255         \edef\f@encoding{\#1}%  
256         \ifx\cf@encoding\f@encoding
```

If the new encoding is the same as the old encoding we have nothing to do. However, in case we had a sequence of several encoding changes without a `\selectfont` in-between we can save processing by making sure that `\enc@update` is `\relax`.

```
257     \let\enc@update\relax  
258 \else
```

If current and new encoding differ we define the macro `\enc@update` to contain all updates necessary at `\selectfont` time.

```
259     \let\enc@update\@enc@update  
260     \fi  
261     \fi  
262 }
```

(End definition for `\fontencoding` and `\f@encoding`.)

```
\@enc@update
```

```
263 \def\@enc@update{%
```

When `\@enc@update` is executed `\f@encoding` holds the encoding name for the new encoding and `\cf@encoding` the name of the last active encoding.

We start by setting the init command for encoding dependent macros to `\@changed@cmd`.

```
264     \expandafter  
265     \let  
266         \csname\cf@encoding -cmd\endcsname  
267         \@changed@cmd
```

Then we turn the one for the new encoding to `\@current@cmd` (see `ltoutenc.dtx` for further explanations).

```
268     \expandafter  
269     \let  
270         \csname\f@encoding-cmd\endcsname  
271         \@current@cmd
```

We execute the default settings `\default@T`, followed by the one for the new encoding.

```
272     \default@T  
273     \csname T@\f@encoding\endcsname
```

Finally we change the default substitution values, disable `\enc@update` and make `\f@encoding` officially the current encoding.

```

274      \csname D@\f@encoding\endcsname
275      \let\enc@update\relax
276      \let\cf@encoding\f@encoding
277 }
```

(End definition for \@@enc@update.)

`\enc@update` The default action in `\selectfont` is to do nothing.

```
278 \let\enc@update\relax
```

(End definition for \enc@update.)

```
\fontfamily
\f@family
\fontseries
\f@series
\fontshape
\f@shape
```

```
279 \%Declarerobustcommand\fontfamily[1]{\edef\f@family{#1}}
```

There are now defined later (and differently).

```
280 \%Declarerobustcommand\fontseries[1]{\edef\f@series{#1}}
```

```
281 \%Declarerobustcommand\fontshape [1]{\edef\f@shape{#1}}
```

(End definition for \fontfamily and others.)

`\usefont` Some handy abbreviation if you want to get some particular font in the current size. If also the size should change one has to issue a `\fontsize` command first.

`\fontencoding` needs to do some setup work so we call that, but instead of calling `\fontfamily`, `\fontseries` and `\fontshape` it earlier versions of this code did, we now set `\f@family`, etc. directly. If we would call `\fontseries` or `\fontshape` as it was done in the past, they would now interact with the existing series and shape which is not desired if we intend to use an explicit font shape!

```

282 </2ekernel>
283 <*2ekernel | latexrelease>
284 <latexrelease>\IncludeInRelease{2020/02/02}%
285 <latexrelease>          {\usefont}{Drop m in usefont}%
286 \Declarerobustcommand\usefont[4]{\fontencoding{#1}}%
287     \edef\f@family{#2}%
288     \set@target@series{#3}%
289     \edef\f@shape{#4}\selectfont
290     \ignorespaces}
291 </2ekernel | latexrelease>
292 <latexrelease>\EndIncludeInRelease
293 <latexrelease>\IncludeInRelease{0000/00/00}%
294 <latexrelease>          {\usefont}{Drop m in usefont}%
295 <latexrelease>
296 <latexrelease>\Declarerobustcommand\usefont[4]{\fontencoding{#1}}%
297 <latexrelease>    \edef\f@family{#2}%
298 <latexrelease>    \edef\f@series{#3}%
299 <latexrelease>    \edef\f@shape{#4}\selectfont
300 <latexrelease>    \ignorespaces}
301 <latexrelease>
302 <latexrelease>\EndIncludeInRelease
303 <*2ekernel>
```

(End definition for \usefont.)

\linespread The command \linespread changes the current \baselinestretch by calling \set@fontsize. The values for \f@size and \f@baselineskip will be left unchanged.

```
304 \DeclareRobustCommand\linespread[1]
305   {\set@fontsize{#1}\f@size\f@baselineskip}
```

(End definition for \linespread.)

\fontsize We also define a macro that allows to specify a size. In this case, however, we also need the value of \baselineskip. As the first argument to \set@fontsize we pass the current value of \baselinestretch. This will either match the internal value (in which case nothing changes, or it will be an updated value due to a user change of that macro using \renewcommand. If we would pass the internal \f@linespread such a change would be effectively overwritten by a size change.

```
306 \DeclareRobustCommand\fontsize[2]
307   {\set@fontsize\baselinestretch{#1}{#2}}
```

(End definition for \fontsize.)

\f@linespread This macro holds the current internal value for \baselinestretch.

```
308 \let\f@family\empty
309 \let\f@series\empty
310 \let\f@shape\empty
311 \let\f@size\empty
312 \let\f@baselineskip\empty
313 \let\f@linespread\empty
```

(End definition for \f@linespread.)

\cf@encoding

```
314 \let\f@encoding\empty
315 \let\cf@encoding\empty
```

(End definition for \cf@encoding.)

\@defaultunits The function \@defaultunits when wrapped around a dimen or skip assignment supplies default units. Usage:

```
\@defaultunits\dimen@=#1pt\relax\@nnil
```

Note: the \relax is *important*. Other units can be substituted for the ‘pt’ if desired.

We use \remove@to@nnil as an auxiliary macros for \@defaultunits. It just has to gobble the supplied default unit ‘pt’ or whatever, if it wasn’t used in the assignment.

```
316 \def\@defaultunits{\afterassignment\remove@to@nnil}
```

(End definition for \@defaultunits.)

\strip@pt This macro strips the characters pt produced by using \the on a dimen register.

```
\rem@pt
317 \begingroup
318   \catcode‘P=12
319   \catcode‘T=12
320   \lowercase{
321     \def\x{\def\rem@pt##1.##2PT{##1\ifnum##2>\z@\.##2\fi}}
322     \expandafter\endgroup\x
323 \def\strip@pt{\expandafter\rem@pt\the}
```

(End definition for `\strip@pt` and `\rem@pt`.)

`\mathversion` `\mathversion` takes the math *version* name as argument, defines `\math@version` appropriately and switches to the font selected forcing a call to `\glb@settings` if the *version* is known to the system.

```
324 \DeclareRobustCommand\mathversion[1]
325   {\@nomath\mathversion
326     \expandafter\ifx\csname mv@\#1\endcsname\relax
327     \@latex@error{Math version '#1' is not defined}\@eha\else
328     \edef\math@version{\#1}\%
```

We need to force a math font setup both now and at the point where we return to the previous math version. Forcing a math font setup can simply be done by setting `\glb@currsize` to an invalid value since this will trigger the setup when the formula starts.

```
329 \gdef\glb@currsize{}%
```

When the scope of the current `\mathversion` ends we need to restore the old setup. However this time we need to force it directly at least if we are inside math, otherwise we could wait. Another way to enhance this code here is todo the setting only if the version really has changed after all. This might be interesting in case of `amstext` and `boldsymbol`.

```
330 \aftergroup\glb@settings
331 \fi}
```

(End definition for `\mathversion` and `\math@version`.)

If TeX would support a hook just before the end of a formula (opposite of `\everymath` so to speak) the implementation of the algorithm would be much simpler because in that case we would set up the correct math fonts at this point without having to worry about incorrect settings due to nesting. The same would be true if in L^AT_EX the use of \$ (as the primitive TeX command) would be impossible and instead only a higher-level interface would be available. Note that this does not mean that a \$ couldn't be the short-hand for starting and stopping that higher-level interface, it only means that the direct TeX function must be hidden.

Anyway, since we don't have this and won't have it in L^AT_EX 2_< we need to implement it in a somewhat slower way.

We test for the current math font setup on entry of a formula, i.e., on the hooks `\everymath` and `\everydisplay`. But since these hooks may contain user data we provide ourselves with an internal version of these hooks which stays frozen.

`\frozen@everymath` New internal names for `\everymath` and `\everydisplay`.
`\frozen@everydisplay`

```
332 \let\frozen@everymath\everymath
333 \let\frozen@everydisplay\everydisplay
```

(End definition for `\frozen@everymath` and `\frozen@everydisplay`.)

`\everymath` Now we provide now user hooks that will be called in the frozen internals.
`\everydisplay`

```
334 \newtoks\everymath
335 \newtoks\everydisplay
```

(End definition for `\everymath` and `\everydisplay`.)

- \frozen@everymath Now we define the behaviour of the frozen hooks: first check the math setup then call the user hook.
- ```
336 \frozen@everymath = {\check@mathfonts
337 \the\everymath}

(End definition for \frozen@everymath.)
```
- \frozen@everydisplay Ditto for the display hook.
- ```
338 \frozen@everydisplay = {\check@mathfonts
339           \the\everydisplay}

(End definition for \frozen@everydisplay.)
```
- \curr@math@size This holds locally the current math size.
- ```
340 \let\curr@math@size\empty

(End definition for \curr@math@size.)
```

## 3.2 Macros for loading fonts

- \pickup@font The macro \pickup@font which is used in \selectfont is very simple: if the font name is undefined (i.e. not known yet) it calls \define@newfont to load it.
- ```
341 \def\pickup@font{%
342   \expandafter \ifx \font@name \relax
343     \define@newfont
344   \fi}

(End definition for \pickup@font.)
```
- \split@name \pickup@font assumes that \font@name is set but it is sometimes called when \f@family, \f@series, \f@shape, or \f@size may have the wrong settings (see, e.g., the definition of \getanddefine@fonts). Therefore we need a macro to extract font *family*, *series*, *shape*, and *size* from the font name. To this end we define \split@name which takes the font name as a list of characters of \catcode 12 (without the backslash at the beginning) delimited by the special control sequence \nil. This is not very complicated: we first ensure that / has the right \catcode
- ```
345 {\catcode`\/=12
```
- and define \split@name so that it will define our private \f@encoding, \f@family, \f@series, \f@shape, and \f@size macros.
- ```
346 \gdef\split@name#1/#2/#3/#4/#5\@nil{\def\f@encoding{#1}%
347                                         \def\f@family{#2}%
348                                         \def\f@series{#3}%
349                                         \def\f@shape{#4}%
350                                         \def\f@size{#5}}}
```
- (End definition for \split@name.)
- \curr@fontshape Abbreviation which may get removed again for speed.
- ```
351 \def\curr@fontshape{\f@encoding/\f@family/\f@series/\f@shape}
```
- (End definition for \curr@fontshape.)
- \define@newfont Now we can tackle the problem of defining a new font.
- ```
352 \def\define@newfont{%
```

We have already mentioned that the `\token` list that `\split@name` will get as argument must not start with a backslash. To reach this goal we will set the `\escapechar` to `-1` so that the `\string` primitive will not generate an escape character. To keep this change local we open a group. We use `\begingroup` for this purpose since `\define@newfont` might be called in math mode, and an empty `\bgroup...egroup` would add an empty `Ord` atom to the math list and thus affect the spacing.

Also locally redefine `\typeout` so that ‘No file ...fd’ Warnings become Font Info message just sent to the log file.

```
353  \begingroup
354    \let\typeout\@font@info
355    \escapechar\m@ne
```

Then we extract *encoding scheme*, *family*, *series*, *shape*, and *size* from the font name. Note the four `\expandafter`'s so that `\font@name` is expanded first, then `\string`, and finally `\split@name`.

```
356  \expandafter\expandafter\expandafter
357    \split@name\expandafter\string\font@name@nil
```

If the `\curr@fontshape` combination is not available, (i.e. undefined) we call the macro `\wrong@fontshape` to take care of this case. Otherwise `\extract@font` will load the external font for us.

```
358 %   \expandafter\ifx
359 %     \csname\curr@fontshape\endcsname \relax
360   \try@load@fontshape % try always
361 %   \fi
362   \expandafter\ifx
363     \csname\curr@fontshape\endcsname \relax
364     \wrong@fontshape\else
```

To allow substitution we call the `curr@fontshape` macro which usually will expand to `\relax` but may hold code for substitution (see `\subst@fontshape` definition).

```
365 %   \csname\curr@fontshape\endcsname
366   \extract@font\fi
```

We are nearly finished and must only restore the `\escapechar` by closing the group.

```
367   \endgroup

368 \def\try@load@fontshape{%
369   \expandafter
370   \ifx\csname\f@encoding+\f@family\endcsname\relax
371     \@font@info{Trying to load font information for
372                 \f@encoding+\f@family}%

```

We predefine this combination to be `\empty` which means that next time we don't try again unnecessary in case we don't find a `.fd` file. If the file contains a `\DeclareFontFamily` command than this setting will be overwritten.

```
373   \global\expandafter\let
374     \csname\f@encoding+\f@family\endcsname\empty
```

Set the catcodes used in the syntax, but do it only once (this will be restored at the end of the font loading group).

```
375   \nfss@catcodes
376   \let\nfss@catcodes\relax
```

For increased portability make the external filename monocase, but look for the (old style) mixed case filename if the first attempt fails.

On any monocase system this means that the file is looked for twice which takes up time and string space, but at least for this release Check for both names to give people time to re-install their private fd files with lowercase names.

```

377   \edef\reserved@a{%
378     \lowercase{%
379       \noexpand\InputIfFileExists{\f@encoding\f@family.fd}}{}}%
380     \reserved@a\relax
381     {\@input{\f@encoding\f@family.fd}}{}}%
382   \fi}

```

(End definition for `\define@newfont`.)

- `\nfss@catcodes` This macro should contain the standard `\catcode` assignments to all characters which are used in the commands found in an `.fd` file and which might have special `\catcodes` in the middle of a document. If necessary, this list can be extended in a package file using a suitable number of `\expandafter`, i.e.,

```

\expandafter\def\expandafter\nfss@catcodes
\expandafter{\nfss@catcodes <additional settings>}

```

Note, that this macro might get executed several times since it is also called by `\DeclareFontShape`, thus it probably should not be misused as a general purpose hook.

```
383 \def\nfss@catcodes{%
```

We start by making @ a letter and ignoring all blanks and newlines.

```

384   \makeatletter
385   \catcode`\@=9
386   \catcode`^I=19
387   \catcode`^M=14

```

Then we set up \, {, }, # and % in case an `.fd` file is loaded during a verbatim environment.

```

388   \catcode`\\=0
389   \catcode`{\=1
390   \catcode`}=2
391   \catcode`#=6
392   \catcode`^=7
393   \catcode`^@=14

```

The we make sure that the important syntax parts have the right `\catcode`.

```

394   \@makeother`<%
395   \@makeother`>%
396   \@makeother`*%
397   \@makeother`.%%
398   \@makeother`-%
399   \@makeother`/%
400   \@makeother`[%
401   \@makeother`]%
402   \@makeother`'%
403   \@makeother`'%
404   \@makeother`"%
405 }

```

(End definition for `\nfss@catcodes`.)

`\LoadFontDefinitionFile` Load and .fd files for some encoding and family (if it exists).

```
406 </2ekernel>
407 <*2ekernel | latexrelease>
408 <latexrelease>\IncludeInRelease{2020/02/02}%
409 <latexrelease>          {\LoadFontDefinitionFile}{Loading .fd files}%
410 \def\LoadFontDefinitionFile#1#2{%
411   \begingroup
412     \edef\f@encoding{#1}%
413     \edef\f@family{#2}%
414     \try@load@fontshape
415   \endgroup
416 }
417 </2ekernel | latexrelease>
418 <latexrelease>\EndIncludeInRelease
419 <latexrelease>\IncludeInRelease{0000/00/00}%
420 <latexrelease>          {\LoadFontDefinitionFile}{Loading .fd files}%
421 <latexrelease>
422 <latexrelease>\let\LoadFontDefinitionFile@\undefined
423 <latexrelease>\EndIncludeInRelease
424 <*2ekernel>
```

(End definition for `\LoadFontDefinitionFile`.)

`\DeclareFontFamilySubstitution` The idea for this macro is stolen from the `substitutefont` package by Günter Milde, with some modifications and a new name.

Its purpose is to provide characters in a special encoding that are not available in the current font family to be taken from a different family that is visually compatible (or not if you choose badly). For example, you can match the GFS Didot Greek characters with T_EX Gyre Pagella (Palatino) by specifying

```
\DeclareFontFamilySubstitution{LGR}{qpl}{udidot}
```

This way if you ask for the LGR encoding in for the qpl family you get the characters from the udidot family substituted.

We need to ensure that the macro is defined with `\nfss@catcodes` in force (not quite sure why at the moment to be honest).

```
425 </2ekernel>
426 <*2ekernel | latexrelease>
427 <latexrelease>\IncludeInRelease{2020/02/02}%
428 <latexrelease>          {\DeclareFontFamilySubstitution}{Provide family substitution}%
429 \begingroup
430 \nfss@catcodes
431 \gdef\DeclareFontFamilySubstitution#1#2#3{%
```

We only provide a set of silent substitutions. The package also (re)declared the family, but this is incorrect in my eyes and it is better to handle that differently.

Of course the families may still need loading at this point and so we arrange for this. Otherwise we might run into trouble because the necessary `\DeclareFontFamily` has not been seen.

```
432   \LoadFontDefinitionFile{#1}{#2}%
433   \LoadFontDefinitionFile{#1}{#3}%
```

```

434  \DeclareFontShape{\#1}{\#2}{m}{it}{<->ssub * #3/m/it}{}%
435  \DeclareFontShape{\#1}{\#2}{m}{n}{<->ssub * #3/m/n}{}%
436  \DeclareFontShape{\#1}{\#2}{m}{sc}{<->ssub * #3/m/sc}{}%
437  \DeclareFontShape{\#1}{\#2}{m}{s1}{<->ssub * #3/m/s1}{}%

```

These days a few more shapes might be around, so we declare those too. If they don't exist then after the first substitution normal fallbacks will happen.

```

438  \DeclareFontShape{\#1}{\#2}{m}{sw}{<->ssub * #3/m/sw}{}%
439  \DeclareFontShape{\#1}{\#2}{m}{scit}{<->ssub * #3/m/scit}{}%
440  \DeclareFontShape{\#1}{\#2}{m}{scsl}{<->ssub * #3/m/scsl}{}%

```

Same game with b and bx, for other weights you are on your own:

```

441  \DeclareFontShape{\#1}{\#2}{b}{it}{<->ssub * #3/b/it}{}%
442  \DeclareFontShape{\#1}{\#2}{b}{n}{<->ssub * #3/b/n}{}%
443  \DeclareFontShape{\#1}{\#2}{b}{scit}{<->ssub * #3/b/scit}{}%
444  \DeclareFontShape{\#1}{\#2}{b}{scsl}{<->ssub * #3/b/scsl}{}%
445  \DeclareFontShape{\#1}{\#2}{b}{sc}{<->ssub * #3/b/sc}{}%
446  \DeclareFontShape{\#1}{\#2}{b}{s1}{<->ssub * #3/b/s1}{}%
447  \DeclareFontShape{\#1}{\#2}{b}{sw}{<->ssub * #3/b/sw}{}%
448  \DeclareFontShape{\#1}{\#2}{bx}{it}{<->ssub * #3/bx/it}{}%
449  \DeclareFontShape{\#1}{\#2}{bx}{n}{<->ssub * #3/bx/n}{}%
450  \DeclareFontShape{\#1}{\#2}{bx}{scit}{<->ssub * #3/bx/scit}{}%
451  \DeclareFontShape{\#1}{\#2}{bx}{scsl}{<->ssub * #3/bx/scsl}{}%
452  \DeclareFontShape{\#1}{\#2}{bx}{sc}{<->ssub * #3/bx/sc}{}%
453  \DeclareFontShape{\#1}{\#2}{bx}{s1}{<->ssub * #3/bx/s1}{}%
454  \DeclareFontShape{\#1}{\#2}{bx}{sw}{<->ssub * #3/bx/sw}{}%
455  }
456  \endgroup
457  </2ekernel | latexrelease>
458  <latexrelease>\EndIncludeInRelease
459  <latexrelease>\IncludeInRelease{0000/00/00}%
460  <latexrelease>      {\DeclareFontFamilySubstitution}{Provide family substitution}%
461  <latexrelease>
462  <latexrelease>\let\DeclareFontFamilySubstitution@\undefined
463  <latexrelease>\EndIncludeInRelease
464  <*2ekernel>

```

(*End definition for \DeclareFontFamilySubstitution.*)

\DeclareErrorFont Declare the last resort shape! We assume that in this fontshape there is a 10pt font but it doesn't really matter. We only loose one macro name if the assumption is false. But at least the font should be there!

```

465  </2ekernel>
466  <*2ekernel | latexrelease>
467  <latexrelease>\IncludeInRelease{2019/10/01}%
468  <latexrelease>      {\DeclareErrorFont}{No side effects please}%
469  \def\DeclareErrorFont#1#2#3#4#5{%
470      \xdef\error@fontshape{%
471          \noexpand\expandafter\noexpand\split@name\noexpand\string
472          \expandafter\noexpand\csname#1/#2/#3/#4/#5\endcsname
473          \noexpand\@nil}%

```

Initialize all those internal variables which may or may not have values in the first seconds of NFSS' bootstrapping process. Later on such values will be updated when an encoding is selected, etc.

We definitely don't want to set `\f@encoding`; we can set all the others since if they are left "blank" any selection would grab "error default values" as well. However, this probably should go also—and now it did.

```

474 %      \gdef\f@encoding{#1}%
475      \gdef\default@family{#2}%
476      \gdef\default@series{#3}%
477      \gdef\default@shape{#4}%
478 }
479 </2ekernel | latexrelease>
480 <latexrelease>\EndIncludeInRelease
481 <latexrelease>\IncludeInRelease{0000/00/00}%
482 <latexrelease>          {\DeclareErrorFont}{No side effects please}%
483 <latexrelease>
484 <latexrelease>\def\DeclareErrorFont#1#2#3#4#5{%
485 <latexrelease>      \xdef\error@fontshape{%
486 <latexrelease>          \noexpand\expandafter\noexpand\split@name\noexpand\string
487 <latexrelease>          \expandafter\noexpand\csname#1/#2/#3/#4/#5\endcsname
488 <latexrelease>          \noexpand\@nil}%
489 <latexrelease>      \gdef\default@family{#2}%
490 <latexrelease>      \gdef\default@series{#3}%
491 <latexrelease>      \gdef\default@shape{#4}%
492 <latexrelease>      \global\let\f@family\default@family
493 <latexrelease>      \global\let\f@series\default@series
494 <latexrelease>      \global\let\f@shape\default@shape
495 <latexrelease>      \gdef\f@size{#5}%
496 <latexrelease>      \gdef\f@baselineskip{#5pt}%
497 <latexrelease>}
498 <latexrelease>\EndIncludeInRelease
499 (*2ekernel)
500 \onlypreamble\DeclareErrorFont

```

(*End definition for \DeclareErrorFont.*)

`\wrong@fontshape` Before we come to the macro `\extract@font` we have to take care of unknown `\curr@fontshape` combinations. The general strategy is to issue a warning and to try a default *shape*, then a default *series*, and finally a default *family*. If this last one also fails T_EX will go into an infinite loop. But if the defaults are set incorrectly one deserves nothing else!

```

501 </2ekernel>
502 <latexrelease>\IncludeInRelease{2015/01/01}{\wrong@fontshape}%
503 <latexrelease>          {Font substitution in preamble}%
504 (*2ekernel | latexrelease)
505 \def\wrong@fontshape{%
506   \csname D@\f@encoding\endcsname % install defaults if in math

```

We remember the wanted `\curr@fontshape` combination which we will need in a moment.

```

507   \edef\reserved@a{\csname\curr@fontshape\endcsname}%
508   \ifx\last@fontshape\reserved@a
509     \errmessage{Corrupted NFSS tables}%
510     \error@fontshape
511   \else

```

Then we warn the user about the mess and set the shape to its default.

```

512   \let\f@shape\default@shape

```

If the combination is not known, try the default *series*.

```
513     \expandafter\ifx\csname\curr@fontshape\endcsname\relax
514         \let\f@series\default@series
```

If this is still undefined, try the default *family*. Otherwise give up. We never try to change the encoding scheme!

```
515     \expandafter
516     \ifx\csname\curr@fontshape\endcsname\relax
517         \let\f@family\default@family
```

If we change the font family and we are in the preamble then the corresponding .fd file may not been loaded yet. Therefore we try this now. Otherwise equating the requested font shape with the finally selected fontshape below will fail and can result in “NFSS tables corrupted”. After begin document that will not happen as all .fd files involved in substitution are loaded at \begin{document}.

```
518     \begingroup
519         \try@load@fontshape
520     \endgroup
521     \fi \fi
522     \fi
```

At this point a valid \curr@fontshape combination must have been found. We inform the user about this fact.

The \expandafter\string here stops TeX adding the space that it usually puts after command names in messages. The similar construction with \undefined just produces ‘undefined’, but saves a few tokens.

\@wrong@font@char is locally redefined in \UseTextSymbol from its normal (empty) definition, to report the symbol generating the font switch.

```
523     \@font@warning{Font shape `'\expandafter\string\reserved@a'
524                     \expandafter@\gobble\string`\undefined\MessageBreak
525                     using '\curr@fontshape' instead \@wrong@font@char}%
526     \global\let\last@fontshape\reserved@a
```

We change \@defaultsubs to produce a warning at the end of the document. The macro \@defaultsubs is initially \relax but gets changed here if some default font substitution happens. It is then executed in \enddocument.

```
527     \gdef\@defaultsubs{%
528         \@font@warning{Some font shapes were not available, defaults
529                     substituted.\@gobbletwo}}%
```

If we substitute a \curr@fontshape combination by the default one we don’t want the warning to be printed out whenever this (unknown) combination is used. Therefore we globally \let the macro corresponding to the wanted combination equal to its substitution. This requires the use of four \expandafter’s since \csname...\endcsname has to be expanded before \reserved@a (i.e. the requested combination), and this must happen before the \let is executed.

```
530     \global\expandafter\expandafter\expandafter\let
531         \expandafter\reserved@a
532             \csname\curr@fontshape\endcsname
```

Now we can redefine \font@name accordingly. This *must* be done globally since it might occur in the group opened by \define@newfont. If we would this definition were local the closing \endgroup there would restore the old meaning of \font@name and then switch to the wrong font at the end of \selectfont although the correct font was loaded.

```

533     \xdef\font@name{%
534         \csname\curr@fontshape/\f@size\endcsname}%
535     \pickup@font}
536     {/2ekernel | latexrelease}
537     \EndIncludeInRelease
538     \IncludeInRelease{0000/00/00}{\wrong@fontshape}%
539     \Font substitution in preamble}%
540     \def\wrong@fontshape{%
541         \csname D@\f@encoding\endcsname
542         \edef\reserved@a{\csname\curr@fontshape\endcsname}%
543         \ifx\last@fontshape\reserved@a
544             \errmessage{Corrupted NFSS tables}%
545         \error@fontshape
546     \else
547         \let\f@shape\default@shape
548         \expandafter\ifx\csname\curr@fontshape\endcsname\relax
549             \let\f@series\default@series
550             \expandafter
551                 \ifx\csname\curr@fontshape\endcsname\relax
552                     \let\f@family\default@family
553                     \fi \fi
554     \fi
555     \c@font@warning{Font shape
556         '\expandafter\string\reserved@a'
557         '\expandafter\@gobble\string\@undefined
558         \MessageBreak
559         using '\curr@fontshape' instead\@wrong@font@char}%
560     \global\let\last@fontshape\reserved@a
561     \gdef\@defaultsubs{%
562         \c@font@warning{Some font shapes were not available,
563             defaults substituted.\@gobbletwo}}%
564     \global\expandafter\expandafter\expandafter\let
565         \expandafter\reserved@a
566             \csname\curr@fontshape\endcsname
567         \xdef\font@name{%
568             \csname\curr@fontshape/\f@size\endcsname}%
569         \pickup@font}
570     \EndIncludeInRelease
571     {*2ekernel}

```

(End definition for `\wrong@fontshape`.)

`\@wrong@font@char` Normally empty but redefined in `\UseTextSymbol` so that the Font shape undefined message can refer to the symbol causing the problem.

```
572 \let\@wrong@font@char\@empty
```

(End definition for `\@wrong@font@char`.)

`\@defaultsubs` See above.

```
573 \let\@defaultsubs\relax
```

(End definition for `\@defaultsubs` and `\@defaultsubs`.)

`\strip@prefix` In `\extract@font` we will need a way to recover the replacement text of a macro. This is done by the primitive `\meaning` together with the macro `\strip@prefix` (for the details see appendix D of the TeXbook, p. 382).

574 `\def\strip@prefix#1>{}`

(End definition for `\strip@prefix`.)

4 Assigning math fonts to *versions*

`\install@mathalphabet` This is just another name for `\gdef` but we can redefine it if necessary later on.

575 `\let\install@mathalphabet\gdef`

(End definition for `\install@mathalphabet`.)

`\math@fonts`

576 `\let\math@fonts\empty`

(End definition for `\math@fonts`.)

`\select@group` `\select@group` has four arguments: the new *(math alphabet identifier)* (a control sequence), the *(math group number)*, the extra macro for math mode and the `\curr@fontshape` definition macro name. We first check if we are in math mode.

577 `%\def\select@group#1#2#3{\relax\ifmmode`

We do these things locally using `\begingroup` instead of `\bgroup` to avoid the appearance of an empty Ord atom on the math list.

578 `% \begingroup`

We set the math fonts for the *family* in question by calling `\getanddefine@fonts` in the correct environment.

579 `% \escapechar\m@ne`

580 `% \getanddefine@fonts{\csname c@mv@\math@version\endcsname}#3%`

We globally select the math fonts...

581 `% \globaldefs\one \math@fonts`

... and close the group to restore `\globaldefs` and `\escapechar`.

582 `% \endgroup`

As long as no *size* or *version* change occurs the *(math alphabet identifier)* should simply switch to the installed *math group* instead of calling `\select@group` unnecessarily. So we globally redefine the first argument (the new *(math alphabet identifier)*) to expand into a `\mathgroup` switch and then select this *alphabet*. Note that this redefinition will be overwritten by the next call to a *version* macro. The original code for the end of `\select@group` was

`\gdef#1{#3\mathgroup #2}#1\fi}`

i.e. first redefining the *(math alphabet identifier)* and then calling the new definition to switch to the wanted *(math group)*. Now we define the *(math alphabet identifier)* as a call to the `\use@mathgroup` command.

583 `% \xdef#1{\noexpand\use@mathgroup\noexpand#2%`

584 `% {\number\csname c@mv@\math@version\endcsname}}%`

But this is not sufficient, as we learned the hard way. The problem here is that the loading of the fonts that comprise the alphabet identifier #1, as well as the necessary math font assignments is deferred until it is used. This is OK so far, but if the fonts are switched within the current formula (which may happen if a sub-formula is a box that contains a math version switch) the font assignments for #1 are not restored unless #1 is used again. This is disastrous since TeX sees the wrong fonts at the end of the math formula, when it converts the math list into a horizontal list.

This is taken into account as follows: When a math alphabet identifier is used for the first time in a certain version it modifies the corresponding macro `\mv@{version}` so that it calls `\getanddefine@fonts` directly in future as well. We use the macro `\extract@alph@from@version` to do this. It takes the math alphabet identifier #1 and the math version macro as arguments.

```
585 %     \expandafter\extract@alph@from@version
586 %         \csname mv@\math@version\expandafter\endcsname
587 %         \expandafter{\number\csname c@\mv@\math@version\endcsname}%
588 %         #1%
589 %         \stepcounter{mv@\math@version}%
```

Finally, it is not possible to simply call the new definition since we have an argument (the third argument of `\use@mathgroup` or more exactly the argument of `\math@egroup` if the `margid` option is in force) which would swallow our closing `\fi`. So we use the `\expandafter` technique to remove the `\fi` before the `\use@mathgroup` is expanded.

```
590 %\expandafter #1\fi}
```

(End definition for `\select@group`.)

`\extract@alph@from@version` We proceed to the definition of the macro `\extract@alph@from@version`. As stated above, it takes a math alphabet identifier and a math version macro (e.g. `\mv@normal`) as its arguments.

```
591 \def\extract@alph@from@version#1#2#3{%
```

To extract and replace the definition of math alphabet identifier #3 in macro #1 we have to recall how this definition looks like: Somewhere in the replacement text of #1 there is the sequence

```
\install@mathalphabet<math alphabet identifier> #3{%
    Definitions for #3}
```

Hence, the first thing we do is to extract the tokens preceding this definitions, the definition itself, and the tokens following it. To this end we define one auxiliary macro `\reserved@a`.

```
592 \def\reserved@a##1\install@mathalphabet#3##2##3\@nil{%
```

When `\reserved@a` is expanded, it will have the tokens preceding the definition in question in its first argument (#1), the following tokens in its third argument (#3), and the replacement text for the math alphabet identifier #3 in its second argument. (#2). This is then recorded for later use in a temporary macro `\reserved@b`.

```
593 \def\reserved@b##2{%
```

Additionally, we define a macro `\reserved@c` to reconstruct the definitions for the math version in question from the tokens that will remain unchanged (#1 and #3) and the yet to build new definitions for the math alphabet identifier #3.

```
594 \def\reserved@c####1{\gdef#1{##1####1##3}}%
```

Then we execute our auxiliary macro.

```
595     \expandafter\reserved@a#1\@nil
```

OK, so now we have to build the new definition for #3. To do so, we first extract the interesting parts out of the old one. The old definition looks like:

```
\select@group<math alphabet identifier>
    <math group number><math extra part>
<curr@fontshape definition>
```

So we define a new temporary macro `\reserved@a` that extracts these parts.

```
596     \def\reserved@a{\select@group#3##1##2\@nil{%
```

This macro can now directly rebuild the math version definition by calling `\reserved@c`:

```
597         \reserved@c{%
598             \getanddefine@fonts{#2}##2%
599             \install@mathalphabet#3{%
600                 \relax\ifmmode \else \non@alpherr#3\fi
601                 \use@mathgroup##1{#2}}}%
```

In addition it defines the alphabet the way it should be used from now on.

```
602     \gdef#3{\relax\ifmmode \else \non@alpherr#3\fi
603             \use@mathgroup##1{#2}}%
```

Finally, we only have to call this macro `\reserved@a` on the old definitions recorded in `\reserved@b`:

```
604     \expandafter\reserved@a\reserved@b\@nil
605 }
```

(End definition for `\extract@alph@from@version`.)

`\math@bgroup` Here are the default definitions for `\math@bgroup` and `\math@egroup`. We use `\bgroup` instead of `\begingroup` to avoid ‘leaking out’ of style changes. This has the side effect of always producing mathord atoms.

```
606 \let\math@bgroup\bgroup
607 \def\math@egroup#1{#1\egroup}
```

(End definition for `\math@bgroup` and `\math@egroup`.)

`\calculate@math@sizes` Here is the default definition for `\calculate@math@sizes` a more elaborate interface is under testing in mthscale.sty.

```
608 \gdef\calculate@math@sizes{%
609     \@font@info{Calculating\space math\space sizes\space for\space
610     size\space <\f@size>}%
611     \dimen@\f@size \p@
612     \tempdima \defaultscriptratio \dimen@
613     \dimen@ \defaultscriptsratio \dimen@
614     \expandafter\xdef\csname S@\f@size\endcsname{%
615         \gdef\noexpand\tf@size{\f@size}%
616         \gdef\noexpand\sf@size{\strip@pt\tempdima}%
617         \gdef\noexpand\ssf@size{\strip@pt\dimen@}%
618         \noexpand\math@fontstrue}}
```

(End definition for `\calculate@math@sizes`.)

\defaultscriptratio The default ratio for math sizes is:
\defaultscriptscriptratio 1 to \defaultscriptratio to \defaultscriptscriptratio.
By default this is 1 to .7 to .5.

```

619 \def\defaultscriptratio{.7}
620 \def\defaultscriptscriptratio{.5}

```

(End definition for \defaultscriptratio and \defaultscriptscriptratio.)

\noaccents@ If we don't have a definition for \noaccents@ we provide a dummy.

```

621 \ifx\noaccents@\undefined
622   \let\noaccents@\empty
623 \fi

```

(End definition for \noaccents@.)

\showhyphens The \showhyphens command must be redefined since the version in plain.tex uses \tenrm. We have also made some further adjustments for its use in L^AT_EX.

```

624 </2ekernel>
625 <latexrelease>\IncludeInRelease{2017/01/01}{\showhyphens}%
626 <latexrelease>                                {XeTeX support for \showhyphens}%
627 (*2ekernel | latexrelease)
628 \ifx\XeTeXcharclass\undefined

```

Version for engines other than XeT_EX.

```

629 \DeclareRobustCommand\showhyphens[1]{%
630   \setbox0\vbox{%
631     \color@begingroup
632     \everypar{}%
633     \parfillskip\z@skip\hsize\maxdimen
634     \normalfont
635     \pretolerance\m@ne\tolerance\m@ne\hbadness\z@\showboxdepth\z@\
636     \color@endgroup}}

```

```

637 \else

```

XeT_EX version. When using system fonts XeT_EX reports consecutive runs of characters as a single item in box logging, which means the standard \showhyphens does not work. This version typesets the text into a narrow box to force hyphenation and then reconstructs a horizontal list with explicit hyphens to generate the display. Note that the lmr OpenType font is forced, this works even if the characters are not in the font as hyphenation is attempted due to the width of the space and hyphen character. It may generate spurious Missing Character warnings in the log, these are however suppressed from the terminal output by ensuring that \tracingonline is locally zero.

```

638 \DeclareRobustCommand\showhyphens[1]{%
639   \setbox0\vbox{%
640     \usefont{TU}{lmr}{m}{n}%
641     \hsize 1sp %
642     \hbadness\@M
643     \hfuzz\maxdimen
644     \tracingonline\z@
645     \everypar={}%
646     \leftskip\z@skip
647     \rightskip\z@skip
648     \parfillskip\z@skip

```

```

649   \hyphenpenalty=-\@M
650   \pretolerance\m@ne
651   \interlinepenalty\z@
652   \clubpenalty\z@
653   \widowpenalty\z@
654   \brokenpenalty1127 %
655   \setbox\z@\hbox{}%
656   \noindent
657   \hskip\z@skip
658   #1%
659   \par

```

Note here we stop the loop if made no progress, non-removable items may mean that we can not process the whole list (which would be testable as `\lastnodetype=-1`).

```

660   \loop
661   @tempswafalse
662   \ifnum\lastnodetype=11\unskip\@tempswatrue\fi
663   \ifnum\lastnodetype=12\unkern\@tempswatrue\fi
664   \ifnum\lastnodetype=13 %
665   \count@\lastpenalty
666   \unpenalty\@tempswatrue
667   \fi
668   \ifnum\lastnodetype=\@ne
669   \setbox\tw@\lastbox\@tempswatrue
670   \setbox0\hbox{\unhbox\tw@\unskip\unskip\unpenalty
671   \ifnum\count@=1127 \else\ \fi
672   \unhbox0}%
673   \count@\z@
674   \fi
675   \if@tempswa
676   \repeat
677   \hbadness\z@
678   \hsize\maxdimen
679   \showboxdepth\z@
680   \tolerance\m@ne
681   \hyphenpenalty\z@
682   \noindent\unhbox\z@
683 }
684 \fi
685 </2ekernel | latexrelease>
686 <latexrelease>\EndIncludeInRelease
687 <latexrelease>\IncludeInRelease{0000/00/00}{\showhyphens}%
688 <latexrelease> {XeTeX support for \showhyphens}%
689 <latexrelease>\gdef\showhyphens#1{%
690 <latexrelease> \setbox0\vbox{%
691 <latexrelease> \color@begingroup
692 <latexrelease> \everypar{}%
693 <latexrelease> \parfillskip\z@skip\hsize\maxdimen
694 <latexrelease> \normalfont
695 <latexrelease> \pretolerance\m@ne\tolerance\m@ne
696 <latexrelease> \hbadness\z@\showboxdepth\z@\ #1%
697 <latexrelease> \color@endgroup}%
698 <latexrelease>\EndIncludeInRelease
699 <*2ekernel>

```

(End definition for `\showhyphens`.)

`\addto@hook` We need a macro to add tokens to a hook.

700 `\long\def\addto@hook#1#2{\#1\expandafter{\the#1#2}}`

(End definition for `\addto@hook`.)

`\@vpt`

701 `\def\@vpt{5}`

(End definition for `\@vpt`.)

`\@vipt`

702 `\def\@vipt{6}`

(End definition for `\@vipt`.)

`\@viipt`

703 `\def\@viipt{7}`

(End definition for `\@viipt`.)

`\@viiipt`

704 `\def\@viiipt{8}`

(End definition for `\@viiipt`.)

`\@ixpt`

705 `\def\@ixpt{9}`

(End definition for `\@ixpt`.)

`\@xipt`

706 `\def\@xipt{10}`

(End definition for `\@xipt`.)

`\@xiipt`

707 `\def\@xiipt{10.95}`

(End definition for `\@xiipt`.)

`\@xiiipt`

708 `\def\@xiiipt{12}`

(End definition for `\@xiiipt`.)

`\@xivipt`

709 `\def\@xivipt{14.4}`

(End definition for `\@xivipt`.)

`\@xviipt`

710 `\def\@xviipt{17.28}`

(End definition for `\@xviipt`.)

```
\@xxpt
711 \def\@xxpt{20.74}
(End definition for \@xxpt.)
```



```
\@xxvpt
712 \def\@xxvpt{24.88}
(End definition for \@xxvpt.)
713 </2ekernel>
```

File s

ltfssaxes.dtx

This file contains the implementation for handling extra axes splitting the series and the values into sub-categories. selection commands. See other parts of the L^AT_EX distribution, or *The L^AT_EX Companion* for higher level documentation of the L^AT_EX Font Selection Scheme.

Everything in the this file got introduced 2020/02/02, so we do a single rollback (for now).

```
1  {*2ekernel}
2  /{2ekernel}
3  {*2ekernel | latexrelease}
4  {latexrelease}\IncludeInRelease{2020/02/02}%
5  {latexrelease}  {\DeclareFontSeriesChangeRule}{Series change rules}%
```

1 Changing the font series

In the original NFSS implementation the series was a single attribute stored in `\f@series` and so one always had to specify both weight and width together. This means it was impossible to typeset, a paragraph in a condensed font and inside have a few words in bold weight (but still condensed) without doing this manually by requesting `\fontseries{bc}\selectfont`.

The new implementation now works differently by looking both at the current value of `\f@series` and the requested new series and out of that combination selects a resulting series value. Thus, if the current series is `c` and we ask for `b` we now get `bc`.

This is done by consulting a simple lookup table. This table is configurable (though most likely that flexibility will seldom of ever be needed) Adding or changing entries in this table are done with `\DeclareFontSeriesChangeRule`.

1.1 The series lookup table

`\DeclareFontSeriesChangeRule` The `\DeclareFontSeriesChangeRule` defines entries in a simple database (implemented as a set of commands) that define mappings between from an existing series and requested new series and maps that to a result series (and additionally offers an alternative if the desired one is not existing):

```
#1 current \f@series
#2 requested new series
#3 result (if that exist for the given font family)
#4 alternative result (if #3 does not exist)
```

If an `.fd` file has its own substitution rules then `#3` exist and thus `#4` is not applied.

If there is no matching database entry or if neither the result nor the alternate result exist in the font family the requested new series is used (which then may trigger substitutions later on).

```
6  \def\DeclareFontSeriesChangeRule#1#2#3#4{%
```

```
7  \c@namedef{series@#1@#2}{{#3}{#4}}}
```

(End definition for `\DeclareFontSeriesChangeRule`.)

1.2 Mapping rules for series changes

The rules set up use explicit series values not `\..default` indirections; my current feeling is that this is in fact better.

With 9 weights and 9 width classes this table is getting a bit large in the end (324 entries) but on the other hand it doesn't change and accessing speed and it is fast this way.

We could alternatively split the axis and maintain weight and width separately, but that would take more processing time and would not allow for setting up explicit exceptions nicely (not sure that this would ever get used though).

Design considerations for mapping entries:

- We make `m` to reset both weight and width (as this is how it always worked). To reset just the width `?m` is provided and to reset just the weight `m?`.
- We do support “`mwidth`” and “`weightm`”, e.g., `mec` to mean “go to medium weight and extra-condensed width”. At the end of the process we automatically drop any leftover `m` in the series name (unless it is just a single `m`).
- If there is no table entry then the target series is used unconditionally. This means that any request to set both weight and width (e.g. `bx` or `ulc`) needs no table entries. For that reason there are no entries which have a weight+width as request (i.e., second argument).

In particular this is also true for cases involving `m`, e.g., `bm` (bold medium width) which automatically gets reduced result in `b` or `mc` (medium weight condensed) which becomes `c` as a result.

- Only a few entries have “alterative” values and perhaps most of them should get dropped. Or maybe not ... needs some thought perhaps.

The idea is that you don't want the normal substitution to kick in because that would reset the shape first and it may be better to stay with `b` when a change to `c` is requested and `bc` doesn't exist, than to go to first change the shape to `n` and then find that `bc/n` doesn't exist either and thus ending up wth `m/n`.

- Also: while I did set up all nine standard weight values from `ul` to `ub` I only bothered to provide entries for `ec`, `sc`, `c` and `x`, because other levels of compression/expansion are not in any real fonts that I know.

Could and perhaps should be eventually extended to cover the whole set.

```
8 \DeclareFontSeriesChangeRule {bc}{b}{bc}{}  
9 \DeclareFontSeriesChangeRule {bc}{c}{bc}{}  
10 \DeclareFontSeriesChangeRule {bc}{eb}{ebc}{}  
11 \DeclareFontSeriesChangeRule {bc}{ec}{bec} {bc}  
12 \DeclareFontSeriesChangeRule {bc}{el}{elc}{}  
13 \DeclareFontSeriesChangeRule {bc}{l}{lc}{}  
14 \DeclareFontSeriesChangeRule {bc}{sb}{sbc}{}  
15 \DeclareFontSeriesChangeRule {bc}{sc}{bsc} {bc}  
16 \DeclareFontSeriesChangeRule {bc}{s1}{slc}{}  
17 \DeclareFontSeriesChangeRule {bc}{ub}{ubc}{}  
18 \DeclareFontSeriesChangeRule {bc}{ul}{ulc}{}  
19 \DeclareFontSeriesChangeRule {bc}{x}{bx}{}  
20 \end{document}
```

```

20 \DeclareFontSeriesChangeRule {bx}{b}{bx}{}%
21 \DeclareFontSeriesChangeRule {bx}{c} {bc} {bx} %<-----
22 \DeclareFontSeriesChangeRule {bx}{eb}{ebx}{}%
23 \DeclareFontSeriesChangeRule {bx}{ec} {bec} {bx} %<-----
24 \DeclareFontSeriesChangeRule {bx}{el}{elx}{}%
25 \DeclareFontSeriesChangeRule {bx}{l}{lx}{}%
26 \DeclareFontSeriesChangeRule {bx}{sb} {sbx} {}%
27 \DeclareFontSeriesChangeRule {bx}{sc} {bsc} {bx} %<-----
28 \DeclareFontSeriesChangeRule {bx}{s1}{slx} {}%
29 \DeclareFontSeriesChangeRule {bx}{ub}{ubx}{}%
30 \DeclareFontSeriesChangeRule {bx}{ul}{ulx}{}%
31 \DeclareFontSeriesChangeRule {bx}{x}{bx}{}%

32 \DeclareFontSeriesChangeRule {b}{bx} {bx} {b} %<-----
33 \DeclareFontSeriesChangeRule {b}{c} {bc} {b} %<-----
34 \DeclareFontSeriesChangeRule {b}{ec} {bec} {b} %<-----
35 \DeclareFontSeriesChangeRule {b}{sb} {sb} {b} %<-----
36 \DeclareFontSeriesChangeRule {b}{sc} {bsc} {b} %<-----
37 \DeclareFontSeriesChangeRule {b}{x} {bx} {b} %<-----

38 \DeclareFontSeriesChangeRule {c}{bx} {bx} {b} %<-----
39 \DeclareFontSeriesChangeRule {c}{b}{bc}{}%
40 \DeclareFontSeriesChangeRule {c}{eb}{ebc}{}%
41 \DeclareFontSeriesChangeRule {c}{el}{elc}{}%
42 \DeclareFontSeriesChangeRule {c}{l}{lc}{}%
43 \DeclareFontSeriesChangeRule {c}{sb}{sbc}{}%
44 \DeclareFontSeriesChangeRule {c}{s1}{slc}{}%
45 \DeclareFontSeriesChangeRule {c}{ub}{ubc}{}%
46 \DeclareFontSeriesChangeRule {c}{ul}{ulc}{}%
47 \DeclareFontSeriesChangeRule {c}{x}{x}{m}           %<-----

48 \DeclareFontSeriesChangeRule {ebc}{b}{bc}{}%
49 \DeclareFontSeriesChangeRule {ebc}{c}{ebc}{}%
50 \DeclareFontSeriesChangeRule {ebc}{eb}{ebc}{}%
51 \DeclareFontSeriesChangeRule {ebc}{ec}{ebec}{ebc}%
52 \DeclareFontSeriesChangeRule {ebc}{el}{elc}{}%
53 \DeclareFontSeriesChangeRule {ebc}{l}{lc}{}%
54 \DeclareFontSeriesChangeRule {ebc}{sb}{sbc}{}%
55 \DeclareFontSeriesChangeRule {ebc}{sc}{ebsc}{ebc}%
56 \DeclareFontSeriesChangeRule {ebc}{s1}{slc}{}%
57 \DeclareFontSeriesChangeRule {ebc}{ub}{ubc}{}%
58 \DeclareFontSeriesChangeRule {ebc}{ul}{ulc}{}%
59 \DeclareFontSeriesChangeRule {ebc}{x}{ebx}{}%

60 \DeclareFontSeriesChangeRule {ec}{bx} {bx} {b} %<-----
61 \DeclareFontSeriesChangeRule {ec}{b}{bec}{}%
62 \DeclareFontSeriesChangeRule {ec}{eb}{ebc}{}%
63 \DeclareFontSeriesChangeRule {ec}{el}{elec}{}%
64 \DeclareFontSeriesChangeRule {ec}{l}{lec}{}%
65 \DeclareFontSeriesChangeRule {ec}{sb}{sbec}{}%
66 \DeclareFontSeriesChangeRule {ec}{s1}{sle}{}%
67 \DeclareFontSeriesChangeRule {ec}{ub}{ubec}{}%
68 \DeclareFontSeriesChangeRule {ec}{ul}{ulec}{}%
69 \DeclareFontSeriesChangeRule {ec}{x}{x}{m}           %<-----

70 \DeclareFontSeriesChangeRule {sc}{bx} {bx} {b} %<-----
71 \DeclareFontSeriesChangeRule {sc}{b}{bsc}{}%

```

```

72 \DeclareFontSeriesChangeRule {sc}{eb}{ebsc}{}
73 \DeclareFontSeriesChangeRule {sc}{el}{elsc}{}
74 \DeclareFontSeriesChangeRule {sc}{l}{lsc}{}
75 \DeclareFontSeriesChangeRule {sc}{sb}{sbsc}{}
76 \DeclareFontSeriesChangeRule {sc}{s1}{slsc}{}
77 \DeclareFontSeriesChangeRule {sc}{ub}{ubsc}{}
78 \DeclareFontSeriesChangeRule {sc}{ul}{ulsc}{}
79 \DeclareFontSeriesChangeRule {sc}{x}{x}{m} %<-----

80 \DeclareFontSeriesChangeRule {ebx}{b}{bx}{}
81 \DeclareFontSeriesChangeRule {ebx}{c}{ebc}{}
82 \DeclareFontSeriesChangeRule {ebx}{eb}{ebx}{}
83 \DeclareFontSeriesChangeRule {ebx}{ec}{ebec}{}
84 \DeclareFontSeriesChangeRule {ebx}{el}{elx}{}
85 \DeclareFontSeriesChangeRule {ebx}{l}{lx}{}
86 \DeclareFontSeriesChangeRule {ebx}{sb}{sbx}{}
87 \DeclareFontSeriesChangeRule {ebx}{sc}{ebsc}{}
88 \DeclareFontSeriesChangeRule {ebx}{s1}{slx}{}
89 \DeclareFontSeriesChangeRule {ebx}{ub}{ubx}{}
90 \DeclareFontSeriesChangeRule {ebx}{ul}{ulx}{}
91 \DeclareFontSeriesChangeRule {ebx}{x}{ebx}{}

92 \DeclareFontSeriesChangeRule {eb}{c}{ebc}{}
93 \DeclareFontSeriesChangeRule {eb}{ec}{ebec}{}
94 \DeclareFontSeriesChangeRule {eb}{sc}{ebsc}{}
95 \DeclareFontSeriesChangeRule {eb}{x}{ebx}{}

96 \DeclareFontSeriesChangeRule {elc}{b}{bc}{}
97 \DeclareFontSeriesChangeRule {elc}{c}{elc}{}
98 \DeclareFontSeriesChangeRule {elc}{eb}{ebc}{}
99 \DeclareFontSeriesChangeRule {elc}{ec}{elec}{}
100 \DeclareFontSeriesChangeRule {elc}{el}{elc}{}
101 \DeclareFontSeriesChangeRule {elc}{l}{lc}{}
102 \DeclareFontSeriesChangeRule {elc}{sb}{sbc}{}
103 \DeclareFontSeriesChangeRule {elc}{sc}{elsc}{}
104 \DeclareFontSeriesChangeRule {elc}{s1}{slc}{}
105 \DeclareFontSeriesChangeRule {elc}{ub}{ubc}{}
106 \DeclareFontSeriesChangeRule {elc}{ul}{ulc}{}
107 \DeclareFontSeriesChangeRule {elc}{x}{elx}{}

108 \DeclareFontSeriesChangeRule {elx}{b}{bx}{}
109 \DeclareFontSeriesChangeRule {elx}{c}{elc}{}
110 \DeclareFontSeriesChangeRule {elx}{eb}{ebx}{}
111 \DeclareFontSeriesChangeRule {elx}{ec}{elec}{}
112 \DeclareFontSeriesChangeRule {elx}{el}{elx}{}
113 \DeclareFontSeriesChangeRule {elx}{l}{lx}{}
114 \DeclareFontSeriesChangeRule {elx}{sb}{sbx}{}
115 \DeclareFontSeriesChangeRule {elx}{sc}{elsc}{}
116 \DeclareFontSeriesChangeRule {elx}{s1}{slx}{}
117 \DeclareFontSeriesChangeRule {elx}{ub}{ubx}{}
118 \DeclareFontSeriesChangeRule {elx}{ul}{ulx}{}
119 \DeclareFontSeriesChangeRule {elx}{x}{elx}{}

120 \DeclareFontSeriesChangeRule {el}{c}{elc}{}
121 \DeclareFontSeriesChangeRule {el}{ec}{elec}{}
122 \DeclareFontSeriesChangeRule {el}{sc}{elsc}{}
123 \DeclareFontSeriesChangeRule {el}{x}{elx}{}

```

```

124 \DeclareFontSeriesChangeRule {lc}{b}{bc}={}
125 \DeclareFontSeriesChangeRule {lc}{c}{lc}={}
126 \DeclareFontSeriesChangeRule {lc}{eb}{ebc}={}
127 \DeclareFontSeriesChangeRule {lc}{ec}{lec}={}
128 \DeclareFontSeriesChangeRule {lc}{el}{elc}={}
129 \DeclareFontSeriesChangeRule {lc}{l}{lc}={}
130 \DeclareFontSeriesChangeRule {lc}{sb}{sbc}={}
131 \DeclareFontSeriesChangeRule {lc}{sc}{lsc}={}
132 \DeclareFontSeriesChangeRule {lc}{s1}{slc}={}
133 \DeclareFontSeriesChangeRule {lc}{ub}{ubc}={}
134 \DeclareFontSeriesChangeRule {lc}{ul}{ulc}={}
135 \DeclareFontSeriesChangeRule {lc}{x}{lx}={}

136 \DeclareFontSeriesChangeRule {lx}{b}{bx}={}
137 \DeclareFontSeriesChangeRule {lx}{c}{lc}={}
138 \DeclareFontSeriesChangeRule {lx}{eb}{ebx}={}
139 \DeclareFontSeriesChangeRule {lx}{ec}{lec}={}
140 \DeclareFontSeriesChangeRule {lx}{el}{elx}={}
141 \DeclareFontSeriesChangeRule {lx}{l}{lx}={}
142 \DeclareFontSeriesChangeRule {lx}{sb}{sbx}={}
143 \DeclareFontSeriesChangeRule {lx}{sc}{lsc}={}
144 \DeclareFontSeriesChangeRule {lx}{s1}{slx}={}
145 \DeclareFontSeriesChangeRule {lx}{ub}{ubx}={}
146 \DeclareFontSeriesChangeRule {lx}{ul}{ulx}={}
147 \DeclareFontSeriesChangeRule {lx}{x}{lx}={}

148 \DeclareFontSeriesChangeRule {l}{bx}{bx}{b} %<-----
149 \DeclareFontSeriesChangeRule {l}{b}{b}{bx} %<-----
150 \DeclareFontSeriesChangeRule {l}{c}{lc}{l} % ? %<-----
151 \DeclareFontSeriesChangeRule {l}{ec}{lec}{l} % ? %<-----
152 \DeclareFontSeriesChangeRule {l}{sb}{sb}{b} % ? %<-----
153 \DeclareFontSeriesChangeRule {l}{sc}{lsc}{l} % ? %<-----
154 \DeclareFontSeriesChangeRule {l}{x}{lx}{l} % ? %<-----

155 \DeclareFontSeriesChangeRule {m}{bx}{bx}{b} %<-----
156 \DeclareFontSeriesChangeRule {m}{b}{b}{bx} %<-----
157 \DeclareFontSeriesChangeRule {m}{c}{c}{m} %<-----
158 \DeclareFontSeriesChangeRule {m}{ec}{ec}{m} %<-----
159 \DeclareFontSeriesChangeRule {m}{l}{l}{m} %<-----
160 \DeclareFontSeriesChangeRule {m}{sb}{sb}{b} %<-----
161 \DeclareFontSeriesChangeRule {m}{sc}{sc}{m} %<-----
162 \DeclareFontSeriesChangeRule {m}{x}{x}{m} %<-----

163 \DeclareFontSeriesChangeRule {sbc}{b}{bc}={}
164 \DeclareFontSeriesChangeRule {sbc}{c}{sbc}={}
165 \DeclareFontSeriesChangeRule {sbc}{eb}{ebc}={}
166 \DeclareFontSeriesChangeRule {sbc}{ec}{sbec}{sbc}
167 \DeclareFontSeriesChangeRule {sbc}{el}{elc}={}
168 \DeclareFontSeriesChangeRule {sbc}{l}{lc}={}
169 \DeclareFontSeriesChangeRule {sbc}{sb}{sbc}={}
170 \DeclareFontSeriesChangeRule {sbc}{sc}{sbsc}{sbc}
171 \DeclareFontSeriesChangeRule {sbc}{s1}{slc}={}
172 \DeclareFontSeriesChangeRule {sbc}{ub}{ubc}={}
173 \DeclareFontSeriesChangeRule {sbc}{ul}{ulc}={}
174 \DeclareFontSeriesChangeRule {sbc}{x}{sbx}={}

175 \DeclareFontSeriesChangeRule {sbx}{b}{bx}={}

```

```

176 \DeclareFontSeriesChangeRule {sbx}{c}{sbc}{}  

177 \DeclareFontSeriesChangeRule {sbx}{eb}{ebx}{}  

178 \DeclareFontSeriesChangeRule {sbx}{ec}{sbec}{}  

179 \DeclareFontSeriesChangeRule {sbx}{el}{elx}{}  

180 \DeclareFontSeriesChangeRule {sbx}{l}{lx}{}  

181 \DeclareFontSeriesChangeRule {sbx}{sb}{sbx}{}  

182 \DeclareFontSeriesChangeRule {sbx}{sc}{sbsc}{}  

183 \DeclareFontSeriesChangeRule {sbx}{s1}{slx}{}  

184 \DeclareFontSeriesChangeRule {sbx}{ub}{ubx}{}  

185 \DeclareFontSeriesChangeRule {sbx}{ul}{ulx}{}  

186 \DeclareFontSeriesChangeRule {sbx}{x}{sbx}{}  

  

187 \DeclareFontSeriesChangeRule {sb}{c} {sbc} {bc} %? %<----  

188 \DeclareFontSeriesChangeRule {sb}{ec} {sbec} {sbc} %? %<----  

189 \DeclareFontSeriesChangeRule {sb}{sc} {sbsc} {sbc} %? %<----  

190 \DeclareFontSeriesChangeRule {sb}{x} {sbx} {bx} %? %<----  

  

191 \DeclareFontSeriesChangeRule {slc}{b}{bc}{}  

192 \DeclareFontSeriesChangeRule {slc}{c}{slc}{}  

193 \DeclareFontSeriesChangeRule {slc}{eb}{ebc}{}  

194 \DeclareFontSeriesChangeRule {slc}{ec}{slec}{}  

195 \DeclareFontSeriesChangeRule {slc}{el}{elc}{}  

196 \DeclareFontSeriesChangeRule {slc}{l}{lc}{}  

197 \DeclareFontSeriesChangeRule {slc}{sb}{sbc}{}  

198 \DeclareFontSeriesChangeRule {slc}{sc}{slsc}{}  

199 \DeclareFontSeriesChangeRule {slc}{s1}{slc}{}  

200 \DeclareFontSeriesChangeRule {slc}{ub}{ubc}{}  

201 \DeclareFontSeriesChangeRule {slc}{ul}{ulc}{}  

202 \DeclareFontSeriesChangeRule {slc}{x}{slx}{}  

  

203 \DeclareFontSeriesChangeRule {slx}{b}{bx}{}  

204 \DeclareFontSeriesChangeRule {slx}{c}{slc}{}  

205 \DeclareFontSeriesChangeRule {slx}{eb}{ebx}{}  

206 \DeclareFontSeriesChangeRule {slx}{ec}{slec}{}  

207 \DeclareFontSeriesChangeRule {slx}{el}{elx}{}  

208 \DeclareFontSeriesChangeRule {slx}{l}{lx}{}  

209 \DeclareFontSeriesChangeRule {slx}{sb}{sbx}{}  

210 \DeclareFontSeriesChangeRule {slx}{sc}{slsc}{}  

211 \DeclareFontSeriesChangeRule {slx}{s1}{slx}{}  

212 \DeclareFontSeriesChangeRule {slx}{ub}{ubx}{}  

213 \DeclareFontSeriesChangeRule {slx}{ul}{ulx}{}  

214 \DeclareFontSeriesChangeRule {slx}{x}{slx}{}  

  

215 \DeclareFontSeriesChangeRule {s1}{c}{slc}{}  

216 \DeclareFontSeriesChangeRule {s1}{ec}{slec}{}  

217 \DeclareFontSeriesChangeRule {s1}{sc}{slsc}{}  

218 \DeclareFontSeriesChangeRule {s1}{x}{slx}{}  

  

219 \DeclareFontSeriesChangeRule {ubc}{b}{bc}{}  

220 \DeclareFontSeriesChangeRule {ubc}{c}{ubc}{}  

221 \DeclareFontSeriesChangeRule {ubc}{eb}{ebc}{}  

222 \DeclareFontSeriesChangeRule {ubc}{ec}{ubec}{}  

223 \DeclareFontSeriesChangeRule {ubc}{el}{elc}{}  

224 \DeclareFontSeriesChangeRule {ubc}{l}{lc}{}  

225 \DeclareFontSeriesChangeRule {ubc}{sb}{sbc}{}  

226 \DeclareFontSeriesChangeRule {ubc}{sc}{ubsc}{}  

227 \DeclareFontSeriesChangeRule {ubc}{s1}{slc}{}  


```

```

228 \DeclareFontSeriesChangeRule {ubc}{ub}{ubc}{}
229 \DeclareFontSeriesChangeRule {ubc}{ul}{ulc}{}
230 \DeclareFontSeriesChangeRule {ubc}{x}{ubx}{}
231 \DeclareFontSeriesChangeRule {ubx}{b}{bx}{}
232 \DeclareFontSeriesChangeRule {ubx}{c}{ubc}{}
233 \DeclareFontSeriesChangeRule {ubx}{eb}{ebx}{}
234 \DeclareFontSeriesChangeRule {ubx}{ec}{ubec}{}
235 \DeclareFontSeriesChangeRule {ubx}{el}{elx}{}
236 \DeclareFontSeriesChangeRule {ubx}{l}{lx}{}
237 \DeclareFontSeriesChangeRule {ubx}{sb}{sbx}{}
238 \DeclareFontSeriesChangeRule {ubx}{sc}{ubsc}{}
239 \DeclareFontSeriesChangeRule {ubx}{s1}{slx}{}
240 \DeclareFontSeriesChangeRule {ubx}{ub}{ubx}{}
241 \DeclareFontSeriesChangeRule {ubx}{ul}{ulx}{}
242 \DeclareFontSeriesChangeRule {ubx}{x}{ubx}{}
243 \DeclareFontSeriesChangeRule {ub}{c}{ubc}{}
244 \DeclareFontSeriesChangeRule {ub}{ec}{ubec}{}
245 \DeclareFontSeriesChangeRule {ub}{sc}{ubsc}{}
246 \DeclareFontSeriesChangeRule {ub}{x}{ubx}{}
247 \DeclareFontSeriesChangeRule {ulc}{b}{bc}{}
248 \DeclareFontSeriesChangeRule {ulc}{c}{ulc}{}
249 \DeclareFontSeriesChangeRule {ulc}{eb}{ebc}{}
250 \DeclareFontSeriesChangeRule {ulc}{ec}{ulec}{ulc}
251 \DeclareFontSeriesChangeRule {ulc}{el}{elc}{}
252 \DeclareFontSeriesChangeRule {ulc}{l}{lc}{}
253 \DeclareFontSeriesChangeRule {ulc}{sb}{sbc}{}
254 \DeclareFontSeriesChangeRule {ulc}{sc}{ulsc}{ulc}
255 \DeclareFontSeriesChangeRule {ulc}{s1}{slc}{}
256 \DeclareFontSeriesChangeRule {ulc}{ub}{ubc}{}
257 \DeclareFontSeriesChangeRule {ulc}{ul}{ulc}{}
258 \DeclareFontSeriesChangeRule {ulc}{x}{ulx}{}
259 \DeclareFontSeriesChangeRule {ulx}{b}{bx}{}
260 \DeclareFontSeriesChangeRule {ulx}{c}{ulc}{}
261 \DeclareFontSeriesChangeRule {ulx}{eb}{ebx}{}
262 \DeclareFontSeriesChangeRule {ulx}{ec}{ulec}{}
263 \DeclareFontSeriesChangeRule {ulx}{el}{elx}{}
264 \DeclareFontSeriesChangeRule {ulx}{l}{lx}{}
265 \DeclareFontSeriesChangeRule {ulx}{sb}{sbx}{}
266 \DeclareFontSeriesChangeRule {ulx}{sc}{ulsc}{}
267 \DeclareFontSeriesChangeRule {ulx}{s1}{slx}{}
268 \DeclareFontSeriesChangeRule {ulx}{ub}{ubx}{}
269 \DeclareFontSeriesChangeRule {ulx}{ul}{ulx}{}
270 \DeclareFontSeriesChangeRule {ulx}{x}{ulx}{}
271 \DeclareFontSeriesChangeRule {ul}{c}{ulc}{}
272 \DeclareFontSeriesChangeRule {ul}{ec}{ulec}{}
273 \DeclareFontSeriesChangeRule {ul}{sc}{ulsc}{}
274 \DeclareFontSeriesChangeRule {ul}{x}{ulx}{}
275 \DeclareFontSeriesChangeRule {x}{b}{bx}{}
276 \DeclareFontSeriesChangeRule {x}{c}{c}{}
277 \DeclareFontSeriesChangeRule {x}{eb}{ebx}{}
278 \DeclareFontSeriesChangeRule {x}{ec}{ec}{}
279 \DeclareFontSeriesChangeRule {x}{el}{elx}{}

```

```

280 \DeclareFontSeriesChangeRule {x}{l}{lx}{}
281 \DeclareFontSeriesChangeRule {x}{sb}{sbx}{}
282 \DeclareFontSeriesChangeRule {x}{sc}{sc}{}
283 \DeclareFontSeriesChangeRule {x}{sl}{slx}{}
284 \DeclareFontSeriesChangeRule {x}{ub}{ubx}{}
285 \DeclareFontSeriesChangeRule {x}{ul}{ulx}{}

```

Special rules for `lm` etc. aren't needed because if the target `lm` is requested it will be used if there is no rule and that is then reduced to `l` automatically. Same for `mc` and friends. Only `?m` and `m?` need rules.

So here are the special rules for `m?`:

```

286 \DeclareFontSeriesChangeRule {bc}{m?}{c}{}
287 \DeclareFontSeriesChangeRule {bec}{m?}{ec}{}
288 \DeclareFontSeriesChangeRule {bsc}{m?}{sc}{}
289 \DeclareFontSeriesChangeRule {bx}{m?}{x}{}
290 \DeclareFontSeriesChangeRule {b}{m?}{m}{}
291 \DeclareFontSeriesChangeRule {c}{m?}{c}{}
292 \DeclareFontSeriesChangeRule {ebc}{m?}{c}{}
293 \DeclareFontSeriesChangeRule {ebec}{m?}{ec}{}
294 \DeclareFontSeriesChangeRule {ebsc}{m?}{sc}{}
295 \DeclareFontSeriesChangeRule {ebx}{m?}{x}{}
296 \DeclareFontSeriesChangeRule {eb}{m?}{m}{}
297 \DeclareFontSeriesChangeRule {ec}{m?}{ec}{}
298 \DeclareFontSeriesChangeRule {elc}{m?}{c}{}
299 \DeclareFontSeriesChangeRule {elec}{m?}{ec}{}
300 \DeclareFontSeriesChangeRule {elsc}{m?}{sc}{}
301 \DeclareFontSeriesChangeRule {elx}{m?}{x}{}
302 \DeclareFontSeriesChangeRule {el}{m?}{m}{}
303 \DeclareFontSeriesChangeRule {lc}{m?}{c}{}
304 \DeclareFontSeriesChangeRule {lec}{m?}{ec}{}
305 \DeclareFontSeriesChangeRule {lsc}{m?}{sc}{}
306 \DeclareFontSeriesChangeRule {lx}{m?}{x}{}
307 \DeclareFontSeriesChangeRule {l}{m?}{m}{}
308 \DeclareFontSeriesChangeRule {m}{m?}{m}{}
309 \DeclareFontSeriesChangeRule {sbc}{m?}{c}{}
310 \DeclareFontSeriesChangeRule {sbec}{m?}{ec}{}
311 \DeclareFontSeriesChangeRule {sbsc}{m?}{sc}{}
312 \DeclareFontSeriesChangeRule {sbx}{m?}{x}{}
313 \DeclareFontSeriesChangeRule {sb}{m?}{m}{}
314 \DeclareFontSeriesChangeRule {sc}{m?}{sc}{}
315 \DeclareFontSeriesChangeRule {slc}{m?}{c}{}
316 \DeclareFontSeriesChangeRule {slec}{m?}{ec}{}
317 \DeclareFontSeriesChangeRule {slsc}{m?}{sc}{}
318 \DeclareFontSeriesChangeRule {slx}{m?}{x}{}
319 \DeclareFontSeriesChangeRule {sl}{m?}{m}{}
320 \DeclareFontSeriesChangeRule {ubc}{m?}{c}{}
321 \DeclareFontSeriesChangeRule {ubec}{m?}{ec}{}
322 \DeclareFontSeriesChangeRule {ubsc}{m?}{sc}{}
323 \DeclareFontSeriesChangeRule {ubx}{m?}{x}{}
324 \DeclareFontSeriesChangeRule {ub}{m?}{ub}{}
325 \DeclareFontSeriesChangeRule {ulc}{m?}{c}{}
326 \DeclareFontSeriesChangeRule {ulec}{m?}{ec}{}
327 \DeclareFontSeriesChangeRule {ulsc}{m?}{sc}{}
328 \DeclareFontSeriesChangeRule {ulx}{m?}{x}{}

```

```

329 \DeclareFontSeriesChangeRule {ul}{m?}{m}{}
330 \DeclareFontSeriesChangeRule {x}{m?}{x}{}
      And there the special rules for ?m:
331 \DeclareFontSeriesChangeRule {bc}{?m}{b}{}
332 \DeclareFontSeriesChangeRule {bec}{?m}{b}{}
333 \DeclareFontSeriesChangeRule {bsc}{?m}{b}{}
334 \DeclareFontSeriesChangeRule {bsc}{?m}{b}{}
335 \DeclareFontSeriesChangeRule {bx}{?m}{b}{}
336 \DeclareFontSeriesChangeRule {b}{?m}{b}{}
337 \DeclareFontSeriesChangeRule {c}{?m}{m}{}
338 \DeclareFontSeriesChangeRule {ebc}{?m}{eb}{}
339 \DeclareFontSeriesChangeRule {ebec}{?m}{eb}{}
340 \DeclareFontSeriesChangeRule {ebsc}{?m}{eb}{}
341 \DeclareFontSeriesChangeRule {ebsc}{?m}{eb}{}
342 \DeclareFontSeriesChangeRule {ebx}{?m}{eb}{}
343 \DeclareFontSeriesChangeRule {eb}{?m}{eb}{}
344 \DeclareFontSeriesChangeRule {ec}{?m}{m}{}
345 \DeclareFontSeriesChangeRule {elc}{?m}{el}{}
346 \DeclareFontSeriesChangeRule {elec}{?m}{el}{}
347 \DeclareFontSeriesChangeRule {elsc}{?m}{el}{}
348 \DeclareFontSeriesChangeRule {elsc}{?m}{el}{}
349 \DeclareFontSeriesChangeRule {elx}{?m}{el}{}
350 \DeclareFontSeriesChangeRule {el}{?m}{el}{}
351 \DeclareFontSeriesChangeRule {lc}{?m}{l}{}
352 \DeclareFontSeriesChangeRule {lec}{?m}{l}{}
353 \DeclareFontSeriesChangeRule {lsc}{?m}{l}{}
354 \DeclareFontSeriesChangeRule {lsc}{?m}{l}{}
355 \DeclareFontSeriesChangeRule {lx}{?m}{l}{}
356 \DeclareFontSeriesChangeRule {l}{?m}{l}{}
357 \DeclareFontSeriesChangeRule {m}{?m}{m}{}
358 \DeclareFontSeriesChangeRule {sbc}{?m}{sb}{}
359 \DeclareFontSeriesChangeRule {sbec}{?m}{sb}{}
360 \DeclareFontSeriesChangeRule {sbsc}{?m}{sb}{}
361 \DeclareFontSeriesChangeRule {sbsc}{?m}{sb}{}
362 \DeclareFontSeriesChangeRule {sbx}{?m}{sb}{}
363 \DeclareFontSeriesChangeRule {sb}{?m}{sb}{}
364 \DeclareFontSeriesChangeRule {sc}{?m}{m}{}
365 \DeclareFontSeriesChangeRule {sc}{?m}{m}{}
366 \DeclareFontSeriesChangeRule {slc}{?m}{s1}{}
367 \DeclareFontSeriesChangeRule {sle}{?m}{s1}{}
368 \DeclareFontSeriesChangeRule {s1sc}{?m}{s1}{}
369 \DeclareFontSeriesChangeRule {s1sc}{?m}{s1}{}
370 \DeclareFontSeriesChangeRule {slx}{?m}{s1}{}
371 \DeclareFontSeriesChangeRule {s1}{?m}{s1}{}
372 \DeclareFontSeriesChangeRule {ubc}{?m}{ub}{}
373 \DeclareFontSeriesChangeRule {ubec}{?m}{ub}{}
374 \DeclareFontSeriesChangeRule {ubsc}{?m}{ub}{}
375 \DeclareFontSeriesChangeRule {ubsc}{?m}{ub}{}
376 \DeclareFontSeriesChangeRule {ubx}{?m}{ub}{}
377 \DeclareFontSeriesChangeRule {ub}{?m}{m}{}
378 \DeclareFontSeriesChangeRule {ulc}{?m}{ul}{}
379 \DeclareFontSeriesChangeRule {ulec}{?m}{ul}{}
380 \DeclareFontSeriesChangeRule {ulsc}{?m}{ul}{}
381 \DeclareFontSeriesChangeRule {ulsc}{?m}{ul}{}

```

```

382 \DeclareFontSeriesChangeRule {ulx}{?m}{ul}{}
383 \DeclareFontSeriesChangeRule {ul}{?m}{ul}{}
384 \DeclareFontSeriesChangeRule {x}{?m}{m}{}

```

1.3 Changing to a new series

\if@forced@series If the series gets forced we need to know that fact later on.

```
385 \newif\if@forced@series
```

(End definition for \if@forced@series.)

\fontseriesforce To change unconditionally to a new series you can use \fontseriesforce. Of course, if the series doesn't exist for the current family substitution still happens, but there is not dependency on the current series.

```
386 \ DeclareRobustCommand\fontseriesforce[1]{\@forced@seriestrue\edef\f@series{\#1}}
```

(End definition for \fontseriesforce.)

\fontseries The \fontseries command takes one argument which is the requested new font series. In the orginal implementation it simply saved the expanded value in \f@series. Now we do a bit more processing and look up the final value in the font series data base. This is done by \merge@font@series.

```
387 \ DeclareRobustCommand\fontseries[1]{\@forced@seriesfalse\merge@font@series{\#1}}
```

(End definition for \fontseries.)

\merge@font@series We look up the data base value by expanding the right command twice. If no such value exist then the result will be \relax otherwise it will be the two brace groups: the desired result and the alternate result. The first case means that the third argument to \merge@font@series will be empty.

```

388 \def\merge@font@series#1{%
389   \expandafter\expandafter\expandafter
390   \merge@font@series@
391   \csname series@\f@series \#1\endcsname
392   {\#1}%
393   \nil
394 }

```

(End definition for \merge@font@series.)

\merge@font@series@ This now defines the new \f@series:

```
395 \def\merge@font@series@#1#2#3\@nil{%
```

If the third argument is empty there is no database entry for the combination and the second argument holds the new series so we return that.

Originally the test was simply \ifx!#3! but that actually dies if #3 starts with a conditional and in the definition of \AmSfont that is actually the case.

```

396 \%ifcat\expandafter X\detokenize{\#1}X%
397   \def\reserved@a{\#3}%
398   \ifx\reserved@a\empty
399     \set@target@series{\#2}%
400   \else

```

Otherwise we check if the desired result for the series (#1) exists for the font family and the current shape. As the `.fd` is perhaps not loaded yet, we first have to do that, otherwise the test would fail even if the face is actually available.

```
401     \maybe@load@fontshape
402     \edef\reserved@a{\f@encoding / \f@family / #1 / \f@shape}%
403     \ifcsname \reserved@a \endcsname
```

If the desired result is available then we use that. However, we do need some post-processing because we need to drop surplus `ms` due to the way naming convention was designed in the '90s (sigh).

```
404     \set@target@series{#1}%
```

If not, then we try the alternate result (#2).

```
405     \else
406     \ifcsname \f@encoding / \f@family / #2 / \f@shape \endcsname
```

If the alternate result exist we use that and also issue a warning (or rather a log entry) that we didn't managed to change to the desired font.

```
407     \set@target@series{#2}%
408     \font@shape@subst@warning
```

If that doesn't exist either, then we use the requested series unmodified (again with a warning).

```
409     \else
410     \set@target@series{#3}%
411     \font@shape@subst@warning
412     \fi
413     \fi
414     \fi
415 }
```

It is possible that the previous font and the new one are actually identical (and the font was not found because it still needs loading) in which case a warning would look rather odd. So we make a quick check for that (which is the reason why we defined `\@reserved@a` above).

```
416 \def\font@shape@subst@warning{%
417   \edef\reserved@b{\curr@fontshape}%
418   \ifx\reserved@a\reserved@b \else
419     \@font@warning{Font shape '\reserved@a' undefined\MessageBreak
420                   using '\reserved@b' instead}%
421   \fi
422 }
```

(End definition for `\merge@font@series@`.)

`\maybe@load@fontshape` A small helper that we use a couple of times: try loading a fontshape (in a group because `\try@load@fontshape` normalizes catcodes).

```
423 \def\maybe@load@fontshape{\begingroup\try@load@fontshape\endgroup}
```

(End definition for `\maybe@load@fontshape`.)

`\set@target@series` Finally the code for normalizing the `\f@series` value.

The combined series value determined by the mapping may still contain an `m` that we have to remove (as the `.fd` files use `c` not `mc` to denote a medium weight condensed series, etc.). We do this in all branches above because a user might have written

```
\DeclareFontSeriesChangeRule {m}{sc}{msc}{mc}
```

instead of using `sc` and `c` as needed in the `.fd` file.

```
424 \def\set@target@series#1{%
```

We need to `\edef` the argument first in case it starts with a conditional. Then we check (and perhaps drop) an “`m`” from the value and assign the result to `\f@series`.

```
425   \edef\f@series{#1}%
426   \series@maybe@drop@one@m\f@series\f@series
427 }
```

(End definition for `\set@target@series`.)

`\series@maybe@drop@one@m` If the series value is in NFSS notation then it should not contain any “`m`” unless it is just an “`m`” by its own. So we need to drop surplus “`m`”s. But we better don’t do this for full names, such as “`semibold`” as used by `autoinst`, for example. So we test against the possible explicit values that should drop an “`m`”. After that we assign the result to `#2` for further use.

```
428 \def\series@maybe@drop@one@m#1{%
429   \expandafter\series@maybe@drop@one@m@x\expandafter{#1}}
430
431 \def\series@maybe@drop@one@m@x#1#2{%
```

The code below is an inline version of the `\in@` macro without the group, so that it works in `\accent`.

```
432 \def\in@@##1,#1,{%
433   \series@check@toks\expandafter{\in@@
434     ,ulm,elm,lm,slm,mm,sbm,bm,ebm,ubm,muc,mec,mc,msc,msx,mx,mex,mux,{},#1,}%
435 \edef\in@@{\the\series@check@toks}%
436 \ifx\in@@\empty
```

The default definition for `\bfdefault` etc is actually `b\empty` so that we can detect if the user has changed the default. However that means a) the above test will definitely fail (maybe something to change) and b) we better use `\edef` on the next line to get rid of it as otherwise the test against `#2` (e.g. `\bfdef@ult`) will fail in other places.

```
437   \edef#2{#1}%
438 \else
439   \edef#2{\expandafter\series@drop@one@m #1\series@drop@one@m}%
440 \fi
441 }
```

As a precaution we use a private toks register not `\toks@` as that is no longer hidden inside the group.

```
442 \newtoks\series@check@toks
```

(End definition for `\series@maybe@drop@one@m`.)

`\series@drop@one@m` Drop up to two `ms` but keep one if that makes the series value empty. Actually, with the current implementation we know that there is at least one in the series value itself and we added one after it, so all we have to do is now returning `#1#2` and dropping the rest.

```
443 \def\series@drop@one@m#1m#2m#3\series@drop@one@m{%
444 % \ifx\relax#1#2\relax m\else#1#2\fi
445 #1#2%
446 }
```

(End definition for `\series@drop@one@m`.)

2 Changing the shape

Shapes are also split in two axes (though it could be more if that is desirable), essentially building in an “sc” axis).

\DeclareFontShapeChangeRule The database for shapes is done in exactly the same way, only that it is much smaller and we usually have no alternative shape (or rather it is empty thus not used).

```
447 \def\DeclareFontShapeChangeRule #1#2#3#4{%
448   @namedef{shape@#1@#2}{\{\#3\}\{\#4\}}}
```

(End definition for \DeclareFontShapeChangeRule.)

There is kind of the same problem with returning back from `sc` to normal. It sort of needs its own letter. In `fontspec` this was solved by the first time `\upshape` changes it or `sl` back (so only `sc` remains) and second time it changes then `sc` back to normal. Maybe that's not a bad way to handle it, but decided for a slightly different approach: `n` always returns to “normal”, ie resets everything and `up` changes italic or slanted to upright and `ulc` undoes small caps.

So we now offer `\normalshape` (using `\shapedefault` which is normally the same as calling both `\ulcshape` and `\upshape`, only more efficient.

\ulcshape To request going back to upper/lowercase we need a new command. It uses `ulc` as shape name but this shape is virtual, i.e., it doesn't exist as a real shape, it is only used as part of the database table entries and thus only appears in the second argument there (but not in the first).

```
449 \DeclareRobustCommand\ulcshape
450   {\not@math@alphabet\ulcshape\relax
451   \fontshape\ulcdefault\selectfont}
452 \let\ulcdefault\@undefined      % for rollback
453 \newcommand\ulcdefault{ulc}
```

(End definition for `\ulcshape`, `\textulc`, and `\ulcdefault`.)

\swshape New command to select a swash shape. The standard rules put this in the same category as italics or slanted, i.e., if you ask for it then italics are undone. One could provide more complicated rules so that `it + sw` becomes `swit` but given that there are only very few fonts that have swash letters that level of flexibility (these days) would be just resulting in a lot of combinations that do not exist.

```
454 \DeclareRobustCommand\swshape
455   {\not@math@alphabet\swshape\relax
456   \fontshape\swdefault\selectfont}
457 \let\swdefault\@undefined      % for rollback
458 \newcommand\swdefault{sw}
```

(End definition for `\swshape`, `\textsw`, and `\swdefault`.)

\sscshape New command to select spaced small capitals. This is only here because `fontaxes` offered it. There isn't a single free font that supports it. However, some commercial ones do, so we offer it so that at some point `fontaxes` could be retired.

So far there aren't any rules for it—probably there should be some putting it in the same category as `sc`.

```
459 \DeclareRobustCommand\sscshape
460   {\not@math@alphabet\sscshape\relax
461   \fontshape\sscdefault\selectfont}
```

```

462 \let\sscdefault\@undefined      % for rollback
463 \newcommand{\sscdefault}[1]{}
(End definition for \sscsshape, \textssc, and \sscdefault.)

```

2.1 Mapping rules for shape combinations

Many of the entries are commented out as we will get that result without any entry.

```

464 \%\\DeclareFontShapeChangeRule {n}{n}  {n}  {}
465 \\DeclareFontShapeChangeRule {n}{it}  {it}  {sl}
466 \\DeclareFontShapeChangeRule {n}{sl}  {sl}  {it}
467 \%\\DeclareFontShapeChangeRule {n}{sw}  {sw}  {}
468 \%\\DeclareFontShapeChangeRule {n}{sc}  {sc}  {}
469 \\DeclareFontShapeChangeRule {n}{ulc} {n}  {}
470 \\DeclareFontShapeChangeRule {n}{up}  {n}  {}

471 \%\\DeclareFontShapeChangeRule {it}{n}  {n}  {}
472 \%\\DeclareFontShapeChangeRule {it}{it}  {it}  {}
473 \\DeclareFontShapeChangeRule {it}{sl}  {sl}  {it}
474 \%\\DeclareFontShapeChangeRule {it}{sw}  {sw}  {}

```

If neither `scit` nor `scls` exist then `sc` will be used as a fallback albeit with a log entry, so except for the latter there will be no change for CM or Latin Modern fonts.

```

475 \\DeclareFontShapeChangeRule {it}{sc}  {scit}  {scls}
476 \\DeclareFontShapeChangeRule {it}{ulc} {it}  {}
477 \\DeclareFontShapeChangeRule {it}{up}  {n}  {}

478 \%\\DeclareFontShapeChangeRule {sl}{n}  {n}  {}
479 \\DeclareFontShapeChangeRule {sl}{it}  {it}  {sl}
480 \%\\DeclareFontShapeChangeRule {sl}{sl}  {sl}  {}
481 \%\\DeclareFontShapeChangeRule {sl}{sw}  {sw}  {}
482 \\DeclareFontShapeChangeRule {sl}{sc}  {scls}  {scit}
483 \\DeclareFontShapeChangeRule {sl}{ulc} {sl}  {}
484 \\DeclareFontShapeChangeRule {sl}{up}  {n}  {}

485 \%\\DeclareFontShapeChangeRule {sc}{n}  {n}  {}
486 \\DeclareFontShapeChangeRule {sc}{it}  {scit}  {scls}
487 \\DeclareFontShapeChangeRule {sc}{sl}  {scls}  {scit}
488 \\DeclareFontShapeChangeRule {sc}{sw}  {scsw}  {sw}
489 \%\\DeclareFontShapeChangeRule {sc}{sc}  {sc}  {}
490 \\DeclareFontShapeChangeRule {sc}{ulc} {n}  {}

```

The next rule might be a bit surprising and rightly so. Correct would be that `sc` is not affected by `up`, i.e., remains `sc` as showed in the commented out rule. However, for nearly three decades commands such as `sc` or `\textup` changed small caps back to the “normal” shape. So for backward compatibility we keep hat behavior.

As a result you are currently typesetting in `scit` or `scls` using `\upshape` twice will return you to the normal shape too, the first will change to `sc` and the second (because of the rule below) change that to `n`. This is the way `fontspec` implemented its version on this interface, so this rule means we are also compatible with the way `fontspec` behaved. Still it remains an oddity which I would rather liked to have avoided.

```

491 \%\\DeclareFontShapeChangeRule {sc}{up} {sc}  {}
492 \\DeclareFontShapeChangeRule {sc}{up} {n}  {}

```

```

493 \%{\ DeclareFontShapeChangeRule {scit}{n} {n} {}}
494 \DeclareFontShapeChangeRule {scit}{it} {scit} {}
495 \DeclareFontShapeChangeRule {scit}{sl} {scsl} {scit}
496 \DeclareFontShapeChangeRule {scit}{sw} {scsw} {sc} % or scit?
497 \DeclareFontShapeChangeRule {scit}{sc} {scit} {}
498 \DeclareFontShapeChangeRule {scit}{ulc} {it} {}
499 \DeclareFontShapeChangeRule {scit}{up} {sc} {}

```

The previous rule assumes that if `scit` exists then `it` exists as well. If not, the mechanism will save `ulc` in `\f@series` which most certainly doesn't exist. So when a font is later selected that would result in a substitution (so no harm done really). Alternatively, we could in this case use `n` as alternative, which may be a bit faster, but such a setup would be so weird in the first place that this isn't worth the effort.

```

500 \%{\ DeclareFontShapeChangeRule {scsl}{n} {n} {}}
501 \DeclareFontShapeChangeRule {scsl}{it} {scit} {scsl}
502 \DeclareFontShapeChangeRule {scsl}{sl} {scsl} {}
503 \DeclareFontShapeChangeRule {scsl}{sw} {scsw} {sc} % or scsl?
504 \DeclareFontShapeChangeRule {scsl}{sc} {scsl} {}
505 \DeclareFontShapeChangeRule {scsl}{ulc} {sl} {}
506 \DeclareFontShapeChangeRule {scsl}{up} {sc} {}

507 \%{\ DeclareFontShapeChangeRule {scsw}{n} {n} {}}
508 \DeclareFontShapeChangeRule {scsw}{it} {scit} {scsw}
509 \DeclareFontShapeChangeRule {scsw}{sl} {scsl} {}
510 \DeclareFontShapeChangeRule {scsw}{sw} {scsw} {}
511 \DeclareFontShapeChangeRule {scsw}{sc} {scsw} {}
512 \DeclareFontShapeChangeRule {scsw}{ulc} {sw} {}
513 \DeclareFontShapeChangeRule {scsw}{up} {sc} {}

514 \%{\ DeclareFontShapeChangeRule {sw}{n} {n} {}}
515 \%{\ DeclareFontShapeChangeRule {sw}{it} {it} {}}
516 \%{\ DeclareFontShapeChangeRule {sw}{sl} {sl} {}}
517 \%{\ DeclareFontShapeChangeRule {sw}{sw} {sw} {}}
518 \DeclareFontShapeChangeRule {sw}{sc} {scsw} {}
519 \DeclareFontShapeChangeRule {sw}{ulc} {sw} {}
520 \DeclareFontShapeChangeRule {sw}{up} {n} {}

```

2.2 Changing to a new shape

`\fontshape` Again the `\fontshape` now has to do a lookup to get to its new value in `\f@shape`. The method is exactly the same as in `\fontseries`.

```
521 \DeclareRobustCommand\fontshape[1]{\merge@font@shape{#1}}
```

(End definition for `\fontshape`.)

`\fontshapeforce` The unconditional version:

```
522 \DeclareRobustCommand\fontshapeforce[1]{\edef\f@shape{#1}}
```

(End definition for `\fontshapeforce`.)

`\merge@font@shape` Look up the database entry (if existing) and act accordingly.

```

523 \def\merge@font@shape#1{%
524   \expandafter\expandafter\expandafter
525   \merge@font@shape@
526   \csname shape@\f@shape \endcsname

```

```

527      {#1}%
528      \nil
529 }

(End definition for \merge@font@shape.)
```

- \merge@font@shape@ Same game now, except that we look at shapes not series values and we can set the shape without the complication of dropping “m”s from the name as we had to for the series.

```

530 \def\merge@font@shape@#1#2#3\@nil{%
531   \def\reserved@a{#3}%
532   \ifx\reserved@a\empty
533     \edef\f@shape{#2}%
534   \else
535     \maybe@load@fontshape
536     \edef\reserved@a{\f@encoding / \f@family / \f@series/#1}%
537     \ifcsname \reserved@a\endcsname
538       \edef\f@shape{#1}%
539     \else
540       \ifcsname \f@encoding / \f@family / \f@series/#2\endcsname
541         \edef\f@shape{#2}%
542         \Qfont@shape@subst@warning
543       \else
544         \edef\f@shape{#3}%
545         \Qfont@shape@subst@warning
546       \fi
547     \fi
548   \fi
549 }
```

(End definition for \merge@font@shape@.)

- \normalshape \normalshape resets both sub-axes if the default rules are used.

```

550 \protected\def\normalshape
551   {\not@math@alphabet\normalshape\relax
552     \fontshape\shapedefault\selectfont}%
```

(End definition for \normalshape.)

3 Make sure we win . . .

This code implements one aspect of what the package `fontaxes` provide. So its redefinitions for the various shape commands, such as `\itshape` should no longer happen. We therefore force the standard definitions at `\AtBeginDocument` (later when this is defined. Once `fontaxes` is no longer doing such redefinitions that could be taken out again.

We use a separate macro so that we can easily disable this (in case of rollback).

- \reinstall@nfss@defs I use `\protected` here not `\DeclareRobustCommand` to avoid extra status lines.

```

553 \def\reinstall@nfss@defs{%
554   \protected\def\upshape
555     {\not@math@alphabet\upshape\relax
556       \fontshape\updefault\selectfont}%
557   \protected\def\slshape
558     {\not@math@alphabet\slshape\relax}
```

```

559          \fontshape\sldefault\selectfont}%
560 \protected\def\scshape
561     {\not@math@\alphabet\scshape\relax
562      \fontshape\scdefault\selectfont}%
563 \protected\def\itshape
564     {\not@math@\alphabet\itshape\mathit
565      \fontshape\itdefault\selectfont}%
566 \protected\def\ulcshape
567     {\not@math@\alphabet\ulcshape\relax
568      \fontshape\ulc}\selectfont}%
569 \protected\def\swshape
570     {\not@math@\alphabet\swshape\relax
571      \fontshape\swdefault\selectfont}%
572 \protected\def\sscshape
573     {\not@math@\alphabet\sscshape\relax
574      \fontshape\sscdefault\selectfont}%
575 }

```

(End definition for `\reinstall@nfss@defs.`)

Supporting rollback ...

```

576 </2ekernel | latexrelease>
577 <latexrelease>\EndIncludeInRelease
578 <latexrelease>\IncludeInRelease{0000/00/00}%
579 <latexrelease> {\DeclareFontSeriesChangeRule}{Series change rules}%
580 <latexrelease>
581 <latexrelease>\DeclareRobustCommand\fontseries[1]{\edef\f@series{\#1}}
582 <latexrelease>\DeclareRobustCommand\fontshape [1]{\edef\f@shape{\#1}}
583 <latexrelease>\let\fontseriesforce@\undefined
584 <latexrelease>\let\fontshapeforce@\undefined
585 <latexrelease>
586 <latexrelease>\let\DeclareFontSeriesChangeRule@\undefined
587 <latexrelease>\let\merge@font@series@\undefined
588 <latexrelease>\let\merge@font@series@\undefined
589 <latexrelease>\let@font@shape@subst@warning@\undefined
590 <latexrelease>\let\maybe@load@fontshape@\undefined
591 <latexrelease>\let\set@target@series@\undefined
592 <latexrelease>\let\series@maybe@drop@one@m@\undefined
593 <latexrelease>\let\series@drop@one@m@\undefined
594 <latexrelease>\let\DeclareFontShapeChangeRule@\undefined
595 <latexrelease>\let\merge@font@shape@\undefined
596 <latexrelease>\let\merge@font@shape@\undefined
597 <latexrelease>\let\normalshape@\undefined
598 <latexrelease>\let\ulcshape@\undefined
599 <latexrelease>\let\ulcdefault@\undefined
600 <latexrelease>\let\swshape@\undefined
601 <latexrelease>\let\swdefault@\undefined
602 <latexrelease>\let\sscshape@\undefined
603 <latexrelease>\let\sscdefault@\undefined
604 <latexrelease>\let\normalshape@\undefined

```

This is always called in `\document` so don't make it undefined.

```

605 <latexrelease>
606 <latexrelease>\let\reinstall@nfss@defs\relax
607 <latexrelease>\EndIncludeInRelease
608 {*2ekernel}

```

This initializes the 2020/02/02 extensions to NFSS after any changes in the preamble.

```
609 〈/2ekernel〉  
610 〈*2ekernel | latexrelease〉  
611 〈latexrelease〉\IncludeInRelease{2020/10/01}%">  
612 〈latexrelease〉 {\reinstall@nfss@defs}{NFSS series init}%">  
613 \g@addto@macro\@kernel@after@begindocument@before  
614 {\reinstall@nfss@defs\init@series@setup}  
615 〈/2ekernel | latexrelease〉  
616 〈latexrelease〉\EndIncludeInRelease  
  
The initialization was introduced in 2020/02/02 but  
617 〈latexrelease〉\IncludeInRelease{2020/02/02}%">  
618 〈latexrelease〉 {\reinstall@nfss@defs}{NFSS series init}%">  
619 〈latexrelease〉\AtBeginDocument{\reinstall@nfss@defs\init@series@setup}  
620 〈latexrelease〉\EndIncludeInRelease  
621 〈latexrelease〉\IncludeInRelease{0000/00/00}%">  
622 〈latexrelease〉 {\reinstall@nfss@defs}{NFSS series init}%">  
623 〈latexrelease〉\EndIncludeInRelease  
624 〈*2ekernel〉  
625 〈/2ekernel〉
```

File t

ltfsstrc.dtx

1 Introduction

This package contains the code for tracing font loading and font changes. It basically overlays some of the low-level functions of NFSS with additional code used for tracing.

The package accepts the following options:

errorshow Write all information about font changes etc. only to the transcript file unless an error happens. This means that information about font substitution will not be shown on the terminal.

warningshow Show all NFSS warnings on the terminal. This setting corresponds to the default behaviour of NFSS if the **tracefnt** package is *not* loaded!

infoshow Show all NFSS warning and all NFSS info messages (that are normally only written to the transcript file) also on the terminal. This is the default if the **tracefnt** package is loaded.

debugshow In addition to **infoshow** show also changing of math fonts as far as possible (this option can produce a large amount of output).

loading Show the name of external fonts when they are loaded. This option shows only “newly” loaded fonts not those already preloaded in the format or the class file before the **tracefnt** package became active.

pausing Turn all font warnings into errors so that L^AT_EX will stop.

2 A driver for this document

The next bit of code contains the documentation driver file for T_EX, i.e., the file that will produce the documentation you are currently reading. It will be extracted from this file by the DOCSTRIP program.

When this file is processed directly by L^AT_EX this will produce the documentation as well.

```
1 <*driver>
2 \documentclass{ltxdoc}
3
4
5 %\OnlyDescription % comment out for implementation details
6
7 \begin{document}
8   \DocInput{ltfsstrc.dtx}
9 \end{document}
10 </driver>
```

3 The Implementation

Warning: Read the macro documentation with a grain of salt. It is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

If we are making a package file it is a good idea to test whether we are running under 2e. This code is actually placed at the very beginning of this file for easier maintenance, thus commented out here.

```
11  <*package>
12  %\NeedsTeXFormat{LaTeX2e}
13  %\ProvidesPackage{tracefnt}[??/?/? v?.??
14  %
15  </package>
```

The debug module makes use of commands contained in a special package file named `trace.sty`.¹¹

```
16  <+debug> \input trace.sty
```

4 Handling Options

`\tracingfonts` Here is the definition of the integer register for the font trace. As a default in a package file we use 1 to give error messages if fonts are substituted. If this code is used for debugging or tracing reasons in the format file (i.e. in `fam.dtx`) we use 0 as the default. But if no font trace is used we build a definition that will produce a warning message.

```
17  <*2ekernel>
18  \def\tracingfonts{%
19    \@font@warning{Command \noexpand\tracingfonts
20      not provided.\MessageBreak
21      Use the ‘tracefnt’ package.\MessageBreak Command found:}%
22    \count@}
23 </2ekernel>
```

The `\count@` in the line above will remove the number after `\tracingfonts`. Note that this definition will be overwritten by the next line if one of these modules are included.

```
24  <*package,trace,debug>
25  \newcount\tracingfonts
26  \tracingfonts=0
27 </package,trace,debug>
```

(End definition for \tracingfonts.)

The option `errorshow` turns off all warnings so that only real errors are shown. `warningshow` corresponds to the NFSS default (when `tracefnt` is not loaded). `infoshow` is the default for this package here; and `debugshow`, `loading`, and `pausing` extend the amount of information even further.

```
28  <*package>
29  \DeclareOption{errorshow}{%
30    \def\@font@info#1{%
31      \GenericInfo{(Font)\@spaces\@spaces\@spaces\space\space}%
32      {LaTeX Font Info: \space\space\space#1}}%
```

¹¹This package is not in distribution at the moment (and probably doesn't work any longer). Think of this part of the code as being historical artefacts.

```

33 \def\@font@warning#1{%
34   \GenericInfo{(Font)}{\spaces\spaces\space\space}%
35   {LaTeX Font Warning: #1}}%
36 }

37 \DeclareOption{warningshow}{%
38   \def\@font@info#1{%
39     \GenericInfo{(Font)}{\spaces\spaces\space\space}%
40     {LaTeX Font Info: \space\space\space#1}}%
41   \def\@font@warning#1{%
42     \GenericWarning{(Font)}{\spaces\space\space\space}%
43     {LaTeX Font Warning: #1}}%
44 }

45 \DeclareOption{infoshow}{%
46   \def\@font@info#1{%
47     \GenericWarning{(Font)}{\spaces\space\space\space}%
48     {LaTeX Font Info: \space\space\space#1}}%
49   \def\@font@warning#1{%
50     \GenericWarning{(Font)}{\spaces\space\space\space}%
51     {LaTeX Font Warning: #1}}%
52 }

53 \DeclareOption{loading}{%
54   \tracingfonts\tw@
55 }

56 \DeclareOption{debugshow}{%
57   \ExecuteOptions{infoshow}%
58   \tracingfonts\thr@@
59 }

60 \DeclareOption{pausing}{%
61   \def\@font@warning#1{%
62     \GenericError
63       {(Font)}{\spaces\space\space\space}%
64       {LaTeX Font Warning: #1}}%
65     {See the LaTeX Companion for details.}%
66     {I'll stop for every LaTeX Font Warning because
67      you requested\MessageBreak the 'pausing' option
68      to the tracefnt package.}}%
69 }

```

We make `infoshow` the default, which in turn defines `\font@warning` and `\font@info`.

```

70 \ExecuteOptions{infoshow}
71 \ProcessOptions
72 
```

We also need a default definition inside the kernel:

```

73 <*2ekernel>
74 \def\@font@info#1{%
75   \GenericInfo{(Font)}{\spaces\space\space\space}%
76   {LaTeX Font Info: \space\space\space#1}}%
77 \def\@font@warning#1{%
78   \GenericWarning{(Font)}{\spaces\space\space\space}%
79   {LaTeX Font Warning: #1}}%
80 
```

5 Macros common to `fam.tex` and `tracefnt.sty`

In the first versions of `tracefnt.dtx` some macros of `fam.dtx`¹² were redefined to included the extra tracing information. Now these macros are all defined in this file (i.e. removed from `fam.dtx`) and different production versions can be obtained simply by specifying a different set of modules to include when generating `ltfss.dtx`.

5.1 General font loading

`\extract@font` This macro organizes the font loading. It first calls `\get@external@font` which will return in `\external@font` the name of the external font file (the `.tfm`) as it was determined by the NFSS tables.

```
81 (*2ekernel | package)
82 \def\extract@font{%
83   \get@external@font
```

Then the external font is loaded and assigned to the font identifier stored inside `\font@name` (for this reason we need `\expandafter`).

```
84   \global\expandafter\font\font@name\external@font\relax
```

When tracing we typeout the internal and external font name.

```
85 (*trace)
86   \ifnum \tracingfonts >@one
87     @font@info{External font '\external@font',
88       loaded as\MessageBreak \font@name}\fi
89 
```

Finally we call the corresponding “loading action” macros to finish things. First the font is locally selected to allow the use of `\font` inside the loading action macros.

```
90   \font@name \relax
```

The next two lines execute the “loading actions” for the family and then for the individual font shape.

```
91   \csname \f@encoding+\f@family\endcsname
92   \csname\curr@fontshape\endcsname
93   \relax
94   }
95 
```

The `\relax` at the end needs to be explained. This is inserted to prevent `TeX` from scanning too far when it is executing the replacement text of the loading code macros.

(*End definition for `\extract@font`.*)

`\get@external@font` This function tries to find an external font name. It will place the name into the macro `\external@font`. If no font is found it will return the one that was defined via `\DeclareErrorFont`.

```
96 (*2ekernel)
97 \def\get@external@font{%
```

We don’t know the external font name at the beginning.

```
98   \let\external@font\@empty
99   \edef\font@info{\expandafter\expandafter\expandafter\string
100     \csname \curr@fontshape \endcsname}%
101   \try@size@range
```

¹²This file is currently not distributed in documented form. Its code is part of `ltfss.dtx`.

If this failed, we'll try to substitute another size of the same font. This is done by the `\try@size@substitution` macro. It "knows about" `\do@extract@font`, `\font@name`, `\f@size`, and so on.

```

102   \ifx\external@font\empty
103     \try@size@substitution
104     \ifx\external@font\empty
105       @latex@error{Font \expandafter \string\font@name\space
106                     not found}\@eha
107       \error@fontshape
108       \get@external@font
109     \fi\fi
110   }
111 
```

(End definition for `\get@external@font`.)

`\selectfont` The macro `\selectfont` is called whenever a font change must take place.

```

112 <*2ekernel | package>
113 \DeclareRobustCommand\selectfont
114 {%

```

When `debug` is specified we actually want something like 'undebbug'. The font selection is now stable so that using `\tracingall` on some other macros will show us a lot of unwanted information about font loading. Therefore we disable tracing during font loading as long as `\tracingfonts` is less than 4.

```

115 <+debug> \pushtracing
116 <+debug> \ifnum\tracingfonts<4 \tracingoff
117 <+debug> \else \tracingon\p@selectfont \fi

```

If `\baselinestretch` was redefined by the user it will not longer match its internal counterpart `\f@linespread`. If so we call `\set@fontsize` to prepare `\size@update`.

```

118   \ifx\f@linespread\baselinestretch \else
119     \set@fontsize\baselinestretch\f@size\f@baselineskip \fi

```

Then we generate the internal name of the font by concatenating *family*, *series*, *shape*, and current *size*, with slashes as delimiters between them. This is much more readable than standard L^AT_EX's `\twfbf`, etc. We define `\font@name` globally, as always. The reason for this is explained later on.

```

120   \xdef\font@name{%
121     \csname curr@fontshape/\f@size\endcsname}%

```

We call the macro `\pickup@font` which will load the font if necessary.

```

122   \pickup@font

```

Then we select the font.

```

123   \font@name

```

If `\tracingfonts` is greater than 2 we also show the font switch. We do this before `\glb@settings` is called since this macro might redefine `\font@name`.

```

124 <*trace>
125   \ifnum \tracingfonts>\two@
126     @font@info{Switching to \font@name}\fi
127 
```

Finally we call `\size@update`. This macro is normally empty but will contain actions (like setting the `\baselineskip`) that have to be carried out when the font size, the base `\baselineskip` or the `\baselinestretch` have changed.

```
128     \size@update
```

A similar function is called to handle anything related to encoding updates. This one is changed from `\relax` by `\fontencoding`.

```
129     \enc@update
```

Just before ending this macro we have to pop the tracing stack if it was pushed before.

```
130 <+debug> \poptracing
131 }
```

(End definition for `\selectfont`.)

`\set@fontsize` The macro `\set@fontsize` does the actual work. First it assigns new values to `\f@size`, `\f@baselineskip` and `\f@linespread`.

```
132 \def\set@fontsize#1#2#3{%
133   \edef\temp{\f@size\relax\@nil}
134   \edef\f@size{\strip@pt\temp}%
135   \edef\temp{\f@baselineskip\relax\@nil}
136   \edef\f@baselineskip{\the\temp}%
137   \edef\f@linespread{\f@linespread}
```

For backward compatibility and for later testing within `\selectfont` the internal value of `\f@linespread` is passed back to `\baselinestretch`.

```
138 \let\baselinestretch\f@linespread
```

Additional processing will happen within `\selectfont`. For this reason the macro `\size@update` (which will be called in `\selectfont`) will be defined to be:

```
139 \def\size@update{%
```

First calculate the new `\baselineskip` and also store it in `normalbaselineskip`

```
140 \baselineskip\f@baselineskip\relax
141 \baselineskip\f@linespread\baselineskip
142 \normalbaselineskip\baselineskip
```

then to set up a new `\strutbox`

```
143 \setbox\strutbox\hbox{%
144   \vrule\height.7\baselineskip
145   \depth.3\baselineskip
146   \width\z@}%
```

We end with a bit of tracing information.

```
147 <*trace>
148 \ifnum \tracingfonts>\tw@
149   \ifx\f@linespread\empty
150     \let\reserved@a\empty
151   \else
152     \def\reserved@a{\f@linespread x}%
153   \fi
154   \font@info{Changing size to \f@size/\reserved@a
155   \f@baselineskip}%
156   \aftergroup\type@restoreinfo \fi
157 </trace>
```

When all this is processed `\size@update` redefines itself to `\relax` so that in later calls of `\selectfont` no extra code will be executed.

```
158     \let\size@update\relax}%
159 }
```

Instead of defining this macro internally we might speed things up by placing the code into a separate macro and use `\let!`

(End definition for `\set@fontsize`.)

`\size@update` Normally this macro does nothing; it will be redefined by `\set@fontsize` to initiate an update.

```
160 \let\size@update\relax
```

(End definition for `\size@update`.)

`\type@restoreinfo` This macro produces some info when a font size and/or baseline change will get restored.

```
161 <*trace>
162   \def\type@restoreinfo{%
163     \ifx\f@linespread\empty
164       \let\reserved@a\empty
165     \else
166       \def\reserved@a{\f@linespread x}%
167     \fi
168     \font@info{Restoring size to
169       \f@size/\reserved@a\f@baselineskip}%
170   }/trace>
```

(End definition for `\type@restoreinfo`.)

`\glb@settings` The macro `\glb@settings` globally selects all math fonts for the current size if necessary.
`\glb@currsiz` `\def\glb@settings{%`

When `\glb@settings` gains control a size change was requested and all previous font assignments need to be replaced. Therefore the old values of the fonts are no longer needed. For every *math group* the new assignments are appended to `\math@fonts`. But this happens only if the `math@fonts` switch is set to true. However, we always set up the correct math sizes for script and scriptscript fonts since they may be needed even if we don't set up the whole math machinery.

Here we set the math size, script size and scriptscript size. If the `S@...` macro is not defined we have to first calculate the three sizes.

```
172   \expandafter\ifx\csname S@\f@size\endcsname\relax
173     \calculate@math@sizes
174   \fi
```

The effect of this is that `\calculate@math@sizes` may or may not define the `S@...` macro. In the first case the next time the same size is requested this macro is used, otherwise `\calculate@math@sizes` is called again. This also sets the `math@fonts` switch. If it is true we must switch the math fonts.

```
175   \csname S@\f@size\endcsname
176   \ifmath@fonts
177   <*trace>
178     \ifnum \tracingfonts>\tw@
179       \font@info{Setting up math fonts for
```

```

180           \f@size/\f@baselineskip}\fi
181 
```

Inside a group we execute the macro for the current math *version*. This sets `\math@fonts` to a list of `\textfont...` assignments. `\getanddefine@fonts` (which may be called at this point) needs the `\escapechar` parameter to be set to `-1`.

```

182     \begingroup
183         \escapechar\m@ne
184         \csname mv@\math@version \endcsname

```

Then we set `\globaldefs` to 1 so that all following changes are done globally. The math font assignments recorded in `\math@fonts` are executed and `\glb@currsiz` is set equal to `\f@size`. This signals that the fonts for math in this size are set up.

```

185     \globaldefs\@ne
186     \math@fonts
187     \let \glb@currsiz \f@size
188 
```

Finally we execute any code that is supposed to happen whenever the math font setup changes. This register will be executed in local mode which means that everything that is supposed to have any effect should be done globally inside. We can't execute it within `\globaldefs\@ne` as we don't know what ends up inside this register, e.g., it might contain calculations which use some local registers to calculate the final (global) value.

```
189     \the\every@math@size
```

Otherwise we announce that the math fonts are not set up for this size.

```

190 {*trace}
191     \else
192         \ifnum \tracingfonts>\tw@
193             \font@info{No math setup for
194                         \f@size/\f@baselineskip}\fi
195 
```

```
196     \fi
197 }
198 
```

(End definition for `\glb@settings` and `\glb@currsiz`.)

`\baselinestretch` In `\selectfont` we used `\baselinestretch` as a factor when assigning a value to `\baselineskip`. We use 1 as a default (i.e. no stretch).

```

199 {*2ekernel}
200 \def\baselinestretch{1}

```

(End definition for `\baselinestretch`.)

`\every@math@size` We must still define the hook `\every@math@size` we used in `\glb@settings`. We initialize it to nothing. It is important to remember that everything that goes into this hook should to global updates, local changes will have weird effects.

```

201 \newtoks\every@math@size
202 \every@math@size={}
203 
```

(End definition for `\every@math@size`.)

5.2 Math fonts setup

5.2.1 Outline of algorithm for math font sizes

TeX uses the math fonts that are current when the end of a formula is reached. If we don't want to keep font setups local to every formula (which would result in an enormous overhead, we have to be careful not to end up with the wrong setup in case formulas are nested, e.g., we need to be able to handle

```
$ a=b+c \mbox{ \small for all $b$ and $c\in Z$}$
```

Here the inner formulae b and $c \in Z$ are typeset in `\small` but we have to return to `\normalsize` before we reach the closing `$` of the outer formula.

This is handled in the following way:

1. At any point in the document the global variable `\gbl@currsize` contains the point size for which the math fonts currently are set up.
2. Whenever we start a formula we compare its value with the local variable `\f@size` that describes the current text font size.
3. If both are the same we assume that we can use the current math font setup without adjustment.
4. If they differ we call `\gbl@settings` which changes the math font setup and updates `\gbl@currsize`.
 - (a) If we are recursively inside another formula (`\if@inmath`) we ensure that `\gbl@settings` is executed again in the outer formula, so that the old setup is automatically restored.
 - (b) Otherwise, we set the switch `@inmath` locally to `true` so that all nested formulae will be able to detect that they are nested in some outer formula.

The above algorithm has the following features:

- For sizes which are not containing any formula no math setup is done. Compared to the original algorithm of NFSS this results in the following savings:
 - No unnecessary loading of math fonts for sizes that are not used to typeset any math formulae (explicit or implicit ones).
 - No time overhead due to unnecessary changes of the math font setup on entrance and exit of the text font size.
- Math font setup changes for top-level formulae will survive (there is no restoration after the formula) thus any following formula in the same size will be directly typesettable. Compared to original implementation in NFSS2 the new algorithm has the overhead of one test per formula to see if the current math setup is valid (in the original algorithm the setup was always valid, thus no test was necessary).
- In nested formulae the math font setup is restored in the outer formula by a series of `\aftergroup` commands and checks. Compared to the original algorithm this involves additional checks ($2 \times \langle \text{non-math levels} \rangle$ per inner formula).

5.2.2 Code for math font size setting

\check@mathfonts In the \check@mathfonts macros we implement the steps 2 to 4 except that instead of a switch the macro \init@restore@glb@settings is used.

```

204  {*2ekernel | package}
205  \def\check@mathfonts{%
206    \ifx \glb@currsize \f@size
207    (*trace)
208      \ifnum \tracingfonts>\thr@@
209        \o@font@info{*** MATH: no change \f@size\space
210          curr/global (\curr@math@size/\glb@currsize)}\fi
211    
```

$$\begin{aligned} & \langle /trace \rangle \\ & \quad \backslash \text{else} \\ & \quad \langle *trace \rangle \\ & \quad \quad \backslash \text{ifnum } \backslash \text{tracingfonts} > \backslash \text{thr@@} \\ & \quad \quad \quad \backslash \text{o@font@info} \{ *** \text{ MATH: setting up } \f@size \backslash \text{space} \\ & \quad \quad \quad \quad curr / global (\curr@math@size / \glb@currsize) \} \backslash fi \\ & \quad \langle /trace \rangle \\ & \quad \quad \backslash \text{glb@settings} \\ & \quad \quad \backslash \text{init@restore@glb@settings} \\ & \quad \backslash fi \\ & \quad \backslash \text{let} \backslash \text{curr@math@size} \backslash \f@size \\ & \quad \backslash \text{def} \backslash \text{init@restore@glb@settings} \{ \backslash \text{aftergroup} \backslash \text{restglb@settings} \} \% \\ & \quad \} \end{aligned}$$

(End definition for \check@mathfonts.)

\init@restore@glb@settings This macros does by default nothing but get redefined inside \check@mathfonts to initiate fontsize restoring in nested formulas.

```

224  {-trace} \let \init@restore@glb@settings \relax
225  (*trace)
226  \def\init@restore@glb@settings{%
227    \ifnum \tracingfonts>\thr@@
228      \o@font@info{*** MATH: no resetting (not in
229        nested math)}\fi
230    }
231  
```

$$\begin{aligned} & \langle /trace \rangle \\ & \quad \backslash \text{let} \backslash \text{init@restore@glb@settings} \backslash \text{relax} \\ & \quad \langle *trace \rangle \\ & \quad \quad \backslash \text{def} \backslash \text{init@restore@glb@settings} \{ \% \\ & \quad \quad \quad \backslash \text{ifnum } \backslash \text{tracingfonts} > \backslash \text{thr@@} \\ & \quad \quad \quad \quad \backslash \text{o@font@info} \{ *** \text{ MATH: no resetting (not in} \\ & \quad \quad \quad \quad \quad nested \text{ math) } \} \backslash fi \\ & \quad \quad \} \\ & \quad \langle /trace \rangle \end{aligned}$$

(End definition for \init@restore@glb@settings.)

\restglb@settings This macro will be executed the first time after the current formula.

```

232  \def\restglb@settings{%
233  (*trace)
234    \ifnum \tracingfonts>\thr@@
235      \o@font@info{*** MATH: restoring}\fi
236  
```

$$\begin{aligned} & \langle /trace \rangle \\ & \quad \backslash \begin{group} \\ & \quad \quad \backslash \text{let} \backslash \f@size \backslash \text{curr@math@size} \\ & \quad \quad \backslash \text{ifx} \backslash \text{glb@currsize } \backslash \f@size \\ & \quad \langle *trace \rangle \\ & \quad \quad \backslash \text{ifnum } \backslash \text{tracingfonts} > \backslash \text{thr@@} \\ & \quad \quad \quad \backslash \text{o@font@info} \{ *** \text{ MATH: ... already okay } (\f@size) \} \backslash fi \\ & \quad \langle /trace \rangle \\ & \quad \quad \backslash \text{else} \end{aligned}$$

```

245  {*trace}
246    \ifnum \tracingfonts>\thr@@
247      \font@info{*** MATH: ... to \f@size}\fi
248  
```

```

249  
```

```

250  
```

```

251  
```

```

252 }

```

(End definition for `\restglb@settings`.)

5.2.3 Other code for math

`\use@mathgroup`

The `\use@mathgroup` macro should be used in user macros to select a math group. Depending on whether or not the `margid` option is in force it has two or three arguments. For this reason it should be called as the last macro.

First we test if we are inside math mode since we don't want to apply a useless definition.

```

253 \def\use@mathgroup#1#2{\relax\ifmmode
254 
```

```

255  
```

```

256  
```

```

257  
```

```

258   \font@info{Using \noexpand\mathgroup
259     (\the\count@) #2}\fi
260 
```

```

261 
```

If so we first call the '=' macro (i.e. argument three) to set up special things for the selected math group. Then we call `\mathgroup` to select the group given by argument two and finally we place #1 (i.e. the argument of the *<math alphabet identifier>*) at the end. This part of the code is surrounded by two commands which behave like `\begingroup` and `\endgroup` if we want *<math alphabet identifier>*s but will expand into `\empty` if we want simply switches to a new math group. Since argument number 2 may be a digit instead of a control sequence we add a `\relax`. Otherwise something like `\mit{1}` would switch to math group 11 (and back) instead of printing an oldstyle 1.

```

260   
```

```

261   
```

```

262   
```

```

263   
```

Before we reinsert the swallowed token (arg. three) into the input stream, in the case that the *<math alphabet identifier>* isn't called in math mode, we remove the `\fi` with the `\expandafter` trick. This is necessary if the token is actually an macro with arguments. In such a case the `\fi` will be misinterpreted as the first argument which would be disastrous.

```

264   
```

The surrounding macros equal `\begingroup` and `\endgroup`. But using internal names makes it possible to overwrite their meaning in certain cases. This is for example used in *AMS-T_EX* macros for placing accents.

(End definition for `\use@mathgroup`.)

\math@egroup If the `margid` option is in force (which can be tested by looking at the definition of \math@bgroup we change the \math@egroup command a bit to display the current $\langle\mathit{math group number}\rangle$ after it closes the scope of $\langle\mathit{math alphabet}\rangle$ with \endgroup.

```

265  {*trace}
266  \ifx\math@bgroup\bgroup
267  \def\math@egroup#1{\#1\egroup
268  \ifnum \tracingfonts>\tw@
269  \@font@info{Restoring \noexpand\mathgroup
270  (\ifnum\mathgroup=\m@ne default\else \the\mathgroup \fi)%
271  }\fi}
272  \fi
273  {/trace}

```

(End definition for \math@egroup.)

\getanddefine@fonts \getanddefine@fonts has two arguments: the $\langle\mathit{math group number}\rangle$ and the *family/series/shape* name as a control sequence.

```
274 \def\getanddefine@fonts#1#2{%
```

First we turn of tracing when \tracingfonts is less than 4.

```

275 {+debug} \pushtracing
276 {+debug} \ifnum\tracingfonts<4 \tracingoff
277 {+debug} \else \tracingon\getanddefine@fonts \fi

278 {*trace}
279 \ifnum \tracingfonts>\tw@
280 \count@#1\relax
281 \@font@info{\noexpand\mathgroup (\the\count@) #1 :=\MessageBreak
282 \string#2 \tf@size/\sf@size/\ssf@size}\fi
283 {/trace}

```

We append the current \tf@size to #2 to obtain the font name.¹³ Again, font@name is defined globally, for the reasons explained in the description of \wrong@fontshape.

```
284 \xdef\font@name{\csname \string#2/\tf@size\endcsname}%
```

Then we call \pickup@font to load it if necessary. We remember the internal name as \textfont@name.

```
285 \pickup@font \let\textfont@name\font@name
```

Same game for \scriptfont and \scripts@criptfont:

```

286 \xdef\font@name{\csname \string#2/\sf@size\endcsname}%
287 \pickup@font \let\scriptfont@name\font@name
288 \xdef\font@name{\csname \string#2/\ssf@size\endcsname}%
289 \pickup@font

```

Then we append the new \textfont... assignments to the \math@fonts.

```

290 \edef\math@fonts{\math@fonts
291           \textfont#1\textfont@name
292           \scriptfont#1\scriptfont@name
293           \scripts@criptfont#1\font@name}%

```

¹³One might ask why this expansion does not generate a macro name that starts with an additional \ character. The solution is that \escapechar is set to -1 before \getanddefine@fonts is called.

Just before ending this macro we have to pop the tracing stack if it was pushed before.

```
294 {+debug} \poptracing
295 }
296 {/2ekernel | package}

(End definition for \getanddefine@fonts.)
```

6 Scaled font extraction

- \ifnot@nil We begin with a simple auxiliary macro. It checks whether its argument is the token \c@nil. If so, it expands to \c@gobble which discards the following argument, otherwise it expands to \c@firstofone which reproduces its argument.

```
297 {*2ekernel}
298 \def\ifnot@nil#1{\def\reserved@a{#1}%
299   \ifx\reserved@a\c@nil \expandafter\c@gobble
300   \else \expandafter\c@firstofone\fi}
```

(End definition for \ifnot@nil.)

- \remove@to@nnil \remove@angles \remove@star Three other auxiliary macros will be needed in the following: \remove@to@nnil gobble up everything up to, and including, the next \c@nnil token, and \remove@angles and \remove@star do the same for the character > and *, respectively, instead of \c@nnil.

```
301 \def\remove@to@nnil#1\c@nnil{}
302 \def\remove@angles#1>{\set@simple@size@args}
303 \def\remove@star#1*{#1}
```

(End definition for \remove@to@nnil, \remove@angles, and \remove@star.)

- \extract@sizefn This macro takes a size specification and parses it into size function and the optional and mandatory arguments.

```
304 \def\extract@sizefn#1*#2\c@nil{%
305   \if>#2>\set@size@funct@args#1\c@nil
306     \let\sizefn@info\c@empty
307   \else\expandafter\set@size@funct@args\remove@star#2\c@nil
308     \def\sizefn@info{#1}\fi
309 }
```

(End definition for \extract@sizefn.)

- \try@simple@size This function tries to extract the given size (specified by \f@size) for the requested font shape. The font information must already be present in \font@info. The central macro that does the real work is \extract@fontinfo. We will first give a simple example how this macro works, and describe it in full generality later.

Assume that the requested parameters are: *encoding scheme* ‘OT1’, *family* ‘cm’, *series* ‘sansserif’, *shape* ‘normal’, and *size* ‘12’. The corresponding font definitions have already been extracted from the macro \OT1/cm/sansserif/normal and stored in font@info. (Otherwise \extract@fontinfo doesn’t get called.) This information consists of a token list made of characters of category code 12 of the form

```
<10*>cmss10<12*>cmss12<17*>cmss17
```

For reasonable packages one usually needs more sizes but this is sufficient to get the flavour. We will define a macro \extract@fontinfo to find the external font name (‘cmss12’) for us:

```
\def\extract@fontinfo#1<12*#2>#3<#4\@nnil{%
  \set@simple@size@args#3<#4\@nnil
  \execute@size@function{#2}}
```

so that when it gets called via

```
\extract@fontinfo<10*>cmss10<12*>cmss12<17*>cmss17\@nnil
```

#1 will contain all characters before <12*>, #2 will be empty, #3 will be exactly cmss12, and #3 will be 17>cmss17. The expansion is therefore

```
\set@simple@size@args cmss12<17*>cmss17\@nnil
\execute@size@function{}
```

This means: the default (empty) size function will be executed, with its optional argument set to empty and its mandatory argument set to cmss12 by \set@simple@size@args. As we discussed earlier, the effect of the default size function is to load the given external font (cmss12) at the specified size (12)—which is exactly what was intended.

But this is only part of the whole story. It may be that the size requested does not occur in the token list \font@info. And the simple definition of \extract@fontinfo we gave above does not allow to specify give more than one size specification in front of the external font name.

Let's address these two problems separately. The first one is solved with the following trick: We define \extract@fontinfo as follows:

```
\def\extract@fontinfo#1<12*#2>#3<#4\@nnil{%
  \ifnot@nil{#3}%
    {\set@simple@size@args#3<#4\@nnil
     \execute@size@function{#2}%
    }%
}
```

How does this work? We call \extract@fontinfo via

```
\expandafter\extract@fontinfo\font@info<12*>\@nil<\@nnil
```

i.e. by appending <12*>\@nil<\@nnil. If the size ('12' in this case) appears in \font@info everything works as explained above, the only difference being that argument #4 of \extract@fontinfo additionally gets the tokens <12*>\@nil<\@nnil. However, if the size is not found everything up to the final <12*> is in argument #1, #3 gets \@nil, and #2 and #4 are empty. The macro \ifnot@nil will discard the calls to \set@simple@size@args and \execute@size@function, and hence \font@info will continue to be equal to \@empty. This means that no simple size specification matching the requested size could be found.

The second problem (more than one simple size specification for one external font name) will be addressed in \set@simple@size@args below.

The macros are hidden inside other control sequences so that we have to build \extract@fontinfo in several steps.

So here's the actual definition of \extract@font in \try@simple@size.

```
310 % % this could be replaced by \try@size@range making the subst slower!
311 \def\try@simple@size{%
```

\reserved@a is made an abbreviation for the head of the definition of the macro \extract@fontinfo.

```
312 \def\reserved@a{\def\extract@fontinfo####1}{%
```

Now we can define `\extract@fontinfo`. Here we handle a small but convenient variation: in case of the default (empty) size function it is allowed to omit the * character.

```
313  \expandafter\reserved@a\expandafter<\f@size>##2<##3\@nnil{%
314      \ifnot@nil{##2}{%
315          {\set@simple@size@args##2<##3\@nnil
316              \execute@size@function\sizefn@info
317          }{}}%
```

Now we call `\extract@fontinfo`. Note the `<\@nil` tokens at the end.

```
318  \expandafter\expandafter
319      \expandafter\extract@fontinfo\expandafter\font@info
320      \expandafter<\f@size>\@nil<\@nnil
321 }
```

(End definition for \try@simple@size.)

`\set@simple@size@args` As promised above, the macro `\set@simple@size@args` will handle the case of several size specifications in a row. If another size specification follows, the very first token of its argument list is the character <. By starting the definition as follows,

```
322 \def\set@simple@size@args#1<{%
```

parameter #1 is empty in this case, and contains the size function's arguments otherwise. We distinguish these two cases (Note that the character < cannot appear in #1) by calling `\remove@angles` for empty #1 and `\extract@sizefn` otherwise. In the latter case we have to take care of the remaining character tokens and discard them. This is done by `\remove@to@nnil`. Note also the use of Kabelschacht's method.

```
323     \if<#1<%
324         \expandafter\remove@angles
325     \else
326         \extract@sizefn#1*\@nil
327         \expandafter\remove@to@nnil
328     \fi}
```

(End definition for \set@simple@size@args.)

Now, we are through with the case of a simple size, except for calling the size function. This will be handled later, as it is the same mechanism for all types of size specification. We will now proceed to macros for extraction of size range specification.

`\extract@rangefontinfo` `\extract@rangefontinfo` goes through a font shape definition in the input until it recognizes the tokens `<\@nil->`. It looks for font ranges with font size functions. Its operation is rather simple: it discards everything up to the next size specification and passes this on to `\is@range` for inspection. The specification (parameter #2 is inserted again, in case it is needed later).

```
329 \def\extract@rangefontinfo#1<#2>{%
330     \is@range#2->\@nil#2>}
```

(End definition for \extract@rangefontinfo.)

`\is@range` `\is@range` is again a sort of dispatcher macro: if the size specification it is looking at is not a range specification it discards it and calls `\extract@rangefontinfo` to continue the search. Otherwise it calls `\check@range` to check the requested size against the specified range.

From the way `\is@range` is called inside `\extract@rangefontinfo` we see that #2 is the character > if the size specification found is a simple one (as it does not contain a

- character. This is checked easily enough and `\extract@rangefontinfo` called again. Note that the extra tokens inserted after the `\@nil` in the call to `\is@range` appear at the beginning of the first argument to `\extract@rangefontinfo` and are hence ignored.

```
331 \def\is@range#1-#2\@nil{%
332   \if>#2\expandafter\check@single\else
333     \expandafter\check@range\fi}
```

(End definition for `\is@range`.)

`\check@range` `\check@range` takes lower bound as parameter #1, upper bound as #2, size function as #3 and the size function's arguments as #4. If #3 is the special token `\@nil \font@info` is exhausted and we can stop searching.

```
334 \def\check@range#1-#2>#3<#4\@nnil{%
335   \ifnot@nil{#3}{%
```

If #3 wasn't `\@nil` we have a range. We start by assuming that we have to recurse. Note that we have to reinsert an `<` as it was already removed by scanning.

```
336 \def\reserved@f{\extract@rangefontinfo<#4\@nnil}%
```

We have to make sure that both boundaries are present, if not we have to set them. Here we check the upper bound. If `\upper@bound` is zero after the assignment we set it to `\maxdimen` (upper open range). We need to use a `\dimen` register for the scan since we may have a decimal number as the boundary.

```
337 \upper@bound0#2\p@
338 \ifdim\upper@bound=\z@\upper@bound\maxdimen\fi
```

Now we check the upper boundary against `\f@size`. If it is larger or equal than `\f@size` this range is no good and we have to recurse.

```
339 \ifdim \f@size \p@<\upper@bound
```

Otherwise we have to check the lower bound. This time it is not necessary to scan the boundary value into a register because if it is empty we get zero as desired. We could even omit the 0 which would result in `1pt` as default lower boundary. If `\f@size` is smaller than the boundary we have to recurse.

```
340 \lower@bound0#1\p@
341 \ifdim \f@size \p@<\lower@bound
342 \else
```

If both tests are passed we can try executing the size function.

```
343 \set@simple@size@args#3<#4\@nnil
344 \execute@size@function\sizefn@info
```

If the function was successful it should have left an external font name in `\external@font`. We use this to see if we can stop scanning. Otherwise we recurse.

```
345 \ifx\external@font\@empty
346 \else
347   \let\reserved@f\@empty
348   \fi
349 \fi
350 \fi
351 \reserved@f}}
```

(End definition for `\check@range`.)

\lower@bound We use two dimen registers \lower@bound and \upper@bound to store the lower and upper endpoints of the range we found.

```
352 \newdimen\lower@bound
353 \newdimen\upper@bound
```

(End definition for \lower@bound and \upper@bound.)

\check@single \check@single takes the size as parameter #1, size function as #2 and the size function's arguments as #3. We can assume that there is always something in the pipeline since the very last entry is a faked range (see above).

```
354 \def\check@single#1>#2<#3\@nnil{%
```

We start by assuming that we have to recurse. Note that we have to reinsert an < as it was already removed by scanning.

```
355 \def\reserved@f{\extract@rangefontinfo<#3\@nnil}{%
```

Now we check the size against \f@size. If it is not equal \f@size it is no good and we have to recurse.

```
356 \ifdim \f@size \p@=#1\p@
```

Otherwise if this test is passed we can try executing the size function.

```
357 \set@simple@size@args#2<#3\@nnil
358 \execute@size@function\sizefn@info
```

If the function was successful it should have left an external font name in \external@font. We use this to see if we can stop scanning. Otherwise we recurse.

```
359 \ifx\external@font\@empty
360 \else
361   \let\reserved@f\@empty
362   \fi
363 \fi
364 \reserved@f}
```

(End definition for \check@single.)

\set@size@funct@args This macro sets the optional and mandatory arguments for a size function. If the optional argument is not present it is set to the empty token list. The mandatory argument is delimited by the token \@nil.

```
365 \def\set@size@funct@args{\@ifnextchar[%]
366   \set@size@funct@args@{\set@size@funct@args@[]}}
367 \def\set@size@funct@args@[#1]>#2\@nil{%
368   \def\mandatory@arg{#2}%
369   \def\optional@arg{#1}%
370 }/{/2ekernel}
```

(End definition for \set@size@funct@args and \set@size@funct@args@.)

\DeclareSizeFunction This function defines a new size function hiding the internal from the designer. The body of the size function may use \optional@arg and \mandatory@arg denoting the optional and mandatory argument that may follow the size specification <...>.

```
371 {*2ekernel}
372 \def\DeclareSizeFunction#1#2{\@namedef{s@fct@#1}{#2}}
373 \onlypreamble\DeclareSizeFunction
374 }/{/2ekernel}
```

(End definition for \DeclareSizeFunction.)

- \execute@size@function This macro is very simple. The only point worth noting is that calling an undefined size function will do nothing (actually execute a \relax).

```
375  {*2ekernel | package}
376  \def\execute@size@function#1{%
377  {*trace}
378      \ifundefined{s@fct@#1}%
379          {\errmessage{Undefined font size function #1}%
380          \s@fct@}%
381          {\csname s@fct@#1\endcsname}%
382  
```

```
383  {-trace}     \csname s@fct@#1\endcsname
384  }
385  
```

```
  
```

(End definition for \execute@size@function.)

- \try@size@range This macro tries to find a suitable range for requested size (specified by \f@size) in \font@info. All the relevant action is done in \extract@rangefontinfo. All that needs to be done is to stuff in the token list in \font@info so that \extract@rangefontinfo can inspect it. Note the <-*\@nil> token at the end to stop scanning.

```
386  {*2ekernel}
387  \def\try@size@range{%
388      \expandafter\extract@rangefontinfo\font@info <-*>\@nil<\@nnil
389  }
```

(End definition for \try@size@range.)

- \try@size@substitution This is the last thing that can be tried. If the desired \f@size is found neither among the simple size specifications nor in one of the ranges the whole list of size specifications is searched for a nearby simple size.

```
390  \gdef\try@size@substitution{%
```

First we do some initializations. \tempdimb will hold the difference between the wanted size and the best solution found so far, so we initialise it with \maxdimen. The macro \best@size will hold the best size found, nothing found is indicated by the empty value.

```
391  \tempdimb \maxdimen
392  \let \best@size \empty
```

Now we loop over the specification

```
393  \expandafter \try@simples \font@info <\number\@M>\@nil<\@nnil
394  }
```

(End definition for \try@size@substitution.)

- \font@submax \fontsubfuzz The macro \font@submax records the maximal deviation from the desired size encountered so far. Its value is used in a warning message at \end{document}. The macro \fontsubfuzz contains the amount that will not cause terminal warnings (warnings still go into the transcript file).

```
395  \def\font@submax{0pt}
396  \def\fontsubfuzz{.4pt}
397  
```

```
  
```

```
398  {+package}\def\fontsubfuzz{0pt}
```

(End definition for \font@submax and \fontsubfuzz.)

\try@simples \try@simples goes through a font shape definition in the input until it recognizes the tokens <*>\@nil>. It looks for simple sizes to determine the two closest sizes. It is assumed that simple sizes are in increasing order.

```
399 (*2ekernel)
400 \gdef\try@simples#1<#2>{%
401   \tryif@simple#2->\tryif@simple}
```

(End definition for \try@simples.)

\tryis@simple \tryis@simple is similar to \is@range. If it sees a simple size, it checks it against the value of \f@size and sets \lower@font@size or \higher@font@size. In the latter case, it stops the iteration. By adding <\number\@M> at the end of the line we always have an end point. This is a hack which probably should be corrected.

First it checks whether it is finished already, then whether the size specification in question is a simple one.

```
402 \gdef\tryif@simple#1-#2\tryif@simple{%
```

Most common case for \reserved@f first:

```
403 \let \reserved@f \try@simples
404 \if>#2%
```

If so, it compares it to the value of \f@size. This is done using a dimen register since there may be fractional numbers.

```
405 \dimen@ #1\p@
406 \ifdim \dimen@<\@M\p@
```

If \dimen@ is \@M\p@ we have reached the end of the fontspec (hopefully) otherwise we compare the value with \f@size and compute in \tempdimc the absolute value of the difference between the two values.

```
407 \ifdim \f@size\p@<\dimen@
408   \tempdimc \dimen@
409   \advance\tempdimc -\f@size\p@
410 \else
411   \tempdimc \f@size\p@
412   \advance\tempdimc -\dimen@
413 \fi
```

The result is then compared with the smallest difference we have encountered, if the new value (in \tempdimc is smaller) we have found a size which is a better approximation so we make it the \best@size and adjust \tempdimb.

```
414 \ifdim \tempdimc<\tempdimb
415   \tempdimb \tempdimc
416   \def \best@size{\#1}%
417 \fi
```

When we have reached the end of the fontspec we substitute the best size found (if any). We code this inline to save macro space; in the past this was done by a macro called \subst@size.

```
418 \else
```

\subst@size This macro substitutes the size recorded in `\best@size` for the unavailable size `\f@size`.
`\font@submax` records the maximum difference between desired size and selected size in the whole run.

```

419 % %\subst@size          %% coded inline
420 % %\def\subst@size{%
421   \ifx \external@font@\empty
422     \ifx \best@size\empty
423       \else
424         \ifdim \tempdimb>\font@submax \relax
425           \xdef \font@submax {\the\tempdimb}%
426         \fi
427         \let \f@user@size \f@size
428         \let \f@size \best@size
429         \ifdim \tempdimb>\fontsubfuzz\relax
430           \font@warning{Font\space shape\space
431             '\curr@fontshape'\space in\space size\space
432             <\f@user@size>\space not\space available\MessageBreak
433             size\space <\f@size>\space substituted}%
434         \fi
435         \try@simple@size
436         \do@subst@correction
437       \fi
438     \fi
439 % %}

```

This brings us back into the main part of `\tryif@simple`. Finally we get rid of any rubbish left over on the input stack.

```

440   \let \reserved@f \remove@to@nnil
441   \fi
442 \fi

```

If it's a range iterate also.

```
443 \reserved@f}
```

(End definition for `\tryis@simple` and `\subst@size`.)

6.1 Sizefunctions

In the following we define some useful size functions.

\s@fct@ This is the default size function. Mandatory argument is an external font name, optional argument a scale factor. The font is scaled to `\f@size` if no optional argument is present, and to `\f@size` multiplied by the optional argument otherwise.

```

444 \DeclareSizeFunction{}{\empty@sfcnt@\font@warning}
445 \DeclareSizeFunction{s}{\empty@sfcnt@\font@info}

446 \def\empty@sfcnt#1{%
447   \tempdimb \f@size\p@
448   \ifx\optional@arg\empty
449     \else
450       \tempdimb \optional@arg\tempdimb
451       #1{Font\space shape\space '\curr@fontshape'\space
452         will\space be\MessageBreak
453         scaled\space to\space size\space \the\tempdimb}%

```

```

454     \fi
455     \edef\external@font{\mandatory@arg\space at\the\@tempdimb}}

```

(End definition for `\s@fct@`.)

- `\s@fct@gen` This size function generates the external name from the mandatory argument and the requested user size, and thus can be used for external names where the size is encoded in the font name. The optional argument a scale factor. The font is scaled to `\f@size` if no optional argument is present, and to `\f@size` multiplied by the optional argument otherwise.

```

456 \DeclareSizeFunction{gen}{\gen@sfcnt\@font@warning}
457 \DeclareSizeFunction{sgen}{\gen@sfcnt\@font@info}
458 \def\gen@sfcnt{%
459   \edef\mandatory@arg{\mandatory@arg\f@size}%
460   \empty@sfcnt}

```

(End definition for `\s@fct@gen` and `\s@fct@sgen`.)

- `\s@fct@genb` This size function is similar to `gen`, but for fonts where the size is encoded in the font name in centipoins, as in the DC fonts version 1.2. The font is scaled to `\f@size` if no optional argument is present, and to `\f@size` multiplied by the optional argument otherwise.

```

461 \DeclareSizeFunction{genb}{\genb@sfcnt\@font@warning}
462 \DeclareSizeFunction{sgenb}{\genb@sfcnt\@font@info}
463 \def\genb@sfcnt{%
464   \edef\mandatory@arg{\mandatory@arg\expandafter\genb@x\f@size..\@0}%
465   \empty@sfcnt}

```

(End definition for `\s@fct@genb` and `\s@fct@sgenb`.)

- `\genb@x` The auxiliary macros `\genb@x` and `\genb@y` are used to convert the `\f@size` into centipoins.

```

466 \def\genb@x#1.#2.#3\@{ \two@digits{#1}\genb@y#200\@}
467 \def\genb@y#1#2#3\@{#1#2}

```

(End definition for `\genb@x` and `\genb@y`.)

- `\s@fct@sub` This size function handles font substitution. The mandatory argument is a family/series/shape combination, the optional argument (if present) is ignored. The font encoding scheme cannot be changed. Therefore, the first thing we do is to prepend the encoding scheme.

```

468 \DeclareSizeFunction{sub}{\sub@sfcnt\@font@warning}
469 \DeclareSizeFunction{ssub}{\sub@sfcnt\@font@info}
470 \def\sub@sfcnt#1{%
471   \edef\mandatory@arg{\f@encoding\mandatory@arg}%

```

Next action is split the arg into its individual components and allow for a late font shape load.

```

472 \begingroup
473   \expandafter\split@name\mandatory@arg/\@nil
474   \try@load@fontshape
475 \endgroup

```

Then we record the current `\f@size` since it may get clobbered.

```
476 \let\f@user@size\f@size
```

Then we check whether this new combination is defined and give an error message if not. In this case we also switch to `\error@fontshape`.

```
477 \expandafter
478 \ifx\csname\mandatory@arg\endcsname\relax
479   \errmessage{No\space declaration\space for\space
480     shape\space \mandatory@arg}%
481   \error@fontshape
482 \else
```

Otherwise we warn the user about the substitution taking place.

```
483   #1{Font\space shape\space '\curr@fontshape'\space in\space
484     size\space <\f@size>\space not\space available\MessageBreak
485     Font\space shape\space '\mandatory@arg'\space tried\space
486     instead}%
487   \expandafter\split@name\mandatory@arg\@nil
488 \fi
```

Then we restart the font specification scan by calling `\get@external@font`.

```
489 \edef\f@size{\f@user@size}%
490 \get@external@font
```

Finally `\do@subst@correction` is called to get the font name right.

```
491 \do@subst@correction
492 }
```

(End definition for `\s@fct@sub`.)

`\@font@aliasinfo` Sometimes a substitution is only done to map a long font name to a standard shape or series, e.g.,

```
DeclareFontShape{T1}{Roboto-LF}{b}{it}{<-> alias * Roboto-LF/bold/it}{}%
```

Using the `ssub` function in that case will give a strange (and incorrect) warning. As an alternative we therefore offer the size function `alias`. It will still add some info into the `.log` file, but no longer complains that the font shape is not available. It is implemented by grabbing the default warning text and replacing it with a new one.

```
493 </2ekernel>
494 <*2ekernel | latexrelease>
495 <latexrelease>\IncludeInRelease{2020/02/02}%
496 <latexrelease>           {\@font@aliasinfo}{alias size function}%
497 \DeclareSizeFunction{alias}{\sub@sfcnt\@font@aliasinfo}
498 \def\@font@aliasinfo#1{%
499   \@font@info{Font\space shape\space '\curr@fontshape'\space
500     aliased\space to\MessageBreak '\mandatory@arg'}%
501 }
502 </2ekernel | latexrelease>
503 <latexrelease>\EndIncludeInRelease
504 <latexrelease>\IncludeInRelease{0000/00/00}%
505 <latexrelease>           {\@font@aliasinfo}{alias size function}%
506 <latexrelease>\let\s@fct@alias\@undefined
507 <latexrelease>\let\@font@aliasinfo\@undefined
508 <latexrelease>
509 <latexrelease>\EndIncludeInRelease
510 <*2ekernel>
```

(End definition for `\@font@aliasinfo`.)

- `\s@fct@subf` The `subf` size function allows substitution of another font. The mandatory argument is the external name of the font to be substituted, the optional argument a size scaling factor like in the default size function. The main difference to the default size function is the warning message.

```
511 \DeclareSizeFunction{subf}{\subf@sfcnt\@font@warning}
512 \DeclareSizeFunction{ssubf}{\subf@sfcnt\@font@info}

513 \def\subf@sfcnt#1{%
514     #1{Font\space shape\space '\curr@fontshape'\space in\space
515         size\space \f@size\space not\space available\MessageBreak
516         external\space font\space '\mandatory@arg'\space used}%
517     \empty@sfcnt#1%
518 }
```

(End definition for `\s@fct@subf`.)

- `\s@fct@fixed` The `fixed` size function is for using a font at a different size than requested. A warning message is printed, and the external font to be used is taken from the mandatory argument. If an optional argument is present it is used as the ‘at’ size for the font. Otherwise the font is loaded at its design size.

```
519 \DeclareSizeFunction{fixed}{\fixed@sfcnt\@font@warning}
520 \DeclareSizeFunction{sfixed}{\fixed@sfcnt\@font@info}

521 \def\fixed@sfcnt#1{%
522     \ifx\optional@arg\empty
523         \let\external@font\mandatory@arg
524     \else
525         \edef\external@font{\mandatory@arg\space at\optional@arg pt}%
526     \fi
527     #1{External\space font\space '\external@font'\space loaded\space
528         for\space size\MessageBreak
529         <\f@size>}%
530 }
531 (/2ekernel)
```

(End definition for `\s@fct@fixed`.)

File u

ltfsscmp.dtx

This file contains the implementation of commands giving compatibility with the original ‘NFSS1’ release of the Font Selection Scheme.

Warning: The macro documentation is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

Version 1 of NFSS is obsolete now for about 20 years (and was “current” only for a short intermediate time) so with the 2015 release these internal interface commands are removed from the kernel and made available via `latexrelease` package so that backward compatibility remains ensured for very old documents.

```
1 (*latexrelease)
2 \IncludeInRelease{2015/01/01}{\new@fontshape}%
3 {NFSS version1 commands}%
4 \let\new@fontshape@\undefined
5 \let\warn@rel@i@\undefined
6 \let\scan@fontshape@\undefined
7 \let\scan@@fontshape@\undefined
8 \let\subst@fontshape@\undefined
9 \let\extra@def@\undefined
10 \let\default@mextra@\undefined
11 \let\preload@sizes@\undefined
12 \let\err@rel@i@\undefined
13 \let\newmathalphabet@\undefined
14 \let\newmathalphabet@@\undefined
15 \let\newmathalphabet@@@\undefined
16 \let\if@no@font@opt@\undefined
17 \let\@no@font@opt@false@\undefined
18 \let\define@mathalphabet@\undefined
19 \let\define@mathgroup@\undefined
20 \let\addtoversion@\undefined
21 \EndIncludeInRelease
```

In older releases we provide the original definitions.

```
22 \IncludeInRelease{0000/00/00}{\new@fontshape}%
23 {NFSS version1 commands}%
```

`\new@fontshape` The interface is now `\DeclareFontShape`.

```
24 \gdef\new@fontshape#1#2#3#4{%
25   \warn@rel@i\new@fontshape\DeclareFontShape
26   \expandafter\scan@fontshape\@gobble#4<\@nil><<%
27   \DeclareFontShape U{#1}{#2}{#3}\reserved@f}%
28 \onlypreamble\new@fontshape
```

(End definition for `\new@fontshape`.)

`\warn@rel@i` The warning message used above.

```
29 \gdef\warn@rel@i#1#2{%
30   \font@warning{*** NFSS release 1 command}
```

```

31           \noexpand#1found\MessageBreak
32   *** Update by using release 2 command
33           \string#2.\MessageBreak
34   *** Recovery is probably possible}%
35 }%
36 \onlypreamble\warn@rel@i

```

(End definition for \warn@rel@i.)

\scan@fontshape This will scan the old font shape definition syntax.

```

37 \gdef\scan@fontshape{%
38   \let\reserved@f\empty
39   \let\reserved@e\empty %      holds last info
40   \scan@@fontshape
41 }%
42 \onlypreamble\scan@fontshape

```

(End definition for \scan@fontshape.)

\scan@@fontshape

```

43 \gdef\scan@@fontshape#1>#2#3<%
44   \ifx\@nil#1%
45     \edef\reserved@f{\reserved@f\reserved@e}%
46   \else
47     \def\reserved@b{#1}%      nick names
48     \def\reserved@c{#3}%
49     \in@{ at}{#3}%
50     \ifin@
51       \in@{pt}{#3}%
52       \ifin@ not a proof but a good chance

```

We grab also everything after pt and discard it if people have forgotten to place a percent sign there.

```

53     \def\reserved@a##1 at##2pt##3\@nil{%
54       \def\reserved@b{##2}%
55       \def\reserved@c{##1}%
56     }%
57     \reserved@a#3\@nil
58   \fi
59 \fi
60 \ifnum 0<0#2
61   \edef\reserved@d{subf*\reserved@c}%
62   \ifcase #2\or
63   \or
64   \else
65     \errmessage{*** What's this? NFSS release 0? ***}%
66   \fi
67 \else
68   \edef\reserved@d{#2\reserved@c}%
69   \fi
70 \ifx\reserved@d\reserved@e
71   \edef\reserved@f{\reserved@f<\reserved@b>}%
72 \else
73   \edef\reserved@f{\reserved@f\reserved@e<\reserved@b>}%add old info
74   \let\reserved@e\reserved@d

```

```

75      \fi
76      \expandafter\scan@@fontshape
77  \fi
78 }%
79 \onlypreamble\scan@@fontshape

```

(End definition for `\scan@@fontshape`.)

`\subst@fontshape` This is now also handled by the extend syntax of `\DeclareFontShape`.

```

80 \gdef\subst@fontshape#1#2#3#4#5#6{%
81   \warn@rel@i\subst@fontshape\DeclareFontShape
82   \DeclareFontShape{U}{#1}{#2}{#3}{<->sub*#4/#5/#6}{()}%
83 \onlypreamble\subst@fontshape

```

(End definition for `\subst@fontshape`.)

`\extra@def` This was replaced by `\DeclareFontFamily`.

```

84 \gdef\extra@def#1#2#3{%
85   \warn@rel@i\extra@def\DeclareFontFamily
86   \DeclareFontFamily{U}{#1}{()}%
87 }%
88 \onlypreamble\extra@def

```

(End definition for `\extra@def`.)

`\default@mextra` The new name is `\DeclareFontEncodingDefaults` but in this case we don't feel comfortable with this either.

```

89 \gdef\default@mextra{%
90   \warn@rel@i\default@mextra\DeclareFontEncodingDefaults

```

We pick up the argument to `\default@mextra` implicitly as the second argument of `\DeclareFontEncodingDefaults`.

```

91   \DeclareFontEncodingDefaults\relax
92 }%
93 \onlypreamble\default@mextra

```

(End definition for `\default@mextra`.)

`\preload@sizes` The new interface is `\DeclarePreloadSizes`.

```

94 \gdef\preload@sizes{%
95   \warn@rel@i\preload@sizes\DeclarePreloadSizes
96   \DeclarePreloadSizes U%
97 }%
98 \onlypreamble\preload@sizes

```

(End definition for `\preload@sizes`.)

`\err@rel@i` This macro is used in cases where emulation with NFSS2 features is not really possible.

```

99 \gdef\err@rel@i#1#2{%
100   \@latex@error{*** NFSS release 1 command \noexpand#1found%
101   ^~J*** Recovery not possible. Use \string#2}%
102   {The new release of NFSS doesn't support the
103   \noexpand#1command^~Jany longer.
104   Please upgrade your file to the syntax of NFSS
105   release 2^~Jusing the \noexpand#2command.}%

```

Let's die.

```
106   \batchmode\input.\relax
107 }%
108 \onlypreamble\err@rel@i
```

(*End definition for \err@rel@i.*)

\newmathalphabet \newmathalphabet is the old form.

```
109 \gdef\newmathalphabet{%
110   \if@no@font@opt
111     @latex@error{*** NFSS release 1 command
112       \noexpand\newmathalphabet found%
113       ^^J \space*** Automatic recovery not possible.%
114       ^^J \space*** TYPE H for Help%
115     }%
116     {Please look at the file usrguide.tex for hints on
117      how to resolve this problem.}%
118   \else
119     \warn@rel@i\newmathalphabet\DeclareMathAlphabet
120   \fi
121   \@ifstar\newmathalphabet@@@
122     \newmathalphabet@@%
123 \gdef\newmathalphabet@@{\DeclareMathAlphabet#1{U}{\{}{\}}{}}%
124 \gdef\newmathalphabet@@@{\#1\#2\#3\#4{%
125   \DeclareMathAlphabet{\#1}{U}{\#2}{\#3}{\#4}}%
126 \onlypreamble\newmathalphabet
127 \onlypreamble\newmathalphabet@@
128 \onlypreamble\newmathalphabet@@@
```

(*End definition for \newmathalphabet , \newmathalphabet@@ , and \newmathalphabet@@@.*)

\if@no@font@opt
\@no@font@optfalse

```
129 \global\let\if@no@font@opt\iftrue
130 \gdef\@no@font@optfalse{\let\if@no@font@opt\iffalse}%
```

(*End definition for \if@no@font@opt and \@no@font@optfalse.*)

\define@mathalphabet This is a case where dying is best.

```
131 \gdef\define@mathalphabet{%
132   \err@rel@i\define@mathalphabet\DeclareMathAlphabet
133 }%
134 \onlypreamble\define@mathalphabet
```

(*End definition for \define@mathalphabet.*)

\define@mathgroup And here is another one

```
135 \gdef\define@mathgroup{%
136   \err@rel@i\define@mathgroup\DeclareSymbolFont
137 }%
138 \onlypreamble\define@mathgroup
```

(*End definition for \define@mathgroup.*)

```
\addtoversion \addtoversion is the old form.  
139 \def\addtoversion#1#2{  
140   \warn@rel@i\addtoversion\SetMathAlphabet  
141   \SetMathAlphabet#2{#1}{U}}%  
142 \onlypreamble\addtoversion  
  
(End definition for \addtoversion.)  
Finishing off this huge \IncludeInRelease argument:  
143 \EndIncludeInRelease  
144 </latexrelease>
```

File v

ltfssdcl.dtx

This file contains the main implementation of the font selection scheme commands. See other parts of the L^AT_EX distribution, or *The L^AT_EX Companion* for higher level documentation of these commands.

Warning: The macro documentation is still basically the documentation from the first NFSS release and therefore in some cases probably not completely accurate.

1 Interface Commands

\in@ \in is a utility macro with two arguments. It determines whether its first argument \ifin@ occurs in its second and sets the switch \ifin@ accordingly. The first argument may not contain braces nor # (more precisely, tokens of category code 1, 2, or 6).

```
1  {*2ekernel}
2  \def\in@#1#2%
3  {%
4   \begingroup
5   \def\in@@##1#1{}%
6   \toks@{\expandafter{\in@@#2{}{}#1}%
7   \edef\in@{\the\toks@}%
8   \expandafter\endgroup
9   \ifx\in@{\emptyset}
10  \in@false
11  \else
12  \in@true
13  \fi
14 }
15 \newif\ifin@
```

(End definition for \in@ and \ifin@.)

Before the \begin{document} command several *math versions* and *math alphabet identifiers* may be declared. In principle, there should be exactly one family/series/shape combination be declared for each version/alphabet pair. But we want to allow for defaults as well for automagical filling of holes.

While building the tables for math alphabet identifiers and math versions we keep several lists:

- the list of all math versions, \version@list, each entry prefixed by the control sequence \version@elt, i.e. this list has the following form

$$\text{\version@elt}\langle\text{version}_1\rangle\text{\version@elt}\langle\text{version}_2\rangle\dots\text{\version@elt}\langle\text{version}_n\rangle$$

- the list of all math alphabet identifiers. Here every entry has the form:

$$\text{\group@elt}\langle\text{math group number}\rangle\\ \{\{\langle\text{default family}\rangle\}\{\langle\text{default series}\rangle\}\{\langle\text{default shape}\rangle\}\}.$$

- Each defined math alphabet identifier holds a list containing Information about the *versions* for which it is defined. This list has a more complicated structure: it looks as follows:

```
\set@alpha<the alphabet identifier itself>
\reserved@c<math version><font info>
...
\@nil
```

where $\langle font\ info\rangle$ is either $\backslash reserved@e$ (if the combination is not defined yet) or
 $\{\{family\}\}\{\{series\}\}\{\{shape\}\}$

\version@list We initialize the version list to be empty.

```
16 \let\version@list=\@empty
17 \onlypreamble\version@list
```

(End definition for $\backslash version@list$.)

\version@elt

```
18 \let\version@elt\relax
19 \onlypreamble\version@elt
```

(End definition for $\backslash version@elt$.)

\new@mathversion The macro $\backslash new@mathversion$ is called with the version control sequence as its argument.

```
20 \%def\new@mathversion#1{%
```

The first thing this macro does is to check if the version identifier is already present in $\backslash version@list$. We enclose $\backslash version@list$ in braces since it might be empty (if no *version* is defined yet). But this means that we need a suitable number of $\backslash expandafter$ primitives.

```
21 \% \expandafter\in@\expandafter#1\expandafter{\version@list}%
22 \% \ifin@
```

If so it prints an error message. The $\backslash next$ macro is used to get rid of the four characters $\backslash mv@$ that would otherwise appear at the begin of the version name in the error message.

```
23 \% \@latex@error{Math version
24 \%           '\expandafter@gobblefour\string#1'
25 \%           already defined}\@eha
```

Otherwise we have a new version, and we can proceed with entering it into the tables. We add it to $\backslash version@list$. This is very easy: we define $\backslash version@elt$ (which is the delimiter in $\backslash version@list$) to protect itself and the following token from being expanded and simply redefine $\backslash version@list$.

```
26 \% \else
27 \%   \global\expandafter\newcount\csname c@\expandafter
28 \%           \gobble\string#1\endcsname
29 \%   \global\csname c@\expandafter
30 \%           \gobble\string#1\endcsname\@ne
31 \%   \def\version@elt{\noexpand\version@elt\noexpand}%
32 \%   \edef\version@list{\version@list\version@elt#1}%
```

Then we prepare to enter the new version into all math alphabet identifier lists. Remember that these lists use `\reserved@c` as delimiter, and that there appears the control sequence `\reserved@e` that must not be expanded. Therefore we take suitable precautions.

```
33 %     \def\reserved@c{\noexpand\reserved@c\noexpand}%
34 %     \let\reserved@e\relax
```

We will now go through the `\alpha@list` to process every *(math alphabet identifier)* in turn. Since this list has `\group@elt` as a delimiter we define this control sequence. It has three arguments as every entry consists of three items (as explained above).

```
35 %     \def\group@elt##1##2##3{%
```

The first of these arguments is the *(math alphabet identifier)*. We redefine it by appending the information about the new version at the end of the list contained in it. However, there is one subtlety: the definitions for `\reserved@c` and `\reserved@e` made above prevent the main part of the list from being expanded. But we still have to take care of the header and the trailer. To do this we remove the trailer by means of the macro `\remove@nil` which also protect the header from being expanded. Its definition is given below. Now we can prepare to add the new version.

```
36 %     \edef##1{\expandafter\remove@nil##1%
37 %     \reserved@c
38 %     #1%
39 %     \reserved@e
40 %     \noexpand\@nil}}%
```

Finally we call `\alpha@list` which will now execute the macro `\group@elt` once for every defined *(math alphabet identifier)*. And that's all for now.

```
41 %     \alpha@list
42 %   \fi}
```

(End definition for \new@mathversion.)

\alpha@list As we explained above every entry in `\alpha@list` has the form

`\alpha@elt
(alphabet identifier)<internal group number><default font assignments>...`

We initialize it to `\empty`.

```
43 \let\alpha@list\empty
44 \onlypreamble\alpha@list
```

(End definition for \alpha@list.)

\alpha@elt

```
45 \let\alpha@elt\relax
46 \onlypreamble\alpha@elt
```

(End definition for \alpha@elt.)

\newgroup Start the group (fam) allocation at 0. (Doesn't belong here.)

```
47 \count18=-1
```

(End definition for \newgroup.)

\stepcounter

(End definition for \stepcounter.)

\select@group We surround \select@group with braces so that functions using it can be used directly after _ or ^. However, if we use oldstyle syntax where the math alphabet doesn't have arguments (ie if \math@bgroup is not \bgroup) we need to get rid of the extra group.

```

48  </2ekernel>
49  <texrelease>\IncludeInRelease{2015/01/01}
50  <texrelease>          {\select@group}{\select@group}%
51  <2ekernel | texrelease>
52  \def\select@group#1#2#3#4{%
53  \ifx\math@bgroup\bgroup\else\relax\expandafter\@firstofone\fi
54  {%
55  \ifmmode
56  \ifnum\csname c@mv@\math@version\endcsname<\e@mathgroup@top
57  \begingroup
58  \escapechar\m@ne
59  \getanddefine@fonts{\csname c@mv@\math@version\endcsname}#3%
60  \globaldefs\@ne \math@fonts
61  \endgroup
62  \init@restore@version
63  \xdef#1{\noexpand\use@mathgroup\noexpand#2%
64  {\number\csname c@mv@\math@version\endcsname}}%
65  \global\advance\csname c@mv@\math@version\endcsname\@ne
66  \else
67  \let#1\relax
68  \@latex@error{Too many math alphabets used in
69  version \math@version}%
70  \eha
71  \fi
72  \else \expandafter\@non@alpherr\fi
73  #1{#4}%
74  }%
75  }
76  <2ekernel | texrelease>
77  <texrelease>\EndIncludeInRelease
78  <texrelease>\IncludeInRelease{0000/00/00}
79  <texrelease>          {\select@group}{\select@group}%
80  \def\select@group#1#2#3#4{%
81  \ifx\math@bgroup\bgroup\else\relax\expandafter\@firstofone\fi
82  \texrelease{ %
83  \ifmmode
84  \ifnum\csname c@mv@\math@version\endcsname<\sixt@n
85  \begingroup
86  \escapechar\m@ne
87  \getanddefine@fonts
88  {\csname c@mv@\math@version\endcsname}#3%
89  \globaldefs\@ne \math@fonts
90  \endgroup
91  \init@restore@version
92  \xdef#1{\noexpand\use@mathgroup\noexpand#2%
93  {\number\csname c@mv@\math@version\endcsname}}%
94  \global\advance\csname c@mv@\math@version\endcsname\@ne
95  \else
96  \let#1\relax
97  \@latex@error{Too many math alphabets used in
98  version \math@version}%

```

```

99  \langle latexrelease\rangle          \@eha
100 \langle latexrelease\rangle    \fi
101 \langle latexrelease\rangle \else \expandafter\non@alpherr\fi
102 \langle latexrelease\rangle #1{\#4}%
103 \langle latexrelease\rangle }%
104 \langle latexrelease\rangle}
105 \langle latexrelease\rangle\EndIncludeInRelease
106 {*2ekernel}

107 \onlypreamble\restore@mathversion

```

(*End definition for \select@group.*)

\init@restore@version

```

108 \def\init@restore@version{%
109   \global\let\init@restore@version\relax
110   \xdef\restore@mathversion
111     {\expandafter\noexpand\csname mv@\math@version\endcsname
112      \global\csname c@mv@\math@version\endcsname
113      \number\csname c@mv@\math@version\endcsname\relax}%
114   \aftergroup\dorestore@version
115 }
116 \onlypreamble\init@restore@version

```

(*End definition for \init@restore@version.*)

\non@alpherr

```

117 \gdef\non@alpherr#1{\@latex@error{%

```

The command here will have a space at the end of its name, so we make sure not to insert an extra one.

```

118   \string#1allowed only in math mode}\@ehd}

```

(*End definition for \non@alpherr.*)

\dorestore@version

```

119 \def\dorestore@version
120 { \ifmmode
121   \aftergroup\dorestore@version
122 \else
123   \gdef\init@restore@version{%
124     \global\let\init@restore@version\relax
125     \xdef\restore@mathversion
126       {\expandafter\noexpand\csname mv@\math@version\endcsname
127         \global\csname c@mv@\math@version\endcsname
128         \number\csname c@mv@\math@version\endcsname\relax}%
129     \aftergroup\dorestore@version
130   }%
131   \begingroup
132     \let\getanddefine@fonts\@gobbletwo
133     \restore@mathversion
134   \endgroup
135 \fi}%
136 \onlypreamble\dorestore@version

```

(*End definition for \dorestore@version.*)

\document@select@group We surround \select@group with braces so that functions using it can be used directly after _ or ^.

```

137  </2ekernel>
138  <latexrelease>\IncludeInRelease{2020/10/01}
139  <latexrelease> {\document@select@group}{\document@select@group}%
140  {*2ekernel | latexrelease}
141  \def\document@select@group#1#2#3#4{%
142  \ifx\math@bgroup\else\relax\expandafter\@firstofone\fi
143  {%
144  \ifmmode
145  \ifnum\csname c@mv@\math@version\endcsname<\e@mathgroup@top
146  \begingroup
147  \escapechar\m@ne
148  \getanddefine@fonts{\csname c@mv@\math@version\endcsname}#3%
149  \globaldefs\@ne \math@fonts
150  \endgroup
151  \expandafter\extract@alph@from@version
152  \csname mv@\math@version\expandafter\endcsname
153  \expandafter{\number\csname
154  c@mv@\math@version\endcsname}%
155  #1%
156  \global\advance\csname c@mv@\math@version\endcsname\@ne
157  \else
158  \let#1\relax
159  \@latex@error{Too many math alphabets used
160  in version \math@version}%
161  \relax
162  \fi
163  \else \expandafter\non@alpherr\fi

```

If the legacy interface is used, e.g., `$\$sf -1$` the math alphabet #1 does not take an argument so we better do not surround #4 with braces, because then we get {\relax} into the formula and introduce an extra Ord atom. The two different cases can be distinguished by looking at the current value of \math@bgroup.

```

164  \expandafter#1\ifx\math@bgroup\else\#4\fi
165  }%
166  }
167  </2ekernel | latexrelease>
168  <latexrelease>\EndIncludeInRelease
169  <latexrelease>\IncludeInRelease{2015/01/01}
170  <latexrelease> {\document@select@group}{\document@select@group}%
171  <latexrelease>
172  <latexrelease>\def\document@select@group#1#2#3#4{%
173  <latexrelease> \ifx\math@bgroup\else\relax\expandafter\@firstofone\fi
174  <latexrelease> {%
175  <latexrelease> \ifmmode
176  <latexrelease> \ifnum\csname c@mv@\math@version\endcsname<\e@mathgroup@top
177  <latexrelease> \begingroup
178  <latexrelease> \escapechar\m@ne
179  <latexrelease> \getanddefine@fonts{\csname c@mv@\math@version\endcsname}#3%
180  <latexrelease> \globaldefs\@ne \math@fonts
181  <latexrelease> \endgroup
182  <latexrelease> \expandafter\extract@alph@from@version
183  <latexrelease> \csname mv@\math@version\expandafter\endcsname

```

```

184 <|latexrelease>          \expandafter{\number\csname
185 <|latexrelease>          c@mv@math@version\endcsname}%
186 <|latexrelease>          #1%
187 <|latexrelease>          \global\advance\csname c@mv@math@version\endcsname\@ne
188 <|latexrelease>          \else
189 <|latexrelease>          \let#1\relax
190 <|latexrelease>          \@latex@error{Too many math alphabets used
191 <|latexrelease>          in version \math@version}%
192 <|latexrelease>          \@eha
193 <|latexrelease>          \fi
194 <|latexrelease>          \else \expandafter\non@alpherr\fi
195 <|latexrelease>          #1{#4}%
196 <|latexrelease>          }%
197 <|latexrelease>          }
198 <|latexrelease>\EndIncludeInRelease
199 <|latexrelease>
200 <|latexrelease>\IncludeInRelease{0000/00/00}
201 <|latexrelease>  {\document@select@group}{\document@select@group}%
202 <|latexrelease>
203 <|latexrelease>\def\document@select@group#1#2#3#4{%
204 <|latexrelease>  \ifx\math@bgroup\math@bgroup\else\relax\expandafter\@firstofone\fi
205 <|latexrelease>  {%
206 <|latexrelease>  \ifmmode
207 <|latexrelease>    \ifnum\csname c@mv@math@version\endcsname<\sixt@n
208 <|latexrelease>    \begingroup
209 <|latexrelease>      \escapechar\m@ne
210 <|latexrelease>      \getanddefine@fonts
211 <|latexrelease>      {\csname c@mv@math@version\endcsname}#3%
212 <|latexrelease>      \globaldefs\@ne \math@fonts
213 <|latexrelease>    \endgroup
214 <|latexrelease>    \expandafter\extract@alph@from@version
215 <|latexrelease>      \csname mv@math@version\expandafter\endcsname
216 <|latexrelease>      \expandafter{\number\csname
217 <|latexrelease>          c@mv@math@version\endcsname}%
218 <|latexrelease>          #1%
219 <|latexrelease>          \global\advance\csname c@mv@math@version\endcsname\@ne
220 <|latexrelease>          \else
221 <|latexrelease>          \let#1\relax
222 <|latexrelease>          \@latex@error{Too many math alphabets used
223 <|latexrelease>          in version \math@version}%
224 <|latexrelease>          \@eha
225 <|latexrelease>          \fi
226 <|latexrelease>          \else \expandafter\non@alpherr\fi
227 <|latexrelease>          #1{#4}%
228 <|latexrelease>          }%
229 <|latexrelease>          }
230 <|latexrelease>\EndIncludeInRelease
231 <|2ekernel>

(End definition for \document@select@group.)
```

```
\process@table
232 \def\process@table{%
233   \def\cdp@elt##1##2##3##4{%
```

```

234     \@font@info{Checking defaults for
235         ##1/##2/##3/##4}%
236     \expandafter
237     \ifx\csname##1##2##3##4\endcsname\relax

```

Grouping is important for two reasons, first `\cdp@elt` will get redefined if `\Declare...` functions are executed within the external .fd file and secondly `\try@load@fontshape` changes a lot of catcodes without surrounding itself with a group.

```

238     \begingroup
239     \def\f@encoding{\#1}\def\f@family{\#2}%
240     \try@load@fontshape
241     \endgroup
242     \fi
243     \expandafter
244     \ifx\csname##1##2##3##4\endcsname\relax
245         \@latex@error{This NFSS system isn't set up properly}%
246             {For encoding scheme ##1 the defaults
247                 ##2##3##4 do not form a valid font shape}%
248     \else
249         \@font@info{... okay}%
250     \fi}%
251 \cdp@list

```

Now we make sure that `\error@fontshape` is okay.

```

252     \begingroup
253     \escapechar\m@ne
254     \error@fontshape
255     \expandafter\ifx\csname \curr@fontshape\endcsname\relax
256         \begingroup
257             \try@load@fontshape
258         \endgroup
259     \fi
260     \expandafter\ifx\csname \curr@fontshape\endcsname\relax
261         \@latex@error{This NFSS system isn't set up properly}%
262             {The system maintainer forgot to specify a suitable
263                 substitution
264                 font shape using the \noexpand\DeclareErrorFont
265                 command}%
266     \fi
267 \endgroup

```

Set `\select@group` to its meaning used within the document body.

```
268     \let\select@group\document@select@group
```

Install the default font attributes as they are currently pointing to error font face. We can speed up the process by just using `\edef`, thereby avoiding all kind of extra processing. Don't use `\reset@font` since that would trigger `\selectfont`.

```

269     \fontencoding\encodingdefault
270     \edef\f@family{\familydefault}%
271     \edef\f@series{\seriesdefault}%
272     \edef\f@shape{\shapedefault}%

```

Drop stuff not longer needed. We need to add many more!!!!!!

```

273     \everyjob{}%
274 }
275 \onlypreamble\process@table

```

```

(End definition for \process@table.)
```

276 %\onlypreamble\set@mathradical

```
\DeclareMathVersion
```

277 \def\DeclareMathVersion#1{%

278 \expandafter\new@mathversion\csname mv@#1\endcsname}

279 \onlypreamble\DeclareMathVersion

```
(End definition for \DeclareMathVersion.)
```

```
\new@mathversion
```

280 \def\new@mathversion#1{%

281 \expandafter\in@\expandafter#1\expandafter{\version@list} %

282 \ifin@

283 \@font@info{Redeclaring math version

284 '\expandafter\gobblefour\string#1'}%

285 \else

286 \expandafter\newcount\csname c@\expandafter

287 \gobble\string#1\endcsname

288 \def\version@elt{\noexpand\version@elt\noexpand} %

289 \edef\version@list{\version@list\version@elt#1} %

290 \fi

\toks@ is used to gather all tokens for the math version. \count@ will be used to count the math groups we add to this version.

291 \toks@{}%

292 \count@z@

Now we loop over \group@list to add all math groups defined so far to the version and at the same time to count them.

293 \def\group@elt##1##2{%

294 \advance\count@\@ne

295 \addto@hook\toks@{\getanddefine@fonts##1##2} %

296 }

297 \group@list

We set the counter for this math version to the number of math groups found in \group@list.

298 \global\csname c@\expandafter\gobble\string#1\endcsname\count@

Now we loop over \alpha@list to add all math alphabets known so far. We have to distinguish the case that an alphabet by default should produce an error in new versions.

299 \def\alpha@elt##1##2##3{%

300 \ifx##2\no@alphabet@error

301 \toks@\expandafter{\the\toks@\install@mathalphabet##1%

302 {\no@alphabet@error##1}}%

303 \else

304 \toks@\expandafter{\the\toks@\install@mathalphabet##1%

305 {\select@group##1##2##3}}%

306 \fi

307 }

308 \alpha@list

Finally we define the math version to expand to the contents of `\toks0`.

```
309 \xdef#1{\the\toks0}%
310 }
311 \Qonlypreamble\new@mathversion
```

(End definition for `\new@mathversion`.)

`\DeclareSymbolFont`

```
312 \def\DeclareSymbolFont#1#2#3#4#5{%
313   \Qtempswafalse
314   \edef\reserved@b{#2}%
315   \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
316     \ifx\reserved@b\reserved@c \Qtempswatrue\fi}%
317   \cdp@list
318   \if@tempswa
319     \Qifundefined{sym#1}{%
320       \ifnum\count18<15 %
321         \expandafter\new@mathgroup\csname sym#1\endcsname
322         \expandafter\new@symbolfont\csname sym#1\endcsname
323           {#2}-{#3}-{#4}-{#5}%
324       \else
325         \Qlatex@error{Too many symbol fonts declared}\Qeha
326       \fi
327     }%
328   }%
329   \Qfont@info{Redeclaring symbol font '#1'}%
```

Update the group list.

```
330 \def\group@elt##1##2{%
331   \noexpand\group@elt\noexpand##1%
332   \expandafter\ifx\csname sym#1\endcsname##1%
333     \expandafter\noexpand\csname##2/#3/#4/#5\endcsname
334   \else
335     \noexpand##2%
336   \fi}%
337 \xdef\group@list{\group@list}%
```

Update the version list.

```
338 \def\version@elt##1{%
339   \expandafter
340   \SetSymbolFont@\expandafter##1\csname##2/#3/#4/#5\expandafter
341     \endcsname \csname sym#1\endcsname
342   }%
343   \version@list
344 }%
345 \else
346   \Qlatex@error{Encoding scheme '#2' unknown}\Qeha
347 \fi
348 }
349 \Qonlypreamble\DeclareSymbolFont
```

(End definition for `\DeclareSymbolFont`.)

```

\group@list
 350 \let\group@list\empty
 351 \onlypreamble\group@list
  (End definition for \group@list.)

\group@elt
 352 \let\group@elt\relax
 353 \onlypreamble\group@elt
  (End definition for \group@elt.)

\new@symbolfont
 354 \def\new@symbolfont#1#2#3#4#5{%
 355   \toks@\expandafter{\group@list}%
 356   \edef\group@list{\the\toks@\noexpand\group@elt\noexpand#1%
 357     \expandafter\noexpand\csname#2/#3/#4/#5\endcsname}%
 358   \def\version@elt##1{\toks@\expandafter{##1}%
 359     \edef##1{\the\toks@\noexpand\getanddefine@fonts
 360       #1\expandafter\noexpand\csname#2/#3/#4/#5\endcsname}%
 361     \global\advance\csname c@\expandafter
 362       \@gobble\string##1\endcsname\@ne
 363   }%
 364   \version@list
 365 }
 366 \onlypreamble\new@symbolfont
  (End definition for \new@symbolfont.)

\SetSymbolFont
 367 \def\SetSymbolFont#1#2#3#4#5#6{%
 368   \tempswafalse
 369   \edef\reserved@c{\#3}%
 370   \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
 371     \ifx\reserved@c\reserved@c \tempswatrue\fi}%
 372   \cdp@list
 373   \if@tempswa
 374     \expandafter\SetSymbolFont@%
 375       \csname mv@#2\expandafter\endcsname\csname#3/#4/#5/#6\expandafter
 376         \endcsname \csname sym#1\endcsname
 377   \else
 378     \@latex@error{Encoding scheme '#3' unknown}\@eha
 379   \fi
 380 }
 381 \onlypreamble\SetSymbolFont
  (End definition for \SetSymbolFont.)

\SetSymbolFont@
 382 \def\SetSymbolFont@#1#2#3{%
 383   \expandafter\in@\expandafter#1\expandafter{\version@list}%
 384   \ifin@
 385     \expandafter\in@\expandafter#3\expandafter{\group@list}%
 386   \ifin@
 387     \begingroup

```

```

388      \expandafter\get@cdp\string#2\@nil\reserved@a
389      \toks@{}%
390      \def\install@mathalphabet##1##2{%
391          \addto@hook\toks@{\install@mathalphabet##1{##2}}%
392      }%
393      \def\getanddefine@fonts##1##2{%
394          \ifnum##1=#3%
395              \addto@hook\toks@{\getanddefine@fonts##2}%
396              \expandafter\get@cdp\string#2\@nil\reserved@b
397              \ifx\reserved@a\reserved@b\else
398                  \@font@info{Encoding '\reserved@b' has changed
399                      to '\reserved@a' for symbol font\MessageBreak
400                      '\expandafter\gobblefour\string#3' in the
401                      math version '\expandafter
402                      \gobblefour\string#1'}%
403              \fi
404              \@font@info{%
405                  Overwriting symbol font
406                  '\expandafter\gobblefour\string#3' in
407                  version '\expandafter
408                  \gobblefour\string#1'\MessageBreak
409                  \@spaces \expandafter\@gobble\string##2 -->
410                  \expandafter\@gobble\string##2}%
411          \else
412              \addto@hook\toks@{\getanddefine@fonts##1##2}%
413          \fi}%
414          #1%
415          \xdef#1{\the\toks@}%
416      \endgroup
417      \else
418          \@latex@error{Symbol font '\expandafter\gobblefour\string#3'
419                          not defined}\@eha
420      \fi
421      \else
422          \@latex@error{Math version '\expandafter\gobblefour\string#1'
423                          is not
424                          defined}{You probably misspelled the name of the math
425                          version.^^JOr you have to specify an additional package.}%
426      \fi
427  }
428  \onlypreamble\SetSymbolFont@
```

(End definition for `\SetSymbolFont@`.)

```

\get@cdp
429 \def\get@cdp#1#2#3\@nil#4{\def#4{#2}}
430 \onlypreamble\get@cdp
```

(End definition for `\get@cdp`.)

```

\DeclareMathAlphabet
431 \def\DeclareMathAlphabet#1#2#3#4#5{%
432     \@tempswafalse
433     \edef\reserved@b{#2}%
434     \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%

```

```

435      \ifx\reserved@b\reserved@c \c@tempswatru\fi}%
436      \cdp@list
437      \if@tempswa
438          \expandafter\ifx
439          \csname\expandafter\@gobble\string#1\endcsname
440          \relax
441              \new@mathalphabet#1{#2}{#3}{#4}{#5}%
442      \else

```

Check if it is already a math alphabet.

```

443      \edef\reserved@a{\noexpand\in@\{\string\select@group}%
444          {\expandafter\meaning\csname \expandafter
445          \@gobble\string#1\space\endcsname}\}%
446      \reserved@a
447      \ifin@
448          \c@font@info{Redeclaring math alphabet \string#1}%
449          \def\version@elt##1{%
450              \expandafter\SetMathAlphabet@{\expandafter
451                  ##1\csname#2/#3/#4/#5\expandafter\endcsname
452
453                  \csname M@#2\expandafter\endcsname
454                  \csname \expandafter\@gobble\string#1\space\endcsname#1}%
455      \version@list
456  \else

```

Check if it is a math alphabet defined via \DeclareSymbolFontAlphabet.

```

456      \edef\reserved@a{\noexpand\in@\{\string\use@mathgroup}%
457          {\expandafter\meaning\csname \expandafter
458          \@gobble\string#1\space\endcsname}\}%
459      \reserved@a
460      \ifin@

```

In that case overwriting is simple since there is nothing inserted in the math version macros.

```

461          \c@font@info{Redeclaring math alphabet \string#1}%
462          \new@mathalphabet#1{#2}{#3}{#4}{#5}%

```

Otherwise panic.

```

463      \else
464          \c@latex@error{Command ‘\string#1’ already defined}\c@eha
465      \fi
466      \fi
467      \else
468          \c@latex@error{Encoding scheme ‘#2’ unknown}\c@eha
469      \fi
470      \fi
471  }
472 \onlypreamble\DeclareMathAlphabet

```

(End definition for \DeclareMathAlphabet.)

```

\new@mathalphabet
473 \def\new@mathalphabet#1#2#3#4#5{%
474     \toks@\expandafter{\alpha@list}%
475     \edef#1{\expandafter\noexpand\csname \expandafter
476         \@gobble\string#1\space\endcsname

```

```

477     \if/#5/%
478         \noexpand\no@alphabet@error
479         \noexpand\no@alphabet@error
480     \else
481         \expandafter\noexpand\csname M@#2\endcsname
482         \expandafter\noexpand\csname#2/#3/#4/#5\endcsname
483     \fi
484   }%
485 \toks2\expandafter{#1}%
486 \edef\alpha@list{\the\toks@\noexpand\alpha@elt\the\toks2}%
487 \def\version@elt##1{\toks@{\expandafter{##1}%
488     \edef##1{\the\toks@\install@mathalphabet
489         \expandafter\noexpand
490         \csname \expandafter\gobble
491             \string#1\space\endcsname
492     {\if/#5/%
493         \noexpand\no@alphabet@error
494         \noexpand#1%
495     \else
496         \noexpand\select@group\the\toks2
497     \fi}%
498   }%
499 \version@list
500 \expandafter\edef\csname \expandafter\gobble
501     \string#1\space\endcsname{\if/#5/%
502         \noexpand\no@alphabet@error
503         \noexpand#1%
504     \else
505         \noexpand\select@group\the\toks2
506     \fi}%
507 \edef#1{\noexpand\protect
508     \expandafter\noexpand\csname \expandafter
509         \gobble\string#1\space\endcsname}%
510 }
511 \onlypreamble\new@mathalphabet

```

(End definition for `\new@mathalphabet`.)

```

\SetMathAlphabet
512 \def\SetMathAlphabet#1#2#3#4#5#6{%
513   \tempswafalse
514   \edef\reserved@b{#3}%
515   \def\cdp@elt##1##2##3##4{\def\reserved@c{##1}%
516     \ifx\reserved@b\reserved@c \tempswatrue\fi}%
517   \cdp@list
518   \if@tempswa
519     \expandafter\SetMathAlphabet@
520       \csname mv@#2\expandafter\endcsname\csname#3/#4/#5/#6\expandafter
521       \endcsname \csname M@#3\expandafter\endcsname
522       \csname \expandafter\gobble\string#1\space\endcsname#1%
523   \else
524     \@latex@error{Encoding scheme '#3' unknown}\@eha
525   \fi
526 }
527 \onlypreamble\SetMathAlphabet

```

(End definition for \SetMathAlphabet.)

```
\SetMathAlphabet@  
528 \def\SetMathAlphabet@#1#2#3#4#5{%  
529   \expandafter\in@\expandafter#1\expandafter{\version@list}-%  
530   \ifin@  
531     \expandafter\in@\expandafter#4\expandafter{\alpha@list}-%  
532     \ifin@  
533       \begingroup  
534         \toks@{}%  
535         \def\getanddefine@fonts##1##2{  
536           \addto@hook\toks@{\getanddefine@fonts##1##2}-%  
537           }%  
538         \def\reserved@c##1##2##3##4{  
539           \expandafter\@gobble\string##4}%  
540         \def\install@mathalphabet##1##2{  
541           \ifx##1#4%  
542             \addto@hook\toks@  
543               {\install@mathalphabet#4{\select@group#4#3#2}}%  
544             \font@info{Overwriting math alphabet  
545               ‘\string##5’ in version ‘\expandafter  
546               \gobblefour\string##1’\MessageBreak  
547               \cspaces \reserved@c##2 -->  
548               \expandafter\gobble\string##2}}%  
549           \else  
550             \addto@hook\toks@{\install@mathalphabet##1##2}}%  
551           \fi  
552           }%  
553           #1%  
554           \xdef#1{\the\toks@}%  
555         \endgroup  
556       \else
```

If the math alphabet was defined via \DeclareSymbolFontAlphabet we have remove its external definition and add it as a normal math alphabet to every version before trying to change it in one version.

```
557   \edef\reserved@a{  
558     \noexpand\in@\string\use@mathgroup}{\meaning#4}}%  
559   \reserved@a  
560   \ifin@  
561     \def\reserved@b##1\use@mathgroup##2##3{  
562       \def\reserved@b##3\def\reserved@c##2}{  
563       \expandafter\reserved@b##4%  
564       \begingroup  
565         \def\install@mathalphabet##1##2{  
566           \addto@hook\toks@{\install@mathalphabet##1##2}}%  
567           }%  
568         \def\getanddefine@fonts##1##2{  
569           \addto@hook\toks@{\getanddefine@fonts##1##2}}%  
570           \ifnum##1=\reserved@b  
571             \expandafter  
572             \addto@hook\expandafter\toks@  
573             \expandafter{\expandafter\install@mathalphabet  
574             \expandafter#4\expandafter}
```

```

575             {\expandafter\select@group\expandafter
576               #4\reserved@c##2}}%
577           \fi
578           }%
579           \def\version@elt##1{%
580             \toks@{ }%
581             ##1%
582             \xdef##1{\the\toks@}%
583           }%
584           \version@list
585         \endgroup

```

Put it into the `\alpha@list` with default ‘error’

```

586           \expandafter\gdef\expandafter\alpha@list\expandafter
587             {\alpha@list
588               \alpha@elt #4\no@alphabet@error \no@alphabet@error}%
589             \gdef#4{\no@alphabet@error #5}% fake things :-

```

Then call the internal setting routine again:

```

590           \SetMathAlphabet@{#1}{#2}{#3}#4#5%
591           \else
592             \@latex@error{Command ‘\string#5’ not defined as a
593               math alphabet}%
594             {Use \noexpand\DeclareMathAlphabet to define it.}%
595           \fi
596           \fi
597           \else
598             \@latex@error{Math version ‘\expandafter\@gobblefour\string#1’
599               is not
600               defined}{You probably misspelled the name of the math
601               version.^~JOr you have to specify an additional package.}%
602           \fi
603       }
604     \onlypreamble\SetMathAlphabet@

```

(End definition for `\SetMathAlphabet@`.)

`\DeclareMathAccent` Could do with more checks like allowing single number in #4 lowercase in #4 etc

```

605   </2ekernel>
606   <*2ekernel | latexrelease>
607   <latexrelease>\IncludeInRelease{2019/10/01}%
608   <latexrelease>          {DeclareMathAccent}{Make math accents robust}%
609   \def\DeclareMathAccent#1#2#3#4{%
610     \expandafter\in@\csname sym#3\expandafter\endcsname
611     \expandafter{\group@list}%
612     \ifin@
613       \begingroup
614         \count`z@=#4\relax
615         \count`tw@=\count`z@
616         \divide\count`z@\sixt@@n
617         \count@=\count`z@
618         \multiply\count@=\sixt@@n
619         \advance\count`tw@-\count@
620         \if\relax\noexpand#1% is command?
621           \edef\reserved@a{\noexpand\in@

```

```

622      {\expandafter\@gobble\string\mathaccent}
623      {\expandafter\meaning
624       \csname\expandafter\@gobble\string#1\space\endcsname}%
625 \reserved@a
626 \ifin@
627   \expandafter\let
628   \csname\expandafter\@gobble\string#1\space\endcsname
629   \undefined
630   \expandafter\set@mathaccent
631   \csname sym#3\endcsname#1#2%
632   {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
633   \font@info{Redeclaring math accent \string#1}%
634 \else
635   \expandafter\ifx
636   \csname\expandafter\@gobble\string#1\endcsname
637   \relax
638   \expandafter\set@mathaccent
639   \csname sym#3\endcsname#1#2%
640   {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
641 \else
642   \@latex@error{Command ‘\string#1’ already defined}\@eha
643   \fi
644   \fi
645 \else
646   \@latex@error{Not a command name: ‘\noexpand#1’}\@eha
647   \fi
648 \endgroup
649 \else
650   \@latex@error{Symbol font ‘#3’ is not defined}\@eha
651 \fi
652 }
653 </2ekernel | latexrelease>
654 <latexrelease>\EndIncludeInRelease
655 <latexrelease>\IncludeInRelease{0000/00/00}%
656 <latexrelease>          {DeclareMathAccent}{\Make math accents robust}%
657 <latexrelease>\def\DeclareMathAccent#1#2#3#4{%
658 <latexrelease>  \expandafter\in@\csname sym#3\expandafter\endcsname
659 <latexrelease>  \expandafter{\group@list}%
660 <latexrelease> \ifin@
661 <latexrelease>  \begingroup
662 <latexrelease>  \count\z@=\#4\relax
663 <latexrelease>  \count\tw@\count\z@
664 <latexrelease>  \divide\count\z@\sixt@on
665 <latexrelease>  \count@\count\z@
666 <latexrelease>  \multiply\count@\sixt@on
667 <latexrelease>  \advance\count\tw@-\count@
668 <latexrelease>  \if\relax\noexpand#1% is command?
669 <latexrelease>    \edef\reserved@a{\noexpand\in@
670 <latexrelease>    {\expandafter\@gobble\string\mathaccent}{\meaning#1}%
671 <latexrelease>    \reserved@a
672 <latexrelease> \ifin@
673 <latexrelease>  \expandafter\set@mathaccent
674 <latexrelease>  \csname sym#3\endcsname#1#2%
675 <latexrelease>  {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%

```

```

676 <latexrelease>          \Ofont@info{Redeclaring math accent \string#1}%
677 <latexrelease>          \else
678 <latexrelease>          \expandafter\ifx
679 <latexrelease>          \csname\expandafter\@gobble\string#1\endcsname
680 <latexrelease>          \relax
681 <latexrelease>          \expandafter\set@mathaccent
682 <latexrelease>          \csname sym#3\endcsname#1#2%
683 <latexrelease>          {\hexnumber@{\count\z@\hexnumber@{\count\tw@}}}
684 <latexrelease>          \else
685 <latexrelease>          \O@latex@error{Command '\string#1' already defined}\Oeha
686 <latexrelease>          \fi
687 <latexrelease>          \fi
688 <latexrelease>          \else
689 <latexrelease>          \O@latex@error{Not a command name: '\noexpand#1'}\Oeha
690 <latexrelease>          \fi
691 <latexrelease>          \endgroup
692 <latexrelease>          \else
693 <latexrelease>          \O@latex@error{Symbol font '#3' is not defined}\Oeha
694 <latexrelease>          \fi
695 <latexrelease>          }
696 <latexrelease>\EndIncludeInRelease
697 <*2ekernel>
698 \Onlypreamble\DeclareMathAccent

```

(*End definition for \DeclareMathAccent.*)

\set@mathaccent

```

699 </2ekernel>
700 <*2ekernel | latexrelease>
701 <latexrelease>\IncludeInRelease{2019/10/01}%
702 <latexrelease>          {\set@mathaccent}{makemath accents robust}%
703 \def\set@mathaccent#1#2#3#4{%
704   \xdef#2{\mathaccent"\mathchar@type#3\hexnumber@#1#4\relax}%
705   \MakeRobust#2%
706 }
707 \Onlypreamble\set@mathaccent
708 </2ekernel | latexrelease>
709 <latexrelease>\EndIncludeInRelease
710 <latexrelease>\IncludeInRelease{0000/00/00}%
711 <latexrelease>          {\set@mathaccent}{makemath accents robust}%
712 <latexrelease>
713 <latexrelease>\def\set@mathaccent#1#2#3#4{%
714   \xdef#2{\mathaccent"\mathchar@type#3\hexnumber@#1#4\relax}%
715 <latexrelease>
716 <latexrelease>\EndIncludeInRelease
717 <*2ekernel>

```

(*End definition for \set@mathaccent.*)

\DeclareMathSymbol

```

718 \def\DeclareMathSymbol#1#2#3#4{%
719   \expandafter\in@\csname sym#3\expandafter\endcsname
720   \expandafter{\group@list}%
721 \ifin@

```

```

722 \begingroup
723   \count\z@=#4\relax
724   \count\tw@\count\z@
725   \divide\count\z@\sixt@@n
726   \count@\count\z@
727   \multiply\count@\sixt@@n
728   \advance\count\tw@-\count@
729   \if\relax\noexpand#1% is command?

```

Store the command name with a space attached inside `\reserved@b` in case we look at a robust definition.

```

730   \edef\reserved@b{\expandafter\noexpand
731     \csname\expandafter@\gobble\string#1\space\endcsname}%

```

Test both #1 and #1_U for containing `mathchar`.

```

732   \edef\reserved@a
733     {\noexpand\in@\{\expandafter\@gobble\string\mathchar\}%
734      {\meaning#1\expandafter\meaning\reserved@b}\}%
735   \reserved@a

```

Drop #1_U in case it was defined before.

```

736   \global\expandafter\let\reserved@b\@undefined
737   \ifin@
738     \expandafter\set@mathsymbol
739       \csname sym#3\endcsname#1#2%
740       {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
741       \font@info{Redeclaring math symbol \string#1}%
742   \else
743     \expandafter\ifx
744       \csname\expandafter@\gobble\string#1\endcsname
745       \relax
746       \expandafter\set@mathsymbol
747         \csname sym#3\endcsname#1#2%
748         {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
749     \else
750       \@latex@error{Command '\string#1' already defined}\@eha
751     \fi
752   \fi
753 \else
754   \expandafter\set@mathchar
755     \csname sym#3\endcsname#1#2
756     {\hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}}%
757   \fi
758 \endgroup
759 \else
760   \@latex@error{Symbol font '#3' is not defined}\@eha
761 \fi
762 }
763 \onlypreamble\DeclareMathSymbol

```

(End definition for `\DeclareMathSymbol`.)

`\set@mathchar`

```

764 \def\set@mathchar#1#2#3#4{%
765   \global\mathcode`#2=\mathchar@type#3\hexnumber@#1#4\relax}
766 \onlypreamble\set@mathchar

```

(End definition for \set@mathchar.)

```
\set@mathsymbol
767 \def\set@mathsymbol#1#2#3#4{%
768   \global\mathchardef#2"\mathchar@type#3\hexnumber@#1#4\relax}
769 \onlypreamble\set@mathsymbol

(End definition for \set@mathsymbol.)

770 \% \def\mathsymbol#1#2#3{%
771 %   \tempcnta=#3\relax
772 %   \tempcntb\tempcnta
773 %   \divide\tempcnta\sixt@@n
774 %   \count@\tempcnta
775 %   \multiply\count@\sixt@@n
776 %   \advance\tempcntb-\count@
777 %   \mathchar"\mathchar@type#1\hexnumber@#2%
778 %           \hexnumber@\tempcnta\hexnumber@\tempcntb\relax}
779 %
780 \% \def\DeclareMathAlphabetCharacter#1#2#3{%
781 %   \DeclareMathSymbol{#1}7{#2}{#3}}
```

\DeclareMathDelimiter

```
782 \def\DeclareMathDelimiter#1{%
783   \if\relax\noexpand#1%
784     \expandafter\DeclareMathDelimiter
785   \else
786     \expandafter\@xxDeclareMathDelimiter
787   \fi
788   #1}
789 \onlypreamble\DeclareMathDelimiter
```

(End definition for \DeclareMathDelimiter.)

\@xxDeclareMathDelimiter

This macro checks if the second arg is a “math type” such as \mathopen. The undocumented original code didn’t use math types when the delimiter was a single letter. For this reason the coding is a bit strange as it tries to support the undocumented syntax for compatibility reasons.

```
790 \def\@xxDeclareMathDelimiter#1#2#3#4{%
```

7 is the default value returned in the case that \mathchar@type is passed something unexpected, like a math symbol font name. We locally move \mathalpha out of the way so if you use that the right branch is taken. This will still fail if an explicit number 7 is used!

```
791 \begingroup
792   \let\mathalpha\mathord
793   \ifnum7=\mathchar@type{#2}%
794     \endgroup
```

If this branch is taken we have old syntax (5 arguments).

```
795   \expandafter\@firstofone
796 \else
```

If this branch is taken `\mathchar@type` is different from 7 so we assume new syntax. In this case we also use the arguments to set up the letter as a math symbol for the case where it is not used as a delimiter.

```
797     \endgroup
798     \DeclareMathSymbol#1{#2}{#3}{#4}%

```

Then we arrange that `\@xDeclareMathDelimiter` only gets #1, #3, #4 ... as it does not expect a math type as argument.

```
799     \expandafter\@firstoftwo
800     \fi
801     {\@xDeclareMathDelimiter#1{#2}{#3}{#4}}
802 \onlypreamble\@xxDeclareMathDelimiter
```

(End definition for `\@xxDeclareMathDelimiter`.)

`\@DeclareMathDelimiter`

```
803 \def\@DeclareMathDelimiter#1#2#3#4#5#6{%
804   \expandafter\in@\csname sym#3\expandafter\endcsname
805   \expandafter{\group@list}%
806 \ifin@
807   \expandafter\in@\csname sym#5\expandafter\endcsname
808   \expandafter{\group@list}%
809 \ifin@
810   \begingroup
811     \count\z@=#4\relax
812     \count\tw@\count\z@
813     \divide\count\z@\sixt@@n
814     \count@\count\z@
815     \multiply\count@\sixt@@n
816     \advance\count\tw@-\count@
817     \edef\reserved@c{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
818 %
819     \count\z@=#6\relax
820     \count\tw@\count\z@
821     \divide\count\z@\sixt@@n
822     \count@\count\z@
823     \multiply\count@\sixt@@n
824     \advance\count\tw@-\count@
825     \edef\reserved@d{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
826 %
827     \edef\reserved@a{\noexpand\in@
828       {\expandafter\gobble\string\delimiter}{\meaning#1}}%
829     \reserved@a
830 \ifin@
831   \expandafter\set@mathdelimiter
832     \csname sym#3\expandafter\endcsname
833     \csname sym#5\endcsname#1#2%
834     \reserved@c\reserved@d
835     \@font@info{Redeclaring math delimiter \string#1}%
836 \else
837   \expandafter\ifx
838     \csname\expandafter\gobble\string#1\endcsname
839     \relax
840     \expandafter\set@mathdelimiter
```

```

841           \csname sym#3\expandafter\endcsname
842           \csname sym#5\endcsname#1#2%
843           \reserved@c\reserved@d
844       \else
845           \@latex@error{Command ‘\string#1’ already defined}\@eha
846       \fi
847   \fi
848 \endgroup
849 \else
850     \@latex@error{Symbol font ‘#5’ is not defined}\@eha
851   \fi
852 \else
853     \@latex@error{Symbol font ‘#3’ is not defined}\@eha
854   \fi
855 }
856 \onlypreamble\@DeclareMathDelimiter

```

(*End definition for \@DeclareMathDelimiter.*)

\@xDeclareMathDelimiter

```

857 \def\@xDeclareMathDelimiter#1#2#3#4#5{%
858   \expandafter\in@\csname sym#2\expandafter\endcsname
859   \expandafter{\group@list}%
860 \ifin@%
861   \expandafter\in@\csname sym#4\expandafter\endcsname
862   \expandafter{\group@list}%
863 \ifin@%
864   \begingroup
865     \count\z@=#3\relax
866     \count\tw@\count\z@
867     \divide\count\z@\sixt@@n
868     \count@\count\z@
869     \multiply\count@\sixt@@n
870     \advance\count\tw@-\count@
871     \edef\reserved@c{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
872   %
873     \count\z@=#5\relax
874     \count\tw@\count\z@
875     \divide\count\z@\sixt@@n
876     \count@\count\z@
877     \multiply\count@\sixt@@n
878     \advance\count\tw@-\count@
879     \edef\reserved@d{\hexnumber@{\count\z@}\hexnumber@{\count\tw@}}%
880   \expandafter\set@mathdelimiter
881     \csname sym#2\expandafter\endcsname\csname sym#4\endcsname#1%
882     \reserved@c\reserved@d
883   \endgroup
884 \else
885     \@latex@error{Symbol font ‘#4’ is not defined}\@eha
886   \fi
887 \else
888     \@latex@error{Symbol font ‘#2’ is not defined}\@eha
889   \fi
890 }

```

```
891 \@onlypreamble\@xDeclareMathDelimiter
```

(End definition for `\@xDeclareMathDelimiter`.)

`\set@mathdelimiter` We have to end the definition of a math delimiter like `\lfloor` with a space and not with `\relax` as we did before, because otherwise constructs involving `\abovewithdelims` will prematurely end (pr/1329)

```
892 </2ekernel>
893 <*2ekernel | latexrelease>
894 <latexrelease>\IncludeInRelease{2019/10/01}%
895 <latexrelease>          {\set@mathdelimiter}{make delimiters robust}%
896 \def\set@mathdelimiter#1#2#3#4#5#6{%
```

We use `\protected` not `\MakeRobust` so that `\bigl\lfloor` etc. works inside `\protected@edef`.

```
897 \protected
898 \xdef#3{\delimeter"\mathchar@type#4\hexnumber@#1#5%
899   \hexnumber@#2#6 }%
900 % \MakeRobust#3%
901 }
902 \@onlypreamble\set@mathdelimiter
903 </2ekernel | latexrelease>
904 <latexrelease>\EndIncludeInRelease
905 <latexrelease>\IncludeInRelease{0000/00/00}%
906 <latexrelease>          {\set@mathdelimiter}{make delimiters robust}%
907 <latexrelease>
908 <latexrelease>\def\set@mathdelimiter#1#2#3#4#5#6{%
909 <latexrelease> \xdef#3{\delimeter"\mathchar@type#4\hexnumber@#1#5%
910 <latexrelease>   \hexnumber@#2#6 }%
911 <latexrelease>
912 <latexrelease>\EndIncludeInRelease
913 <*2ekernel>
```

(End definition for `\set@mathdelimiter`.)

`\set@@mathdelimiter`

```
914 \def\set@@mathdelimiter#1#2#3#4#5{%
915   \global\delcode`#3="\hexnumber@#1#4\hexnumber@#2#5\relax}
916 \@onlypreamble\set@@mathdelimiter
```

(End definition for `\set@@mathdelimiter`.)

`\DeclareMathRadical`

```
917 \def\DeclareMathRadical#1#2#3#4#5{%
```

Below is a crude fix to make this macro work if #1 is undefined or `\relax`. Should be improved!

```
918 \expandafter\ifx
919   \csname\expandafter\@gobble\string#1\endcsname
920   \relax
921   \let#1\radical
922 \fi
923 \edef\reserved@a{\noexpand\in@
924   {\expandafter\@gobble\string\radical}{\meaning#1}}%
925 \reserved@a
```

```

926 \ifin@
927   \expandafter\in@\csname sym#2\expandafter\endcsname
928     \expandafter{\group@list}%
929 \ifin@
930   \expandafter\in@\csname sym#4\expandafter\endcsname
931     \expandafter{\group@list}%
932 \ifin@
933   \begingroup
934     \count\z@=#3\relax
935     \count\tw@ \count\z@
936     \divide\count\z@\sixt@n
937     \count@\count\z@
938     \multiply\count@\sixt@n
939     \advance\count\tw@-\count@
940     \edef\reserved@c{%
941       \hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}%
942     \count\z@=#5\relax
943     \count\tw@ \count\z@
944     \divide\count\z@\sixt@n
945     \count@\count\z@
946     \multiply\count@\sixt@n
947     \advance\count\tw@-\count@
948     \edef\reserved@d{%
949       \hexnumber@\{\count\z@\}\hexnumber@\{\count\tw@\}%

```

Coded inline instead of using \set@mathradical

```

950 %           \expandafter\set@mathradical
951 %             \csname sym#2\expandafter\endcsname
952 %               \csname sym#4\endcsname#1%
953 %                 \reserved@c\reserved@d
954 %                   \xdef#1{\radical"\expandafter\hexnumber@
955 %                     \csname sym#2\endcsname\reserved@c
956 %                       \expandafter\hexnumber@
957 %                         \csname sym#4\endcsname\reserved@d
958 %                           \relax}%
959 %           \endgroup
960 %         \else
961 %           \@latex@error{Symbol font '#4' is not defined}\@eha
962 %         \fi
963 %       \else
964 %         \@latex@error{Symbol font '#2' is not defined}\@eha
965 %       \fi
966 %     \else
967 %       \@latex@error{Command '\string#1' already defined}\@eha
968 %     \fi
969 }
970 \onlypreamble\DeclareMathRadical

```

(End definition for \DeclareMathRadical.)

Definition below was wrong it contained \delimiter !

```

def\set@mathradical#1#2#3#4#5{%
  \xdef#3{\radical"\hexnumber@#1#4\hexnumber@#2#5\relax}}

```

\mathalpha just a dummy currently

```

971 \let\mathalpha\relax
(End definition for \mathalpha.)  

\mathchar@type
972 \def\mathchar@type#1{%
973   \ifodd #1#1 \else % is this non-negative number?
974     \ifx#1\mathord 0\else
975       \ifx#1\mathop 1\else
976         \ifx#1\mathbin 2\else
977           \ifx#1\mathrel 3\else
978             \ifx#1\mathopen 4\else
979               \ifx#1\mathclose 5\else
980                 \ifx#1\mathpunct 6\else
981                   7% % anything else is variable ord
982                 \fi
983               \fi
984             \fi
985           \fi
986         \fi
987       \fi
988     \fi
989   \fi}
990 @onlypreamble\mathchar@type

```

(End definition for \mathchar@type.)

\DeclareSymbolFontAlphabet

```

991 \def\DeclareSymbolFontAlphabet#1#2{%
992   \expandafter\DeclareSymbolFontAlphabet@
993     \csname \expandafter\gobble\string#1\space\endcsname{#2}#1}
994 @onlypreamble\DeclareSymbolFontAlphabet

```

(End definition for \DeclareSymbolFontAlphabet.)

\DeclareSymbolFontAlphabet@

```

995 \def\DeclareSymbolFontAlphabet@#1#2#3{%

```

We use the switch \if@tempswa to decide if we can declare this symbol font alphabet.

```

996 \if@tempswatrue

```

First check if #2 is known to be a symbol font

```

997 \expandafter\in@\csname sym#2\expandafter\endcsname
998   \expandafter{\group@list}%
999 \ifin@
```

Check if #1 is defined as a math alphabet defined via \DeclareMathAlphabet:

```

1000 \expandafter\in@\expandafter#1\expandafter{\alpha@list}%
1001 \ifin@
```

If so remove it from the \alpha@list and from all math version macros.

```

1002   \font@info{Redeclaring math alphabet \string#3}%
1003   \toks@{}%
1004   \def\alpha@elt##1##2##3{%
1005     \ifx##1\else\addto@hook\toks@{\alpha@elt##1##2##3}\fi}%
1006   \alpha@list
1007   \xdef\alpha@list{\the\toks@}%
```

Now we loop over all versions and remove the math alphabet:

```

1008 \def\version@elt##1{%
1009     \begingroup
1010     \toks@{\}%
1011     \def\getanddefine@fonts####1####2{%
1012         \addto@hook\toks@{\getanddefine@fonts####1####2}%
1013     \def\install@mathalphabet####1####2{%
1014         \ifx####1\else
1015             \addto@hook\toks@{\install@mathalphabet
1016                         ####1{####2}}\fi}%
1017         ##1%
1018         \xdef##1{\the\toks@}%
1019     \endgroup
1020     }%
1021     \version@list
1022 }
```

If #3 is not defined as a math alphabet check if it is defined at all:

```

1023     \expandafter\ifx
1024     \csname\expandafter\gobble\string#1\space\endcsname
1025     \relax
```

If it is undefined, fine otherwise check if it is a math alphabet defined via \DeclareSymbolFontAlphabet:

```

1026 \else
1027     \edef\reserved@a{%
1028         \noexpand\in@{\string\use@mathgroup}{\meaning#1}%
1029     \reserved@a
1030     \ifin@
1031         \font@info{Redeclaring math alphabet \string#3}%
1032     \else
```

Since the command #3 is defined to be something which is not a math alphabet we have to skip redefining it.

```

1033     \tempswafalse
1034     \@latex@error{Command ‘\string#3’ already defined}\@eha
1035     \fi
1036     \fi
1037     \fi
1038 }
```

Since the symbol font is not known we better skip defining this alphabet.

```

1039     \tempswafalse
1040     \@latex@error{Unknown symbol font ‘#2’}\@eha
1041     \fi
1042     \if@tempswa
```

When we reach this point we are allowed to define #1 to be a symbol font math alphabet. This means that we have to set it to

```
\use@mathgroup <math-settings> \sym<name>
```

The *<math-settings>* are the one for the encoding that is used in the font shape where \sym<name> is pointing to. This means that we have to get it from the information stored in \group@list. Thus we loop through that list after defining \group@elt in a suitable way.

```
1043     \def\group@elt##1##2{%
```

```

1044      \expandafter\ifx\csname sym#2\endcsname##1%
1045      \expandafter\reserved@a\string##2\@nil
1046      \fi}%
1047      \def\reserved@a##1##2##3\@nil{%
1048          \def\reserved@a{##2}}%
1049      \group@list
1050      \toks@{\relax\ifmmode \else \non@alpherr#1\fi}%
1051      \edef#1{\the\toks@
1052          \noexpand\use@mathgroup
1053          \expandafter\noexpand\csname M@\reserved@a\endcsname
1054          \csname sym#2\endcsname}%
1055      \def#3{\protect#1}%
1056      \fi
1057  }
1058  \onlypreamble\DeclareSymbolFontAlphabet@
1059  {/2ekernel}

```

(End definition for `\DeclareSymbolFontAlphabet@`.)

File w ltfssini.dtx

This file contains the top level L^AT_EX interface to the font selection scheme commands. See other parts of the L^AT_EX distribution, or *The L^AT_EX Companion* for higher level documentation of these commands.

1 NFSS Initialisation

Finally, there are six commands that are to be used in L^AT_EX and that we will therefore protect against expansion at the wrong point: \fontfamily, \fontseries, \fontshape, \fontsize, \selectfont, and \mathversion.

```
1  {*2ekernel}
```

1.1 Providing math *versions*

L^AT_EX provides two *versions*. We call them *normal* and *bold*, respectively.

```
2  \DeclareMathVersion{normal}
3  \DeclareMathVersion{bold}
```

Now we define the standard font change commands. We don't allow the use of \rmfamily etc. in math mode.

(Actually most are now defined further down in the file.)

First the changes to another *family*:

```
4  \%{\ DeclareRobustCommand{\rmfamily
5  %          {\not@math@alphabet\rmfamily\mathrm
6  %          \fontfamily\rmdefault\selectfont}
7  \%{\ DeclareRobustCommand{\sffamily
8  %          {\not@math@alphabet\sffamily\mathsf
9  %          \fontfamily\sfdefault\selectfont}
10 \%{\ DeclareRobustCommand{\ttfamily
11 %          {\not@math@alphabet\ttfamily\mathtt
12 %          \fontfamily\ttdefault\selectfont}
```

Then the commands changing the *series*:

```
13 \%{\ DeclareRobustCommand{\bfseries
14 %          {\not@math@alphabet\bfseries\mathbf
15 %          \fontseries\bfdefault\selectfont}
16 \%{\ DeclareRobustCommand{\mdseries
17 %          {\not@math@alphabet\mdseries\relax
18 %          \fontseries\mddefault\selectfont}
19 \%{\ DeclareRobustCommand{\upshape
20 %          {\not@math@alphabet\upshape\relax
21 %          \fontshape\updefault\selectfont}
```

Then the commands changing the *shape*:

```
22 \%{\ DeclareRobustCommand{\slshape
23 %          {\not@math@alphabet\slshape\relax
24 %          \fontshape\sldefault\selectfont}
25 \%{\ DeclareRobustCommand{\scshape
26 %          {\not@math@alphabet\scshape\relax
```

```

27   \fontshape\scdefault\selectfont}
28 \DeclareRobustCommand\itshape
29   {\not@math@alphabet\itshape\mathit
30   \fontshape\itdefault\selectfont}

```

2 Custom series settings for main document families

This section was introduced 2020/02/02 and for now we support a full rollback (may need splitting later).

```

31 </2ekernel>
32 <*2ekernel | latexrelease>
33 <latexrelease>\IncludeInRelease{2020/02/02}%
34 <latexrelease>           {\DeclareFontSeriesDefault}{Custom series}%

```

One problem with the NFSS approach of handling the series axis turned out to be that (especially with respect to “boldness”) different font families implemented different strategies. For example, with Computer Modern fonts you normally only have `bx` whereas most PostScript fonts offered only `b` but not `bx`. As a result L^AT_EX’s standard setting for `\bfdefault` didn’t work with such fonts, but if it got changed to produce `b`, then that didn’t work with Computer Modern if the fonts got combined (e.g., using Computer Modern Typewriter with such fonts).

The solution back then was to provide substitution rules in the font .fd such that if a `bx` series got requested the `b` series got used. While this works in that particular case, it isn’t a very general solution. For example, if you happen to have a font family that has several weights you may want to typeset the whole document in a somewhat lighter or darker font but if you then modify `\mddefault` to allow for this, then of course your change only works with that particular family but not with the typewriter or sans serif family you also want to use.

A better solution was provided by the `mweights` package by Bob Tennent that offers defaults on the level of the three main font families in the document: for “rm”, “sf” and “tt” so that font packages could define defaults for the sans serif document font by providing `\bfseries@sf` which then was used when `\bfseries` got executed and the current family was the `\sffamily`.

We now support this concept directly from within L^AT_EX and for use in font packages (or the document preamble) we offer `\DeclareFontSeriesDefault`. This declaration takes three arguments:

document family interface: Can either be `rm`, `sf` or `tt`. This is optional and if not given the overall default.

document series interface: Can be `md` or `bf`.

series value: This is the value that is going to be used with the combination is requested.

For example, `\DeclareFontSeriesDefault[rm]{bf}{sb}` would use `sb` (semi-bold) when `\rmfamily\bfseries` is asked for.

If used without the optional argument, e.g., `\DeclareFontSeriesDefault{bf}{b}` then this is like redefining `\bfdefault` or `\mddefault`.

If some family specify defaults aren't given, e.g. if there are no declarations for, say, `tt` then the format defaults of `\mddefault` and `\bfdefault` are assumed. If those are later changed this is *not* reflected!¹⁴

`\DeclareFontSeriesDefault` The command to declare font series defaults for the "rm", "sf" or "tt" family.

```
35 \let\DeclareFontSeriesDefault\@undefined      % for rollback
36 \newcommand\DeclareFontSeriesDefault[3][]{%
37   \def\reserved@a{\#1}%

```

No optional argument: set up general default.

```
38   \ifx\reserved@a\@empty
39     \ifcsname #2series\endcsname          % supported are
40       \def\reserved@a{\#1}%

```

Adding `\@empty` allows us to detect if the default gets redefined with `\renewcommand` or `\def` by the user.

```
41   \expandafter\def
42     \csname #2default\endcsname{\#3\@empty}%
43   \expandafter\def
44     \csname #2default@previous\endcsname{\#3\@empty}%
45 \else
46   \@latex@error{Wrong syntax for \string\DeclareFontSeriesDefault}%
47   {Mandatory first argument must be 'md' or 'bf'.}
48 \fi

```

Optional argument given, set up specific default.

```
49 \else
50   \ifcsname #2series@\#1\endcsname          % supported are
51     \def\reserved@a{\#1}%
52   \expandafter\edef
53     \csname #2series@\#1\endcsname{\#3}%

```

If the interface is used we remove the frozen kernel default. This way, we know that something was explicitly set up (even if the setup has the same value as the default).

```
54   \expandafter\let
55     \csname #2series@\#1@kernel\endcsname\@undefined
56 \else
57   \@latex@error{Wrong syntax for \string\DeclareFontSeriesDefault}%
58   {Optional argument must be 'rm', 'sf', or 'tt'. \MessageBreak
59   Mandatory first argument must be 'md' or 'bf'.}
60 \fi
61 \fi
62 }
```

(End definition for `\DeclareFontSeriesDefault`.)

`\mdseries@rm` We initialize the family specific default at the end of the format generation. Later on they may get overwritten in the preamble or a package via `\DeclareFontSeriesDefault` (or possibly directly).

`\bfseries@rm` Conceptual change: The `\bfdefault` will be `b` not `bx` because that is what it should be really for nearly every font except Computer/Latin Modern.

`\bfseries@tt`

¹⁴I see no easy way to achieve this without compromising compatibility with existing packages that currently use `mweights` and directly define (some) of the `\mdseries@..` commands but not others.

To account for the fact that by default we typeset in CM or LM we set up the `\bfseries@..` defaults to use `bx` instead.

This means that it behaves like before because if the default fonts are used then `\bfseries@rm` etc kick in and make `\textbf` use `bx`. However, if the font gets changed then `\bfdefault` will get used.

```
63 \def\bfseries@rm{bx}
64 \def\bfseries@sf{bx}
65 \def\bfseries@tt{bx}
```

Frozen version of the kernel defaults so we can see if they have changed.

```
66 \let\bfseries@rm@kernel\bfseries@rm
67 \let\bfseries@sf@kernel\bfseries@sf
68 \let\bfseries@tt@kernel\bfseries@tt
```

The default for the medium series is `m` and this will be interpreted as resetting both weight and width. To reset only one of them the virtual value `?m` and `m?` are available.

```
69 \def\mdseries@rm{m}
70 \def\mdseries@sf{m}
71 \def\mdseries@tt{m}
```

(*End definition for `\mdseries@rm` and others.*)

`\series@change@debug` For debugging, but right now none of this code is extracted. The idea is to have a separate package with debugging code one day.

```
72 {*debug}
73 \let\series@change@debug\typeout
74 \let\series@change@debug\gobble
75 (/debug)
```

(*End definition for `\series@change@debug`.*)

`\prepare@family@series@update` This is core command that prepares for the family update. The big difference to the documented code above is that the nested `\ifx` statements seem to be missing. Instead we loop through an internal list that holds the names of the three meta families. This approach allows us to extend the mechanism at a later stage to allow for additional named meta families.

Here is the current definition of that list:

```
76 \def@meta@family@list{\@elt{rm}\@elt{sf}\@elt{tt}}
77 \def\prepare@family@series@update#1#2{%
78   \if@forced@series
79   {+debug} \series@change@debug{No series preparation (forced \f@series)\on@line}%
80     \fontfamily#2%
81   \else
82   {+debug} \series@change@debug{Preparing for switching to #1 (#2)\on@line}%
83     \expand@font@defaults
```

We prepare for changing the current series. We have to find it before changing the family as discussed above.

```
84 \let\target@series@value\@empty
85 \def\target@meta@family@value{#1}%
```

As the very last item in the meta family list we add `\@elt{??}` and define this pseudo meta family to be the current font family. So if none of the real meta families matched then this will match. This will cover the following case:

- `\bfseries` is called for a family using `bx` (e.g., CMR)
- Switch to a font family that is none of the meta families, e.g., via `\fontfamily{ptm}\selectfont`
- Then none of the real meta families, match but the final `\@elt{??}` will.
- Therefore if the current series is `\mddefault` or `\bfdefault` it will be detected and the corresponding target series selected.

```
86     \expandafter\edef\csname ??def@ult\endcsname{\f@family}%
```

To find it we loop over the meta family list with a suitable definition of `\@elt`.

```
87     \let\@elt\update@series@target@value
88     \@meta@family@list
```

Last resort pseudo meta family. Will only be looked at if none of the real ones have matched.

```
89     \@elt{??}%
90     \let\@elt\relax
```

That will figure out the correct series value to use without updating it. Now we can change the family.

```
91     \fontfamily#2%
```

After that we update the series. That code is again like the one above.

```
92     \ifx\target@series@value\empty
93     {+debug} \series@change@debug{Target series still empty ...}%
94     \else
95     \ifx\f@series\target@series@value
96     {+debug} \series@change@debug{Target series unchanged:
97     {+debug} \f@series \space = \target@series@value}%
98     \else
99     \maybe@load@fontshape
100    {+debug} \series@change@debug{Target series:
101    {+debug} \f@series \space -> \target@series@value}%
```

The `\target@series@value` may contain something like `cm` (coming from a default) and so we can't directly assign it to `\f@series` so we have to drop any surplus `m` first.

```
102 \%     \let\f@series\target@series@value
103     \series@maybe@drop@one@m\target@series@value\f@series
104     \fi
105     \fi
106     \fi
107 }
```

(End definition for `\prepare@family@series@update` and `\@meta@family@list`.)

`\update@series@target@value` In this macro used in the look you basically find the nested `\ifxs` from the outline above. The only difference is that it is parameterized instead of being written out and only for one block of tests because the code is called repeatedly when looping over the meta family list. From the list we get each meta family name in turn.

```
108 \def\update@series@target@value#1{%
```

There is one additional test at the beginning, because the list contains all meta families and we need to ignore the case where current one from the list and target one are identical.

```

109  \def\reserved@a{\#1}%
110  \ifx\target@meta@family@value\reserved@a    % rm -> rm do nothing
111  \else
112  {+debug} \series@change@debug{Trying to match #1: \csname#1def@ult\endcsname
113  {+debug}                                \space = \f@family\space ?}%

```

We only “do” something if the current font family matches the current meta family.

```
114      \expandafter\ifx\csname#1def@ult\endcsname\f@family
```

If that’s the case we know that this is the block that applies (only one meta family can match). So to speed things up we change \@elt so that the rest of the loop gets gobbled.

```
115      \let\@elt\@gobble
```

Then we try to find the right new value for the series (as explained above). The two macros defined first are only there because we now need to use \csname and this way the code will be a little faster.

```

116      \expandafter\let\expandafter\reserved@b
117          \csname mdseries@\target@meta@family@value\endcsname
118      \expandafter\let\expandafter\reserved@c
119          \csname bfseries@\target@meta@family@value\endcsname
120 {+debug} \series@change@debug{Targets for mdseries and bfseries:
121 {+debug}                                \reserved@b\space and \reserved@c}%

```

This here is now identical to the nested \ifx block from the outline, except that it there appeared twice in \rmfamily. This is now covered by looping and stopping the loop when a match was found.

We have to sanitize the default value first because it may contain something like mc and that would never match \f@series because there it would be called c with the m dropped. It would be probably better to do that differently these days, but it is hard to adjust without causing a lot of issues, so we do the dropping in various places instead.

```

122      \expandafter\series@maybe@drop@one@m
123          \csname mdseries@#1\endcsname\reserved@d
124      \ifx\reserved@d\f@series
125 {+debug} \series@change@debug{mdseries@#1 matched -> \reserved@b}%
126                                \let\target@series@value\reserved@b
127      \else

```

Again do some sanitizing.

```

128      \expandafter\series@maybe@drop@one@m
129          \csname bfseries@#1\endcsname\reserved@d
130      \ifx\reserved@d\f@series
131 {+debug} \series@change@debug{bfseries@#1 matched -> \reserved@c}%
132                                \let\target@series@value\reserved@c
133      \else\ifx\f@series\mddef@ult \let\target@series@value\reserved@b
134 {+debug} \series@change@debug{mddef@ult matched -> \reserved@b}%
135      \else\ifx\f@series\bfdef@ult \let\target@series@value\reserved@c
136 {+debug} \series@change@debug{bfdef@ult matched -> \reserved@c}%
137      \fi\fi\fi\fi
138      \fi
139      \fi
140 }

```

(End definition for \update@series@target@value.)

```
\init@series@setup This is code to be run at begin document ...
```

```
141 \def\init@series@setup{%
```

We only want `bx` in `\bfseries@rm` if the roman font is Computer Modern or Latin Modern, otherwise it should be `b`. It was set to `bx` in the kernel so that any font use with the default families in the preamble get this value. Now at the real document start we check if the fonts have been changed. If there was a `\DeclareFontSeriesDefault` declaration or `\bfseries@rm` was directly altered then it differs from `\bfseries@rm@kernel` and we do nothing. Otherwise we check if `\rmdefault` is one of the CM/LM font families and if so we keep `bx` otherwise we change it to `b`.

This approach doesn't cover one case: CM/LM got changed to a different family that supports `bx`, but the support package for that family used `\def\bfseries@rm{bx}` instead of using `\DeclareFontSeriesDefault`. In that case the code here changes it to `b`. Solution: use the `\DeclareFontSeriesDefault` interface.

```
142 \ifx\bfseries@rm@kernel\bfseries@rm
143   \expandafter\in@\expandafter{\rmdefault}%
144   {cmr,cmsc,cmtt,lcmsc,lcmtt,lmr,lmss,lmstt}%
145 \ifin@ \else \def\bfseries@rm{b}\fi\fi
```

Same approach for `\bfseries@sf` and `\bfseries@tt`:

```
146 \ifx\bfseries@sf@kernel\bfseries@sf
147   \expandafter\in@\expandafter{\sfdefault}%
148   {cmr,cmsc,cmtt,lcmsc,lcmtt,lmr,lmss,lmstt}%
149 \ifin@ \else \def\bfseries@sf{b}\fi\fi
150 \ifx\bfseries@tt@kernel\bfseries@tt
151   \expandafter\in@\expandafter{\ttdefault}%
152   {cmr,cmsc,cmtt,lcmsc,lcmtt,lmr,lmss,lmstt}%
153 \ifin@ \else \def\bfseries@tt{b}\fi\fi
```

If the document preamble has changed the `\familydefault` or if the `\rmdefault` contains a new font family, we may have to adjust the series defaults accordingly, before starting typesetting.

Similarly, if the user has changed the `\mddefault` or the medium series for the family selected as document font we may also have to adjust the `\seriesdefault`.

On the other hand if the document font is still CM or LM then `\bfdefault` is wrong, because it is now saying `b` and not `bx` as it should for such fonts.

To fix all this we first run `\reset@font` (the internal kernel name for `\normalfont`). This will set up the document encoding, family, series and shape based on the current values of `\encodingdefault`, `\familydefault`, `\seriesdefault` and `\shapedefault`. However, if the family (from `\familydefault`) has special medium default we should switch to that (and not use what is current value from `\seriesdefault`). This can be achieved by afterwards calling `\mediumseries` and then changing `\seriesdefault` to the now current series value (in `\f@series`).

But what should happen if `\seriesdefault` got explicitly changed? In that case the explicit change should survive and we should not alter `\seriesdefault`. This is solved by comparing the current value of `\seriesdefault` with a kernel version saved in the format and if they differ we do not call `\mdseries` or change `\seriesdefault`.

```
154 \reset@font
155 \ifx\seriesdefault\seriesdefault@kernel
156   \mdseries
157   \let\seriesdefault\f@series
158 \fi
159 }%
```

(End definition for \init@series@setup.)

As the kernel code now implements the same functionality as `mweights`, albeit internally coded slightly differently, that package shouldn't be loaded any more. We therefore pretend that it already got loaded. Thus, a font package that tries to load it and then sets `\mdseries@...`, etc. will continue to work but will now use the kernel code.

Of course, mid-term such package should probably use `\DeclareFontSeriesDefault` instead of making using low-level definitions.

```
160 \expandafter\let\csname ver@mweights.sty\endcsname\fmtversion
161 </2ekernel | latexrelease>
162 <latexrelease>\EndIncludeInRelease
163 <latexrelease>\IncludeInRelease{0000/00/00}%
164 <latexrelease>          {\DeclareFontSeriesDefault}{Custom series}%
165 <latexrelease>
166 <latexrelease>\let\DeclareFontSeriesDefault\@undefined
167 <latexrelease>\let\bfseries@rm\@undefined
168 <latexrelease>\let\bfseries@sf\@undefined
169 <latexrelease>\let\bfseries@tt\@undefined
170 <latexrelease>\let\bfseries@rm@kernel\@undefined
171 <latexrelease>\let\bfseries@sf@kernel\@undefined
172 <latexrelease>\let\bfseries@tt@kernel\@undefined
173 <latexrelease>\let\mdseries@rm\@undefined
174 <latexrelease>\let\mdseries@sf\@undefined
175 <latexrelease>\let\mdseries@tt\@undefined
176 <latexrelease>\expandafter\let\csname ver@mweights.sty\endcsname\@undefined
177 <latexrelease>
178 <latexrelease>\let\@meta@family@list\@undefined
179 <latexrelease>\let\prepare@family@series@update\@undefined
180 <latexrelease>\let\update@series@target@value\@undefined
181 <latexrelease>
```

This is always called in `\document` so don't make it undefined.

```
182 <latexrelease>\let\init@series@setup\relax
183 <latexrelease>
184 <latexrelease>\EndIncludeInRelease
185 <*2ekernel>
186 </2ekernel>
187 <*2ekernel | latexrelease>
188 <latexrelease>\IncludeInRelease{2020/10/01}%
189 <latexrelease>          {\bfseries}{Custom series with hooks}%
```

`\expand@font@defaults` The family specific defaults are fully expanded, i.e., they are defined via `\edef` inside `\DeclareFontSeriesDefault`. However, the overall defaults, e.g., `\bfdefault` may have been redefined by the user and thus may not be fully expanded. So to enable reliable comparison we make expanded versions of them. That we rerun each time. The alternative would be to only allow for changes before begin document.

```
190 \def\expand@font@defaults{%
191   \edef\rmdef@ult{\rmdefault}%
192   \edef\sfdef@ult{\sfdefault}%
193   \edef\ttdef@ult{\ttdefault}%
```

The series defaults may contain some surplus `m` that we need to drop here.

```
194 \series@maybe@drop@one@m\bfdefault\bfdef@ult
195 \series@maybe@drop@one@m\mddefault\mddef@ult
```

Formats that set up parallel fonts, e.g., for Japanese, can use this hook to add additional code here.

```
196  \UseHook{expand@font@defaults}%
197 }
```

(End definition for `\expand@font@defaults` and others.)

\bfseries This document command switches to the bold series.

```
198 \DeclareRobustCommand{\bfseries}{%
199   \not@math@alphabet\bfseries\mathbf}
```

In the original NFSS definition it then called `\fontseries` with the value `\bfdefault`. In the new scheme we have more alternatives and therefore check if the current family (`\f@family`) is the current `\rmdef@ult`, `\sfdef@ult` or `\ttdef@ult` and the select the correct family default in that case.

```
200 \expand@font@defaults
```

If `\bfdefault` and `\bfdefault@previous` are different then the default got changed directly through the legacy interface (i.e., via `\def` or `\renewcommand`). In that case we reset all meta family defaults so that the document behaves like it was the case before the new mechanism was introduced.

```
201 \ifx\bfdefault\bfdefault@previous\else
```

We add `\empty` and then let `\bfdefault@previous` to `\bfdefault` so that we can detect any further change.

```
202 \expandafter\def\expandafter\bfdefault
203   \expandafter{\bfdefault\empty}%
204 \let\bfdefault@previous\bfdefault
```

And we reset the meta family defaults (`\bfdef@ult` is an expanded version of `\bfdefault`).

```
205 \let\bfseries@rm\bfdef@ult
206 \let\bfseries@sf\bfdef@ult
207 \let\bfseries@tt\bfdef@ult
```

Formats that set up parallel fonts, e.g., for Japanese, can use this hook to add resets here. Note that this hook is only run when resets are necessary.

```
208 \UseHook{bfseries/defaults}%
209 \fi
210 \ifx\f@family\rmdef@ult    \fontseries\bfseries@rm
211 \else\ifx\f@family\sfdef@ult \fontseries\bfseries@sf
212 \else\ifx\f@family\ttdef@ult \fontseries\bfseries@tt
```

If not `\bfdefault` is used.

```
213 \else                      \fontseries\bfdefault
214 \fi\fi\fi
```

This hook in contrast is always executed.

```
215 \UseHook{bfseries}%
216 \selectfont
217 }
```

(End definition for `\bfseries`.)

\mdseries This document command switches to the medium series.

```
218 \DeclareRobustCommand{\mdseries}{%
219   \not@math@alphabet{\mdseries}\relax
220   \expand@font@defaults
221   \ifx\mddefault\mddefault@previous\else
222     \expandafter\def\expandafter\mddefault\expandafter{\mddefault@\emptyset}%
223     \let\mddefault@previous\mddefault
224     \let\mdseries@rm\mddef@ult
225     \let\mdseries@sf\mddef@ult
226     \let\mdseries@tt\mddef@ult}
```

Formats that set up parallel fonts, e.g., for Japanese, can use this hook to add resets here.

```
227   \UseHook{mdseries/defaults}%
228   \fi
229   \ifx\f@family\rmdef@ult      \fontseries\mdseries@rm
230   \else\ifx\f@family\sdef@ult \fontseries\mdseries@sf
231   \else\ifx\f@family\ttdef@ult \fontseries\mdseries@tt
232   \else                      \fontseries\mddefault
233   \fi\fi\fi
234   \UseHook{mdseries}%
235   \selectfont
236 }
```

(End definition for \mdseries.)

\rmfamily Here are the document level commands for changing the main font families, or rather, here is a documented outline of the code, the actual code is then streamlined and somewhat generalized.

```
DeclareRobustCommand{\rmfamily}{%
  \not@math@alphabet{\rmfamily}\mathrm}
```

If families are changed then we have to do a bit more work. In the original NFSS implementation a family change kept encoding, series shape and size unchanged but now we can't any longer simply reuse the current series value. Instead we may have to change it from one family default to the next.

```
\expand@font@defaults
```

We have to do the testing while the current family is still unchanged but we have to do the adjustment of the series after it got changed (because the new family might has different sets of shapes available and we certainly don't want to see substitution going on. So we use \target@series@value to hold the target series (if any).

```
\let\target@series@value\empty
```

Thus, if the current family is the sans family

```
\ifx\f@family\sdef@ult
```

and if we using the medium series of the sans family

```
\ifx\f@series\mdseries@sf
```

then lets switch to the medium series for the serif family

```
\let\target@series@value\mdseries@rm
```

and if we use the bold series of the sans family switch to the bold default of the serif family:

```
\else\ifx\f@series\bfseries@sf \let\target@series@value\bfseries@rm
```

However, the sans family may not have any specific defaults set, so we also compare with the overall defaults.

```
\else\ifx\f@series\mddef@ult \let\target@series@value\mdseries@rm  
\else\ifx\f@series\bfdef@ult \let\target@series@value\bfseries@rm
```

If neither test was true we leave the series alone. This way a special manual setting such as `\fontseries{lc}` is not undone if the family changes (of course there may not be any support for it in the new family but then the NFSS substitution kicks in and sorts it out).

```
\fi\fi\fi\fi
```

We need to do the same if the current family is the typewriter family:

```
\else\ifx\f@family\ttdef@ult  
  \ifx\f@series\mdseries@tt \let\target@series@value\mdseries@rm  
  \else\ifx\f@series\bfseries@tt \let\target@series@value\bfseries@rm  
  \else\ifx\f@series\mddef@ult \let\target@series@value\mdseries@rm  
  \else\ifx\f@series\bfdef@ult \let\target@series@value\bfseries@rm  
    \fi\fi\fi\fi  
\fi\fi
```

With these preparations for series out of the way we can now change the font family to `\rmdefault`.

```
\fontfamily\rmdefault
```

If `\target@series@value` is still empty there is nothing more to do other than selecting the new family. However, if not then we should update the font series now as well. But there is one further subtle issue. We may not have loaded an `.fd` file for our target font family yet. In the past that was done in `\selectfont` if necessary but since we are now doing all the comparisons in `\fontseries` we need to make sure that the font family specifications are already loaded prior to calling `\fontseries`.

```
\ifx\target@series@value\empty \else  
  \maybe@load@fontshape
```

Updating the series in this case means directly changing `\f@series` to the target value. We don't want to go through `\fontseries` because that would apply the mappings and then `bx + b` would keep `bx` instead of changing to `b` as desired. as

```
\let\f@series\target@series@value  
\fi  
\selectfont}
```

So now for the real definition: most of the code above gets delegated to a helper command `\prepare@family@series@update` so that the definition becomes again fairly short. In addition we add a hook, mainly for our Japanese friends so that the code can be extended prior to the call to `\selectfont`.

```
237 \DeclareRobustCommand\rmfamily{%
238   \not@math@alphabet\rmfamily\mathrm
```

This holds all the code discussed above, first argument is the meta family, i.e., `rm` in this case, and second argument is the default family name, e.g., `cmr` indirectly accessed via `\rmdefault`. This is calling `\fontfamily` and if necessary `\fontseries` as outline above.

```
239   \prepare@family@series@update{rm}\rmdefault
```

Then comes the hook code (by default a no-op) and finally the call to `\selectfont`.

```
240   \UseHook{rmfamily}%
241   \selectfont}
```

The definitions for `\sffamily` and `\ttfamily` are similar, the differences are only in what font families get checked.

```
\sffamily \ttsfamily
242 \DeclareRobustCommand\sffamily{%
243   \not@math@alphabet\sffamily\mathsf
244   \prepare@family@series@update{sf}\sfdefault
245   \UseHook{sffamily}%
246   \selectfont

247 \DeclareRobustCommand\ttfamily{%
248   \not@math@alphabet\ttfamily\mathtt
249   \prepare@family@series@update{tt}\ttdefault
250   \UseHook{ttfamily}%
251   \selectfont}
```

(End definition for `\rmfamily`, `\sffamily`, and `\ttsfamily`.)

`rmfamily` Declare the hooks used above.

```
sffamily \NewHook{rmfamily}
ttfamily \NewHook{sffamily}
normalfont \NewHook{ttfamily}
expand@font@defaults \NewHook{normalfont}
bfseries \NewHook{expand@font@defaults}
bfseries/defaults \NewHook{bfseries}
mdseries \NewHook{bfseries/defaults}
mdseries/defaults \NewHook{mdseries}
```

(End definition for `rmfamily` and others.)

`\@rmfamilyhook` `\@sffamilyhook` `\@ttfamilyhook` These four hooks have legacy versions used in 2020/02/02 so we should support them until they aren't any longer used.

By default the hooks do nothing.

```
\@defaultfamilyhook
261 \let\@rmfamilyhook\empty
262 \let\@sffamilyhook\empty
263 \let\@ttfamilyhook\empty
264 \let\@defaultfamilyhook\empty %FMi sort out
```

(End definition for `\@rmfamilyhook` and others.)

```

265  </2ekernel | latexrelease>
266  <latexrelease>\EndIncludeInRelease
267  <latexrelease>\IncludeInRelease{2020/02/02}%
268  <latexrelease>                                {\bfseries}{Custom series with hooks}%
269  <latexrelease>
270  <latexrelease>\def\expand@font@defaults{%
271  <latexrelease>    \edef\rmdef@ult{\rmdefault}%
272  <latexrelease>    \edef\sffdef@ult{\sfdefault}%
273  <latexrelease>    \edef\ttdef@ult{\ttdefault}%
274  <latexrelease>    \edef\bfdef@ult{\bfdefault}%
275  <latexrelease>    \edef\mddef@ult{\mddefault}%
276  <latexrelease>    \edef\famdef@ult{\familydefault}%
277  <latexrelease>}
278  <latexrelease>
279  <latexrelease>\DeclareRobustCommand\bfseries{%
280  <latexrelease>  \not@math@alphabet\bfseries\mathbf
281  <latexrelease>  \expand@font@defaults
282  <latexrelease>    \ifx\f@family\rmdef@ult      \fontseries\bfseries@rm
283  <latexrelease>    \else\ifx\f@family\sffdef@ult \fontseries\bfseries@sf
284  <latexrelease>    \else\ifx\f@family\ttdef@ult \fontseries\bfseries@tt
285  <latexrelease>    \else                           \fontseries\bfdefault
286  <latexrelease>    \fi\fi\fi
287  <latexrelease>  \selectfont
288  <latexrelease>}
289  <latexrelease>
290  <latexrelease>\DeclareRobustCommand\mdseries{%
291  <latexrelease>  \not@math@alphabet\mdseries\relax
292  <latexrelease>  \expand@font@defaults
293  <latexrelease>    \ifx\f@family\rmdef@ult      \fontseries\mdseries@rm
294  <latexrelease>    \else\ifx\f@family\sffdef@ult \fontseries\mdseries@sf
295  <latexrelease>    \else\ifx\f@family\ttdef@ult \fontseries\mdseries@tt
296  <latexrelease>    \else                           \fontseries\mddefault
297  <latexrelease>    \fi\fi\fi
298  <latexrelease>  \selectfont
299  <latexrelease>}
300  <latexrelease>
301  <latexrelease>\DeclareRobustCommand\rmfamily{%
302  <latexrelease>  \not@math@alphabet\rmfamily\mathrm
303  <latexrelease>  \prepare@family@series@update{rm}\rmdefault
304  <latexrelease>  \@rmfamilyhook
305  <latexrelease>  \selectfont
306  <latexrelease>\DeclareRobustCommand\sffamily{%
307  <latexrelease>  \not@math@alphabet\sffamily\mathsf
308  <latexrelease>  \prepare@family@series@update{sf}\sfdefault
309  <latexrelease>  \@sffamilyhook
310  <latexrelease>  \selectfont
311  <latexrelease>\DeclareRobustCommand\ttfamily{%
312  <latexrelease>  \not@math@alphabet\ttfamily\mathtt
313  <latexrelease>  \prepare@family@series@update{tt}\ttdefault
314  <latexrelease>  \@ttfamilyhook
315  <latexrelease>  \selectfont
316  <latexrelease>

```

```

317 〈\latexrelease〉
318 〈\latexrelease〉\EndIncludeInRelease
319 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
320 〈\latexrelease〉          {\bfseries}{Custom series with hooks}%
321 〈\latexrelease〉
322 〈\latexrelease〉\let\expand@font@defaults\@undefined
323 〈\latexrelease〉
324 〈\latexrelease〉\DeclareRobustCommand\bfseries
325 〈\latexrelease〉      {\not@math@alphabet\bfseries\mathbf}
326 〈\latexrelease〉      \fontseries\bfdefault\selectfont}
327 〈\latexrelease〉\DeclareRobustCommand\mdseries
328 〈\latexrelease〉      {\not@math@alphabet\mdseries\relax
329 〈\latexrelease〉      \fontseries\mddefault\selectfont}
330 〈\latexrelease〉\DeclareRobustCommand\rmfamily
331 〈\latexrelease〉      {\not@math@alphabet\rmfamily\mathrm}
332 〈\latexrelease〉      \fontfamily\rmdefault\selectfont}
333 〈\latexrelease〉\DeclareRobustCommand\sffamily
334 〈\latexrelease〉      {\not@math@alphabet\sffamily\mathsf}
335 〈\latexrelease〉      \fontfamily\sffamily\selectfont}
336 〈\latexrelease〉\DeclareRobustCommand\ttfamily
337 〈\latexrelease〉      {\not@math@alphabet\ttfamily\mathtt}
338 〈\latexrelease〉      \fontfamily\ttdefault\selectfont}
339 〈\latexrelease〉
340 〈\latexrelease〉\let\@rmfamilyhook\@undefined
341 〈\latexrelease〉\let\@sffamilyhook\@undefined
342 〈\latexrelease〉\let\@ttfamilyhook\@undefined
343 〈\latexrelease〉
344 〈\latexrelease〉\EndIncludeInRelease
345 〈*2ekernel〉

```

`\IfFontSeriesContextTF` With the ability for `\bfseries` or `\mdseries` to be mapped to different NFSS axis values it becomes important to have the ability to determine the current context as we can no longer look at `\f@series` to answer a question such as “am I currently typesetting in a bold typeface?”

This is provided by the test `\IfFontSeriesContextTF`. It takes three arguments:

- The context we try to check (either `bf` for bold or `md` for medium, i.e., the same that can go into the first mandatory argument of `\DeclareFontSeriesDefault`),
- what to do if we are in this context (true case) and
- what to do if we are not (false case).

This allows you to define commands like `\IfBold`, e.g.,

```
\newcommand\IfBold[2]{\IfSeriesContextTF{bf}{#1}{#2}}
```

and then do

```
This is \IfBold{bold}{non-bold} text.
```

and get the appropriate result.

```

346 〈/2ekernel〉
347 〈*2ekernel | \latexrelease〉
348 〈\latexrelease〉\IncludeInRelease{2020/10/01}%
349 〈\latexrelease〉          {\IfFontSeriesContextTF}{Font series context}%

```

```

350 \DeclareRobustCommand\IfFontSeriesContextTF[1]{%
351   \expand@font@defaults

```

In the beginning we haven't found the context we are looking for.

```

352   \@font@series@contextfalse

```

We store the requested context away for use in the tests.

```

353   \def\requested@test@context{#1}%

```

The next definition is there to ensure that get a final match during testing even if the current family is none of the meta families (`rm`, `sf` or `tt`). This will then basically tests if the current font family matches the overall default.

```

354 \expandafter\edef\csname ??def@ult\endcsname{\f@family}%

```

Then we run through the meta family list (currently containing just the three values) followed by the artificial meta family `??` and test each of them in turn using `\test@font@series@context` as the testing command.

```

355   \let\@elt\test@font@series@context
356   \@meta@family@list
357   \@elt{??}%
358 \let\@elt\relax

```

Following that we evaluate the status of `\if@font@series@context` to determine which of the remaining arguments (true/false case) we have to execute.

```

359 \if@font@series@context
360 \expandafter\@firstoftwo
361 \else
362 \expandafter\@secondoftwo
363 \fi
364 }

```

(End definition for `\IfFontSeriesContextTF`.)

`\test@font@series@context` This tests the context (stored in `\requested@test@context`) and updates the booleean if the right context is found.

```

365 \def\test@font@series@context#1{%

```

First task is to figure out whether the current family matches `\rmfamily`, `\sffamily`, etc. so in `\reserved@a` we store the value of `\rmdef@ult` (or whatever the given meta family is) and compare that to `\f@family`.

```

366 \edef\reserved@a{\csname #1def@ult\endcsname}%
367 \ifx\f@family\reserved@a

```

If they match we have found the right meta family so we don't need to test any of the remaining meta family and therefore change `\@elt` to `\@gobble`.

```

368 \let\@elt\@gobble

```

Now we have to test if `\f@series` matches the requested context (e.g., whether `\bfseries@rm` has that value if the current meta family is `rm` and we are looking for the `bf` context).

```

369 \expandafter\ifx
370   \csname\requested@test@context series@#1\endcsname\f@series

```

If yes we change the boolean and are done.

```

371   \@font@series@contexttrue

```

If not then maybe the reason is that nothing special was set up for that meta family so we also check now if `\f@series` matches the overall default (e.g., `\bfdef@ult` if we are looking for the bold context). If that matches we change the boolean.

```

372     \else
373         \expandafter\ifx
374             \csname\requested@test@context def@ult\endcsname\f@series
375             \font@series@contexttrue
376         \fi\fi\fi
377     }

(End definition for \test@font@series@context.)
```

`\if@font@series@context` The boolean to signal if we found the requested font series context.

```

378 \newif\if@font@series@context

(End definition for \if@font@series@context.)

379 </2ekernel | latexrelease>
380 <latexrelease>\EndIncludeInRelease
381 <latexrelease>\IncludeInRelease{0000/00/00}%
382 <latexrelease>           {\IfFontSeriesContextTF}{Font series context}%
383 <latexrelease>
384 <latexrelease>\let\IfFontSeriesContextTF\@undefined
385 <latexrelease>\let\test@font@series@context\@undefined
386 <latexrelease>\let\if@font@series@context\@undefined
387 <latexrelease>\let\@font@series@contexttrue\@undefined
388 <latexrelease>\let\@font@series@contextfalse\@undefined
389 <latexrelease>\EndIncludeInRelease
390 <*2ekernel>
```

3 Supporting nested emphasis

By default L^AT_EX 2_E supports two levels of nested emphasis: if the current font has an upright shape then it switches to `\itshape` otherwise to `\emnnershape` (which defaults to `\upshape`). This means nested emphasis will oscillate between italic and upright shapes.

Sometimes it would be nice to allow for a more lengthy sequence, but instead of providing a fixed one L^AT_EX now offers a general mechanism that allows to define arbitrary sequences.

```
\DeclareEmphSequence
  \emforce
```

This declaration expects a comma separated list of (font) change declarations corresponding to increasing levels of emphasis. The mechanism tries to be “smart” and verifies that the declarations actually alter the font. If not it will ignore this level and tries the next one—the assumption being that there was a manual font change in the document to the font that is now supposed to be used for emphasis. Of course, this only works if the declarations in the list actually change the font and not, say, just the color. In such a case one has to use `\emforce` to which directs the mechanism to use the level even if the font attributes haven’t changed.

If the nesting is so deep, that the specified levels are exhausted then `\emreset` is used as a final set of declarations (which by default returns back to the upright shape). Any additional nesting levels will then reuse the list from its beginning.

\DeclareEmphSequence \DeclareEmphSequence expects aclist of declaration. Spaces in the argument are dropped to avoid surious spaces in the output. The declarations are additive. At the very end the shape is reset using \emreset and \emforce so that this case is never skipped.¹⁵ Further nested calls restart at the beginning.

```

391  </2ekernel>
392  {*2ekernel | latexrelease}
393  <| latexrelease>\IncludeInRelease{2020/02/02}%
394  <| latexrelease>          {\DeclareEmphSequence}{Nested emph}%
395  \def\DeclareEmphSequence#1{%
396    \protected@edef\emfontdeclare@clist{\zap@space#1, \empty\emforce\emreset}%
397  }

```

By default the it is empty, in which case \eminnershape is used by LATEX.

```

398 \let\emfontdeclare@clist\empty
(End definition for \DeclareEmphSequence.)

```

\emrest Reset the font to upright and upper/lower case. With the default rules using \shapedefault does that for us but to be on the safe side we do it like this:

```

399 \DeclareRobustCommand\emreset{\upshape\ulcshape}

```

(End definition for \emrest.)

\em The new definition for \em (and implicitly \emph is like it was before if \emfontdeclare@clist is empty.

```

400 \DeclareRobustCommand\em{%
401   @nomath\em
402   \ifx\emfontdeclare@clist\empty
403     \ifdim \fontdimen\@ne\font >\z@
404       \eminnershape \else \itshape \fi
405   \else

```

But if not we use the list to decide how to do emphasis.

We use the current font to check if the declarations have any effect, so even a size change is allowed and identified as a modification (but a color change, for example, isn't). So first we save the current status.

```

406 \edef\em@currfont{\csname curr@fontshape/\f@size\endcsname}%

```

Then we grab the next element from the list and check if it can be used.

```

407   \expandafter\do@emfont@update\emfontdeclare@clist\do@emfont@update
408   \fi
409 }
410 \def\eminnershape{\upshape}

```

(End definition for \em.)

\do@emfont@update We know that the list (if not empty) has at least 2 elements separated by a comma, so we pick up the first in #1 and the rest in #2.

```

411 \def\do@emfont@update#1,#2\do@emfont@update{%

```

First action is to alter the list and move the first entry to the end

```

412 \def\emfontdeclare@clist{#2,#1}%

```

¹⁵ Maybe we should not add \emforce but allow that case to be skipped as well. Of course, that might result in an endless loop if somebody defines a sequence without any font change and without \emforce but ...

Then we execute current declaration. Appending `\selectfont` means one can write just `\fontshape{it}}` and that works then too.

```
413 % \typeout{Use: \detokenize{\#1}}%
414 #1\selectfont
```

We then compare the current font with our saved version, but with a slight twist: we add `\em@force` at the end of the name. Normally this is empty so has no effect but if there was an `\emforce` as part of `#1` it will append a `/` to the font name (making it invalid) thus this will then always fail the test.

If the test fails we are done and the declarations will be used. Otherwise we will try the next declaration in the sequence.

```
415 \expandafter\ifx\csname \curr@fontshape/\f@size\em@force
```

For the comparison with `\ifx` we have to expand `\em@currfont` once as the relevant info is inside.

```
416 \expandafter\endcsname
417 \em@currfont
418 \expandafter\do@\emfont@update\emfontdeclare@clist\do@\emfont@update
```

If `\emforce` was used, we have to undo its effect:

```
419 \else
420 \let\em@force\@empty
421 \fi
422 }
```

(End definition for `\do@\emfont@update`.)

`\emforce`
`\em@force` The definition of `\emforce` is simple: change `\em@force` to make the above test always invalid.

```
423 \protected\def\emforce{\def\em@force{/}}
424 \let\em@force\@empty
425 </2ekernel | latexrelease>
426 <latexrelease>\EndIncludeInRelease
```

(End definition for `\emforce` and `\em@force`.)

`\em` These are the older definitions for `\em`, prior to 2020.
`\eminnershape`

We also have to define the *emphasize* font change command (i.e. `\em`). This command will look if the current font is sloped (i.e. has a positive `\fontdimen1`) and will then select either `\upshape` or `\itshape`.

```
427 <latexrelease>\IncludeInRelease{2015/01/01}{\DeclareEmphSequence}{Nested emph}%
428 <latexrelease>\let\DeclareEmphSequence\@undefined
429 <latexrelease>\let\emfontdeclare@clist\@undefined
430 <latexrelease>\let\emreset\@undefined
431 <latexrelease>\let\do@\emfont@update\@undefined
432 <latexrelease>\let\emforce\@undefined
433 <latexrelease>\let\em@force\@undefined
434 <latexrelease>
435 <latexrelease>\DeclareRobustCommand\em
436 <latexrelease>      \nomath\em \ifdim \fontdimen1ne\font >\z@
437 <latexrelease>                                \eminnershape \else \itshape \fi}%
438 <latexrelease>\EndIncludeInRelease
439 <latexrelease>
440 <latexrelease>\IncludeInRelease{0000/00/00}{\DeclareEmphSequence}{Nested emph}%
```

```

441 〈\latexrelease〉\DeclareRobustCommand\em
442 〈\latexrelease〉      { \@nomath\em \ifdim \fontdimen\@ne\font >\z@
443 〈\latexrelease〉                           \upshape \else \itshape \fi}%
444 〈\latexrelease〉\let\eminnershape\@undefined
445 〈\latexrelease〉\EndIncludeInRelease
446 {*2ekernel}

```

(End definition for `\em` and `\eminnershape`.)

`\not@math@alphabet` This function generates an error message when it is called in math mode. The same function should be defined in `newfont.sty`.

```

447 \def\not@math@alphabet#1#2{%
448   \relax
449   \ifmmode
450     \@latex@error{Command \noexpand#1 invalid in math mode}%
451     {%
452       Please
453       \ifx#2\relax
454         define a new math alphabet^{#1}%
455         if you want to use a special font in math mode%
456       \else

```

We have to a `\noexpand` below to prevent expansion of #2. In case of #1 we can omit this (due to the current definition of robust commands since they do come out right there :-).

```

457   use the math alphabet \noexpand#2 instead of
458   the #1 command%
459   \fi
460   .
461   }%
462 \fi}

```

(End definition for `\not@math@alphabet`.)

Finally we provide two abbreviations to switch to the L^AT_EX versions.

```

463 \DeclareRobustCommand\boldmath{\@nomath\boldmath
464   \mathversion{bold}}
465 \DeclareRobustCommand\unboldmath{\@nomath\unboldmath
466   \mathversion{normal}}

```

Here we switch to the default math version by defining the internal macro `\math@version`. We dare not to call `\mathversion` at this place because this would call `\glb@settings`.

```
467 \def\math@version{normal}
```

3.1 Legacy

We start by defining a few macros that are part of standard L^AT_EX's user interface. The use of these functions is not encouraged, but they will allow to process older documents without changes to the source.

```
\newfont
468 \def\newfont#1#2{\@ifdefinable#1{\font#1=#2\relax}{}}
```

(End definition for `\newfont`.)

```

\symbol

469  </2ekernel>
470  {*2ekernel | latexrelease}
471  <latexrelease>\IncludeInRelease{2020/10/01}%
472  <latexrelease>          {\symbol}{XeTeX change for math}%
473  \ifdefined\XeTeXversion
474    \DeclareRobustCommand\symbol[1]{\Ucharcat#1 12\relax}
475  \else
476    \DeclareRobustCommand\symbol[1]{\char#1\relax}
477  \fi
478  </2ekernel | latexrelease>

479  <latexrelease>\EndIncludeInRelease
480  <latexrelease>\IncludeInRelease{0000/00/00}%
481  <latexrelease>          {\symbol}{XeTeX change for math}%
482  <latexrelease>
483  <latexrelease>\DeclareRobustCommand\symbol[1]{\char#1\relax}
484  <latexrelease>
485  <latexrelease>\EndIncludeInRelease
486  {*2ekernel}>

```

(End definition for `\symbol`.)

3.2 Miscellaneous

- `\@setfontsize` This abbreviation is used by L^AT_EX's user level size changing commands, such as `\large`.
- `\@setsizesize`
- ```

487 \def\@setfontsize#1#2#3{\@nomath#1%

```
- For the benefit of people relying on keeping the name of the current font command saved in `\@currsize` we define it. To ensure that `\@setfontsize` keeps being robust we omit this assignment during times where `\protect` differs from `\@typeset@protect`.
- ```

488  \ifx\protect\@typeset@protect
489    \let\@currsize#1%
490  \fi
491  \fontsize{#2}{#3}\selectfont

```
- For compatibility we also define `\@setsizesize` the 209 command
- ```

492 {*compat}
493 \def\@setsizesize#1#2#3#4{\@setfontsize#1{#4}{#2}}
494 (/compat)

```
- (End definition for `\@setfontsize` and `\@setsizesize`.)
- `\hexnumber@` To set up L<sup>A</sup>T<sub>E</sub>X's special math character definitions we first provide a macro to generate hexadecimal numbers. It is a rather simple `\ifcase`.
- ```

495  \def\hexnumber@#1{\ifcase\number#1
496  0\or 1\or 2\or 3\or 4\or 5\or 6\or 7\or 8\or
497  9\or A\or B\or C\or D\or E\or F\fi}

```
- (End definition for `\hexnumber@`.)
- `\nfss@text` In its simplest form `\nfss@text` is an `\mbox`. This will produce unbreakable text outside math and inside math you will get text with the same fonts as outside. The only drawback is that such item won't change sizes in subscripts. But this behavior can be easily changed.

With the `amstex` style option one will get a sub style called `amstext` which will redefine the `\nfss@text` macro to produce correct text in all sizes.

We have to use `\def` instead of the shorter `\let` since `\mbox` is undefined when we reach this point.

```
498 \def\nfss@text#1{{\mbox{#1}}}
```

(End definition for `\nfss@text`.)

- `\copyright` The definition of `\copyright` was changed so that it works in other type styles, and to make it robust. We leave the family untouched so that the copyright notice will come out differently if a different font family is in use. This command is commented out, since it is now defined in `ltoutenc.dtx`.

```
499 %\DeclareRobustCommand\copyright
500 %    {{\ooalign{\hfil
501 %        \raise.07ex\hbox{\mdseries\upshape c}\hfil\crcr
502 %        \mathhexbox20D}}}
```

(End definition for `\copyright`.)

- `\normalfont` The macro `\reset@font` is used in L^AT_EX to switch to a standard font, in order to initialize the current font in situations where typesetting is done in a new visual context (e.g. in a footnote). We define it here to allow the test for the new L^AT_EX version above but nevertheless are able to run all kind of mixtures.

The user interface name for `\reset@font` is `\normalfont`:

```
503 </2ekernel>
504 <*2ekernel | latexrelease>
505 <latexrelease>\IncludeInRelease{2020/02/02}%
506 <latexrelease>          {\normalfont}{Add hook to \normalfont}%
507 \DeclareRobustCommand\normalfont{%
```

Instead of calling `\usefont`, as it was done in the past, we inline the code from `\usefont` as we want to add the hook before `\selectfont`, but after all the font attributes are set.

```
508 \fontencoding\encodingdefault
509 \edef\f@family{\familydefault}%
510 \edef\f@series{\seriesdefault}%
511 \edef\f@shape{\shapedefault}%
512 \UseHook{normalfont}%
```

This is the old name for the hook introduced in 2020/02/02. It will be removed in one of the future releases!

```
513 \@defaultfamilyhook           % hookname from 2020/02 will vanish
514 \selectfont
```

```
515 \let\reset@font\normalfont
```

(End definition for `\normalfont` and `\reset@font`.)

```
516 </2ekernel | latexrelease>
517 <latexrelease>\EndIncludeInRelease
518 <latexrelease>\IncludeInRelease{0000/00/00}%
519 <latexrelease>          {\normalfont}{Add hook to \normalfont}%
520 <latexrelease>
521 <latexrelease>\DeclareRobustCommand\normalfont
522 <latexrelease>          {\usefont\encodingdefault
523 <latexrelease>                  \familydefault
```

```

524 〈\latexrelease〉          \seriesdefault
525 〈\latexrelease〉          \shapedefault
526 〈\latexrelease〉          \relax}
527 〈\latexrelease〉\let\reset@font\normalfont
528 〈\latexrelease〉
529 〈\latexrelease〉\let\@defaultfamilyhook\@undefined
530 〈\latexrelease〉
531 〈\latexrelease〉\EndIncludeInRelease
532 {*2ekernel}

```

We left out the special L^AT_EX fonts which are not automatically included in the base version of the font selection since these fonts contain only a few characters which are also included in the AMS fonts so anybody who is using these fonts doesn't need them. But for compatibility reasons we will define these symbols.

```

533 \def\not@base#1{\@latex@error
534   {Command \noexpand#1 not provided in base LATEX2e}%
535   {Load the latexsym or the amsfonts package to
536     define this symbol}}
537 \def\mho{\not@base\mho}
538 \def\Join{\not@base\Join}
539 \def\Box{\not@base\Box}
540 \def\Diamond{\not@base\Diamond}
541 \def\leadsto{\not@base\leadsto}
542 \def\sqsubset{\not@base\sqsubset}
543 \def\sqsupset{\not@base\sqsupset}
544 \def\lhd{\not@base\lhd}
545 \def\unlhd{\not@base\unlhd}
546 \def\rhd{\not@base\rhd}
547 \def\unrhd{\not@base\unrhd}

```

We now initialize all variables set by \DeclareErrorFont. These values are not really important since they will be overwritten later on by the definition in `fontdef.ltx`.

However, if `fontdef.cfg` is corrupted then at least a hopefully suitable error font is present.

```

548 \DeclareErrorFont{OT1}{cmr}{m}{n}{10} %% don't modify this setting
549                                     %% overwrite it in fontdef.cfg
550                                     %% if necessary

```

We also set some default values for `\f@family` etc. Note that we don't yet have any encodings that comes later. In the past this was implicitly done by \DeclareErrorFont.

```

551 \fontfamily{cmr}
552 \fontseries{m}
553 \fontshape{n}
554 \fontsize{10}{10}

```

The initial `fontenc` package load list. This will get overwritten in `fonttext` and is only provided in case an old `fonttext.cfg` does not define the command:

```
555 \def\@fontenc@load@list{\@elt{T1,OT1}}
```

We now load the customizable parts of NFSS.

```

556 \InputIfFileExists{fonttext.cfg}
557   {\typeout{=====
558   ^J%}

```

```

559         Local config file fonttext.cfg used^^J%
560         ^^J%
561         =====}%
562         \def\@addtolist##1{\xdef\@filelist{\@filelist,##1}}%
563     }
564     {\input{fonttext.ltx}}
565 \let\@addtolist\@gobble

```

Ditto for math although I don't think that we will get a lot of customisation :-)

```

566 \InputIfFileExists{fontmath.cfg}
567   {\typeout{=====
568   ^^^J%
569   Local config file fontmath.cfg used^^J%
570   ^^^J%
571   =====}%
572   \def\@addtolist##1{\xdef\@filelist{\@filelist,##1}}%
573 }
574   {\input{fontmath.ltx}}
575 \let\@addtolist\@gobble

```

Then we preload several fonts. This file might be customized *without* changing the behavior of the format (i.e. necessary font definitions will be loaded at runtime if they are not preloaded). This is done in the file `preload.ltx`.

```

576 \InputIfFileExists{preload.cfg}
577   {\typeout{=====
578   ^^^J%
579   Local config file preload.cfg used^^J%
580   ^^^J%
581   =====}%
582   \def\@addtolist##1{\xdef\@filelist{\@filelist,##1}}%
583 }
584   {\input{preload.ltx}}
585 \let\@addtolist\@gobble

```

`\seriesdefault` After `\seriesdefault` got defined inside `fonttext.ltx` or a `.cfg` file overwriting it, we alter its value by appending `\empty` to it. This will vanish if expanded but allows us to check if the default gets altered (even to the same value) in the document preamble. All we have to do is to save the current value somewhere and later compare the two. For this we use `\seriesdefault@kernel`.

```

586 \expandafter\def\expandafter\seriesdefault\expandafter{\seriesdefault\empty}
587 \let\seriesdefault@kernel\seriesdefault

```

(End definition for `\seriesdefault` and `\seriesdefault@kernel`.)

`\@acci` We also save the values of some accents in `\@acci`, `\@accii` and `\@acciii` so they can
`\@accii` be restored by a `minipage` inside a `tabbing` environment.

```

588 \let\@acci\` \let\@accii\` \let\@acciii\

```

(End definition for `\@acci`, `\@accii`, and `\@acciii`.)

`\cal` Here were the two old *<alphabet identifiers>*.

(End definition for `\cal` and `\mit`.)

```

589 </2ekernel>

```

File x

fontdef.dtx

<-latexrelease> [2020/08/01 v3.0i LaTeX Kernel (<-latexrelease> font setup)]

1 Introduction

This file is used to generate the files `fonttext.ltx` (text font declarations) and `fontmath.ltx` (math font declarations), which are used during the format generation. It contains the declaration of the standard text encodings used at the site as well as a minimal subset of font shape groups that NFSS will look at to ensure that the specified encodings are valid.

The math part contains the setup for math encodings as well as the default math symbol declarations that belong to the encoding.

It is possible to change this setup (by using other fonts, or defaults) without losing the ability to process documents written at other sites. Portability in this sense means that a document will compile without errors. It does not mean, however, that identical output will be produced. For this it is necessary that the distributed setup is used at both installations.

2 Customization

You are not allowed to change this source file! If you want to change the default encodings and/or the font shape groups preloaded you should create a copy of `fonttext.ltx` under the name `fonttext.cfg` and change this copy. If L^AT_EX 2 _{ε} finds a file of this name it will use it, otherwise it uses the standard file which is `fontdef.ltx`.

If you don't plan to use Computer Modern much or at all, it might (!) be a good idea to make your own `fonttext.cfg`. Look at the comments below (docstrip module 'text') to see what should go into such a file.

To change the math font setup use a copy of `fontmath.ltx` under the name `fontmath.cfg` and change this copy. However, dealing with this interface is even more a job for an expert than changing the text font setup — in short, we don't encourage either.

Warning: please note that we don't support customised L^AT_EX versions. Thus, before sending in a bug report please try your test file with a L^AT_EX format which is not customised and send in the log from that version (unless the problem goes away).

Please note: the following standard encodings have to be defined in all local variants of `font....cfg` to guarantee that all L^AT_EX installations behave in the same way.

T1	Cork T _E X text encoding
OT1	old T _E X text encoding
U	unknown encoding
OML	old T _E X math letters encoding
OMS	old T _E X math symbols encoding
OMX	old T _E X math extension symbols encoding
TU	Unicode

Notice that some of these encodings are ‘old’ in the sense that we hope that they will be superseded soon by encoding standards defined by the \TeX user community. Therefore this set of default encodings may change in the future.

The first candidate is OT1 which will soon be replaced by T1, the official \TeX text encoding.

Warning: If you add additional encodings to this file there is no guarantee any longer that files processable at your installation will also be processable at other installations. Thus, if you make use of such an encoding in your document, e.g. if you intend to typeset in Cyrillic (OT2 encoding), you need to specify this encoding in the preamble of your document prior to sending it to another installation. Once the encoding is specified in that place in your document, the document is processable at all \LaTeX installations (provided they have suitable fonts installed).

For this reason we suggest that you define a short package file that sets up an additional encoding used at your site (rather than putting the encoding into this file) since this package can easily be shipped with your document.

3 The `docstrip` modules

The following modules are used to direct `docstrip` in generating external files:

driver	produce a documentation driver file
text	produce the file <code>fonttext.ltx</code>
math	produce the file <code>fontmath.ltx</code>
cfgtext	produce a dummy <code>fonttext.cfg</code> file
cfgmath	produce a dummy <code>fontmath.cfg</code> file

A typical `docstrip` command file would then have entries like:

```
generateFile{fonttext.ltx}{t}{\from{fontdef.dtx}{text}}
```

4 A driver for this document

The next bit of code contains the documentation driver file for \TeX , i.e. the file that will produce the documentation you are currently reading. It will be extracted from this file by the `DOCSTRIP` program.

```
1 <*driver>
2 \documentclass{ltxdoc}
3 \GetFileInfo{fontdef.dtx}
4 \begin{document}
5   \DocInput{fontdef.dtx}
6 \end{document}
7 
```

5 The `fonttext.ltx` file

The identification is done earlier on with a `\ProvidesFile` declaration.

```
8 <*text>
9 \typeout{== Don't modify this file, use a .cfg file instead ==^J}
```

5.1 Encodings

This file declares the standard encodings for text and math fonts. All others should be declared in packages or in the documents directly.

For every text encoding there are normally a number of encoding specific commands, e.g. accents, special characters, etc. (The definition for such a command might have to change when the encoding is changed, because the character is in a different position, or not available at all, or the accent is produced in a different way.) This is handled by a general mechanism which is described in `loutenc.dtx`.

By convention, text encoding specific declarations, including the declaration `\DeclareFontEncoding` are kept in separate file of the form `(enc)enc.def`, e.g. `ot1enc.def`. This allows other applications to make use of the declarations as well.

Similar to the default encoding, the loading of the encoding files for the two major text encodings shouldn't be changed. In particular, the `inputenc` package depends on this.

```
10 \input {omlenc.def}
11 \input {omsenc.def}
```

Documents containing a lot of accented characters should really be using T1 fonts. We therefore load this last so that T1 encoding specific commands are executed as fast as possible (encoding files are no longer reloaded in `fontenc`).

```
12 \input {ot1enc.def}
13 \input {t1enc.def}
14 \input{ts1enc.def}
15 \ifx\Umathcode\@undefined
```

We then set the default text font encoding. This will hopefully change some day to T1. This setting should *not* be changed to produce a portable format.

```
16 \fontencoding{OT1}
```

The initial `fontenc` package load list if an 8-bit TeX engine is used:

```
17 \def\@fontenc@load@list{\@elt{T1,OT1}}
18 \def\rmsubstdefault{cmr}
19 \def\sfsubstdefault{cmss}
20 \def\ttsubstdefault{cmtt}
21 \LoadFontDefinitionFile{TS1}{cmr}
22 \else
```

Unicode.

```
23 \input {tuenc.def}
24 \fontencoding{TU}
```

The initial `fontenc` package load list if a Unicode engine is used:

```
25 \def\@fontenc@load@list{\@elt{TU}}
26 \DeclareFontSubstitution{TU}{lmr}{m}{n}
27 \LoadFontDefinitionFile{TU}{lmr}
28 \LoadFontDefinitionFile{TU}{lmss}
29 \LoadFontDefinitionFile{TU}{lmtt}
30 \def\rmsubstdefault{lmr}
31 \def\sfsubstdefault{lmss}
32 \def\ttsubstdefault{lmtt}
33 \LoadFontDefinitionFile{TS1}{lmr}
```

```
34 \DeclareFontSubstitution{TU}{lmr}{m}{n}
```

End of Unicode branch.

```
35 \fi
```

If different encodings for text fonts are in use one could put the common setup into `\DeclareFontEncodingDefaults`. There is now a better mechanism so using this interface is discouraged!

```
36 \DeclareFontEncodingDefaults{}{}
```

Then we define the default substitution for every encoding. This release of L^AT_EX 2 _{ε} assumes that the ec fonts are available. It is possible to change this to point to some other font family (e.g., Times with the appropriate encoding if it is available) without making documents non-portable. However, in such a case documents will produce different page breaks at other sites. The substitution defaults can all be changed without losing portability as long as there are font shape definitions for the selected substitutions.

```
37 \DeclareFontSubstitution{T1}{cmr}{m}{n}
```

```
38 \DeclareFontSubstitution{OT1}{cmr}{m}{n}
```

For every encoding declaration, L^AT_EX 2 _{ε} will try to verify that the given substitution information makes sense, i.e. that it is impossible to go into an endless loop if font substitution happens. This is done at the moment the `\begin{document}` is encountered. L^AT_EX 2 _{ε} will then check that for every encoding the substitution defaults form a valid font shape group, which means that it will check if there is a `\DeclareFontShape` declaration for this combination. We will therefore load the corresponding .fd files now. If we don't do this they would be loaded at verification time (i.e. at `\begin{document}`) which would delay processing unnecessarily.

Warning: Please note that this means that you have to regenerate the format whenever you change any of these .fd files since L^AT_EX 2 _{ε} will not read .fd files if it already knows about the encoding/family combination.

The `\nfss@catcodes` ensures that white space is ignored in any definitions made in the fd files.

```
39 \begingroup
40 \nfss@catcodes
41 \input {t1cmr.fd}
42 \input {ot1cmr.fd}
43 \endgroup
```

We also load some other font definition files which are normally needed in a document. This is only done for processing speed and you can comment the next two lines out to save some memory. If necessary these files are then loaded when your document is processed. (Loading .fd files is a less drastic step compared to preloading fonts because the number of fonts is limited 255 at (nearly) every T_EX installation, while the amount of main memory is not a limiting factor at most installations.)

```
44 \begingroup
45 \nfss@catcodes
46 \input {ot1cmss.fd}
47 \input {ot1cmtt.fd}
48 \endgroup
```

Even with all the precautions it is still possible that NFSS will run into problems, for example, when a `.fd` file contains corrupted data. To guard against such cases NFSS has a very low-level fallback font that is installed with the following line.

```
49 \DeclareErrorFont{OT1}{cmr}{m}{n}{10}
```

This means, “if everything else fails use Computer Modern Roman normal shape at 10pt in the old text encoding”. You can change the font used but the encoding should be the same as the one specified with `\fontencoding` above.

5.2 Defaults

To allow the use of `\rmfamily`, `\sffamily`, etc. in documents even if non-standard families are used we provide nine macros which hold the name of the corresponding families, series, and so on. This makes it easy to use other font families (like Times Roman, etc.). One simply has to redefine these defaults.

All these hooks have to be defined in this file but you can change their meaning (except for `\encodingdefault`) without making documents non-portable.

<code>\encodingdefault</code>	The following three definitions set up the meaning for <code>\rmfamily</code> , <code>\sffamily</code> , and <code>\ttfamily</code> .
<code>\rmdefault</code>	<code>\ifx\Umathcode\@undefined</code>
<code>\sfdefault</code>	<code>\newcommand\encodingdefault{OT1}</code>
<code>\ttdefault</code>	<code>\newcommand\rmdefault{cmr}</code>
	<code>\newcommand\sffamily{cmss}</code>
	<code>\newcommand\ttdefault{cmtt}</code>
	<code>\else</code>
	<code>\newcommand\encodingdefault{TU}</code>
	<code>\newcommand\rmdefault{lmr}</code>
	<code>\fontfamily{\rmdefault}</code>
	<code>\newcommand\sffamily{lmss}</code>
	<code>\newcommand\ttdefault{lmtt}</code>
	<code>\fi</code>
	<code></text></code>
	<code>\langle latexrelease \rangle \IncludeInRelease{2017/01/01} %</code>
	<code>\langle latexrelease \rangle \encodingdefault{TU encoding default} %</code>
	<code>\langle latexrelease \rangle \ifx\Umathcode\@undefined</code>
	<code>\langle latexrelease \rangle \renewcommand\encodingdefault{OT1}</code>
	<code>\langle latexrelease \rangle \fontencoding{\encodingdefault}</code>
	<code>\langle latexrelease \rangle \renewcommand\rmdefault{cmr}</code>
	<code>\langle latexrelease \rangle \fontfamily{\rmdefault}</code>
	<code>\langle latexrelease \rangle \renewcommand\sffamily{cmss}</code>
	<code>\langle latexrelease \rangle \renewcommand\ttdefault{cmtt}</code>
	<code>\langle latexrelease \rangle \else</code>
	<code>\langle latexrelease \rangle \renewcommand\encodingdefault{TU}</code>
	<code>\langle latexrelease \rangle %done in every job \fontencoding{\encodingdefault}</code>
	<code>\langle latexrelease \rangle \renewcommand\rmdefault{lmr}</code>
	<code>\langle latexrelease \rangle \fontfamily{\rmdefault}</code>
	<code>\langle latexrelease \rangle \renewcommand\sffamily{lmss}</code>
	<code>\langle latexrelease \rangle \renewcommand\ttdefault{lmtt}</code>
	<code>\langle latexrelease \rangle \fi</code>
	<code>\langle latexrelease \rangle \EndIncludeInRelease</code>
	<code>\langle latexrelease \rangle \IncludeInRelease{0000/00/00} %</code>
	<code>\langle latexrelease \rangle \encodingdefault{TU encoding default} %</code>

```

83  \let\fontencoding{\OT1}
84  \let\renewcommand\encodingdefault{\OT1}
85  \let\fontencoding{\encodingdefault}
86  \let\renewcommand\rmdefault{cmr}
87  \let\fontfamily{\rmdefault}
88  \let\renewcommand\sffamily{\cmss}
89  \let\renewcommand\ttdefault{\cmtt}
90  \EndIncludeInRelease
91  {*text}

```

(End definition for `\encodingdefault` and others.)

`\bfdefault` Series changing commands are influenced by the following hooks.
`\mddefault` 92 `\newcommand\bfdefault{b}` % overwritten below (for rollback)
93 `\newcommand\mddefault{m}` % overwritten below (for rollback)

(End definition for `\bfdefault` and `\mddefault`.)

`\itdefault` Shape changing commands use the following hooks.

`\sldefault` 94 `\newcommand\itdefault{it}`
`\scdefault` 95 `\newcommand\sldefault{sl}`
`\updefault` 96 `\newcommand\scdefault{sc}`
97 `\newcommand\updefault{up}` % overwritten below (for rollback)

(End definition for `\itdefault` and others.)

```

98  {/text}
99  {*text | latexrelease}
100 \let\IncludeInRelease{2020/02/02}%
101 \let\updefault{\updefault}{font defaults change}%
102 % \begin{macrocode}
103 \renewcommand\updefault{up}

```

We append `\@empty` to the series value so that we can detect if it got changed via `\def` or `\renewcommand` later.

```

104 \renewcommand\bfdefault{b\@empty}
105 \renewcommand\mddefault{m\@empty}
106 \let\bfdefault@previous\bfdefault
107 \let\mddefault@previous\mddefault
108 {/text | latexrelease}
109 \let\EndIncludeInRelease
110 \let\IncludeInRelease{0000/00/00}%
111 \let\updefault{\updefault}{font defaults change}%
112 \let\renewcommand\updefault{n}
113 \let\renewcommand\bfdefault{bx}
114 \let\renewcommand\mddefault{undefined}
115 \let\renewcommand\EndIncludeInRelease
116 \let\bfdefault@previous\undefined
117 \let\mddefault@previous\undefined
118 \let\EndIncludeInRelease
119 {*text}

```

\familydefault Finally we have the hooks that describe the behaviour of the `\normalfont` command.
\seriesdefault To stay portable, the definition of `\encodingdefault` should *not* be changed and should
\shapedefault match the setting above for `\fontencoding`. All other values can be set according to
your taste.

```
120 \newcommand\familydefault{\rmdefault}
121 \newcommand\seriesdefault{\mddefault}
```

In previous releases `\shapedefault` pointed to `\updefault` which resolved to `n`, but
these days that is no longer the case (and up is wrong when you want to do a reset. So
we now use `n` explicitly.

```
122 \newcommand\shapedefault{n}
```

(End definition for `\familydefault`, `\seriesdefault`, and `\shapedefault`.)

This finishes the low-level setup in `fonttext.ltx`.

```
123 </text>
```

6 The fontmath.ltx file

The identification is done earlier on with a `\ProvidesFile` declaration.

```
124 {*math}
125 \typeout{== Don't modify this file, use a .cfg file instead ==^J}
```

6.1 The font encodings used

```
126 \DeclareFontEncoding{OML}{}{}
127 \DeclareFontEncoding{OMS}{}{}
128 \DeclareFontEncoding{OMX}{}{}
```

Finally a declaration for U encoding which serves for all fonts that do not fit standard
encodings. For math this sets up `\noaccents@` providing for AMS-L^AT_EX. This macro
is used therein to handle accented characters if they are not supported by the font. In
other words, if fonts with U encoding are used in math, all accents (like from `\breve{e}`) are
obtained from some other font that has them.

```
129 \DeclareFontEncoding{U}{}{\noaccents@}
```

The encodings for math are next:

```
130 \DeclareFontSubstitution{OML}{cmm}{m}{it}
131 \DeclareFontSubstitution{OMS}{cmsy}{m}{n}
132 \DeclareFontSubstitution{OMX}{cmex}{m}{n}
133 \DeclareFontSubstitution{U}{cmr}{m}{n}

134 \begingroup
135 \nfss@catcodes
136 \input {omlcmm.fd}
137 \input {oms cmsy.fd}
138 \input {omx cmex.fd}
139 \input {ucmr.fd}
140 \endgroup
```

6.1.1 Symbolfont and Alphabet declarations

We now define the basic symbol fonts used by L^AT_EX. These four symbol fonts must be
defined by this file.

It is possible to make the symbol fonts point to other external fonts without losing
the ability to process documents written at other sites, as long as one defines the same

symbol font names with the same encodings, e.g. `operators` with OT1 etc. If other encodings are used documents become non-portable. Such a change should therefore be done in a package file.

```

141 \DeclareSymbolFont{operators}    {OT1}{cmr} {m}{n}
142 \DeclareSymbolFont{letters}      {OML}{cmm} {m}{it}
143 \DeclareSymbolFont{symbols}      {OMS}{cmsy}{m}{n}
144 \DeclareSymbolFont{largesymbols}{OMX}{cmex}{m}{n}

145 \SetSymbolFont{operators}{bold}{OT1}{cmr}{bx}{n}
146 \SetSymbolFont{letters}   {bold}{OML}{cmm}{b}{it}
147 \SetSymbolFont{symbols}   {bold}{OMS}{cmsy}{b}{n}

```

Below are the seven math alphabets which are defined by NFSS. Again they must be defined by this file. However, as before you can change the fonts used without losing portability, but you should be careful when changing the encoding since that may make documents come out wrong.

```

148 \DeclareSymbolFontAlphabet{\mathrm}{operators}
149 \DeclareSymbolFontAlphabet{\mathrmnormal}{letters}
150 \DeclareSymbolFontAlphabet{\mathcal}{symbols}
151 \DeclareMathAlphabet{\mathbf}{OT1}{cmr}{bx}{n}
152 \DeclareMathAlphabet{\mathsf}{OT1}{cmss}{m}{n}
153 \DeclareMathAlphabet{\mathit}{OT1}{cmr}{m}{it}
154 \DeclareMathAlphabet{\mathtt}{OT1}{cmtt}{m}{n}

```

Given the currently available fonts we cannot bold-en `\mathbf` and `\mathtt` but in principle one could use ‘ultra bold’ or something. The alphabets defined via `\DeclareSymbolFontAlphabet` will change automatically in a new math version if the corresponding symbol font changes.

```

155 \SetMathAlphabet{\mathsf}{bold}{OT1}{cmss}{bx}{n}
156 \SetMathAlphabet{\mathit}{bold}{OT1}{cmr}{bx}{it}

```

6.2 Math font sizes

The declarations below declare the text, script and scriptscript size to be used for each text font size.

All occurrences of sizes longer than a single character are replaced with the macro name that holds them, saving a number of tokens (but losing a bit of speed, so this may not stay this way).

```

157 \DeclareMathSizes{5}{5}{5}{5}
158 \DeclareMathSizes{6}{6}{5}{5}
159 \DeclareMathSizes{7}{7}{5}{5}
160 \DeclareMathSizes{8}{8}{6}{5}
161 \DeclareMathSizes{9}{9}{6}{5}
162 \DeclareMathSizes{\@xpt}{\@xpt}{7}{5}
163 \DeclareMathSizes{\@xipt}{\@xipt}{8}{6}
164 \DeclareMathSizes{\@xiipt}{\@xiipt}{8}{6}
165 \DeclareMathSizes{\@xivpt}{\@xivpt}{\@xpt}{7}
166 \DeclareMathSizes{\@xviipt}{\@xviipt}{\@xiipt}{\@xpt}
167 \DeclareMathSizes{\@xxpt}{\@xxpt}{\@xivpt}{\@xiipt}
168 \DeclareMathSizes{\@xxvpt}{\@xxvpt}{\@xxpt}{\@xviipt}

```

6.3 The math symbol assignments

We start by setting up math codes for most of the characters typed in directly from the keyboard. Most of them are normally already setup up in the same way by IniT_EX. However, we repeat them here to have a complete setup which can be exchanged with another if desired.

6.3.1 The letters

```
169 \DeclareMathSymbol{a}{\mathalpha}{letters}{`a}
170 \DeclareMathSymbol{b}{\mathalpha}{letters}{`b}
171 \DeclareMathSymbol{c}{\mathalpha}{letters}{`c}
172 \DeclareMathSymbol{d}{\mathalpha}{letters}{`d}
173 \DeclareMathSymbol{e}{\mathalpha}{letters}{`e}
174 \DeclareMathSymbol{f}{\mathalpha}{letters}{`f}
175 \DeclareMathSymbol{g}{\mathalpha}{letters}{`g}
176 \DeclareMathSymbol{h}{\mathalpha}{letters}{`h}
177 \DeclareMathSymbol{i}{\mathalpha}{letters}{`i}
178 \DeclareMathSymbol{j}{\mathalpha}{letters}{`j}
179 \DeclareMathSymbol{k}{\mathalpha}{letters}{`k}
180 \DeclareMathSymbol{l}{\mathalpha}{letters}{`l}
181 \DeclareMathSymbol{m}{\mathalpha}{letters}{`m}
182 \DeclareMathSymbol{n}{\mathalpha}{letters}{`n}
183 \DeclareMathSymbol{o}{\mathalpha}{letters}{`o}
184 \DeclareMathSymbol{p}{\mathalpha}{letters}{`p}
185 \DeclareMathSymbol{q}{\mathalpha}{letters}{`q}
186 \DeclareMathSymbol{r}{\mathalpha}{letters}{`r}
187 \DeclareMathSymbol{s}{\mathalpha}{letters}{`s}
188 \DeclareMathSymbol{t}{\mathalpha}{letters}{`t}
189 \DeclareMathSymbol{u}{\mathalpha}{letters}{`u}
190 \DeclareMathSymbol{v}{\mathalpha}{letters}{`v}
191 \DeclareMathSymbol{w}{\mathalpha}{letters}{`w}
192 \DeclareMathSymbol{x}{\mathalpha}{letters}{`x}
193 \DeclareMathSymbol{y}{\mathalpha}{letters}{`y}
194 \DeclareMathSymbol{z}{\mathalpha}{letters}{`z}

195 \DeclareMathSymbol{A}{\mathalpha}{letters}{`A}
196 \DeclareMathSymbol{B}{\mathalpha}{letters}{`B}
197 \DeclareMathSymbol{C}{\mathalpha}{letters}{`C}
198 \DeclareMathSymbol{D}{\mathalpha}{letters}{`D}
199 \DeclareMathSymbol{E}{\mathalpha}{letters}{`E}
200 \DeclareMathSymbol{F}{\mathalpha}{letters}{`F}
201 \DeclareMathSymbol{G}{\mathalpha}{letters}{`G}
202 \DeclareMathSymbol{H}{\mathalpha}{letters}{`H}
203 \DeclareMathSymbol{I}{\mathalpha}{letters}{`I}
204 \DeclareMathSymbol{J}{\mathalpha}{letters}{`J}
205 \DeclareMathSymbol{K}{\mathalpha}{letters}{`K}
206 \DeclareMathSymbol{L}{\mathalpha}{letters}{`L}
207 \DeclareMathSymbol{M}{\mathalpha}{letters}{`M}
208 \DeclareMathSymbol{N}{\mathalpha}{letters}{`N}
209 \DeclareMathSymbol{O}{\mathalpha}{letters}{`O}
210 \DeclareMathSymbol{P}{\mathalpha}{letters}{`P}
211 \DeclareMathSymbol{Q}{\mathalpha}{letters}{`Q}
212 \DeclareMathSymbol{R}{\mathalpha}{letters}{`R}
213 \DeclareMathSymbol{S}{\mathalpha}{letters}{`S}
```

```

214 \DeclareMathSymbol{T}{\mathalpha}{letters}{`T}
215 \DeclareMathSymbol{U}{\mathalpha}{letters}{`U}
216 \DeclareMathSymbol{V}{\mathalpha}{letters}{`V}
217 \DeclareMathSymbol{W}{\mathalpha}{letters}{`W}
218 \DeclareMathSymbol{X}{\mathalpha}{letters}{`X}
219 \DeclareMathSymbol{Y}{\mathalpha}{letters}{`Y}
220 \DeclareMathSymbol{Z}{\mathalpha}{letters}{`Z}

```

6.3.2 The digits

```

221 \DeclareMathSymbol{0}{\mathalpha}{operators}{`0}
222 \DeclareMathSymbol{1}{\mathalpha}{operators}{`1}
223 \DeclareMathSymbol{2}{\mathalpha}{operators}{`2}
224 \DeclareMathSymbol{3}{\mathalpha}{operators}{`3}
225 \DeclareMathSymbol{4}{\mathalpha}{operators}{`4}
226 \DeclareMathSymbol{5}{\mathalpha}{operators}{`5}
227 \DeclareMathSymbol{6}{\mathalpha}{operators}{`6}
228 \DeclareMathSymbol{7}{\mathalpha}{operators}{`7}
229 \DeclareMathSymbol{8}{\mathalpha}{operators}{`8}
230 \DeclareMathSymbol{9}{\mathalpha}{operators}{`9}

```

6.3.3 Punctuation, brace, etc. keys

```

231 \DeclareMathSymbol{!}{\mathclose}{operators}{`21}
232 \DeclareMathSymbol{*}{\mathbin}{symbols}{`03} % \ast
233 \DeclareMathSymbol{+}{\mathbin}{operators}{`2B}
234 \DeclareMathSymbol{,}{\mathpunct}{letters}{`3B}
235 \DeclareMathSymbol{-}{\mathbin}{symbols}{`00}
236 \DeclareMathSymbol{.}{\mathord}{letters}{`3A}
237 \DeclareMathSymbol{:}{\mathrel}{operators}{`3A}
238 \DeclareMathSymbol{;}{\mathpunct}{operators}{`3B}
239 \DeclareMathSymbol{=}{\mathrel}{operators}{`3D}
240 \DeclareMathSymbol{?}{\mathclose}{operators}{`3F}

```

The following symbols are defined as delimiters below which automatically defines them as math symbols.

```

241 \% \DeclareMathSymbol{()}{\mathopen}{operators}{`28}
242 \% \DeclareMathSymbol{)}{\mathclose}{operators}{`29}
243 \% \DeclareMathSymbol{/}{\mathord}{letters}{`3D}
244 \% \DeclareMathSymbol{[]}{\mathopen}{operators}{`5B}
245 \% \DeclareMathSymbol{}]{\mathclose}{operators}{`5D}
246 \% \DeclareMathSymbol{|}{\mathord}{symbols}{`6A}
247 \% \DeclareMathSymbol{<}{\mathrel}{letters}{`3C}
248 \% \DeclareMathSymbol{>}{\mathrel}{letters}{`3E}

```

Should all of the following being activated by default? Probably not.

```

249 \% \DeclareMathSymbol{'{}{\mathopen}{symbols}{`66}
250 \% \DeclareMathSymbol{'{}{\mathclose}{symbols}{`67}
251 \% \DeclareMathSymbol{'\\}{\mathord}{symbols}{`6E} % \backslash
252 \mathcode`\"=8000 % \space
253 \mathcode`'=8000 % ^\prime
254 \mathcode`\_="8000 % \

```

6.3.4 Delimitercodes for characters

[to be completed]

Finally, $\text{\rm Init}\text{\rm EX}$ sets all \rm \delcode values to -1, except $\text{\rm \delcode' .}=0$

```

255 \DeclareMathDelimiter{()}{\mathopen}{operators}{28}{largesymbols}{00}
256 \DeclareMathDelimiter{}{\mathclose}{operators}{29}{largesymbols}{01}
257 \DeclareMathDelimiter{[]}{\mathopen}{operators}{5B}{largesymbols}{02}
258 \DeclareMathDelimiter{}{\mathclose}{operators}{5D}{largesymbols}{03}

```

The next two are considered to be relations when not used in the context of a delimiter! And worse, they do even represent different glyphs when being used as delimiter and not as delimiter. This is a user level syntax inherited from plain TeX. Therefore we explicitly redefine the math symbol definitions for these symbols afterwards.

```

259 \DeclareMathDelimiter{<}{\mathopen}{symbols}{68}{largesymbols}{0A}
260 \DeclareMathDelimiter{>}{\mathclose}{symbols}{69}{largesymbols}{0B}
261 \DeclareMathSymbol{<}{\mathrel}{letters}{3C}
262 \DeclareMathSymbol{>}{\mathrel}{letters}{3E}

```

And here is another case where the non-delimiter version produces a glyph different from the delimiter version.

```

263 \DeclareMathDelimiter{/}{\mathord}{operators}{2F}{largesymbols}{0E}
264 \DeclareMathSymbol{/}{\mathord}{letters}{3D}
265 \DeclareMathDelimiter{|}{\mathord}{symbols}{6A}{largesymbols}{0C}
266 \expandafter\DeclareMathDelimiter@\backslashchar
267 \mathord{symbols}{6E}{largesymbols}{0F}

```

N.B. { and } should NOT get delcodes; otherwise parameter grouping fails!

6.4 Symbols accessed via control sequences

6.4.1 Greek letters

```

268 \DeclareMathSymbol{\alpha}{\mathord}{letters}{0B}
269 \DeclareMathSymbol{\beta}{\mathord}{letters}{0C}
270 \DeclareMathSymbol{\gamma}{\mathord}{letters}{0D}
271 \DeclareMathSymbol{\delta}{\mathord}{letters}{0E}
272 \DeclareMathSymbol{\epsilon}{\mathord}{letters}{0F}
273 \DeclareMathSymbol{\zeta}{\mathord}{letters}{10}
274 \DeclareMathSymbol{\eta}{\mathord}{letters}{11}
275 \DeclareMathSymbol{\theta}{\mathord}{letters}{12}
276 \DeclareMathSymbol{\iota}{\mathord}{letters}{13}
277 \DeclareMathSymbol{\kappa}{\mathord}{letters}{14}
278 \DeclareMathSymbol{\lambda}{\mathord}{letters}{15}
279 \DeclareMathSymbol{\mu}{\mathord}{letters}{16}
280 \DeclareMathSymbol{\nu}{\mathord}{letters}{17}
281 \DeclareMathSymbol{\xi}{\mathord}{letters}{18}
282 \DeclareMathSymbol{\pi}{\mathord}{letters}{19}
283 \DeclareMathSymbol{\rho}{\mathord}{letters}{1A}
284 \DeclareMathSymbol{\sigma}{\mathord}{letters}{1B}
285 \DeclareMathSymbol{\tau}{\mathord}{letters}{1C}
286 \DeclareMathSymbol{\upsilon}{\mathord}{letters}{1D}
287 \DeclareMathSymbol{\phi}{\mathord}{letters}{1E}
288 \DeclareMathSymbol{\chi}{\mathord}{letters}{1F}
289 \DeclareMathSymbol{\psi}{\mathord}{letters}{20}
290 \DeclareMathSymbol{\omega}{\mathord}{letters}{21}
291 \DeclareMathSymbol{\varepsilon}{\mathord}{letters}{22}
292 \DeclareMathSymbol{\vartheta}{\mathord}{letters}{23}
293 \DeclareMathSymbol{\varpi}{\mathord}{letters}{24}

```

```

294 \DeclareMathSymbol{\varrho}{\mathord}{letters}{"25}
295 \DeclareMathSymbol{\varsigma}{\mathord}{letters}{"26}
296 \DeclareMathSymbol{\varphi}{\mathord}{letters}{"27}
297 \DeclareMathSymbol{\Gamma}{\mathalpha}{operators}{"00}
298 \DeclareMathSymbol{\Delta}{\mathalpha}{operators}{"01}
299 \DeclareMathSymbol{\Theta}{\mathalpha}{operators}{"02}
300 \DeclareMathSymbol{\Lambda}{\mathalpha}{operators}{"03}
301 \DeclareMathSymbol{\Xi}{\mathalpha}{operators}{"04}
302 \DeclareMathSymbol{\Pi}{\mathalpha}{operators}{"05}
303 \DeclareMathSymbol{\Sigma}{\mathalpha}{operators}{"06}
304 \DeclareMathSymbol{\Upsilon}{\mathalpha}{operators}{"07}
305 \DeclareMathSymbol{\Phi}{\mathalpha}{operators}{"08}
306 \DeclareMathSymbol{\Psi}{\mathalpha}{operators}{"09}
307 \DeclareMathSymbol{\Omega}{\mathalpha}{operators}{"0A}

```

6.4.2 Ordinary symbols

```

308 \DeclareMathSymbol{\aleph}{\mathord}{symbols}{"40}
309 \DeclareMathSymbol{\imath}{\mathord}{letters}{"7B}
310 \DeclareMathSymbol{\jmath}{\mathord}{letters}{"7C}
311 \DeclareMathSymbol{\ell}{\mathord}{letters}{"60}
312 \DeclareMathSymbol{\wp}{\mathord}{letters}{"7D}
313 \DeclareMathSymbol{\Re}{\mathord}{symbols}{"3C}
314 \DeclareMathSymbol{\Im}{\mathord}{symbols}{"3D}
315 \DeclareMathSymbol{\partial}{\mathord}{letters}{"40}
316 \DeclareMathSymbol{\infty}{\mathord}{symbols}{"31}
317 \DeclareMathSymbol{\prime}{\mathord}{symbols}{"30}
318 \DeclareMathSymbol{\emptyset}{\mathord}{symbols}{"3B}
319 \DeclareMathSymbol{\nabla}{\mathord}{symbols}{"72}
320 \DeclareMathSymbol{\top}{\mathord}{symbols}{"3E}
321 \DeclareMathSymbol{\bot}{\mathord}{symbols}{"3F}
322 \DeclareMathSymbol{\triangle}{\mathord}{symbols}{"34}
323 \DeclareMathSymbol{\forall}{\mathord}{symbols}{"38}
324 \DeclareMathSymbol{\exists}{\mathord}{symbols}{"39}
325 \DeclareMathSymbol{\neg}{\mathord}{symbols}{"3A}

```

Alias:

```

326 %     \let\lnot=\neg
327 \DeclareMathSymbol{\lnot}{\mathord}{symbols}{"3A}
328 \DeclareMathSymbol{\flat}{\mathord}{letters}{"5B}
329 \DeclareMathSymbol{\natural}{\mathord}{letters}{"5C}
330 \DeclareMathSymbol{\sharp}{\mathord}{letters}{"5D}
331 \DeclareMathSymbol{\clubsuit}{\mathord}{symbols}{"7C}
332 \DeclareMathSymbol{\diamondsuit}{\mathord}{symbols}{"7D}
333 \DeclareMathSymbol{\heartsuit}{\mathord}{symbols}{"7E}
334 \DeclareMathSymbol{\spadesuit}{\mathord}{symbols}{"7F}

335 \ DeclareRobustCommand{\hbar}{{\mathchar'26\mkern-9mu h}}
336 \ DeclareRobustCommand{\surd}{{\mathchar"1270}}
337 \ DeclareRobustCommand{\angle}{{\vbox{\ialign{$\m@th\scriptstyle##$\crcr
338     \not\mathrel{\mkern14mu}\crcr
339     \noalign{\nointerlineskip}
340     \mkern2.5mu\leaders\hrule\height.34pt\hfill\mkern2.5mu\crcr}}}}

```

6.4.3 Large Operators

```

341 \DeclareMathSymbol{\coprod}{\mathop}{largesymbols}{"60}

```

```

342 \DeclareMathSymbol{\bigvee}{\mathop}{largesymbols}{57}
343 \DeclareMathSymbol{\bigwedge}{\mathop}{largesymbols}{56}
344 \DeclareMathSymbol{\biguplus}{\mathop}{largesymbols}{55}
345 \DeclareMathSymbol{\bigcap}{\mathop}{largesymbols}{54}
346 \DeclareMathSymbol{\bigcup}{\mathop}{largesymbols}{53}
347 \DeclareMathSymbol{\intop}{\mathop}{largesymbols}{52}
348     \DeclareRobustCommand\int{\intop\nolimits}
349 \DeclareMathSymbol{\prod}{\mathop}{largesymbols}{51}
350 \DeclareMathSymbol{\sum}{\mathop}{largesymbols}{50}
351 \DeclareMathSymbol{\bigotimes}{\mathop}{largesymbols}{4E}
352 \DeclareMathSymbol{\bigoplus}{\mathop}{largesymbols}{4C}
353 \DeclareMathSymbol{\bigodot}{\mathop}{largesymbols}{4A}
354 \DeclareMathSymbol{\ointop}{\mathop}{largesymbols}{48}
355     \DeclareRobustCommand\oint{\ointop\nolimits}
356 \DeclareMathSymbol{\bigsqcup}{\mathop}{largesymbols}{46}
357 \DeclareMathSymbol{\smallint}{\mathop}{symbols}{73}

```

6.4.4 Binary symbols

```

358 \DeclareMathSymbol{\triangleleft}{\mathbin}{letters}{2F}
359 \DeclareMathSymbol{\triangleright}{\mathbin}{letters}{2E}
360 \DeclareMathSymbol{\bigtriangleup}{\mathbin}{symbols}{34}
361 \DeclareMathSymbol{\bigtriangledown}{\mathbin}{symbols}{35}

```

Alias:

```

362 %   \let \varbigtriangledown \bigtriangledown
363 %   \let \varbigtriangleup \bigtriangleup
364 \DeclareMathSymbol{\varbigtriangleup}{\mathbin}{symbols}{34}
365 \DeclareMathSymbol{\varbigtriangledown}{\mathbin}{symbols}{35}

```

These last two synonyms are needed because the `stmaryrd` package redefines them as Operators.

```

366 \DeclareMathSymbol{\wedge}{\mathbin}{symbols}{5E}
367 \DeclareMathSymbol{\vee}{\mathbin}{symbols}{5F}

```

Alias:

```

368 %   \let\land=\wedge
369 %   \let\lor=\vee
370 \DeclareMathSymbol{\land}{\mathbin}{symbols}{5E}
371 \DeclareMathSymbol{\lor}{\mathbin}{symbols}{5F}
372 \DeclareMathSymbol{\cap}{\mathbin}{symbols}{5C}
373 \DeclareMathSymbol{\cup}{\mathbin}{symbols}{5B}
374 \DeclareMathSymbol{\ddagger}{\mathbin}{symbols}{7A}
375 \DeclareMathSymbol{\dagger}{\mathbin}{symbols}{79}
376 \DeclareMathSymbol{\sqcap}{\mathbin}{symbols}{75}
377 \DeclareMathSymbol{\sqcup}{\mathbin}{symbols}{74}
378 \DeclareMathSymbol{\uplus}{\mathbin}{symbols}{5D}
379 \DeclareMathSymbol{\amalg}{\mathbin}{symbols}{71}
380 \DeclareMathSymbol{\diamond}{\mathbin}{symbols}{05}
381 \DeclareMathSymbol{\bullet}{\mathbin}{symbols}{0F}
382 \DeclareMathSymbol{\wr}{\mathbin}{symbols}{6F}
383 \DeclareMathSymbol{\div}{\mathbin}{symbols}{04}
384 \DeclareMathSymbol{\odot}{\mathbin}{symbols}{0C}
385 \DeclareMathSymbol{\oslash}{\mathbin}{symbols}{0B}
386 \DeclareMathSymbol{\otimes}{\mathbin}{symbols}{0A}
387 \DeclareMathSymbol{\ominus}{\mathbin}{symbols}{09}

```

```

388 \DeclareMathSymbol{\oplus}{\mathbin}{symbols}{08}
389 \DeclareMathSymbol{\mp}{\mathbin}{symbols}{07}
390 \DeclareMathSymbol{\pm}{\mathbin}{symbols}{06}
391 \DeclareMathSymbol{\circ}{\mathbin}{symbols}{0E}
392 \DeclareMathSymbol{\bigcirc}{\mathbin}{symbols}{0D}
393 \DeclareMathSymbol{\setminus}{\mathbin}{symbols}{6E}
394 \DeclareMathSymbol{\cdotp}{\mathbin}{symbols}{01}
395 \DeclareMathSymbol{\ast}{\mathbin}{symbols}{03}
396 \DeclareMathSymbol{\times}{\mathbin}{symbols}{02}
397 \DeclareMathSymbol{\star}{\mathbin}{letters}{3F}

```

6.4.5 Relations

```

398 \DeclareMathSymbol{\propto}{\mathrel}{symbols}{2F}
399 \DeclareMathSymbol{\sqsubseteq}{\mathrel}{symbols}{76}
400 \DeclareMathSymbol{\sqsupseteq}{\mathrel}{symbols}{77}
401 \DeclareMathSymbol{\parallel}{\mathrel}{symbols}{6B}
402 \DeclareMathSymbol{\mid}{\mathrel}{symbols}{6A}
403 \DeclareMathSymbol{\dashv}{\mathrel}{symbols}{61}
404 \DeclareMathSymbol{\vdash}{\mathrel}{symbols}{60}
405 \DeclareMathSymbol{\nearrow}{\mathrel}{symbols}{25}
406 \DeclareMathSymbol{\searrow}{\mathrel}{symbols}{26}
407 \DeclareMathSymbol{\nwarrow}{\mathrel}{symbols}{2D}
408 \DeclareMathSymbol{\swarrow}{\mathrel}{symbols}{2E}
409 \DeclareMathSymbol{\Leftrightarrow}{\mathrel}{symbols}{2C}
410 \DeclareMathSymbol{\Leftarrow}{\mathrel}{symbols}{28}
411 \DeclareMathSymbol{\Rightarrow}{\mathrel}{symbols}{29}
412 \DeclareRobustCommand{\neq}{\not=}

```

As `\neq` is robust we should not use `\let` to define `\ne` as then it would change if `\neq` changes.

```
413 \DeclareRobustCommand{\ne}{\not=}
```

It would ok to use `\let` for those declared by `\DeclareMathSymbol` but for a cleaner interface we avoid it always (just in case the internals change).

```
414 \DeclareMathSymbol{\leq}{\mathrel}{symbols}{14}
415 \DeclareMathSymbol{\geq}{\mathrel}{symbols}{15}
```

Alias:

```

416 % \let\le=\leq
417 % \let\ge=\geq
418 \DeclareMathSymbol{\le}{\mathrel}{symbols}{14}
419 \DeclareMathSymbol{\ge}{\mathrel}{symbols}{15}
420 \DeclareMathSymbol{\succ}{\mathrel}{symbols}{1F}
421 \DeclareMathSymbol{\prec}{\mathrel}{symbols}{1E}
422 \DeclareMathSymbol{\approx}{\mathrel}{symbols}{19}
423 \DeclareMathSymbol{\succeq}{\mathrel}{symbols}{17}
424 \DeclareMathSymbol{\preceq}{\mathrel}{symbols}{16}
425 \DeclareMathSymbol{\supset}{\mathrel}{symbols}{1B}
426 \DeclareMathSymbol{\subset}{\mathrel}{symbols}{1A}
427 \DeclareMathSymbol{\supseteq}{\mathrel}{symbols}{13}
428 \DeclareMathSymbol{\subseteq}{\mathrel}{symbols}{12}
429 \DeclareMathSymbol{\in}{\mathrel}{symbols}{32}
430 \DeclareMathSymbol{\ni}{\mathrel}{symbols}{33}

```

Alias:

```
431 % \let\owns=\ni
```

```

432 \DeclareMathSymbol{\owns}{\mathrel}{symbols}{33}
433 \DeclareMathSymbol{\gg}{\mathrel}{symbols}{1D}
434 \DeclareMathSymbol{\ll}{\mathrel}{symbols}{1C}
435 \DeclareMathSymbol{\not}{\mathrel}{symbols}{36}
436 \DeclareMathSymbol{\leftrightarrow}{\mathrel}{symbols}{24}
437 \DeclareMathSymbol{\leftarrow}{\mathrel}{symbols}{20}
438 \DeclareMathSymbol{\rightarrow}{\mathrel}{symbols}{21}

Alias:
439 %   \let\gets=\leftarrow
440 %   \let\to=\rightarrow
441 \DeclareMathSymbol{\gets}{\mathrel}{symbols}{20}
442 \DeclareMathSymbol{\to}{\mathrel}{symbols}{21}
443 \DeclareMathSymbol{\mapstochar}{\mathrel}{symbols}{37}
444     \ DeclareRobustCommand{\mapsto}{\mapstochar\rightarrow}
445 \DeclareMathSymbol{\sim}{\mathrel}{symbols}{18}
446 \DeclareMathSymbol{\simeq}{\mathrel}{symbols}{27}
447 \DeclareMathSymbol{\perp}{\mathrel}{symbols}{3F}
448 \DeclareMathSymbol{\equiv}{\mathrel}{symbols}{11}
449 \DeclareMathSymbol{\asymp}{\mathrel}{symbols}{10}
450 \DeclareMathSymbol{\smile}{\mathrel}{letters}{5E}
451 \DeclareMathSymbol{\frown}{\mathrel}{letters}{5F}
452 \DeclareMathSymbol{\leftharpoonup}{\mathrel}{letters}{28}
453 \DeclareMathSymbol{\leftharpoondown}{\mathrel}{letters}{29}
454 \DeclareMathSymbol{\rightharpoonup}{\mathrel}{letters}{2A}
455 \DeclareMathSymbol{\rightharpoondown}{\mathrel}{letters}{2B}

```

Here cometh much profligate robustification of math constructs. Warning: some of these commands may become non-robust if an AMS package is loaded.

Further potential problems: some math font packages may make unfortunate assumptions about some of these definitions that are not true of the robust versions we need.

```

456 \DeclareRobustCommand
457   \cong{\mathrel{\mathpalette\overeq\sim}} % congruence sign
458 \def\overeq#1#2{\lower.5\p@\vbox{\lineskip\maxdimen\lineskip-.5\p@
459   \ialign{$\m@th#1\hfil\#\hfil$\crcr#2\crcr=\crcr}}}
460 \DeclareRobustCommand
461   \notin{\mathrel{\mathpalette\cncel\in}}
462 \def\cncel#1#2{\m@th\ooalign{$\hfil#1\mkern1mu/\hfil$\crcr$#1#2$}}
463 \DeclareRobustCommand
464   \rightleftharpoons{\mathrel{\mathpalette\rlh@{}}}
465 \def\rlh@#1{\vcenter{\m@th\hbox{\ooalign{\raise2pt
466   \hbox{$\#1\rightharpoonup$}\crcr
467   $\#1\leftharpoondown$}}}}
468 \DeclareRobustCommand
469   \doteq{\mathrel{\textstyle.\over=}}

```

6.4.6 Arrows

```

470 \DeclareRobustCommand
471   \joinrel{\mathrel{\mkern-3mu}}
472 \DeclareRobustCommand
473   \relbar{\mathrel{\smash-}} % \smash, because -
474                           % has the same height as +

```

In contrast to `plain.tex` `\Relbar` got braces around the equal sign to guard against it being “math active” expanding to `\futurelet...`. This might be the case when packages are implementing shorthands for math, e.g. `=` meaning `\Rightarrow` etc. It would actually be better not to use `=` in such definitions but instead define something like `\mathequalsign` and use this. However we can’t do this now as it would break other math layouts where characters are in different places (since those wouldn’t know about the need for a new command name).

```

475 \DeclareRobustCommand
476   \Relbar{\mathrel{=}}
477 \DeclareMathSymbol{\lhook}{\mathrel}{letters}{`2C}
478   \DeclareRobustCommand\hookrightarrow{\lhook\joinrel\rightarrow}
479 \DeclareMathSymbol{\rhook}{\mathrel}{letters}{`2D}
480   \DeclareRobustCommand\hookleftarrow{\leftarrow\joinrel\rhook}
481 \DeclareRobustCommand
482   \bowtie{\mathrel\triangleleft\joinrel\mathrel\triangleleft}
483 \DeclareRobustCommand
484   \models{\mathrel{!}\joinrel\Relbar}
485 \DeclareRobustCommand
486   \Longrightarrow{\Relbar\joinrel\rightarrow}

```

LaTeX Change: `\longrightarrow` and `\longleftarrow` redefined to make them robust.

```

487 \DeclareRobustCommand\longrightarrow
488   {\relbar\joinrel\rightarrow}
489 \DeclareRobustCommand\longleftarrow
490   {\leftarrow\joinrel\relbar}
491 \DeclareRobustCommand
492   \Longrightarrow{\Leftarrow\joinrel\Relbar}
493 \DeclareRobustCommand
494   \longmapsto{\mapstochar\longrightarrow}
495 \DeclareRobustCommand
496   \longleftrightarrow{\leftarrow\joinrel\rightarrow}
497 \DeclareRobustCommand
498   \Longleftrightarrow{\Leftarrow\joinrel\rightarrow}
499 \DeclareRobustCommand
500   \iiff{\;}{\Longleftrightarrow\;}

```

6.4.7 Punctuation symbols

```

501 \DeclareMathSymbol{\ldotp}{\mathpunct}{letters}{`3A}
502 \DeclareMathSymbol{\cdotp}{\mathpunct}{symbols}{`01}
503 \DeclareMathSymbol{\colon}{\mathpunct}{operators}{`3A}

```

This is commented out, since `\ldots` is now defined in `ltoutenc.dtx`.

```

504 %\def\@ldots{\mathinner{\ldotp\ldotp\ldotp}}
505 %\ DeclareRobustCommand\ldots
506 %   {\relax\ifmmode\@ldots\else\mbox{$\m@th\@ldots$}\fi}
507 \DeclareRobustCommand
508   \cdots{\mathinner{\cdotp\cdotp\cdotp}}
509 \DeclareRobustCommand
510   \vdots{\vbox{\baselineskip4\p@\lineskiplimit\z@
511   \kern6\p@\hbox{.}\hbox{.}\hbox{.}}}
512 \DeclareRobustCommand
513   \ddots{\mathinner{\mkern1mu\raise7\p@
514   \vbox{\kern7\p@\hbox{.}\hbox{.}}\mkern2mu}

```

```
515     \raise4\p@\hbox{.}\mkern2mu\raise\p@\hbox{.}\mkern1mu}}
```

6.4.8 Math accents

```
516 \DeclareMathAccent{\acute}{\mathalpha}{operators}{13}
517 \DeclareMathAccent{\grave}{\mathalpha}{operators}{12}
518 \DeclareMathAccent{\ddot}{\mathalpha}{operators}{7F}
519 \DeclareMathAccent{\tilde}{\mathalpha}{operators}{7E}
520 \DeclareMathAccent{\bar}{\mathalpha}{operators}{16}
521 \DeclareMathAccent{\breve}{\mathalpha}{operators}{15}
522 \DeclareMathAccent{\check}{\mathalpha}{operators}{14}
523 \DeclareMathAccent{\hat}{\mathalpha}{operators}{5E}
524 \DeclareMathAccent{\vec}{\mathord}{letters}{7E}
525 \DeclareMathAccent{\dot}{\mathalpha}{operators}{5F}
526 \DeclareMathAccent{\widetilde}{\mathord}{largesymbols}{65}
527 \DeclareMathAccent{\widehat}{\mathord}{largesymbols}{62}
```

For some reason plain TeX never bothered to provide a ring accent in math (although it is available in the fonts), but since we got a request for it here we go:

```
528 \DeclareMathAccent{\mathring}{\mathalpha}{operators}{17}
```

6.4.9 Radicals

```
529 \DeclareMathRadical{\sqrtsign}{symbols}{70}{largesymbols}{70}
```

6.4.10 Over and under something, etc

```
530 \ DeclareRobustCommand\overrightarrow[1]{\vbox{\m@th\ialign{##\crcr
531     \rightarrowfill\crcr\noalign{\kern-\p@\nointerlineskip}
532     $ \hfil\displaystyle{#1}\hfil$\crcr}}
533 \ DeclareRobustCommand\overleftarrow[1]{\vbox{\m@th\ialign{##\crcr
534     \leftarrowfill\crcr\noalign{\kern-\p@\nointerlineskip}
535     $ \hfil\displaystyle{#1}\hfil$\crcr}}
536 \ DeclareRobustCommand\overbrace[1]
537     {\mathop{\vbox{\m@th\ialign{##\crcr\noalign{\kern3\p@}%
538         \downbracefill\crcr\noalign{\kern3\p@\nointerlineskip}%
539         $ \hfil\displaystyle{#1}\hfil$\crcr}}}\limits}
540 \ DeclareRobustCommand\underbrace[1]{\mathop{\vtop{\m@th\ialign{##\crcr
541     $ \hfil\displaystyle{#1}\hfil$\crcr
542     \noalign{\kern3\p@\nointerlineskip}%
543     \upbracefill\crcr\noalign{\kern3\p@}}}\limits}
```

(quite a waste of tokens, IMHO — Frank)

```
544 \ DeclareRobustCommand\skew[3]
545   {{\muskip\z@#1mu\divide\muskip\z@\tw@ \mkern\muskip\z@
546     #2{\mkern-\muskip\z@{#3}\mkern\muskip\z@\mkern-\muskip\z@{}}}
547 \ DeclareRobustCommand\rightarrowfill{$\m@th\smash-\mkern-7mu%
548   \cleaders\hbox{$\mkern-2mu\smash-\mkern-2mu$}\hfill
549   \mkern-7mu\mathord\rightarrow$}
550 \ DeclareRobustCommand\leftarrowfill{$\m@th\mathord\leftarrow\mkern-7mu%
551   \cleaders\hbox{$\mkern-2mu\smash-\mkern-2mu$}\hfill
552   \mkern-7mu\smash-$}
553 \ DeclareMathSymbol{\braceleft}{\mathord}{largesymbols}{7A}
554 \ DeclareMathSymbol{\bracerd}{\mathord}{largesymbols}{7B}
555 \ DeclareMathSymbol{\bracelu}{\mathord}{largesymbols}{7C}
556 \ DeclareMathSymbol{\braceru}{\mathord}{largesymbols}{7D}
557 \ DeclareRobustCommand\downbracefill{$\m@th \setbox\z@\hbox{$\braceleft$}%
558   \braceleft\leaders\vrule \height\ht\z@ \depth\z@\hfill\braceru
```

```

559  \braceleftu\leaders\vrule \Oheight\ht\z@ \Odepth\z@\hfill\bracerd$}
560  \DeclareRobustCommand\upbracefill{$\m@th \setbox\z@\hbox{$\braceleft$}%
561  \braceleftu\leaders\vrule \Oheight\ht\z@ \Odepth\z@\hfill\bracerd
562  \bracerd\leaders\vrule \Oheight\ht\z@ \Odepth\z@\hfill\braceru$}

```

6.4.11 Delimiters

```

563 \DeclareMathDelimiter{\lmooustache}  % top from (, bottom from )
564   {\mathopen}{largesymbols}{7A}{largesymbols}{40}
565 \DeclareMathDelimiter{\rmoustache}  % top from ), bottom from (
566   {\mathclose}{largesymbols}{7B}{largesymbols}{41}
567 \DeclareMathDelimiter{\arrowvert}    % arrow without arrowheads
568   {\mathord}{symbols}{6A}{largesymbols}{3C}
569 \DeclareMathDelimiter{\Arrowvert}   % double arrow without arrowheads
570   {\mathord}{symbols}{6B}{largesymbols}{3D}
571 \DeclareMathDelimiter{\Vert}
572   {\mathord}{symbols}{6B}{largesymbols}{OD}

```

\DeclareMathDelimiter produces a command that is robust (with an internal macro containing the payload) so we should not use \let for making an alias

```

573 \%let\|=Vert
574 \DeclareMathDelimiter{\|}{\mathord}{symbols}{6B}{largesymbols}{OD}
575 \DeclareMathDelimiter{\vert}{\mathord}{symbols}{6A}{largesymbols}{OC}
576 \DeclareMathDelimiter{\uparrow}{\mathrel}{symbols}{22}{largesymbols}{78}
577 \DeclareMathDelimiter{\downarrow}{\mathrel}{symbols}{23}{largesymbols}{79}
578 \DeclareMathDelimiter{\updownarrow}{\mathrel}{symbols}{6C}{largesymbols}{3F}
579 \DeclareMathDelimiter{\Uparrow}{\mathrel}{symbols}{2A}{largesymbols}{7E}
580 \DeclareMathDelimiter{\Downarrow}{\mathrel}{symbols}{2B}{largesymbols}{7F}
581 \DeclareMathDelimiter{\Updownarrow}{\mathrel}{symbols}{6D}{largesymbols}{77}
582 \DeclareMathDelimiter{\backslash}{\mathord}{symbols}{6E}{largesymbols}{OF}
583 \DeclareMathDelimiter{\rangle}{\mathclose}{symbols}{69}{largesymbols}{OB}
584 \DeclareMathDelimiter{\langle}{\mathopen}{symbols}{68}{largesymbols}{OA}
585 \DeclareMathDelimiter{\rbrace}{\mathclose}{symbols}{67}{largesymbols}{09}
586 \DeclareMathDelimiter{\lbrace}{\mathopen}{symbols}{66}{largesymbols}{08}
587 \DeclareMathDelimiter{\rceil}{\mathclose}{symbols}{65}{largesymbols}{07}
588 \DeclareMathDelimiter{\lceil}{\mathopen}{symbols}{64}{largesymbols}{06}
589 \DeclareMathDelimiter{\rfloor}{\mathclose}{symbols}{63}{largesymbols}{05}
590 \DeclareMathDelimiter{\lfloor}{\mathopen}{symbols}{62}{largesymbols}{04}

```

\lgroup There are three plain TeX delimiters which are not fully supported by NFSS, since they partly point into a bold cmr font. Allocating a full symbol font, just to have three delimiters seems a bit too much given the limited space available. For this reason only the extensible sizes are supported. If this is not desired one can use, without losing portability, define \mathbf and \mathtt as font symbol alphabet (setting up cmr/bx/n and cmtt/m/n as symbol fonts first) and modify the delimiter declarations to point with their small variant to those symbol fonts. (This is done in `oldlfont.dtx` so look there for examples.)

```

608 \DeclareMathDelimiter{\lgroup} % extensible ( with sharper tips
609     {\mathopen}{largesymbols}{3A}{largesymbols}{3A}
610 \DeclareMathDelimiter{\rgroup} % extensible ) with sharper tips
611     {\mathclose}{largesymbols}{3B}{largesymbols}{3B}
612 \DeclareMathDelimiter{\bracevert} % the vertical bar that extends braces
613     {\mathord}{largesymbols}{3E}{largesymbols}{3E}
```

(End definition for \lgroup, \rgroup, and \bracevert.)

6.5 Math versions of text commands

The \mathunderscore here is really a text definition, so it has been put back into `ltoutenc.dtx` (by Chris, 30/04/97) and should be removed from here.

These symbols are the math versions of text commands such as \P, \\$, etc.

\mathparagraph These math symbols are not in plain TeX.

```

614 \DeclareMathSymbol{\mathparagraph}{\mathord}{symbols}{7B}
615 \DeclareMathSymbol{\mathsection}{\mathord}{symbols}{78}
616 \DeclareMathSymbol{\mathdollar}{\mathord}{operators}{24}
\mathsterling
617 \DeclareRobustCommand{\mathsterling}{\mathit{\mathchar"7024}}
618 \DeclareRobustCommand{\mathunderscore}{\kern.06em\vbox{\hrule\@width.3em}}
```

(End definition for \mathparagraph and others.)

\mathellipsis This is plain TeX's \ldots.

```
619 \DeclareRobustCommand{\mathellipsis}{\mathinner{\ldotp\ldotp\ldotp}}%
```

(End definition for \mathellipsis.)

6.6 Other special functions and parameters

6.6.1 Biggggg

```

620 </math>
621 /*math | latexrelease>
622 <latexrelease>\IncludeInRelease{2018/12/01}%
623 <latexrelease> {\Big}{Start LR-mode}%
624 \DeclareRobustCommand{\big[1]{\leavevmode@ifvmode
625   {\hbox{$\left#1\vbox{to8.5\p@{}\right.\n@space$}}}}
626 \DeclareRobustCommand{\Big[1]{\leavevmode@ifvmode
627   {\hbox{$\left#1\vbox{to11.5\p@{}\right.\n@space$}}}}
628 \DeclareRobustCommand{\bigg[1]{\leavevmode@ifvmode
629   {\hbox{$\left#1\vbox{to14.5\p@{}\right.\n@space$}}}}
630 \DeclareRobustCommand{\Bigg[1]{\leavevmode@ifvmode
631   {\hbox{$\left#1\vbox{to17.5\p@{}\right.\n@space$}}}}
632 </math | latexrelease>
```

```

633  \end{macro}
634  \end{macro}
635  \end{macro}
636  \def\big#1{\hbox{$\left#1\vbox{to8.5\p@{}\right.\n@space$}$}}
637  \def\Big#1{\hbox{$\left#1\vbox{to11.5\p@{}\right.\n@space$}$}}
638  \def\bigg#1{\hbox{$\left#1\vbox{to14.5\p@{}\right.\n@space$}$}}
639  \def\Bigg#1{\hbox{$\left#1\vbox{to17.5\p@{}\right.\n@space$}$}}
640  \end{macro}
641  \end{macro}
642  \def\n@space{\nulldelimiterspace\z@\m@th}

```

6.6.2 The log-like functions

\operator@font The \operator@font determines the symbol font used for log-like functions.

```

643  \def\operator@font{\mathgroup\symoperators}

```

(End definition for \operator@font.)

6.6.3 Parameters

```

644  \thinmuskip=3mu
645  \medmuskip=4mu plus 2mu minus 4mu
646  \thickmuskip=5mu plus 5mu

```

This finishes the low-level setup in `fontmath.ltx`.

```

647  \end{math}

```

7 Default cfg files

We provide default cfg files here to ensure that on installations that search large file trees we do not pick up some strange customisation files from somewhere.

```

648  {*cfgtext | cfgmath | cfgprel}
649  %%
650  %%
651  %%
652  %% Load the standard setup:
653  %%
654  {+cfgtext} \input{fonttext.ltx}
655  {+cfgmath} \input{fontmath.ltx}
656  {+cfgprel} \input{preload.ltx}
657  %%
658  %% Small changes could go here; see documentation in cfgguide.tex for
659  %% allowed modifications.
660  %%
661  %% In particular it is not allowed to misuse this configuration file
662  %% to modify internal LaTeX commands!
663  %%
664  %% If you use this file as the basis for configuration please change
665  %% the \ProvidesFile lines to clearly identify your modification, e.g.,
666  %%
667  {+cfgtext} \% \ProvidesFile{fonttext.cfg}[2001/06/01
668  {+cfgmath} \% \ProvidesFile{fonttext.cfg}[2001/06/01
669  {+cfgprel} \% \ProvidesFile{preload.cfg}[2001/06/01
670  %%                                         Customised local font setup]
671  %%

```

672 %%
673 ⟨/cfgtext | cfgmath | cfgprel⟩

File y

preload.dtx

1 Overview

This file contains a number of possible settings for preloading fonts during installation of NFSS2 (which is used by L^AT_EX 2 _{ε}). It will be used to generate the following files:

preload.min	minimal subset of fonts necessary to run NFSS2
preload.ori	preload of CM fonts similar to the old <code>1fonts.tex</code>
preload.ltx	The standard selection of preloads
cmpreload.xpt	preload of CM fonts for 10pt document size
cmpreload.xip	preload of CM fonts for 11pt document size
cmpreload.xii	preload of CM fonts for 12pt document size
dcpreload.xpt	preload of DC fonts for 10pt size
dcpreload.xip	preload of DC fonts for 11pt size
dcpreload.xii	preload of DC fonts for 12pt size

These files are for installations that make use of Computer Modern fonts either old encoding (OT1) or Cork encoding (T1). The Computer Modern fonts with Cork encoding are known as DC-fonts.

Most important is `preload.ltx` which is used during format generation. You are *not* allowed to change this file.

2 Customization

You can customize the preloaded fonts in your L^AT_EX 2 _{ε} system by installing a file with the name `preload.cfg`. If this file exists it will be used in place of the system file `preload.ltx`. You can, for example, copy one of the files mentioned above (that can be generated from this source) to `preload.cfg`.

Or you can define completely other preloads. In that case start from `preload.min` since that contains the fonts that have to be preloaded by *all* L^AT_EX 2 _{ε} systems.

Avoid using `preload.ori`, it will load so many fonts that on most installations it is nearly impossible to load other font families afterwards. This file is only generated to show what fonts have been preloaded by L^AT_EX 2.09.

If you normally use other fonts than Computer Modern `preload.min` might be best.

Warning: If you preload fonts with encodings other than the normally supported encodings you have to declare that encoding in a `fontdef.cfg` configuration file (see the documentation in the file `fontdef.dtx`). Adding an extra encoding to the format might produce non-portable documents, thus this should be avoided if possible.

3 Module switches for the DOCSTRIP program

The DOCSTRIP will generate the above file from this source using the following module directives:

driver	produce a documentation driver file
preload	produce a preload... file
cm	for OT1 encoded Computer Modern
dc	for T1 encoded Computer Modern
min	produce minimal subset
xpt	produce 10pt preloads
xipt	produce 11pt preloads
xiipt	produce 12pt preloads
ori	produce preloads similar to old <code>lfonts.tex</code>
tex	produce preload.ltx

A typical DOCSTRIP command file would then have entries like:

```
generateFile{preload.min}{t}{\from{preload.dtx}{preload,min}}
```

for generating preload files.

4 A driver for this document

The next bit of code contains the documentation driver file for TEX, i.e., the file that will produce the documentation you are currently reading. It will be extracted from this file by the DOCSTRIP program.

```
1 <*driver>
2 \documentclass{ltxdoc}
3 %\OnlyDescription % comment out for implementation details
4 \begin{document}
5   \DocInput{preload.dtx}
6 \end{document}
7 
```

5 The code

We begin by loading the math extension font (`cmex10`) and the LATEX line and circle fonts. It is necessary to do this explicitly since these are used by `lplain.tex` and `latex.tex`. Since the internal font name contains / characters and digits we construct the name via `\csname`. These are the only fonts (!) that must be loaded in this file.

All `\DeclarePreloadSizes` can be removed or others can be added, they only influence the processing speed.

```
8 \expandafter\font\csname OMX/cmex/m/n/10\endcsname=cmex10\relax
9 \font\tenln =line10 \font\tenlnw =linew10\relax
10 \font\tencirc=lcircle10 \font\tencircw=lcirclew10\relax
```

The above fonts should not be touched but anything below this point here in the preload suggestions can be modified without any problems.

```
11 <-tex>%*****
12 <-tex>% Start any modification below this point **
13 <-tex>%*****
14 <-tex>
15 %
16 %% Computer Modern Roman:
17 %%-----
```

```

18 <*ori>
19 \DeclarePreloadSizes{OT1}{cmr}{m}{n}
20 {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74,24.88}
21 \DeclarePreloadSizes{OT1}{cmr}{bx}{n}{9,10,10.95,12,14.4,17.28}
22 \DeclarePreloadSizes{OT1}{cmr}{m}{sl}{10,10.95,12}
23 \DeclarePreloadSizes{OT1}{cmr}{m}{it}{7,8,9,10,10.95,12}
24 </ori>
25 <+xpt & cm> \DeclarePreloadSizes{OT1}{cmr}{m}{n}{5,7,10}
26 <+xpt & dc> \DeclarePreloadSizes{T1}{cmr}{m}{n}{5,7,10}
27 <+xipt & cm> \DeclarePreloadSizes{OT1}{cmr}{m}{n}{6,8,10.95}
28 <+xipt & dc> \DeclarePreloadSizes{T1}{cmr}{m}{n}{6,8,10.95}
29 <+xiipt & cm> \DeclarePreloadSizes{OT1}{cmr}{m}{n}{6,8,12}
30 <+xiipt & dc> \DeclarePreloadSizes{T1}{cmr}{m}{n}{6,8,12}
31 %%
32 %% Computer Modern Sans:
33 %-----%
34 <+ori> \DeclarePreloadSizes{OT1}{cmss}{m}{n}{10,10.95,12}
35 %%
36 %% Computer Modern Typewriter:
37 %-----%
38 <+ori> \DeclarePreloadSizes{OT1}{cmtt}{m}{n}{9,10,10.95,12}
39 %%
40 %% Computer Modern Math:
41 %-----%
42 <*ori>
43 \DeclarePreloadSizes{OML}{cmm}{m}{it}
44 {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74}
45 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}
46 {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74}
47 </ori>

```

The math fonts are the same for both DC and CM fonts. So far there isn't an agreed on standard.

```

48 <*xpt>
49 \DeclarePreloadSizes{OML}{cmm}{m}{it}{5,7,10}
50 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}{5,7,10}
51 </xpt>
52 <*xipt>
53 \DeclarePreloadSizes{OML}{cmm}{m}{it}{6,8,10.95}
54 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}{6,8,10.95}
55 </xipt>
56 <*xiipt>
57 \DeclarePreloadSizes{OML}{cmm}{m}{it}{6,8,12}
58 \DeclarePreloadSizes{OMS}{cmsy}{m}{n}{6,8,12}
59 </xiipt>
60 %%
61 %% LaTeX symbol fonts:
62 %-----%
63 <*ori>
64 \DeclarePreloadSizes{U}{lasy}{m}{n}
65 {5,6,7,8,9,10,10.95,12,14.4,17.28,20.74}
66 </ori>
67 </preload>

```

File z

ltfntcmd.dtx

Abstract

The commands defined in this file `ltfntcmd` are part of the kernel code for L^AT_EX 2_&/NFSS2.

It is also meant to serve as documentation for package writers since it demonstrates how to define high-level font changing commands using a small number of creator functions.

1 Introduction

Font changes such as `\bfseries`, `\sffamily`, etc. are declarations; this means that their scope is delimited by the grouping structure, either by the next `\end` of some environment or by explicitly using a group, e.g., writing something like `{\bfseries...}` in the source. If you make the mistake of writing `\bfseries{...}` (thinking of `\bfseries` as a command with one argument) then the result is rather striking.

Font declarations are an artifact of the T_EX system and for several reasons it is better to avoid them on the user level whenever possible. In L^AT_EX3 they will probably all be replaced by environments and by font commands taking one argument.

This file defines a creator function for such declarative font switches. This function creates commands which can be used in both math and text.

This file also defines a number of high-level commands (all starting with `\text...`) that have one argument and typeset this argument in the requested way. Thus these commands are for typesetting short pieces of text in a specific family, series or shape. These are all produced as examples of the use of a creator function which is itself also defined in this file.

Table 1 shows all these high-level commands in action. A further advantage of using these commands is that they automatically take care of any necessary italic correction on either side of their argument.

Thus, when using such commands, one does not have to worry about forgetting the italic correction when changing fonts. Only in very few situations is this additional space wrong but, for example, most typographers recommend omitting the italic correction if a small punctuation character, like a comma, directly follows the font change. Since the amount of correction required is partly a matter of taste, you can define in what situations the italic correction should be suppressed. This is done by putting the characters that should cancel a preceding italic correction in the list `\nocorrlist`.¹⁶ The default definition for this list is produced by the following.

```
\newcommand \nocorrlist {,.}
```

It is best to declare the most often used characters first, because this will make the processing slightly faster. For example,

```
\emph{When using the \NFSS{} high-level commands,  
the \emph{proper} use of italic corrections is  
automatically taken care of}. Only
```

¹⁶Any package that changes the `\catcode` of a character inside `\nocorrlist` must then explicitly reset the list. Otherwise the changed character will no longer be recognized by the suppression algorithm.

<i>Command</i>	<i>Corresponds to</i>	<i>Action</i>
<code>\textnormal{..}</code>	<code>\normalfont</code>	Typeset argument in normal family
<code>\textrm{..}</code>	<code>\rmfamily</code>	Typeset argument in roman family
<code>\textsf{..}</code>	<code>\sffamily</code>	Typeset argument in <code>sans serif</code> family
<code>\texttt{..}</code>	<code>\ttfamily</code>	Typeset argument in <code>typewriter</code> family
<code>\textmd{..}</code>	<code>\mdseries</code>	Typeset argument in medium series
<code>\textbf{..}</code>	<code>\bfseries</code>	Typeset argument in bold series
<code>\textup{..}</code>	<code>\upshape</code>	Typeset argument in normal shape
<code>\textit{..}</code>	<code>\itshape</code>	Typeset argument in <i>italic</i> shape
<code>\textsl{..}</code>	<code>\slshape</code>	Typeset argument in <i>slanted</i> shape
<code>\textsc{..}</code>	<code>\scshape</code>	Typeset argument in <code>SMALL CAPS</code> shape
<code>\emph{..}</code>	<code>\em</code>	Typeset argument <i>emphasized</i>

Table 1: Font-change commands with arguments

The font change commands provided here all start with `\text..` to emphasize that they are for use in normal text and to be easily memorable. They automatically take care of any necessary italic correction on either side of the argument.

`\emph{sometimes}` one has to help `\LaTeX{}` by adding a `\verb=\nocorr=` command.

which results in:

When using the NFSS high-level commands, the proper use of italic corrections is automatically taken care of. Only sometimes one has to help L^AT_EX by adding a `\nocorr` command.

In contrast, the use of the declaration forms is often more appropriate when you define your own commands or environments.

```
\newenvironment{bfitemize}{\begin{itemize}\normalfont\bfseries}
{\end{itemize}}
\begin{bfitemize}
\item This environment produces boldface items.
\item It is defined in terms of \LaTeX's
      \texttt{itemize} environment and NFSS
      declarations.
\end{bfitemize}
```

This gives:

- This environment produces boldface items.
- It is defined in terms of L^AT_EX's `itemize` environment and NFSS declarations.

In addition to global customization of when to insert the italic correction, it is of course sometimes necessary to explicitly insert one with `\!/`.

It is also possible to suppress the italic correction in individual instances. For this, the command `\nocorr` is provided.

The `\nocorr` must appear as the first or last token inside the braces of the argument of the `\text...` commands, at that end of the text where you wish to suppress the italic correction.

It is worth pointing out here that inserting a `\V` in places where it can have no function (i.e. anywhere except immediately after a slanted letter) is not an error—it will just be silently ignored. Unfortunately this is not true if the redefinition of `\V` in `amstex.sty` is used as this version can cause space to be removed immediately before the `\V`.

2 The implementation

`\DeclareTextFontCommand` This is the creator function for `\text..` commands. It gives a warning if `\foo` or `\fragfoo` is already defined.

In math mode it simply puts the font declaration and text into a box (possibly an automagically sized one).

Otherwise it first scans the text to see where `\nocorr` occurs within it. This sets the `\check@ic` commands to do what is necessary concerning the italic correction at both ends.

The algorithm for deciding whether to put in an italic correction is not very subtle: one is added whenever the newly current font is not itself positively sloped, unless the next token is a character in the ‘nocorr’ list. At the end of the text this is done after closing the group so as to check the ‘outer font’. Note that this will often result in adding an italic correction token after a character in an unsloped font; we believe (in early 2003) that this is perhaps inefficient but not dangerous.

It also now checks for empty contents of the text command and optimises this case. Some care is also taken to check that doing dangerous things in vertical mode is avoided.

The italic correction token is added to the horizontal list before (in the list) an immediately preceding non-zero glob of glue (skip) and any non-zero penalty preceding that since, in the typical case, this puts it immediately after the last character in the preceding word.

Note that it is necessary to put in the `\aftergroup\maybe@ic` at the end of the group so that it comes after any other aftergroup tokens and immediately before the following tokens. It is also necessary to remove the `\fi` from the token list before the group ends; this is done by adding an `\expandafter` just before the closing brace.

```
1  {*2ekernel}
2  \def \DeclareTextFontCommand #1#2{%
3    \DeclareRobustCommand#1[1]{%
4      \ifmmode
5        \nfss@text{#2##1}%
6      \else
7        \hmode@bgroup
8        \text@command{##1}%
9        #2\check@icl ##1\check@icr
10       \expandafter
11       \egroup
12     \fi
13   }%
14 }
```

(End definition for `\DeclareTextFontCommand`.)

`\textrm` Now we define the `\text<family>` commands in terms of the above; `\textttt` does not look very nice!

`\textsf` 15 `\DeclareTextFontCommand{\textrm}{\rmfamily}`
`\textnormal` 16 `\DeclareTextFontCommand{\textsf}{\sffamily}`
17 `\DeclareTextFontCommand{\textttt}{\ttfamily}`
18 `\DeclareTextFontCommand{\textnormal}{\normalsize}`

(End definition for `\textrm` and others.)

`\textbf` For the series attribute:

`\textmd` 19 `\DeclareTextFontCommand{\textbf}{\bfseries}`
20 `\DeclareTextFontCommand{\textmd}{\mdseries}`

(End definition for `\textbf` and `\textmd`.)

`\textit` And for the shapes:

`\textsl` 21 `\DeclareTextFontCommand{\textit}{\itshape}`
`\textsc` 22 `\DeclareTextFontCommand{\textsl}{\slshape}`
`\textup` 23 `\DeclareTextFontCommand{\textsc}{\scshape}`
24 `\DeclareTextFontCommand{\textup}{\upshape}`

(End definition for `\textit` and others.)

`textulc`
`textsw` 25 `/2ekernel`
`textssc` 26 `(*2ekernel | latexrelease)`
27 `\langle latexrelease \rangle \IncludeInRelease{2020/02/02} %`
28 `\langle latexrelease \rangle \textulc{Additional text commands} %`
29 `\DeclareTextFontCommand{\textulc}{\ulcshape}`
30 `\DeclareTextFontCommand{\textsw}{\swshape}`
31 `\DeclareTextFontCommand{\textssc}{\sscshape}`
32 `\langle /2ekernel | latexrelease \rangle`
33 `\langle latexrelease \rangle \EndIncludeInRelease`
34 `\langle latexrelease \rangle \IncludeInRelease{0000/00/00} %`
35 `\langle latexrelease \rangle \textulc{Additional text commands} %`
36 `\langle latexrelease \rangle`
37 `\langle latexrelease \rangle \let\textulc\@undefined`
38 `\langle latexrelease \rangle \let\textsw\@undefined`
39 `\langle latexrelease \rangle \let\textssc\@undefined`
40 `\langle latexrelease \rangle \EndIncludeInRelease`
41 `(*2ekernel)`

(End definition for `textulc`, `textsw`, and `textssc`.)

`\emph` Finally we have the `\em` font change declaration of L^AT_EX. The corresponding definition with argument is

42 `\DeclareTextFontCommand{\emph}{\em}`

(End definition for `\emph`.)

`\nocorr` This is just a label, so it does nothing; it should also be unexpandable.

43 `\let\nocorr\relax`

(End definition for \nocorr.)

- \check@ic1 We define these defaults in case some error causes them to be expanded at the wrong time.

```
44 \let \check@ic1 \@empty
45 \let \check@icr \@empty
```

(End definition for \check@ic1 and \check@icr.)

- \text@command This checks for a \nocorr as the first token in its argument and also for one in any other position not protected within braces (the latter is treated as if it were at the end of the argument).

Is this the correct action in the ‘empty’ case? It is efficient but typographically it is, strictly, incorrect!

```
46 \def \text@command #1{%
47   \def \reserved@a {#1}%
48   \ifx \reserved@a \@empty
49     \let \check@ic1 \@empty
50     \let \check@icr \@empty
51   \else
```

\space is a reserved word in L^AT_EX or actually already in plain T_EX. If somebody really redefines it so many things will break that I don’t see any reason to make this routine here slower than necessary.

```
52 %   \def \reserved@b { }%
53 %   \ifx \reserved@a \reserved@b
54   \ifx \reserved@a \space
55     \let \check@ic1 \@empty
56     \let \check@icr \@empty
57   \else
58     \check@nocorr@ #1\nocorr\@nil
59   \fi
60 \fi
61 }
62 \def \check@nocorr@ #1#2\nocorr#3\@nil {%
```

The two checks are initialised here to their values in the normal case.

```
63 \let \check@ic1 \maybe@ic
64 \def \check@icr {\ifvmode \else \aftergroup \maybe@ic \fi}%
65 \def \reserved@a {\nocorr}%
66 \def \reserved@b {#1}%
67 \def \reserved@c {#3}%
68 \ifx \reserved@a \reserved@b
69   \ifx \reserved@c \@empty
```

In this case there is a \nocorr at the start but not at the end, so \check@ic1 should be empty.

```
70   \let \check@ic1 \@empty
71 \else
```

Otherwise there is a \nocorr both at the start and elsewhere, so no italic corrections should be added.

```
72   \let \check@ic1 \@empty
73   \let \check@icr \@empty
74 \fi
```

```

75     \else
76         \ifx \reserved@c \empty
```

In this case there is no `\nocorr` anywhere, so we need to check for an italic correction at both the beginning and the end. This has been set up as the default so no code is needed here.

```

77     \else
```

In this case there is no `\nocorr` at the start but there is one elsewhere, so no `\aftergroup` is needed.

```

78         \let \check@icr \empty
79         \fi
80     \fi
81 }
```

(End definition for `\text@command` and `\check@nocorr@`.)

`\ifmaybe@ic` Switch used solely within `\maybe@ic` not interfering with other switches.

```

82 \newif\ifmaybe@ic
```

(End definition for `\ifmaybe@ic`.)

`\maybe@ic` These macros implement the italic correction.

```

\maybe@ic@ 83 \def \maybe@ic {\futurelet\@let@token\maybe@ic@}
84 \def \maybe@ic@ {\%
```

We first check to see if the current font is positively sloped. (But do not forget the message Rainer sent about an upright font with non-zero slope! Or is this an urban myth?) It has been suggested that this should test against a small positive value, but what?

```

85 \ifdim \fontdimen@ne\font>\z@
86 \else
87     \maybe@icttrue
```

It would be possible, but probably not worthwhile, to continue the forward scan beyond any closing braces.

```

88 \expandafter\@tfor\expandafter\reserved@a\expandafter:\expandafter=%
89     \nocorlist
```

We have to hide the `\@let@token` in the macro `\t@st@ic` rather than testing it directly in the loop since it might be `\let` to a `\fi` or `\else`, which would result in chaos.

```

90 \do \t@st@ic
```

Frank thinks that the next bit it is inefficient if done after the second change. Chris thinks that most all of this is inefficient for the commonest cases: but that is the price of a cleverer algorithm. It is certainly needed to deal with the use of `\nolinebreak`.

```

91     \ifmaybe@ic \sw@slant \fi
92     \fi
93 }
```

(End definition for `\maybe@ic` and `\maybe@ic@`.)

`\t@st@ic` The next token in the input stream is stored in `\@let@token` via a `\let`, the current token from `\nocorrlist` is stored via `\def` in `\reserved@a`. To compare them we have to fiddle around a bit.

If the only things to check were characters then this could be done via an `\if` thus their catcodes would not matter; but this will not work whilst `\futurelet` is used above.

```

94 \def \t@st@ic {%
95   \expandafter\let\expandafter\reserved@b\expandafter=\reserved@a\relax
96   \ifx\reserved@b\@let@token

```

If they are the same we record the fact and jump out of the loop.

```

97   \maybe@icfalse
98   \break@tfor
99   \fi
100 }

```

(End definition for `\t@st@ic`.)

`\sw@slant` The definition of the mysterious `\sw@slant` command is as follows.

```

101 \def \sw@slant {%

```

It is surely correct to put in an italic correction when there is no skip. If the last thing on the list is actually a zero skip (including things whose dimension part is zero, such as `\hfill`), or anything other than a character, then the italic correction will have no effect.

In order to work correctly with unbreakable spaces from `\~` (and other common forms of line-breaking control) we also move back across a penalty before the glue.

```

102 \ifdim \lastskip=z@
103   \fix@penalty
104 \else
105   \skip@\lastskip
106   \unskip
107   \fix@penalty
108   \hskip \skip@
109 \fi
110 }

```

The above code means: “If there is a non-zero space just before the current position (`\ifdim...`) save the amount of that space (`\skip@\lastskip`), remove it (`\unskip`), then do a similar thing if there is a penalty just before the skip, and finally put the space back in.”

Since zero glue cannot be distinguished in this context from no glue, we dare not put in an `\hskip` in this case as this may produce an unwanted breakpoint. This is not satisfactory.

The penalty before the glue is handled similarly, with the same caveats concerning the zero case. Is this the first recorded use of `\unpenalty` in standard L^AT_EX code?

```

111 \def \fix@penalty {%
112   \ifnum \lastpenalty=z@
113     \@@italiccorr
114   \else
115     \count@\lastpenalty
116     \unpenalty
117     \@@italiccorr

```

```

118      \penalty \count0
119  \fi
120 }

```

(End definition for `\sw@slant` and `\fix@penalty`.)

- `\nocorrlist` This holds the list of characters that should prevent italic correction. They should be ordered by decreasing frequency of use. If any such character is made active later on one needs to redefine the list so that the active character becomes part of it.

```

121 \def \nocorrlist {,.}
122 (End definition for \nocorrlist.)

```

- `\nfss@text` This command will by default behave like a L^AT_EX `\mbox` but may be redefined by packages such as `amstext.sty` to be a bit cleverer.

```

122 \ifx \nfss@text \undefined
123   \def \nfss@text {\leavevmode\hbox}
124 \fi

```

(End definition for `\nfss@text`.)

- `\DeclareOldFontCommand` This is the function used to create declarative font-changing commands that can also be used to change alphabets in math-mode.

Usage: `\DeclareOldFontCommand \fn{\font-change decls} {math-alphabet}`

Here `\fn` is the font-declaration command being defined, `\font-change decls` is the declaration it will expand to in text-mode, and `{math-alphabet}` is the (single) math alphabet specifier which is to be used in math-mode.

It does not care whether the command being defined already exists but it does give a warning if it redefines anything.

Here are some typical examples of its use in conjunction with more basic NFSS2 font commands.

```

\DeclareOldFontCommand{\rm}{\normalfont\rmfamily}{\mathrm}
\DeclareOldFontCommand{\sf}{\normalfont\sfamily}{\mathrm{sf}}
\DeclareOldFontCommand{\tt}{\normalfont\ttfamily}{\mathrm{tt}}

```

```

125 \def \DeclareOldFontCommand #1#2#3{%
126   \ DeclareRobustCommand #1{\@fontswitch {#2}{#3}}%
127 }

```

(End definition for `\DeclareOldFontCommand`.)

- `\@fontswitch` These two commands actually do the necessary tests and declarative font- or alphabet-changing.

```

128 \def \@fontswitch #1#2{%
129   \ifmmode
130     \let \math@bgroup \relax
131     \def \math@egroup {\let \math@bgroup \math@bgroup
132                           \let \math@egroup \math@egroup}%

```

We need to have a `\relax` in the following line in case the #2 is something like `\mathsf` grabbing the next token as an argument. For this reason the code also uses explicit arguments again (see pr/1275).

```
133      #2\relax
134  \else
135    #1%
136  \fi
137 }
138 \let \@@math@bgroup \math@bgroup
139 \let \@@math@egroup \math@egroup

(End definition for \fontswitch, \math@bgroup, and \math@egroup.)
```

These commands are available only in the preamble.

```
140 \onlypreamble \DeclareTextFontCommand
141 \onlypreamble \DeclareOldFontCommand
```

3 Initialization

`\normalsize` This is defined to produce an error.

```
142 \def\normalsize{%
143   \@latex@error {The font size command \protect\normalsize\space
144     is not defined:\MessageBreak
145     there is probably something wrong with
146     the class file}\@eha
147 }
148 ⟨/2ekernel⟩
```

(End definition for `\normalsize`.)

File A

lttextcomp.dtx

This file contains the implementation for accessing the glyphs provided by the TS1 encoding (Text Companion Encoding). This is now offered as part of the kernel and so the `textcomp` package which used to provide the definitions is now mainly needed for compatibility reasons (and doesn't do much any more).

```
\oldstylenums  
\legacyoldstylenums
```

Preserve the old definition of `\oldstylenums` under a different name.

This macro implements old style numerals but only works if we assume that the standard math fonts are used. Thus it needs changing in case other math encodings are used.

```
1  {*2ekernel | latexrelease}  
2  {latexrelease}\IncludeInRelease{2020/02/02}%  
3  {latexrelease}          {\oldstylenums}{Old style numerals}%  
4  \DeclareRobustCommand\legacyoldstylenums[1]{%  
5    \begingroup
```

Provide spacing using the interword space of the current font.

```
6    \spaceskip\fontdimen\tw@\font
```

Then switch to the math italic font. We don't change the current value of `\f@series` which means that you can use bold numerals if `\bfseries` is in force. As family we use `\rmdefault` which means that this only works if there exist an OML encoded version of that font or rather a corresponding .fd file (which is the case for standard L^AT_EX fonts even though they only contain substitutions).

```
7    \usefont{OML}{\rmdefault}{\f@series}{it}%  
8    \mathgroup\symletters #1%  
9    \endgroup  
10 }
```

And here is the improved one that adjusts depending on surroundings.

```
11 \DeclareRobustCommand\oldstylenums[1]{%  
12   \begingroup  
13   \ifmmode  
14     \mathgroup\symletters #1%  
15   \else
```

The `\CheckEncodingSubset` is discussed below.

```
16   \CheckEncodingSubset\use@text@encoding{TS1}\tc@oldstylesubst2{{#1}}%  
17   \fi  
18   \endgroup  
19 }
```

The helper to select the substitution if needed.

```
20 \def\tc@oldstylesubst#1{  
21   \tc@errorwarn  
22   {Oldstyle digits unavailable for  
23    family \f@family.\MessageBreak  
24    Default oldstyle digits used instead}\@eha  
25   \bgroup  
26     \expand@font@defaults
```

The substitution defaults are provided in the file `fonttext.ltx`.

```
27   \ifx\f@family\rmdef@ult
28     \fontfamily\rmsubstdefault
29   \else\ifx\f@family\sfdef@ult
30     \fontfamily\sfsbstdefault
31   \else\ifx\f@family\ttdef@ult
32     \fontfamily\ttsbstdefault
33   \else
34     \fontfamily\textcompsubstdefault
35   \fi\fi\fi
36   \fontencoding{TS1}\selectfont#1%
37 \egroup
38 }
```

(End definition for `\oldstylenums` and `\legacyoldstylenums`.)

`\textcompsubstdefault` Here is the default for the “unknown” case:

```
39 \def\textcompsubstdefault{\rmsubstdefault}
```

(End definition for `\textcompsubstdefault`.)

```
40 </2ekernel | latexrelease>
41 <latexrelease>\EndIncludeInRelease
42 <latexrelease>\IncludeInRelease{0000/00/00}%
43 <latexrelease>          {\oldstylenums}{Old style numerals}%
44 <latexrelease>
45 <latexrelease>\DeclareRobustCommand\oldstylenums[1]{%
46 <latexrelease>  \begingroup
47 <latexrelease>  \spaceskip\fontdimen\tw@\font
48 <latexrelease>  \usefont{OML}{\rmdefault}{\f@series}{it}%
49 <latexrelease>  \mathgroup\symletters #1%
50 <latexrelease>  \endgroup
51 <latexrelease>}
52 <latexrelease>\let\legacyoldstylenums\undefined
53 <latexrelease>\def\textcompsubstdefault{cmr}
54 <latexrelease>
55 <latexrelease>\EndIncludeInRelease
```

Everything else in the this file got introduced 2020/02/02, so we do a single rollback (for now).

```
56 <*2ekernel>
57 </2ekernel>
58 <*2ekernel | latexrelease>
59 <latexrelease>\IncludeInRelease{2020/02/02}%
60 <latexrelease>  {\DeclareEncodingSubset}{Text companion symbols}%
```

`\DeclareEncodingSubset` The declaration takes 3 mandatory arguments: an *encoding* for which a subsetting is wanted (currently always TS1, and most likely forever), the *font family* for which we declare the subset and finally the *subset* number (between 0 (all of the encoding is supported) and 9 many glyphs are missing).

For TS1 the numbers have been choosen in a way that most fonts can be fairly correctly categorized, but the default settings are always conservative, that is they may claim that less glyphs are supported than there actually are.

As these days many font families are set up to end in -LF (lining figures), -OsF (oldstyle figures), etc. the declaration supports a shortcut: if the *font family* name ends in -* then the star gets replaced by these common ending, e.g.,

```
\DeclareEncodingSubset{TS1}{Alegreya-*}{2}
```

is the same as writing

```
\DeclareEncodingSubset{TS1}{Alegreya-LF}{2}
\DeclareEncodingSubset{TS1}{Alegreya-OsF}{2}
\DeclareEncodingSubset{TS1}{Alegreya-TLF}{2}
\DeclareEncodingSubset{TS1}{Alegreya-T0sF}{2}
```

If only some are needed then one can define them individually but in many cases all four are wanted, hence the shortcut.

The coding of the declaration has no error checking as it is mostly for internal use.

```
61 \def\DeclareEncodingSubset#1#2{%
62   \DeclareEncodingSubset@aux{#1}#2*\ DeclareEncodingSubset@aux
63 }
64 \def\DeclareEncodingSubset@aux#1#2*#3\DeclareEncodingSubset@aux#4{%
```

if #3 is empty then there was no star, otherwise we define all four variants.

```
65   \expandafter\ifx\expandafter X\detokenize{#3}X%
66     \@DeclareEncodingSubset{#1}{#2}{#4}%
67   \else
68     \@DeclareEncodingSubset{#1}{#2LF}{#4}%
69     \@DeclareEncodingSubset{#1}{#2TLF}{#4}%
70     \@DeclareEncodingSubset{#1}{#20sF}{#4}%
71     \@DeclareEncodingSubset{#1}{#2T0sF}{#4}%
72   \fi
73 }
```

The subset info is stored in a command with the name `\family:subset` so if that already exists we change otherwise declare a subset.

```
74 \def\@DeclareEncodingSubset#1#2#3{%
75   \@ifundefined{#1:#2}%
76     {\@font@info{Setting #2 sub-encoding to #1/#3}}%
77     {\@font@info{Changing #2 sub-encoding to #1/#3}}%
78   \@namedef{#1:#2}{#3}}
```

Any reason to allow those in the middle of documents?

```
79 \@onlypreamble\DeclareEncodingSubset
80 \@onlypreamble\DeclareEncodingSubset@aux
81 \@onlypreamble\@DeclareEncodingSubset
```

(End definition for `\DeclareEncodingSubset`.)

`\CheckEncodingSubset` The command `\CheckEncodingSubset` will check if the current font family has the right encoding subset to typeset a certain command. It takes five arguments as follows: first argument is either `\UseTextSymbol`, `\UseTextAccent` depending on whether or not the symbol is a text symbol or a text accent.

The second argument is the encoding from which this symbol should be fetched.

The third argument is either a fake accessor command or an error message. the code in that argument (if ever executed) receives two arguments: #2 and #5 of `\CheckEncodingSubset`.

Argument four is the subset encoding id to test against: if this value is higher than the subset id of the current font family then we typeset the symbol, i.e., execute `#1{#2}#5` otherwise it runs `#3#5`, e.g., to produce an error message or fake the glyph somehow.

Argument five is the symbol or accent command that is being checked.

For usage examples see definitions below.

```

82 \def\CheckEncodingSubset#1#2#3#4#5{%
83   \ifnum #4>%
84     \expandafter\ifx\csname #2:\f@family\endcsname\relax
85       \csname #2:?\endcsname
86     \else
87       \csname #2:\f@family\endcsname
88     \fi
89   \relax
90   \expandafter\@firstoftwo
91 \else
92   \expandafter\@secondoftwo
93 \fi
94 {#1{#2}}{#3}%
95 #5%
96 }

```

(End definition for `\CheckEncodingSubset`.)

To set up the glyphs for the subsets we need a number helpers.

`\tc@errorwarn` To we produce errors, warnings, or only info in the transcripts if glyphs require substitutions? By default it is “info” only. With the `textcomp` package that can be changed.

```
97 \def\tc@errorwarn#1#2{\@latex@info{#1}}
```

(End definition for `\tc@errorwarn`.)

```

\tc@subst
98 \def\tc@subst#1{%
99   \tc@errorwarn
100  {Symbol \string#1 not provided by\MessageBreak
101    font family \f@family\space
102    in TS1 encoding.\MessageBreak Default family used instead}\@eha
103 \bgroup
104   \expand@font@defaults
105   \ifx\f@family\rmdef@ult
106     \fontfamily\rmsubstdefault
107   \else\ifx\f@family\sfdef@ult
108     \fontfamily\sfsbstdefault
109   \else\ifx\f@family\ttdef@ult
110     \fontfamily\ttsbstdefault
111   \else
112     \fontfamily\textcompsbstdefault
113   \fi\fi\fi

```

Whatever default was chosen, we claim now (locally hopefully) that it can handle all slots (even if not true) to avoid looping in certain situations, e.g., when something was set up incorrectly.

```

114  \@namedef{TS1:\f@family}{0}%
115  \selectfont{#1}%
116 \egroup
117 }
```

(End definition for \tc@subst.)

\tc@fake@euro \tc@fake@euro is an example of a “fake” definition to use in arg #3 of \CheckEncodingSubset when a symbol is not available in a certain font family. Here we produce a poor man’s Euro symbol by combining a “C” with a “=”.

```
118 \def\tc@fake@euro#1{%
119   \leavevmode
120   \@font@info{Faking \noexpand#1for font family
121           \f@family\MessageBreak in TS1 encoding}%
122   \valign{\#`\cr
123     \vfil\hbox to 0.07em{\dimen@\f@size\p@
124       \math@fontsfalse
125       \fontsize{.7\dimen@}\z@\selectfont=\hss}%
126     \vfil\cr%
127     \hbox{C}\crcr
128   }%
129 }
```

(End definition for \tc@fake@euro.)

\tc@check@symbol \tc@check@symbol These are two abbreviations that we use below to check symbols and accents in TS1.
\tc@check@accent Only there to save some space, e.g., we can then write

```
DeclareTextCommandDefault{\textcurrency}{\tc@check@symbol3\textcurrency}
```

to ensure that \textcurrency is only typeset if the current font has a TS1 subset id of less than 3. Otherwise \tc@error is called telling the user that for this font family \textcurrency is not available.

```
130 \def\tc@check@symbol{\CheckEncodingSubset\UseTextSymbol{TS1}\tc@subst}
```

Accents and been mad an error in the textcomp package when not available. Now that we provide the functionality in the kernel we avoid the eror by swapping in a T1 accent if the TS1 accent is not available.

```
131 \% \def\tc@check@accent{\CheckEncodingSubset\UseTextAccent{TS1}\tc@error}
```

```
132 \def\tc@check@accent#1{\CheckEncodingSubset\UseTextAccent{TS1}{\tc@swap@accent#1}}
```

```
133 \def\tc@swap@accent#1#2{\UseTextAccent{T1}#1}
```

(End definition for \tc@check@symbol and \tc@check@accent.)

1 Sub-encodings

Here are the default definitions for the TS1 symbols. First those that we assume are always available if a font implements TS1.

```
134 \DeclareTextSymbolDefault{\textdollar}{TS1}
135 \UndeclareTextCommand{\textdollar} {OT1}          % don't use the OT1 def any longer
136 \DeclareTextSymbolDefault{\textsterling}{TS1}
137 \UndeclareTextCommand{\textsterling}{OT1}         % don't use the OT1 def any longer
138 \DeclareTextSymbolDefault{\textperthousand}{TS1}
139 \UndeclareTextCommand{\textperthousand}{T1}        % don't use the T1 def
```

Using `\UndeclareTextCommand` above is enough only if the encoding definition files are not reloaded afterwards. In the past that happened if `fontenc` was used in the document preamble (not any longer). So in some sense it is better to fully remove them from the encoding files, but for rollbacks it is easier to keep them in for now.

These are the standard `itemize` and footnote symbols originally taken from OMS and now from TS1:

```

140 \DeclareTextSymbolDefault{\textasteriskcentered}{TS1}
141 \DeclareTextSymbolDefault{\textbullet}{TS1}
142 \DeclareTextSymbolDefault{\textdaggerdbl}{TS1}
143 \DeclareTextSymbolDefault{\textdagger}{TS1}
144 \DeclareTextSymbolDefault{\textparagraph}{TS1}
145 \DeclareTextSymbolDefault{\textperiodcentered}{TS1}
146 \DeclareTextSymbolDefault{\textsection}{TS1}

```

And here are the other TS1 glyphs that are implemented by every font (or nearly everyone—a few are commented out and moved to sub-encoding 9, because they aren't around in one or two fonts).

```

147 %%\DeclareTextSymbolDefault{\textbardbl}{TS1} % subst in sub-enc 9 above
148 \DeclareTextSymbolDefault{\textbrokenbar}{TS1}
149 %%\DeclareTextSymbolDefault{\textcelsius}{TS1} % subst in sub-enc 9 above
150 \DeclareTextSymbolDefault{\textcent}{TS1}
151 \DeclareTextSymbolDefault{\textcopyright}{TS1}
152 \DeclareTextSymbolDefault{\textdegree}{TS1}
153 \DeclareTextSymbolDefault{\textdiv}{TS1}
154 \DeclareTextSymbolDefault{\textlnot}{TS1}
155 \DeclareTextSymbolDefault{\textonehalf}{TS1}
156 \DeclareTextSymbolDefault{\textonequarter}{TS1}
157 %%\DeclareTextSymbolDefault{\textonesuperior}{TS1} % subst in sub-enc 9 above
158 \DeclareTextSymbolDefault{\textordfeminine}{TS1}
159 \DeclareTextSymbolDefault{\textordmasculine}{TS1}
160 \DeclareTextSymbolDefault{\textpm}{TS1}
161 \DeclareTextSymbolDefault{\textquotesingle}{TS1}
162 \DeclareTextSymbolDefault{\textquotestraightbase}{TS1}
163 \DeclareTextSymbolDefault{\textquotestraightdblbase}{TS1}
164 \DeclareTextSymbolDefault{\textregistered}{TS1}
165 %%\DeclareTextSymbolDefault{\textthreequartersemdash}{TS1} % subst in sub-enc 9 above
166 \DeclareTextSymbolDefault{\textthreequarters}{TS1}
167 %%\DeclareTextSymbolDefault{\textthreesuperior}{TS1} % subst in sub-enc 9 above
168 \DeclareTextSymbolDefault{\texttimes}{TS1}
169 \DeclareTextSymbolDefault{\texttrademark}{TS1}
170 %%\DeclareTextSymbolDefault{\texttwelveudash}{TS1} % subst in sub-enc 9 above
171 %%\DeclareTextSymbolDefault{\texttwosuperior}{TS1} % subst in sub-enc 9 above
172 \DeclareTextSymbolDefault{\textyen}{TS1}
173 \DeclareTextSymbolDefault{\textcapitalcompwordmark}{TS1}
174 \DeclareTextSymbolDefault{\textascendercompwordmark}{TS1}

```

In the following sections the remaining default definitions are ordered by sub-encoding in which they become unavailable (i.e., they are not provided in the sub-encoding with that number and all sub-encodings with higher numbers).

Thus the symbols that are available in sub-encoding x are the symbols above (always available) and the symbols listed in the sections for sub-encodings $x + 1$ and higher.

1.1 Sub-encoding 1 (drop symbols not working in Latin Modern)

The `\textcircled` is available but the glyph is simply too small so we keep using the OMS glyph.

```
175 \DeclareTextCommandDefault{\textcircled}{  
176   {\CheckEncodingSubset\UseTextAccent{TS1}{\UseTextAccent{OMS}}1\textcircled}}
```

1.2 Sub-encoding 2 (majority of new OTF fonts via autoinst)

```
177 \DeclareTextCommandDefault{\t}{  
178   {\CheckEncodingSubset\UseTextAccent{TS1}{\UseTextAccent{OML}}2\t}}
```

Capital accents are really only very seldom implemented, so from sub-encoding 2 onwards we use the normal T1 accents if they are asked for in the document.

In Unicode engines we don't implement them at all but always use the basic accents instead. whether that works or not really depends on the font, something like `\"X` usually comes out wrong in Unicode engines.

```
179 \ifx\Umathcode\@undefined  
180   \DeclareTextCommandDefault{\capitalacute}{\tcc@check@accent{\'}2\capitalacute}  
181   \DeclareTextCommandDefault{\capitalbreve}{\tcc@check@accent{\u}2\capitalbreve}  
182   \DeclareTextCommandDefault{\capitalcaron}{\tcc@check@accent{\v}2\capitalcaron}  
183   \DeclareTextCommandDefault{\capitalcedilla}{\tcc@check@accent{\c}2\capitalcedilla}  
184   \DeclareTextCommandDefault{\capitalcircumflex}{\tcc@check@accent{\^}2\capitalcircumflex}  
185   \DeclareTextCommandDefault{\capitaldieresis}{\tcc@check@accent{\\"}2\capitaldieresis}  
186   \DeclareTextCommandDefault{\capitaldotaccent}{\tcc@check@accent{\.}2\capitaldotaccent}  
187   \DeclareTextCommandDefault{\capitalgrave}{\tcc@check@accent{\'}2\capitalgrave}  
188   \DeclareTextCommandDefault{\capitalhungarumlaut}{\tcc@check@accent{\H}2\capitalhungarumlaut}  
189   \DeclareTextCommandDefault{\capitalmacron}{\tcc@check@accent{\=}2\capitalmacron}  
190   \DeclareTextCommandDefault{\capitalogonek}{\tcc@check@accent{\k}2\capitalogonek}  
191   \DeclareTextCommandDefault{\capitalring}{\tcc@check@accent{\r}2\capitalring}  
192   \DeclareTextCommandDefault{\capitaltie}{\tcc@check@accent{\t}2\capitaltie}  
193   \DeclareTextCommandDefault{\capitaltilde}{\tcc@check@accent{\~}2\capitaltilde}
```

For `\newtie` and `\capitalnewtie` this is actually wrong, they should pick up the accent from the substitution font (not done yet).

```
194 \DeclareTextCommandDefault{\newtie}{\tcc@check@accent{\t}2\newtie}  
195 \DeclareTextCommandDefault{\capitalnewtie}{\tcc@check@accent{\t}2\capitalnewtie}
```

In Unicode engines we just execute the simple accents:

```
196 \else  
197   \DeclareTextCommandDefault{\capitalacute}{\@tabacckludge'}  
198   \DeclareTextCommandDefault{\capitalbreve}{\u}  
199   \DeclareTextCommandDefault{\capitalcaron}{\v}  
200   \DeclareTextCommandDefault{\capitalcedilla}{\c}  
201   \DeclareTextCommandDefault{\capitalcircumflex}{\^}  
202   \DeclareTextCommandDefault{\capitaldieresis}{\\"}  
203   \DeclareTextCommandDefault{\capitaldotaccent}{\.}  
204   \DeclareTextCommandDefault{\capitalgrave}{\@tabacckludge'}  
205   \DeclareTextCommandDefault{\capitalhungarumlaut}{\H}  
206   \DeclareTextCommandDefault{\capitalmacron}{\@tabacckludge=}  
207   \DeclareTextCommandDefault{\capitalnewtie}{\t}  
208   \DeclareTextCommandDefault{\capitalogonek}{\k}  
209   \DeclareTextCommandDefault{\capitalring}{\r}  
210   \DeclareTextCommandDefault{\capitaltie}{\t}  
211   \DeclareTextCommandDefault{\capitaltilde}{\~}
```

```

212  \DeclareTextCommandDefault{\newtie}{\t}
213  \fi
```

The next two symbols exist in some fonts (faked?), but we ignore that to keep the subsets reasonable compact and most important linear.

```

214  \DeclareTextCommandDefault{\textlbrackdbl}    {\textlbrackdbl}
215  \DeclareTextCommandDefault{\textrbrackdbl}    {\textrbrackdbl}
```

Old style numerals are again in some fonts but using -OsF, etc. is the better approach to get them, so we claim they aren't in sub-encoding 2 as that's true for most fonts.

```

216  \DeclareTextCommandDefault{\texteightholdstyle} {\texteightholdstyle}
217  \DeclareTextCommandDefault{\textfiveoldstyle}    {\textfiveoldstyle}
218  \DeclareTextCommandDefault{\textfouroldstyle}   {\textfouroldstyle}
219  \DeclareTextCommandDefault{\textnineoldstyle}   {\textnineoldstyle}
220  \DeclareTextCommandDefault{\textoneoldstyle}    {\textoneoldstyle}
221  \DeclareTextCommandDefault{\textsevenoldstyle} {\textsevenoldstyle}
222  \DeclareTextCommandDefault{\textsixoldstyle}   {\textsixoldstyle}
223  \DeclareTextCommandDefault{\textthreeoldstyle} {\textthreeoldstyle}
224  \DeclareTextCommandDefault{\texttwooldstyle}   {\texttwooldstyle}
225  \DeclareTextCommandDefault{\textzerooldstyle}  {\textzerooldstyle}
```

The next set of glyphs is special to TeX fonts (and available with a few older PS fonts supported in the virtual fonts), but not any longer in the majority of fonts provided through autoinst, so we pretend there aren't available in sub-encoding 2 and below.

```

226  \DeclareTextCommandDefault{\textacutedbl}      {\textacutedbl}
227  \DeclareTextCommandDefault{\textasciacute}     {\textasciacute}
228  \DeclareTextCommandDefault{\textasciibreve}    {\textasciibreve}
229  \DeclareTextCommandDefault{\textasciicaron}    {\textasciicaron}
230  \DeclareTextCommandDefault{\textasciidieresis} {\textasciidieresis}
231  \DeclareTextCommandDefault{\textasciigrave}    {\textasciigrave}
232  \DeclareTextCommandDefault{\textasciimacron}   {\textasciimacron}
233  \DeclareTextCommandDefault{\textgravedbl}      {\textgravedbl}
234  \DeclareTextCommandDefault{\texttildelow}      {\texttildelow}
```

Finally those below are only available in CM-based fonts but in no font that has its origin outside of the TeX world.

```

235  \DeclareTextCommandDefault{\textbaht}          {\textbaht}
236  \DeclareTextCommandDefault{\textbigcircle}     {\textbigcircle}
237  \DeclareTextCommandDefault{\textborn}          {\textborn}
238  \DeclareTextCommandDefault{\textcentoldstyle} {\textcentoldstyle}
239  \DeclareTextCommandDefault{\textcircledP}       {\textcircledP}
240  \DeclareTextCommandDefault{\textcopyleft}      {\textcopyleft}
241  \DeclareTextCommandDefault{\textdblhyphenchar}{\textdblhyphenchar}
242  \DeclareTextCommandDefault{\textdblhyphen}     {\textdblhyphen}
243  \DeclareTextCommandDefault{\textdied}          {\textdied}
244  \DeclareTextCommandDefault{\textdiscount}     {\textdiscount}
245  \DeclareTextCommandDefault{\textdivorced}      {\textdivorced}
246  \DeclareTextCommandDefault{\textdollaroldstyle}{\textdollaroldstyle}
247  \DeclareTextCommandDefault{\textguarani}        {\textguarani}
248  \DeclareTextCommandDefault{\textleaf}          {\textleaf}
249  \DeclareTextCommandDefault{\textlquill}         {\textlquill}
250  \DeclareTextCommandDefault{\textmarried}       {\textmarried}
251  \DeclareTextCommandDefault{\textmho}           {\textmho}
252  \DeclareTextCommandDefault{\textmusicalnote}  {\textmusicalnote}
253  \DeclareTextCommandDefault{\textnaira}         {\textnaira}
254  \DeclareTextCommandDefault{\textopenbullet}    {\textopenbullet}
```

```

255 \DeclareTextCommandDefault{\textpeso}          {\textpeso}
256 \DeclareTextCommandDefault{\textpilcrow}        {\textpilcrow}
257 \DeclareTextCommandDefault{\textrecipe}         {\textrecipe}
258 \DeclareTextCommandDefault{\textreferencemark}  {\textreferencemark}
259 \DeclareTextCommandDefault{\textrquill}          {\textrquill}
260 \DeclareTextCommandDefault{\textservicemark}    {\textservicemark}
261 \DeclareTextCommandDefault{\textsurd}           {\textsurd}

```

The `\textpertenthousand` also belongs in this group but here we have a choice: in T1 there is definition for `\textpertenthousand` making the symbol up from % and `\char 24` (twice) but in many fonts that char doesn't exist and the slot is reused for random ligatures. So better not use it because often it is wrong. But pointing to TS1 is also not great as only a few fonts have it as a real symbol, so we get a substitution to CM or LM.

Alternatively we could just state that the symbol is unavailable in those fonts. For now I substitute.

```

262 \DeclareTextCommandDefault{\textpertenthousand} {\textpertenthousand}
263 \UndeclareTextCommand{\textpertenthousand}{T1}

```

1.3 Sub-encoding 3

Sub-encoding 2 is the one where we loose many symbols. In the higher-numbered sub-encodings we see only a few dropped additionally.

```

264 \DeclareTextCommandDefault{\textlangle}          {\textlangle}
265 \DeclareTextCommandDefault{\textrangle}          {\textrangle}

```

1.4 Sub-encoding 4

```

266 \DeclareTextCommandDefault{\textcolonmonetary}  {\textcolonmonetary}
267 \DeclareTextCommandDefault{\textdong}             {\textdong}
268 \DeclareTextCommandDefault{\textdownarrow}        {\textdownarrow}
269 \DeclareTextCommandDefault{\textleftarrow}        {\textleftarrow}
270 \DeclareTextCommandDefault{\textlira}              {\textlira}
271 \DeclareTextCommandDefault{\textrightarrow}       {\textrightarrow}
272 \DeclareTextCommandDefault{\textuparrow}           {\textuparrow}
273 \DeclareTextCommandDefault{\textwon}              {\textwon}

```

1.5 Sub-encoding 5 (most older PS fonts)

Most older PS fonts (supported in TeX since the early nineties when virtual fonts became available) are sorted under this sub-encoding. But in reality, many of them don't have all glyphs that should be available in sub-encoding 5. Instead they show little squares, i.e., they produce "tofu" if you are unlucky.

But the coverage is so random that it is impossible to sort them properly and if we tried to ensure that they only typeset those glyphs that are really always available we would put them all into sub-encoding 9 so that's a compromise really.

Modern fonts that don't typeset a tofu character if a glyph is missing are only catalogued as sub-encoding 5 if they really support of its glyph set.

```

274 \DeclareTextCommandDefault{\textestimated}     {\textestimated}
275 \DeclareTextCommandDefault{\textnumero}         {\textnumero}

```

1.6 Sub-encoding 6

```
276 \DeclareTextCommandDefault{\textflorin} {\tc@check@symbol6\textflorin}  
277 \DeclareTextCommandDefault{\textcurrency} {\tc@check@symbol6\textcurrency}
```

1.7 Sub-encoding 7

```
278 \DeclareTextCommandDefault{\textfractionsolidus}{\tc@check@symbol7\textfractionsolidus}  
279 \DeclareTextCommandDefault{\textohm} {\tc@check@symbol7\textohm}  
280 \DeclareTextCommandDefault{\textmu} {\tc@check@symbol7\textmu}  
281 \DeclareTextCommandDefault{\textminus} {\tc@check@symbol7\textminus}
```

1.8 Sub-encoding 8

```
282 \DeclareTextCommandDefault{\textblank} {\tc@check@symbol{8}\textblank}  
283 \DeclareTextCommandDefault{\textinterrobangdown}{\tc@check@symbol{8}\textinterrobangdown}  
284 \DeclareTextCommandDefault{\textinterrobang} {\tc@check@symbol{8}\textinterrobang}
```

Fonts with this sub-encoding don't have a Euro symbol, but instead of substituting we fake it.

```
285 \DeclareTextCommandDefault{\texteuro} {\CheckEncodingSubset\UseTextSymbol{TS1}\tc@fake@euro{8}\texteuro}
```

1.9 Sub-encoding 9 (most missing)

```
287 \DeclareTextCommandDefault{\textcelsius}{\tc@check@symbol{9}\textcelsius}  
288 \DeclareTextCommandDefault{\textonesuperior}{\tc@check@symbol{9}\textonesuperior}  
289 \DeclareTextCommandDefault{\textthreequartersemdash}{\tc@check@symbol{9}\textthreequartersemdash}  
290 \DeclareTextCommandDefault{\textthreesuperior}{\tc@check@symbol{9}\textthreesuperior}  
291 \DeclareTextCommandDefault{\texttwelveudash}{\tc@check@symbol{9}\texttwelveudash}  
292 \DeclareTextCommandDefault{\texttwosuperior}{\tc@check@symbol{9}\texttwosuperior}  
293 \DeclareTextCommandDefault{\textbardbl}{\tc@check@symbol{9}\textbardbl}
```

2 Unicode engine specials

If we are using a unicode engine we handle some glyphs differently, so this here are the definitions for the Unicode encoding (overwriting the defaults above).

```
294 \ifx \Umathcode\@undefined \else
```

This set should be taken from TS1 encoding even if it means you get it from the default font for that encoding.

```
295 \% \DeclareTextSymbol{\textcopyright}{TS1}{171}  
296 \% \DeclareTextSymbol{\textdblyhyphen}{TS1}{45}  
297 \% \DeclareTextSymbol{\textdblyhyphenchar}{TS1}{127}  
298 \% \DeclareTextSymbol{\textquotestraightbase}{TS1}{13}  
299 \% \DeclareTextSymbol{\textquotestraightdblbase}{TS1}{18}  
300 \% \DeclareTextSymbol{\textleaf}{TS1}{108}  
301 \% \DeclareTextSymbol{\texttwelveudash}{TS1}{21}  
302 \% \DeclareTextSymbol{\textthreequartersemdash}{TS1}{22}
```

If oldstyle numerals are asked for we just use \oldstylenums.

```
303 \DeclareTextCommand{\textzerooldstyle} \UnicodeEncodingName{\oldstylenums{0}}  
304 \DeclareTextCommand{\textoneoldstyle} \UnicodeEncodingName{\oldstylenums{1}}  
305 \DeclareTextCommand{\texttwooldstyle} \UnicodeEncodingName{\oldstylenums{2}}  
306 \DeclareTextCommand{\textthreeoldstyle} \UnicodeEncodingName{\oldstylenums{3}}  
307 \DeclareTextCommand{\textfouroldstyle} \UnicodeEncodingName{\oldstylenums{4}}  
308 \DeclareTextCommand{\textfiveoldstyle} \UnicodeEncodingName{\oldstylenums{5}}
```

```

309 \DeclareTextCommand{\textsixoldstyle} \UnicodeEncodingName{\oldstylenums{6}}
310 \DeclareTextCommand{\textsevenoldstyle}\UnicodeEncodingName{\oldstylenums{7}}
311 \DeclareTextCommand{\texteightoldstyle}\UnicodeEncodingName{\oldstylenums{8}}
312 \DeclareTextCommand{\textnineoldstyle} \UnicodeEncodingName{\oldstylenums{9}}

```

These have Unicode slots so this should be integrated into TU explicitly

```

313 \DeclareTextSymbol{\textpilcrow} \UnicodeEncodingName{"00B6}
314 \DeclareTextSymbol{\textborn} \UnicodeEncodingName{"002A}
315 \DeclareTextSymbol{\textdied} \UnicodeEncodingName{"2020}
316 \DeclareTextSymbol{\textlbrackdbl} \UnicodeEncodingName{"27E6}
317 \DeclareTextSymbol{\textrbrackdbl} \UnicodeEncodingName{"27E7}
318 \DeclareTextSymbol{\textguarani} \UnicodeEncodingName{"20B2}

```

We could make `\textcentoldstyle` and `\textdollaroldstyle` point to dollar and cent in the Unicode encoding

```

319 \% \DeclareTextSymbol{\textcentoldstyle} \UnicodeEncodingName{"00A2}
320 \% \DeclareTextSymbol{\textdollaroldstyle} \UnicodeEncodingName{"0024}

```

but I think it is better to pick them up from TS1 even if that usually means LMR fonts

```

321 \DeclareTextSymbol{\textdollaroldstyle}{TS1}{138}
322 \DeclareTextSymbol{\textcentoldstyle} {TS1}{139}
323 \fi % --- END of Unicode engines specials

```

3 Font family sub-encodings setup

We declare the subsets for a good number of fonts in the kernel ...

But first the default for anything that is not declared. We use 9 which is most likely much too conservative, but with the advantage that we aren't getting missing glyphs (or at least that this is very unlikely). For nearly all font in the TeX Live distribution of 2019 "correct" classifications are given below, so that this default is only used for new font families, and over time the right classifications can be added here too.

```
324 \DeclareEncodingSubset{TS1}{?}{9}
```

This first block contains the fonts that have been already supported by the `textcomp` package way back, i.e., the font families that have TeX support since the mid-nineties.

```

325 \DeclareEncodingSubset{TS1}{ccr} {0}
326 \DeclareEncodingSubset{TS1}{cmbr} {0}
327 \DeclareEncodingSubset{TS1}{cmr} {0}
328 \DeclareEncodingSubset{TS1}{cmss} {0}
329 \DeclareEncodingSubset{TS1}{cmtl} {0}
330 \DeclareEncodingSubset{TS1}{cmtt} {0}
331 \DeclareEncodingSubset{TS1}{cmvtt} {0}
332 \DeclareEncodingSubset{TS1}{pxr} {0}
333 \DeclareEncodingSubset{TS1}{pxss} {0}
334 \DeclareEncodingSubset{TS1}{pxtt} {0}
335 \DeclareEncodingSubset{TS1}{qag} {0}
336 \DeclareEncodingSubset{TS1}{qbk} {0}
337 \DeclareEncodingSubset{TS1}{qcr} {0}
338 \DeclareEncodingSubset{TS1}{qcs} {0}
339 \DeclareEncodingSubset{TS1}{qhvc} {0}
340 \DeclareEncodingSubset{TS1}{qhv} {0}
341 \DeclareEncodingSubset{TS1}{qp1} {0}
342 \DeclareEncodingSubset{TS1}{qtm} {0}

```

```

343 \DeclareEncodingSubset{TS1}{qzc} {0}
344 \DeclareEncodingSubset{TS1}{txr} {0}
345 \DeclareEncodingSubset{TS1}{txss} {0}
346 \DeclareEncodingSubset{TS1}{txtt} {0}

347 \DeclareEncodingSubset{TS1}{lmr} {1}
348 \DeclareEncodingSubset{TS1}{lmdh} {1}
349 \DeclareEncodingSubset{TS1}{lmss} {1}
350 \DeclareEncodingSubset{TS1}{lmssq} {1}
351 \DeclareEncodingSubset{TS1}{lmvtt} {1}
352 \DeclareEncodingSubset{TS1}{lmtt} {1} % missing TM, SM, pertenthousand for some reason

353 \DeclareEncodingSubset{TS1}{ptmx} {2}
354 \DeclareEncodingSubset{TS1}{ptmj} {2}
355 \DeclareEncodingSubset{TS1}{u18} {2}

356 \DeclareEncodingSubset{TS1}{bch} {5} % tofu for blank, ohm
357 \DeclareEncodingSubset{TS1}{futj} {5} % tofu for blank, interrobang/down, ohm
358 \DeclareEncodingSubset{TS1}{futs} {5} % tofu for blank, ohm
359 \DeclareEncodingSubset{TS1}{futx} {5} % probably (currently broken distrib)
360 \DeclareEncodingSubset{TS1}{pag} {5} % tofu for blank, interrobang/down, ohm
361 \DeclareEncodingSubset{TS1}{pbk} {5} % tofu for blank, interrobang/down, ohm
362 \DeclareEncodingSubset{TS1}{pcr} {5} % tofu for blank, interrobang/down, ohm
363 \DeclareEncodingSubset{TS1}{phv} {5} % tofu for blank, interrobang/down, ohm
364 \DeclareEncodingSubset{TS1}{pnc} {5} % tofu for blank, interrobang/down, ohm
365 \DeclareEncodingSubset{TS1}{pplj} {5} % tofu for blank
366 \DeclareEncodingSubset{TS1}{pplx} {5} % tofu for blank
367 \DeclareEncodingSubset{TS1}{ppl} {5} % tofu for blank interrobang/down
368 \DeclareEncodingSubset{TS1}{ptm} {5} % tofu for blank, interrobang/down, ohm
369 \DeclareEncodingSubset{TS1}{pzc} {5} % tofu for blank, interrobang/down, ohm
370 \DeclareEncodingSubset{TS1}{u19} {5} % tofu for blank, interrobang/down, ohm

371 \DeclareEncodingSubset{TS1}{dayroms} {6} % tofu for blank, interrobang/down, ohm
372 \DeclareEncodingSubset{TS1}{dayrom} {6} % tofu for blank, interrobang/down, ohm

373 \DeclareEncodingSubset{TS1}{augie} {8} % really only missing euro
374 \DeclareEncodingSubset{TS1}{put} {8}
375 \DeclareEncodingSubset{TS1}{uag} {8} % probably (currently broken distrib)
376 \DeclareEncodingSubset{TS1}{ugq} {8}

377 \DeclareEncodingSubset{TS1}{zi4} {9}

```

LucidaBright (sold through TUG) probably not quite correct, I guess as I have the older fonts ...

```

378 \DeclareEncodingSubset{TS1}{hls} {5}
379 \DeclareEncodingSubset{TS1}{hlst} {5}
380 \DeclareEncodingSubset{TS1}{hlct} {5}
381 \DeclareEncodingSubset{TS1}{hlh} {5}
382 \DeclareEncodingSubset{TS1}{hlx} {8}
383 \DeclareEncodingSubset{TS1}{hlce} {8}
384 \DeclareEncodingSubset{TS1}{hlcn} {8}
385 \DeclareEncodingSubset{TS1}{hlcw} {8}
386 \DeclareEncodingSubset{TS1}{hlcf} {8}

```

Below are the newer fonts that have support files for L^AT_EX. With very few exceptions the classifications are done so that all characters are correctly produced (either being available in the font or substituted).

There are a few fonts that contain “tofu” squares in places (instead of a real glyph) and in a few cases some really seldom needed chars are unavailable, i.e., produce missing glyphs (to avoid that a large number of available chars are unnecessarily substituted).

```

387 \DeclareEncodingSubset{TS1}{lato-*} {0} % with a bunch of tofu inside
388 \DeclareEncodingSubset{TS1}{opensans-*} {0} % with a bunch of tofu inside
389 \DeclareEncodingSubset{TS1}{cantarell-*} {0} % with a bunch of tofu inside
390 \DeclareEncodingSubset{TS1}{fbb-*} {0} % missing centoldstyle
391 \DeclareEncodingSubset{TS1}{tl1} {1} % with lots of tofu inside
392 \DeclareEncodingSubset{TS1}{Alegreya-*} {2}
393 \DeclareEncodingSubset{TS1}{AlegreyaSans-*} {2}
394 \DeclareEncodingSubset{TS1}{DejaVuSans-TLF} {2}
395 \DeclareEncodingSubset{TS1}{DejaVuSansCondensed-TLF} {2}
396 \DeclareEncodingSubset{TS1}{DejaVuSansMono-TLF} {2}
397 \DeclareEncodingSubset{TS1}{EBGaramond-*} {2}
398 \DeclareEncodingSubset{TS1}{Tempora-TLF} {2}
399 \DeclareEncodingSubset{TS1}{Tempora-T0sF} {2}
400 \DeclareEncodingSubset{TS1}{Arimo-TLF} {3}
401 \DeclareEncodingSubset{TS1}{Carlito-*} {3}
402 \DeclareEncodingSubset{TS1}{FiraSans-*} {3}
403 \DeclareEncodingSubset{TS1}{IBMPlexSans-TLF} {3}
404 \DeclareEncodingSubset{TS1}{Merriweather-OsF} {3}
405 \DeclareEncodingSubset{TS1}{Montserrat-*} {3}
406 \DeclareEncodingSubset{TS1}{MontserratAlternates-*} {3}
407 \DeclareEncodingSubset{TS1}{SourceCodePro-TLF} {3}
408 \DeclareEncodingSubset{TS1}{SourceCodePro-T0sF} {3}
409 \DeclareEncodingSubset{TS1}{SourceSansPro-*} {3}
410 \DeclareEncodingSubset{TS1}{SourceSerifPro-*} {3}
411 \DeclareEncodingSubset{TS1}{Tinos-TLF} {3}
412 \DeclareEncodingSubset{TS1}{AccanthisADFStdNoThree-LF}{4}
413 \DeclareEncodingSubset{TS1}{Cabin-TLF} {4}
414 \DeclareEncodingSubset{TS1}{Caladea-TLF} {4}
415 \DeclareEncodingSubset{TS1}{Chivo-*} {4}
416 \DeclareEncodingSubset{TS1}{ClearSans-TLF} {4}
417 \DeclareEncodingSubset{TS1}{Coelacanth-LF} {4}
418 \DeclareEncodingSubset{TS1}{CrimsonPro-*} {4}
419 \DeclareEncodingSubset{TS1}{FiraMono-TLF} {4}
420 \DeclareEncodingSubset{TS1}{FiraMono-T0sF} {4}
421 \DeclareEncodingSubset{TS1}{Go-TLF} {4}
422 \DeclareEncodingSubset{TS1}{GoMono-TLF} {4}
423 \DeclareEncodingSubset{TS1}{InriaSans-*} {4}
424 \DeclareEncodingSubset{TS1}{InriaSerif-*} {4}
425 \DeclareEncodingSubset{TS1}{LibertinusSans-*} {4}
426 \DeclareEncodingSubset{TS1}{LibertinusSerif-*} {4}
427 \DeclareEncodingSubset{TS1}{LibreBodoni-TLF} {4}
428 \DeclareEncodingSubset{TS1}{LibreFranklin-TLF} {4}
429 \DeclareEncodingSubset{TS1}{LinguisticsPro-LF} {4}
430 \DeclareEncodingSubset{TS1}{LinguisticsPro-OsF} {4}
431 \DeclareEncodingSubset{TS1}{LinuxBiolinumT-*} {4}
432 \DeclareEncodingSubset{TS1}{LinuxLibertineT-*} {4}
433 \DeclareEncodingSubset{TS1}{MerriweatherSans-OsF} {4}
434 \DeclareEncodingSubset{TS1}{MintSpirit-*} {4}
435 \DeclareEncodingSubset{TS1}{MintSpiritNoTwo-*} {4}

```

```

436 \DeclareEncodingSubset{TS1}{PTMono-TLF} {4}
437 \DeclareEncodingSubset{TS1}{PTSans-TLF} {4}
438 \DeclareEncodingSubset{TS1}{PTSansCaption-TLF} {4}
439 \DeclareEncodingSubset{TS1}{PTSansNarrow-TLF} {4}
440 \DeclareEncodingSubset{TS1}{PTSerif-TLF} {4}
441 \DeclareEncodingSubset{TS1}{PTSerifCaption-TLF} {4}
442 \DeclareEncodingSubset{TS1}{Raleway-TLF} {4}
443 \DeclareEncodingSubset{TS1}{Raleway-T0sF} {4}
444 \DeclareEncodingSubset{TS1}{Roboto-*} {4}
445 \DeclareEncodingSubset{TS1}{RobotoMono-TLF} {4}
446 \DeclareEncodingSubset{TS1}{RobotoSlab-TLF} {4}
447 \DeclareEncodingSubset{TS1}{Rosario-*} {4}
448 \DeclareEncodingSubset{TS1}{SticksTooText-*} {4}
449 \DeclareEncodingSubset{TS1}{UniversalisADFStd-LF} {4}

450 \DeclareEncodingSubset{TS1}{Almendra-0sF} {5}
451 \DeclareEncodingSubset{TS1}{Baskervaldx-*} {5}
452 \DeclareEncodingSubset{TS1}{BaskervilleF-*} {5}
453 \DeclareEncodingSubset{TS1}{Bitter-TLF} {5}
454 \DeclareEncodingSubset{TS1}{Cinzel-LF} {5}
455 \DeclareEncodingSubset{TS1}{CinzelDecorative-LF} {5}
456 \DeclareEncodingSubset{TS1}{DejaVuSerif-TLF} {5}
457 \DeclareEncodingSubset{TS1}{DejaVuSerifCondensed-TLF} {5}
458 \DeclareEncodingSubset{TS1}{GilliusADF-LF} {5}
459 \DeclareEncodingSubset{TS1}{GilliusADFCond-LF} {5}
460 \DeclareEncodingSubset{TS1}{GilliusADFNоТwo-LF} {5}
461 \DeclareEncodingSubset{TS1}{GilliusADFNоТwoCond-LF} {5}
462 \DeclareEncodingSubset{TS1}{LobsterTwo-LF} {5}
463 \DeclareEncodingSubset{TS1}{OldStandard-TLF} {5}
464 \DeclareEncodingSubset{TS1}{PlayfairDisplay-TLF} {5}
465 \DeclareEncodingSubset{TS1}{PlayfairDisplay-T0sF} {5}
466 \DeclareEncodingSubset{TS1}{TheanoDidot-TLF} {5}
467 \DeclareEncodingSubset{TS1}{TheanoDidot-T0sF} {5}
468 \DeclareEncodingSubset{TS1}{TheanoModern-TLF} {5}
469 \DeclareEncodingSubset{TS1}{TheanoModern-T0sF} {5}
470 \DeclareEncodingSubset{TS1}{TheanoOldStyle-TLF} {5}
471 \DeclareEncodingSubset{TS1}{TheanoOldStyle-T0sF} {5}

472 \DeclareEncodingSubset{TS1}{Crimson-TLF} {6}
473 \DeclareEncodingSubset{TS1}{IBMPlexMono-TLF} {6}
474 \DeclareEncodingSubset{TS1}{IBMPlexSerif-TLF} {6}
475 \DeclareEncodingSubset{TS1}{LibertinusMono-TLF} {6}
476 \DeclareEncodingSubset{TS1}{LibertinusSerifDisplay-LF} {6}
477 \DeclareEncodingSubset{TS1}{LinuxLibertineDisplayT-*} {6}
478 \DeclareEncodingSubset{TS1}{LinuxLibertineMonot-LF} {6}
479 \DeclareEncodingSubset{TS1}{LinuxLibertineMonot-TLF} {6}
480 \DeclareEncodingSubset{TS1}{Overlock-LF} {6}

481 \DeclareEncodingSubset{TS1}{CormorantGaramond-*} {7}
482 \DeclareEncodingSubset{TS1}{Heuristica-TLF} {7}
483 \DeclareEncodingSubset{TS1}{Heuristica-T0sF} {7}
484 \DeclareEncodingSubset{TS1}{IMFELLEnglish-TLF} {7}
485 \DeclareEncodingSubset{TS1}{LibreBaskerville-TLF} {7}
486 \DeclareEncodingSubset{TS1}{LibreCaslon-*} {7}
487 \DeclareEncodingSubset{TS1}{Marcellus-LF} {7}
488 \DeclareEncodingSubset{TS1}{NotoSans-*} {7}

```

```

489 \DeclareEncodingSubset{TS1}{NotoSansMono-TLF} {7}
490 \DeclareEncodingSubset{TS1}{NotoSansMono-T0sF} {7}
491 \DeclareEncodingSubset{TS1}{NotoSerif-*} {7}
492 \DeclareEncodingSubset{TS1}{Quattrocento-TLF} {7}
493 \DeclareEncodingSubset{TS1}{QuattrocentoSans-TLF} {7}
494 \DeclareEncodingSubset{TS1}{XCharter-TLF} {7}
495 \DeclareEncodingSubset{TS1}{XCharter-T0sF} {7}
496 \DeclareEncodingSubset{TS1}{erewhon-*} {7}
497 \DeclareEncodingSubset{TS1}{ComicNeue-TLF} {7}
498 \DeclareEncodingSubset{TS1}{ComicNeueAngular-TLF} {7}
499 \DeclareEncodingSubset{TS1}{Forum-LF} {7} % the superiors are missing
500 \DeclareEncodingSubset{TS1}{Cochineal-*} {8}
501 \DeclareEncodingSubset{TS1}{AlgolRevived-TLF} {9}

```

4 Legacy symbol support for lists and footnote symbols

\UseLegacyTextSymbols

```

502 \def\UseLegacyTextSymbols{%
503   \DeclareTextSymbolDefault{\textasteriskcentered}{OMS}%
504   \DeclareTextSymbolDefault{\textbardbl}{OMS}%
505   \DeclareTextSymbolDefault{\textbullet}{OMS}%
506   \DeclareTextSymbolDefault{\textdaggerdbl}{OMS}%
507   \DeclareTextSymbolDefault{\textdagger}{OMS}%
508   \DeclareTextSymbolDefault{\textparagraph}{OMS}%
509   \DeclareTextSymbolDefault{\textperiodcentered}{OMS}%
510   \DeclareTextSymbolDefault{\textsection}{OMS}%
511   \UndeclareTextCommand{\textsection}{T1}%
512   \expandafter\let\csname oldstylenums \expandafter\endcsname
513   \csname legacyoldstylenums \endcsname
514 }

```

(End definition for \UseLegacyTextSymbols.)

```

\textlegacyasteriskcentered
\textlegacybardbl
\textlegacybullet
\textlegacydaggerdbl
\textlegacydagger
\textlegacyparagraph
\textlegacyperiodcentered
\textlegacysection

```

Here are new names for the legacy symbols that L^AT_EX used to pick up from the OMS encoded fonts (and used for itemize lists or footnote symbols).

We go the roundabout way via separate OMS declarations so that

```
\renewcommand\textbullet{\textlegacybullet}
```

doesn't produce an endless loop.

```

515 \DeclareTextSymbol{\textlegacyasteriskcentered}{OMS}{3}    % "03
516 \DeclareTextSymbol{\textlegacybardbl}{OMS}{107}           % "6B
517 \DeclareTextSymbol{\textlegacybullet}{OMS}{15}             % "0F
518 \DeclareTextSymbol{\textlegacydaggerdbl}{OMS}{122}          % "7A
519 \DeclareTextSymbol{\textlegacydagger}{OMS}{121}            % "79
520 \DeclareTextSymbol{\textlegacyparagraph}{OMS}{123}          % "7B
521 \DeclareTextSymbol{\textlegacyperiodcentered}{OMS}{1}        % "01
522 \DeclareTextSymbol{\textlegacysection}{OMS}{120}            % "78

```

```

523 \DeclareTextSymbolDefault{\textlegacyasteriskcentered}{OMS}
524 \DeclareTextSymbolDefault{\textlegacybardbl}{OMS}
525 \DeclareTextSymbolDefault{\textlegacybullet}{OMS}
526 \DeclareTextSymbolDefault{\textlegacydaggerdbl}{OMS}
527 \DeclareTextSymbolDefault{\textlegacydagger}{OMS}
528 \DeclareTextSymbolDefault{\textlegacyparagraph}{OMS}
529 \DeclareTextSymbolDefault{\textlegacyperiodcentered}{OMS}
530 \DeclareTextSymbolDefault{\textlegacysection}{OMS}

(End definition for \textlegacyasteriskcentered and others.)

Supporting rollback ...

531 //ekernel | latexrelease)
532 <latexrelease>\EndIncludeInRelease
533 <latexrelease>\IncludeInRelease{0000/00/00}%
534 <latexrelease> {\DeclareEncodingSubset}{Text companion symbols}%
535 <latexrelease>
536 <latexrelease>\let\DeclareEncodingSubset\@undefined
537 <latexrelease>\let\CheckEncodingSubset\@undefined
538 <latexrelease>
539 <latexrelease>\DeclareTextSymbolDefault{\textdollar}{OT1}
540 <latexrelease>\DeclareTextSymbolDefault{\textsterling}{OT1}
541 <latexrelease>\DeclareTextCommand{\textdollar}{OT1}{\hmode@bgroup
542 <latexrelease> \ifdim \fontdimen\@ne\font >\z@
543 <latexrelease> \slshape
544 <latexrelease> \else
545 <latexrelease> \upshape
546 <latexrelease> \fi
547 <latexrelease> \char`\$`egroup
548 <latexrelease>\DeclareTextCommand{\textsterling}{OT1}{\hmode@bgroup
549 <latexrelease> \ifdim \fontdimen\@ne\font >\z@
550 <latexrelease> \itshape
551 <latexrelease> \else
552 <latexrelease> \fontshape{ui}\selectfont
553 <latexrelease> \fi
554 <latexrelease> \char`\$`egroup
555 <latexrelease>\DeclareTextCommand{\textperthousand}{T1}
556 <latexrelease> {\%\char 24 }
557 <latexrelease>
558 <latexrelease>\DeclareTextSymbolDefault{\textasteriskcentered}{OMS}
559 <latexrelease>\DeclareTextSymbolDefault{\textbullet}{OMS}
560 <latexrelease>\DeclareTextSymbolDefault{\textdaggerdbl}{OMS}
561 <latexrelease>\DeclareTextSymbolDefault{\textdagger}{OMS}
562 <latexrelease>\DeclareTextSymbolDefault{\textparagraph}{OMS}
563 <latexrelease>\DeclareTextSymbolDefault{\textperiodcentered}{OMS}
564 <latexrelease>\DeclareTextSymbolDefault{\textsection}{OMS}
565 <latexrelease>
566 <latexrelease>\DeclareTextSymbolDefault{\textbardbl}{OMS}
567 <latexrelease>\let\textbrokenbar\@undefined
568 <latexrelease>\let\textcelsius\@undefined
569 <latexrelease>\let\textcent\@undefined
570 <latexrelease>\DeclareTextCommandDefault{\textcopyright}{\textcircled{c}}
571 <latexrelease>\let\textdegree\@undefined
572 <latexrelease>\let\textdiv\@undefined
573 <latexrelease>\let\textlnot\@undefined

```

```

574 〈\latexrelease〉\let\textonehalf\@undefined
575 〈\latexrelease〉\let\textonequarter\@undefined
576 〈\latexrelease〉\let\textonesuperior\@undefined
577 〈\latexrelease〉\DeclareTextCommandDefault{\textordfeminine}{\textsuperscript{a}}
578 〈\latexrelease〉\DeclareTextCommandDefault{\textordmasculine}{\textsuperscript{o}}
579 〈\latexrelease〉\let\textpm\@undefined
580 〈\latexrelease〉\let\textquotesingle\@undefined
581 〈\latexrelease〉\let\textquotestraightbase\@undefined
582 〈\latexrelease〉\let\textquotestraightdblbase\@undefined
583 〈\latexrelease〉\DeclareTextCommandDefault{\textregistered}{\textcircled{\%}
584 〈\latexrelease〉\check@mathfonts\fontsize\sf@size\z@\math@fontsfalse\selectfont R\}}
585 〈\latexrelease〉\let\textthreequartersemdash\@undefined
586 〈\latexrelease〉\let\textthreequarters\@undefined
587 〈\latexrelease〉\let\textthreesuperior\@undefined
588 〈\latexrelease〉\let\texttimes\@undefined
589 〈\latexrelease〉\DeclareTextCommandDefault{\texttrademark}{\textsuperscript{TM}}
590 〈\latexrelease〉\let\texttwelveudash\@undefined
591 〈\latexrelease〉\let\texttwosuperior\@undefined
592 〈\latexrelease〉\let\textyen\@undefined
593 〈\latexrelease〉
594 〈\latexrelease〉\let\textcapitalcompwordmark\@undefined
595 〈\latexrelease〉\let\textascendercompwordmark\@undefined
596 〈\latexrelease〉
597 〈\latexrelease〉\DeclareTextAccentDefault{\textcircled}{OMS}
598 〈\latexrelease〉\DeclareTextAccentDefault{\t}{OML}
599 〈\latexrelease〉
600 〈\latexrelease〉\let\capitalacute\@undefined
601 〈\latexrelease〉\let\capitalbreve\@undefined
602 〈\latexrelease〉\let\capitalcaron\@undefined
603 〈\latexrelease〉\let\capitalcedilla\@undefined
604 〈\latexrelease〉\let\capitalcircumflex\@undefined
605 〈\latexrelease〉\let\capitaldieresis\@undefined
606 〈\latexrelease〉\let\capitaldotaccent\@undefined
607 〈\latexrelease〉\let\capitalgrave\@undefined
608 〈\latexrelease〉\let\capitalhungarumlaut\@undefined
609 〈\latexrelease〉\let\capitalmacron\@undefined
610 〈\latexrelease〉\let\capitalnewtie\@undefined
611 〈\latexrelease〉\let\capitalogonek\@undefined
612 〈\latexrelease〉\let\capitalring\@undefined
613 〈\latexrelease〉\let\capitaltie\@undefined
614 〈\latexrelease〉\let\capitaltilde\@undefined
615 〈\latexrelease〉\let\newtie\@undefined
616 〈\latexrelease〉
617 〈\latexrelease〉\let\textlbrackdbl\@undefined
618 〈\latexrelease〉\let\textrbrackdbl\@undefined
619 〈\latexrelease〉
620 〈\latexrelease〉\let\texteightoldstyle\@undefined
621 〈\latexrelease〉\let\textfiveoldstyle\@undefined
622 〈\latexrelease〉\let\textfouroldstyle\@undefined
623 〈\latexrelease〉\let\textnineoldstyle\@undefined
624 〈\latexrelease〉\let\textoneoldstyle\@undefined
625 〈\latexrelease〉\let\textsevenoldstyle\@undefined
626 〈\latexrelease〉\let\textsixoldstyle\@undefined
627 〈\latexrelease〉\let\textthreeoldstyle\@undefined

```

```

628 〈latexrelease〉\let\texttwooldstyle\@undefined
629 〈latexrelease〉\let\textzerooldstyle\@undefined
630 〈latexrelease〉
631 〈latexrelease〉\let\textacutedbl\@undefined
632 〈latexrelease〉\let\textasciacute\@undefined
633 〈latexrelease〉\let\textasciibreve\@undefined
634 〈latexrelease〉\let\textasciicaron\@undefined
635 〈latexrelease〉\let\textasciidieresis\@undefined
636 〈latexrelease〉\let\textasciigrave\@undefined
637 〈latexrelease〉\let\textasciimacron\@undefined
638 〈latexrelease〉\let\textgravedbl\@undefined
639 〈latexrelease〉\let\texttildelow\@undefined
640 〈latexrelease〉
641 〈latexrelease〉\let\textbaht\@undefined
642 〈latexrelease〉\let\textbigcircle\@undefined
643 〈latexrelease〉\let\textborn\@undefined
644 〈latexrelease〉\let\textcentoldstyle\@undefined
645 〈latexrelease〉\let\textcircledP\@undefined
646 〈latexrelease〉\let\textcopyleft\@undefined
647 〈latexrelease〉\let\textdblhyphenchar\@undefined
648 〈latexrelease〉\let\textdblhyphen\@undefined
649 〈latexrelease〉\let\textdied\@undefined
650 〈latexrelease〉\let\textdiscount\@undefined
651 〈latexrelease〉\let\textdivorced\@undefined
652 〈latexrelease〉\let\textdollaroldstyle\@undefined
653 〈latexrelease〉\let\textguarani\@undefined
654 〈latexrelease〉\let\textleaf\@undefined
655 〈latexrelease〉\let\textlquill\@undefined
656 〈latexrelease〉\let\textmarried\@undefined
657 〈latexrelease〉\let\textmho\@undefined
658 〈latexrelease〉\let\textmusicalnote\@undefined
659 〈latexrelease〉\let\textnaira\@undefined
660 〈latexrelease〉\let\textopenbullet\@undefined
661 〈latexrelease〉\let\textpeso\@undefined
662 〈latexrelease〉\let\textpilcrow\@undefined
663 〈latexrelease〉\let\textrecipe\@undefined
664 〈latexrelease〉\let\textreferencemark\@undefined
665 〈latexrelease〉\let\textrquill\@undefined
666 〈latexrelease〉\let\textservicemark\@undefined
667 〈latexrelease〉\let\textsurd\@undefined
668 〈latexrelease〉
669 〈latexrelease〉\DeclareTextCommand{\textpertenthousand}{T1}
670 〈latexrelease〉 { \%\char 24\char 24 }
671 〈latexrelease〉
672 〈latexrelease〉\let\textlangl\@undefined
673 〈latexrelease〉\let\textrangl\@undefined
674 〈latexrelease〉
675 〈latexrelease〉\let\textcolonmonetary\@undefined
676 〈latexrelease〉\let\textdong\@undefined
677 〈latexrelease〉\let\textdownarrow\@undefined
678 〈latexrelease〉\let\textleftarrow\@undefined
679 〈latexrelease〉\let\textlira\@undefined
680 〈latexrelease〉\let\textrightarrow\@undefined
681 〈latexrelease〉\let\textuparrow\@undefined

```

```

682 〈\latexrelease〉\let\textwon\@undefined
683 〈\latexrelease〉
684 〈\latexrelease〉\let\textestimated\@undefined
685 〈\latexrelease〉\let\textnumero\@undefined
686 〈\latexrelease〉
687 〈\latexrelease〉\let\textflorin\@undefined
688 〈\latexrelease〉\let\textcurrency\@undefined
689 〈\latexrelease〉
690 〈\latexrelease〉\let\textfractonsolidus\@undefined
691 〈\latexrelease〉\let\textohm\@undefined
692 〈\latexrelease〉\let\textmu\@undefined
693 〈\latexrelease〉\let\textminus\@undefined
694 〈\latexrelease〉
695 〈\latexrelease〉\let\textblank\@undefined
696 〈\latexrelease〉\let\textinterrobangdown\@undefined
697 〈\latexrelease〉\let\textinterrobang\@undefined
698 〈\latexrelease〉
699 〈\latexrelease〉\let\texteuro\@undefined
700 〈\latexrelease〉
701 〈\latexrelease〉\let\textcelsius\@undefined
702 〈\latexrelease〉\let\textonesuperior\@undefined
703 〈\latexrelease〉\let\textthreequartersemdash\@undefined
704 〈\latexrelease〉\let\textthreesuperior\@undefined
705 〈\latexrelease〉\let\texttwelveudash\@undefined
706 〈\latexrelease〉\let\texttwosuperior\@undefined
707 〈\latexrelease〉\let\textbardbl\@undefined
708 〈\latexrelease〉
709 〈\latexrelease〉\let\UseLegacyTextSymbols\@undefined
710 〈\latexrelease〉\let\textlegacyasteriskcentered\@undefined
711 〈\latexrelease〉\let\textlegacybardbl\@undefined
712 〈\latexrelease〉\let\textlegacybullet\@undefined
713 〈\latexrelease〉\let\textlegacydaggerdbl\@undefined
714 〈\latexrelease〉\let\textlegacydagger\@undefined
715 〈\latexrelease〉\let\textlegacyparagraph\@undefined
716 〈\latexrelease〉\let\textlegacyperiodcentered\@undefined
717 〈\latexrelease〉\let\textlegacysection\@undefined
718 〈\latexrelease〉
719 〈\latexrelease〉\EndIncludeInRelease
720 〈*2ekernel〉
721 〈/2ekernel〉

```

5 The `textcomp` package

```

722 〈*TS1sty〉
723 \providetcommand\DeclareRelease[3]{}
724 \providetcommand\DeclareCurrentRelease[2]{}
725
726 \DeclareRelease{}{2018-08-11}{textcomp-2018-08-11.sty}
727 \DeclareCurrentRelease{}{2020-02-02}
728
729 \ProvidesPackage{textcomp}
730 [2020/02/02 v2.0n Standard LaTeX package]

```

A precaution in case this is used without rebuilding the format.

```

731 \NeedsTeXFormat{LaTeX2e}[2020/02/02]
    This is implemented by defining the default subset:
732 \DeclareOption{full}{\DeclareEncodingSubset{TS1}{?}{0}}
733 \DeclareOption{almostfull}{\DeclareEncodingSubset{TS1}{?}{1}}
734 \DeclareOption{euro}{\DeclareEncodingSubset{TS1}{?}{8}}
735 \DeclareOption{safe}{\DeclareEncodingSubset{TS1}{?}{9}}

```

The default is set up in the kernel is “safe” these days for unknown fonts but LaTeX has definitions for most families so it seldom applies.

If a different default is used then one needs to check the results to ensure that there aren’t “missing glyphs”.

The next set of options define the warning level (default in the kernel is info only). Using the package options you can change this behavior.

```

736 \DeclareOption{error}{\gdef\@tc@errorwarn{\PackageError{textcomp}}}
737 \DeclareOption{warn}{\gdef\@tc@errorwarn#1#2{\PackageWarning{textcomp}{#1}}}
738 \DeclareOption{info}{\gdef\@tc@errorwarn#1#2{\PackageInfo{textcomp}{#1}}}
739 \DeclareOption{quiet}{\gdef\@tc@errorwarn#1#2{}}

```

The “force” option basically changes the sub-encoding to that of the default (which, unless changes, is 9 these days), i.e., it no longer depends on the font in use. This is mainly there because it might have been used in older documents, but not something that is recommended.

```

740 \DeclareOption{force}{%
741     \def\CheckEncodingSubset#1#2#3#4#5{%
742         \ifnum #4>%
743             0\csname #2:?\endcsname
744             \relax
745             \expandafter\@firstoftwo
746         \else
747             \expandafter\@secondoftwo
748         \fi
749         {#1{#2}}{#3}%
750         #5}%
751 }
752 \ExecuteOptions{info}
753 \ProcessOptions\relax

```

There is not much else to do nowadays, because everything is already set up in the L^AT_EX kernel.

```

754 \InputIfFileExists{textcomp.cfg}
755   {\PackageInfo{textcomp}{Local configuration file used}}{}
756 
```

5.1 The old textcomp package code

This section contains the old code for the textcomp package and its documentation. It is only used if we roll back prior to 2020. Thus all the rest is mainly for historians. Note that the old code categorised in the sub-encodings only into 6 classes not 10.

```

757 (*TS1oldsty)
758 \ProvidesPackage{textcomp}
759   [2018/08/11 v2.0j Standard LaTeX package]

```

This one is for the TS1 encoding which contains text symbols for use with the T1-encoded text fonts. It therefore first inputs the file `TS1enc.def` and then sets (or resets) the defaults for the symbols it contains. The result of this is that when one of these symbols is accessed and the current encoding does not provide it, the symbol will be supplied by a silent, local change to this encoding.

Since many PostScript fonts only implement a subset of TS1 many commands only produce black blobs of ink. To resolve the resulting problems a number of options have been introduced and some code has been developed to distinguish sub-encodings.

The sub-encodings have a numerical id and are defined as follows for TS1:

- #5 those TS1 symbols that are also in the ISO-Adobe character set; without `\textcurrency`, which is often misused for the Euro. Older Type1 fonts from the non-TeX world provide only this subset.
- #4 = #5 + `\texteuro`. Most newer fonts provide this.
- #3 = #4 + `\textomega`. Can also be described as $TS1 \cap (ISO\text{-}Adobe \cup MacRoman)$. (Except for the missing "currency".)
- #2 = #3 + `\textestimated` + `\textcurrency`. Can also be described as $TS1 \cap Adobe\text{-}Western\text{-}2$. This may be relevant for OpenType fonts, which usually show the Adobe-Western-2 character set.
- #1 = TS1 without `\textcircled` and `\t`. These two glyphs are often not implemented and if their kernel defaults are changed commands like `\copyright` unnecessarily fail.
- #0 = full TS1

And here a summary to go in the transcript file:

```

760 \PackageInfo{textcomp}{Sub-encoding information:\MessageBreak
761   \space\space 5 = only ISO-Adobe without
762     \string\textcurrency\MessageBreak
763   \space\space 4 = 5 + \string\texteuro\MessageBreak
764   \space\space 3 = 4 + \string\textohm\MessageBreak
765   \space\space 2 = 3 + \noexpand\textestimated+
766     \string\textcurrency\MessageBreak
767   \space\space 1 = TS1 - \noexpand\textcircled-
768     \string\t\MessageBreak
769   \space\space 0 = TS1 (full)\MessageBreak
770 Font families with sub-encoding setting implement\MessageBreak
771 only a restricted character set as indicated.\MessageBreak
772 Family '?' is the default used for unknown fonts.\MessageBreak
773 See the documentation for details\@gobble}

```

`\DeclareEncodingSubset` An encoding subset to which a font family belongs is declared by the command `\DeclareEncodingSubset` that takes the major encoding as the first argument (e.g., TS1), the family name as the second argument (e.g., `cmt`), and the subset encoding id as a third, (e.g., 0 for `cmt`).

The default encoding subset to use when nothing is known about the current font family is named `?`.

```

774 \def\DeclareEncodingSubset#1#2#3{%
775   \@ifundefined{#1:#2}%

```

```

776      {\PackageInfo{textcomp}{Setting #2 sub-encoding to #1/#3}}%
777      {\PackageInfo{textcomp}{Changing #2 sub-encoding to #1/#3}}%
778      \@namedef{\#1:#2}{\#3}%
779  \onlypreamble\DeclareEncodingSubset

```

(End definition for \DeclareEncodingSubset.)

The options for the package are the following:

safe for unknown font families enables only symbols that are also in the ISO-Adobe character set; without "currency", which is often misused for the Euro. Older Type1 fonts from the non-TeX world provide only this subset.

euro enables the "safe" symbols plus the \texteuro command. Most newer fonts provide this.

full enables all TS1 commands; useful only with fonts like EC or CM bright.

almostfull same as "full", except that \textcircled and \t are *not* redefined from their defaults to avoid that commands like \copyright suddenly no longer work.

force ignore all subset encoding definitions stored in the package itself or in the configuration file and always use the default subset as specified by one of the other options (seldom useful, only dangerous).

\iftc@forced Switch used to implement the **force** option
 780 \newif\iftc@forced \tc@forcedfalse

(End definition for \iftc@forced.)

This is implemented by defining the default subset:

```

781 \DeclareOption{full}{\DeclareEncodingSubset{TS1}{?}{0}}
782 \DeclareOption{almostfull}{\DeclareEncodingSubset{TS1}{?}{1}}
783 \DeclareOption{euro}{\DeclareEncodingSubset{TS1}{?}{4}}
784 \DeclareOption{safe}{\DeclareEncodingSubset{TS1}{?}{5}}

```

The default is "almostfull" which means that old documents will work except that \textcircled and \t will use the kernel defaults (with the advantage that this also works if the current font (as often the case) doesn't implement these glyphs.

The "force" option simply sets the switch to true.

785 \DeclareOption{force}{\tc@forcedtrue}

The suggestions to user is to use the "safe" option always unless that balks in which case they could switch to "almostfull" but then better check their output manually.

```

786 \def\tc@errorwarn{\PackageError}
787 \DeclareOption{warn}{\gdef\tc@errorwarn{\gdef\PackageWarning{\#1}{\#2}}}
788 \DeclareOption{quiet}{\gdef\tc@errorwarn{\gdef\PackageWarning{\#1}{\#2}}}
789 \ExecuteOptions{almostfull}
790 \ProcessOptions\relax

```

\CheckEncodingSubset The command \CheckEncodingSubset will check if the current font family has the right encoding subset to typeset a certain command. It takes five arguments as follows: first argument is either \UseTextSymbol, \UseTextAccent depending on whether or not the symbol is a text symbol or a text accent.

The second argument is the encoding from which this symbol should be fetched.

The third argument is either a fake accessor command or an error message. the code in that argument (if ever executed) receives two arguments: #2 and #5 of \CheckEncodingSubset.

Argument four is the subset encoding id to test against: if this value is higher than the subset id of the current font family then we typeset the symbol, i.e., execute #1{#2}#5 otherwise it runs #3#5, e.g., to produce an error message or fake the glyph somehow.

Argument five is the symbol or accent command that is being checked.

For usage examples see definitions below.

```
791 \iftc@forced
```

If the “force” option was given we always use the default for testing against.

```
792 \def\CheckEncodingSubset#1#2#3#4#5{%
793   \ifnum #4>%
794     0\csname #2:?\endcsname
795     \relax
796     \expandafter\@firstoftwo
797   \else
798     \expandafter\@secondoftwo
799   \fi
800   {#1{#2}}{#3}%
801   #5%
802 }
```

In normal circumstances the test is a bit more complicated: first check if there exists a macro \⟨arg2⟩:⟨current-family⟩ and if so use that value to test against, otherwise use the default to test against.

```
803 \else
804 \def\CheckEncodingSubset#1#2#3#4#5{%
805   \ifnum #4>%
806     \expandafter\ifx\csname #2:\f@family\endcsname\relax
807       0\csname #2:?\endcsname
808     \else
809       \csname #2:\f@family\endcsname
810     \fi
811     \relax
812     \expandafter\@firstoftwo
813   \else
814     \expandafter\@secondoftwo
815   \fi
816   {#1{#2}}{#3}%
817   #5%
818 }
819 \fi
```

(End definition for \CheckEncodingSubset.)

```
\tc@subst
```

```
820 \def\tc@subst#1{%
821   \tc@errorwarn{textcomp}%
822   {Symbol \string#1 not provided by\MessageBreak
823    font family \f@family\space
824    in TS1 encoding.\MessageBreak Default family used instead}\@eha
825   \bgroup\fontfamily\textcompsubstdefault\selectfont#1\egroup
826 }
```

(End definition for \tc@subst.)

\tc@error \tc@error is going to be used in arg #3 of \CheckEncodingSubset when a symbol is not available in a certain font family. It gets pass the encoding it normally lives in (arg one) and the name of the symbol or accent that has a problem.

```
827 % error commands take argument:  
828 % #1 symbol to be used  
829 \def\tc@error#1{  
830   \PackageError{textcomp}{% should be latex error if general  
831   {Accent \string#1 not provided by\MessageBreak  
832   font family \f@family\space  
833   in TS1 encoding}\@eha  
834 }
```

(End definition for \tc@error.)

\tc@fake@euro \tc@fake@euro is an example of a “fake” definition to use in arg #3 of \CheckEncodingSubset when a symbol is not available in a certain font family. Here we produce an Euro symbol by combining a “C” with a “=”.

```
835 \def\tc@fake@euro#1{  
836   \leavevmode  
837   \PackageInfo{textcomp}{Faking \noexpand#1 for font family  
838   \f@family\MessageBreak in TS1 encoding}  
839   \valign{\#\cr  
840     \vfil\hbox to 0.07em{\dimen@\f@size\p@  
841       \math@fontsfalse  
842       \fontsize{.7\dimen@}\z@\selectfont=\hss}  
843     \vfil\cr%  
844     \hbox{C}\crcr  
845   }%  
846 }
```

(End definition for \tc@fake@euro.)

\tc@check@symbol \tc@check@symbol These are two abbreviations that we use below to check symbols and accents in TS1.
\tc@check@accent \tc@check@accent Only there to save some space, e.g., we can then write

```
DeclareTextCommandDefault{\textcurrency}{\tc@check@symbol3\textcurrency}
```

to ensure that \textcurrency is only typeset if the current font has a TS1 subset id of less than 3. Otherwise \tc@error is called telling the user that for this font family \textcurrency is not available.

```
847 \def\tc@check@symbol{\CheckEncodingSubset\UseTextSymbol{TS1}\tc@subst}  
848 \def\tc@check@accent{\CheckEncodingSubset\UseTextAccent{TS1}\tc@error}
```

(End definition for \tc@check@symbol and \tc@check@accent.)

We start with the commands that are “safe” and which can be unconditionally set up, first the accents...

```
849 \DeclareTextAccentDefault{\capitalcedilla}{TS1}  
850 \DeclareTextAccentDefault{\capitalogonek}{TS1}  
851 \DeclareTextAccentDefault{\capitalgrave}{TS1}  
852 \DeclareTextAccentDefault{\capitalacute}{TS1}  
853 \DeclareTextAccentDefault{\capitalcircumflex}{TS1}  
854 \DeclareTextAccentDefault{\capitaltilde}{TS1}
```

```

855 \DeclareTextAccentDefault{\capitaldieresis}{TS1}
856 \DeclareTextAccentDefault{\capitalhungarumlaut}{TS1}
857 \DeclareTextAccentDefault{\capitalring}{TS1}
858 \DeclareTextAccentDefault{\capitalcaron}{TS1}
859 \DeclareTextAccentDefault{\capitalbreve}{TS1}
860 \DeclareTextAccentDefault{\capitalmacron}{TS1}
861 \DeclareTextAccentDefault{\capitaldotaccent}{TS1}
... and then the other glyphs.
862 \DeclareTextSymbolDefault{\textcapitalcompwordmark}{TS1}
863 \DeclareTextSymbolDefault{\textascendercompwordmark}{TS1}
864 \DeclareTextSymbolDefault{\textquotestraightbase}{TS1}
865 \DeclareTextSymbolDefault{\textquotestraightdblbase}{TS1}
866 \DeclareTextSymbolDefault{\texttwelveudash}{TS1}
867 \DeclareTextSymbolDefault{\textthreequartersemdash}{TS1}
868 \DeclareTextSymbolDefault{\textdollar}{TS1}
869 \DeclareTextSymbolDefault{\textquotesingle}{TS1}
870 \DeclareTextSymbolDefault{\textasteriskcentered}{TS1}
871 \DeclareTextSymbolDefault{\textfractionsolidus}{TS1}
872 \DeclareTextSymbolDefault{\textminus}{TS1}
873 \DeclareTextSymbolDefault{\textlbrackdbl}{TS1}
874 \DeclareTextSymbolDefault{\textrbrackdbl}{TS1}
875 \DeclareTextSymbolDefault{\textasciigrave}{TS1}
876 \DeclareTextSymbolDefault{\texttildelow}{TS1}
877 \DeclareTextSymbolDefault{\textasciibreve}{TS1}
878 \DeclareTextSymbolDefault{\textasciicaron}{TS1}
879 \DeclareTextSymbolDefault{\textgravedbl}{TS1}
880 \DeclareTextSymbolDefault{\textacutedbl}{TS1}
881 \DeclareTextSymbolDefault{\textdagger}{TS1}
882 \DeclareTextSymbolDefault{\textdaggerdbl}{TS1}
883 \DeclareTextSymbolDefault{\textbardbl}{TS1}
884 \DeclareTextSymbolDefault{\textperthousand}{TS1}
885 \DeclareTextSymbolDefault{\textbullet}{TS1}
886 \DeclareTextSymbolDefault{\textcelsius}{TS1}
887 \DeclareTextSymbolDefault{\textflorin}{TS1}
888 \DeclareTextSymbolDefault{\texttrademark}{TS1}
889 \DeclareTextSymbolDefault{\textcent}{TS1}
890 \DeclareTextSymbolDefault{\textsterling}{TS1}
891 \DeclareTextSymbolDefault{\textyen}{TS1}
892 \DeclareTextSymbolDefault{\textbrokenbar}{TS1}
893 \DeclareTextSymbolDefault{\textsection}{TS1}
894 \DeclareTextSymbolDefault{\textasciidieresis}{TS1}
895 \DeclareTextSymbolDefault{\textcopyright}{TS1}
896 \DeclareTextSymbolDefault{\textordfeminine}{TS1}
897 \DeclareTextSymbolDefault{\textlnot}{TS1}
898 \DeclareTextSymbolDefault{\textregistered}{TS1}
899 \DeclareTextSymbolDefault{\textasciimacron}{TS1}
900 \DeclareTextSymbolDefault{\textdegree}{TS1}
901 \DeclareTextSymbolDefault{\textpm}{TS1}
902 \DeclareTextSymbolDefault{\texttwosuperior}{TS1}
903 \DeclareTextSymbolDefault{\textthreesuperior}{TS1}
904 \DeclareTextSymbolDefault{\textasciacute}{TS1}
905 \DeclareTextSymbolDefault{\textmu}{TS1}
906 \DeclareTextSymbolDefault{\textparagraph}{TS1}
907 \DeclareTextSymbolDefault{\textperiodcentered}{TS1}

```

```

908 \DeclareTextSymbolDefault{\textonesuperior}{TS1}
909 \DeclareTextSymbolDefault{\textordmasculine}{TS1}
910 \DeclareTextSymbolDefault{\textonequarter}{TS1}
911 \DeclareTextSymbolDefault{\textonehalf}{TS1}
912 \DeclareTextSymbolDefault{\textthreequarters}{TS1}
913 \DeclareTextSymbolDefault{\texttimes}{TS1}
914 \DeclareTextSymbolDefault{\textdiv}{TS1}

```

The `\texteuro` is only available for subsets with id 4 or less. Otherwise we fake the glyph using `\tc@fake@euro`

```

915 \DeclareTextCommandDefault{\texteuro}{%
916   \CheckEncodingSubset\UseTextSymbol{TS1}\tc@fake@euro5\texteuro}

```

The `\textohm` is only available for subsets with id 3 or less. Otherwise we produce an error.

```

917 \DeclareTextCommandDefault{\textohm}{\tc@check@symbol4\textohm}

```

The `\textestimated` and `\textcurrency` are only provided for fonts with subset encoding with id 2 or less.

```

918 \DeclareTextCommandDefault{\textestimated}{%
919   \tc@check@symbol3\textestimated}
920 \DeclareTextCommandDefault{\textcurrency}{%
921   \tc@check@symbol3\textcurrency}

```

Nearly all of the remaining glyphs are provided only with fonts with id 1 or 0, i.e., are essentially complete.

```

922 \DeclareTextCommandDefault{\capitaltie}{%
923   \tc@check@accent2\capitaltie}
924 \DeclareTextCommandDefault{\newtie}{%
925   \tc@check@accent2\newtie}
926 \DeclareTextCommandDefault{\capitalnewtie}{%
927   \tc@check@accent2\capitalnewtie}
928 \DeclareTextCommandDefault{\textleftarrow}{%
929   \tc@check@symbol2\textleftarrow}
930 \DeclareTextCommandDefault{\textrightarrow}{%
931   \tc@check@symbol2\textrightarrow}
932 \DeclareTextCommandDefault{\textblank}{%
933   \tc@check@symbol2\textblank}
934 \DeclareTextCommandDefault{\textdblhyphen}{%
935   \tc@check@symbol2\textdblhyphen}
936 \DeclareTextCommandDefault{\textzerooldstyle}{%
937   \tc@check@symbol2\textzerooldstyle}
938 \DeclareTextCommandDefault{\textoneoldstyle}{%
939   \tc@check@symbol2\textoneoldstyle}
940 \DeclareTextCommandDefault{\texttwooldstyle}{%
941   \tc@check@symbol2\texttwooldstyle}
942 \DeclareTextCommandDefault{\textthreeoldstyle}{%
943   \tc@check@symbol2\textthreeoldstyle}
944 \DeclareTextCommandDefault{\textfouroldstyle}{%
945   \tc@check@symbol2\textfouroldstyle}
946 \DeclareTextCommandDefault{\textfiveoldstyle}{%
947   \tc@check@symbol2\textfiveoldstyle}
948 \DeclareTextCommandDefault{\textsixoldstyle}{%
949   \tc@check@symbol2\textsixoldstyle}
950 \DeclareTextCommandDefault{\textsevenoldstyle}{%

```

```

951      {\tc@check@symbol2{textsevenoldstyle}}
952 \DeclareTextCommandDefault{\texteightoldstyle}{%
953   {\tc@check@symbol2{texteightoldstyle}}
954 \DeclareTextCommandDefault{\textnineoldstyle}{%
955   {\tc@check@symbol2{textnineoldstyle}}
956 \DeclareTextCommandDefault{\textlangle}{%
957   {\tc@check@symbol2{textlangle}}
958 \DeclareTextCommandDefault{\textrangle}{%
959   {\tc@check@symbol2{textrangle}}
960 \DeclareTextCommandDefault{\textmho}{%
961   {\tc@check@symbol2{textmho}}
962 \DeclareTextCommandDefault{\textbigcircle}{%
963   {\tc@check@symbol2{textbigcircle}}
964 \DeclareTextCommandDefault{\textuparrowarrow}{%
965   {\tc@check@symbol2{textuparrowarrow}}
966 \DeclareTextCommandDefault{\textdownarrowarrow}{%
967   {\tc@check@symbol2{textdownarrowarrow}}
968 \DeclareTextCommandDefault{\textborn}{%
969   {\tc@check@symbol2{textborn}}
970 \DeclareTextCommandDefault{\textdivorced}{%
971   {\tc@check@symbol2{textdivorced}}
972 \DeclareTextCommandDefault{\textdied}{%
973   {\tc@check@symbol2{textdied}}
974 \DeclareTextCommandDefault{\textleaf}{%
975   {\tc@check@symbol2{textleaf}}
976 \DeclareTextCommandDefault{\textmarried}{%
977   {\tc@check@symbol2{textmarried}}
978 \DeclareTextCommandDefault{\textmusicalnote}{%
979   {\tc@check@symbol2{textmusicalnote}}
980 \DeclareTextCommandDefault{\textdblhyphenchar}{%
981   {\tc@check@symbol2{textdblhyphenchar}}
982 \DeclareTextCommandDefault{\textdollaroldstyle}{%
983   {\tc@check@symbol2{textdollaroldstyle}}
984 \DeclareTextCommandDefault{\textcentoldstyle}{%
985   {\tc@check@symbol2{textcentoldstyle}}
986 \DeclareTextCommandDefault{\textcolonmonetary}{%
987   {\tc@check@symbol2{textcolonmonetary}}
988 \DeclareTextCommandDefault{\textwon}{%
989   {\tc@check@symbol2{textwon}}
990 \DeclareTextCommandDefault{\textnaira}{%
991   {\tc@check@symbol2{textnaira}}
992 \DeclareTextCommandDefault{\textguarani}{%
993   {\tc@check@symbol2{textguarani}}
994 \DeclareTextCommandDefault{\textpeso}{%
995   {\tc@check@symbol2{textpeso}}
996 \DeclareTextCommandDefault{\textlira}{%
997   {\tc@check@symbol2{textlira}}
998 \DeclareTextCommandDefault{\textrecipe}{%
999   {\tc@check@symbol2{textrecipe}}
1000 \DeclareTextCommandDefault{\textinterrobang}{%
1001   {\tc@check@symbol2{textinterrobang}}
1002 \DeclareTextCommandDefault{\textinterrobangdown}{%
1003   {\tc@check@symbol2{textinterrobangdown}}
1004 \DeclareTextCommandDefault{\textdong}{%

```

```

1005      {\tc@check@symbol2{textdong}}
1006  \DeclareTextCommandDefault{\textpertenthousand}{%
1007      {\tc@check@symbol2{textpertenthousand}}
1008  \DeclareTextCommandDefault{\textpilcrow}{%
1009      {\tc@check@symbol2{textpilcrow}}
1010  \DeclareTextCommandDefault{\textbaht}{%
1011      {\tc@check@symbol2{textbaht}}
1012  \DeclareTextCommandDefault{\textnumero}{%
1013      {\tc@check@symbol2{textnumero}}
1014  \DeclareTextCommandDefault{\textdiscount}{%
1015      {\tc@check@symbol2{textdiscount}}
1016  \DeclareTextCommandDefault{\textopenbullet}{%
1017      {\tc@check@symbol2{textopenbullet}}
1018  \DeclareTextCommandDefault{\textservicemark}{%
1019      {\tc@check@symbol2{textservicemark}}
1020  \DeclareTextCommandDefault{\textlquill}{%
1021      {\tc@check@symbol2{textlquill}}
1022  \DeclareTextCommandDefault{\textrquill}{%
1023      {\tc@check@symbol2{textrquill}}
1024  \DeclareTextCommandDefault{\textcopyleft}{%
1025      {\tc@check@symbol2{textcopyleft}}
1026  \DeclareTextCommandDefault{\textcircledP}{%
1027      {\tc@check@symbol2{textcircledP}}
1028  \DeclareTextCommandDefault{\textreferencemark}{%
1029      {\tc@check@symbol2{textreferencemark}}
1030  \DeclareTextCommandDefault{\textsurd}{%
1031      {\tc@check@symbol2{textsurd}}

```

The `\textcircled` and `\t` are handled specially, unless the current font has a subset id of 0 (i.e. full TS1) we pick the symbols up from the math font encodings, i.e., the third argument to `\CheckEncodingSubset` uses `\UseTextAccent` to get them from there.

```

1032  \DeclareTextCommandDefault{\textcircled}{%
1033      {\CheckEncodingSubset\UseTextAccent{TS1}}%
1034      {\UseTextAccent{OMS}}1\textcircled}
1035  \DeclareTextCommandDefault{\t}{%
1036      {\CheckEncodingSubset\UseTextAccent{TS1}}%
1037      {\UseTextAccent{OML}}1\t}

```

Finally input the encoding-specific definitions for TS1 thus making the top-level definitions optimised for this encoding (and not for the default encoding).

```
1038 \input{ts1enc.def}
```

Now having the new glyphs available we also want to make sure that they are used. For most cases this will automatically happen but for some glyphs there are inferior definitions already known to L^AT_EX which will prevent the usage of the TS1 versions. So we better get rid of them:

```

1039 \UndeclareTextCommand{\textsterling}{OT1}
1040 \UndeclareTextCommand{\textdollar} {OT1}

```

Similar declarations should probably be made for other encodings like OT4 if they are in use.

```

1041 %\UndeclareTextCommand{\textsterling}{OT4}
1042 %\UndeclareTextCommand{\textdollar} {OT4}

```

From the T1 encoding there are two candidates for removal: $\%_0$ and $\%_{00}$ since these are both constructed from $\%$ followed by a tiny ‘ 0 ’ rather than being a single glyph. The problem with this approach is that in PostScript fonts this small zero is usually not available resulting in $\%■$ rather than $\%_0$ while the real glyph (at least for \textperthousand) is available in the PostScript version of TS1. So for the moment we compromise by removing the T1 declaration for \textperthousand but keeping the one for $\text{\textpertenthousand}$. This will have the effect that with Computer Modern fonts everything will come out (although $\%_0$ and $\%_{00}$ are not taken from the same physical font) and with PostScript fonts $\%_0$ will come out correctly while $\%_{00}$ will most likely look like $\%■$ — which is probably an improvement over just getting a single ‘ $■$ ’ to indicate a completely missing glyph, which would happen if we also ‘undeclared’ $\text{\textpertenthousand}$.

```
1043 \UndeclareTextCommand{\textperthousand}{T1}
1044 %\UndeclareTextCommand{\textpertenthousand}{T1}
```

5.1.1 Supporting oldstyle digits

```
1045 \DeclareRobustCommand\oldstylenums[1]{%
1046   \begingroup
1047   \ifmmode
1048     \mathgroup\symletters #1%
1049   \else
1050     \CheckEncodingSubset\@use@text@encoding{TS1}%
1051     {\PackageWarning{textcomp}%
1052       {Oldstyle digits unavailable for
1053         family \f@family.\MessageBreak
1054         Lining digits used instead}}%
1055     \tw@{#1}%
1056   \fi
1057   \endgroup
1058 }
```

5.1.2 Subset encoding defaults

For many font families commonly used in the TeX world we provide the subset encoding data here. Users can add additional font families in the file `textcomp.cfg` if they own other fonts.

However, if the option “forced” was given then all subset encoding specifications are ignored, so there is no point in setting any of them up:

```
1059 \iftc@forced \else
      Computer modern based fonts (e.g., CM, CM-Bright, Concrete):
1060 \DeclareEncodingSubset{TS1}{cmr}      {0}
1061 \DeclareEncodingSubset{TS1}{cmss}     {0}
1062 \DeclareEncodingSubset{TS1}{cmtt}     {0}
1063 \DeclareEncodingSubset{TS1}{cmvtt}    {0}
1064 \DeclareEncodingSubset{TS1}{cmbr}     {0}
1065 \DeclareEncodingSubset{TS1}{cmtl}     {0}
1066 \DeclareEncodingSubset{TS1}{ccr}      {0}

      PSNFSS fonts:
1067 \DeclareEncodingSubset{TS1}{ptm}      {4}
1068 \DeclareEncodingSubset{TS1}{pcr}      {4}
1069 \DeclareEncodingSubset{TS1}{phv}      {4}
1070 \DeclareEncodingSubset{TS1}{ppl}      {3}
```

```

1071 \DeclareEncodingSubset{TS1}{pag}      {4}
1072 \DeclareEncodingSubset{TS1}{pbk}      {4}
1073 \DeclareEncodingSubset{TS1}{pnc}      {4}
1074 \DeclareEncodingSubset{TS1}{pzc}      {4}
1075 \DeclareEncodingSubset{TS1}{bch}      {4}
1076 \DeclareEncodingSubset{TS1}{put}      {5}

```

Other CTAN fonts (probably not complete):

```

1077 \DeclareEncodingSubset{TS1}{uag}      {5}
1078 \DeclareEncodingSubset{TS1}{ugq}      {5}
1079 \DeclareEncodingSubset{TS1}{u18}      {4}
1080 \DeclareEncodingSubset{TS1}{u19}      {4} % (LuxiSans, one day)
1081 \DeclareEncodingSubset{TS1}{augie}    {5}
1082 \DeclareEncodingSubset{TS1}{dayrom}   {3}
1083 \DeclareEncodingSubset{TS1}{dayroms}  {3}
1084 \DeclareEncodingSubset{TS1}{pxr}      {0}
1085 \DeclareEncodingSubset{TS1}{pxss}     {0}
1086 \DeclareEncodingSubset{TS1}{pxtt}     {0}
1087 \DeclareEncodingSubset{TS1}{txr}      {0}
1088 \DeclareEncodingSubset{TS1}{txss}     {0}
1089 \DeclareEncodingSubset{TS1}{txtt}     {0}

```

Latin Modern and TeX Gyre:

```

1090 \DeclareEncodingSubset{TS1}{lmr}      {0}
1091 \DeclareEncodingSubset{TS1}{lmdh}     {0}
1092 \DeclareEncodingSubset{TS1}{lmss}     {0}
1093 \DeclareEncodingSubset{TS1}{lmssq}    {0}
1094 \DeclareEncodingSubset{TS1}{lmvtt}   {0}
1095 \DeclareEncodingSubset{TS1}{lmtt}     {0}

1096 \DeclareEncodingSubset{TS1}{qhv}      {0}
1097 \DeclareEncodingSubset{TS1}{qag}      {0}
1098 \DeclareEncodingSubset{TS1}{qbk}      {0}
1099 \DeclareEncodingSubset{TS1}{qcr}      {0}
1100 \DeclareEncodingSubset{TS1}{qcs}      {0}
1101 \DeclareEncodingSubset{TS1}{qp1}      {0}
1102 \DeclareEncodingSubset{TS1}{qtm}      {0}
1103 \DeclareEncodingSubset{TS1}{qzc}      {0}
1104 \DeclareEncodingSubset{TS1}{qhvc}    {0}

```

Fourier-GUTenberg:

```

1105 \DeclareEncodingSubset{TS1}{futs}    {4}
1106 \DeclareEncodingSubset{TS1}{futx}    {4}
1107 \DeclareEncodingSubset{TS1}{futj}    {4}

```

Y&Y's Lucida Bright

```

1108 \DeclareEncodingSubset{TS1}{hlh}      {3}
1109 \DeclareEncodingSubset{TS1}{hls}      {3}
1110 \DeclareEncodingSubset{TS1}{hlst}     {3}

```

The remaining settings for Lucida are conservative: the following fonts contain the `\textohm` character but not the `\texteuro`, i.e., belong to neither subset 4 nor subset 3. If you want to use the `\textohm` with these fonts copy these definition to `textcomp.cfg` and change the subset to 3. However in that case make sure that you do not use the `\texteuro`.

```

1111 \DeclareEncodingSubset{TS1}{hlct}    {5}

```

```
1112 \DeclareEncodingSubset{TS1}{hlx}      {5}
1113 \DeclareEncodingSubset{TS1}{hlce}      {5}
1114 \DeclareEncodingSubset{TS1}{hlcn}      {5}
1115 \DeclareEncodingSubset{TS1}{hlcw}      {5}
1116 \DeclareEncodingSubset{TS1}{hlcf}      {5}

        Other commercial families...

1117 \DeclareEncodingSubset{TS1}{pplx}      {3}
1118 \DeclareEncodingSubset{TS1}{pplj}      {3}
1119 \DeclareEncodingSubset{TS1}{ptmx}      {4}
1120 \DeclareEncodingSubset{TS1}{ptmj}      {4}
```

If the file `textcomp.cfg` exists it will be loaded at this point. This allows to define further subset encodings for font families not covered by default.

```
1121 \InputIfFileExists{textcomp.cfg}
1122   {\PackageInfo{textcomp}{Local configuration file used}}{}
1123 \fi
1124 </TS1oldsty>
```

File B

ltpageno.dtx

1 Page Numbering

Page numbers are produced by a page counter, used just like any other counter. The only difference is that `\c@page` contains the number of the next page to be output (the one currently being produced), rather than one minus it. Thus, it is normally initialized to 1 rather than 0. `\c@page` is defined to be `\count0`, rather than a count assigned by `\newcount`.

`\pagenumbering`

The user sets the pagenumber style with the `\pagenumbering{<foo>}` command, which sets the page counter to 1 and defines `\thepage` to be `\foo`. For example, `\pagenumbering{roman}` causes pages to be numbered i, ii, etc.

```
1 {*2ekernel}
2 \message{page nos.,}
3 \countdef\c@page=0 \c@page=1
4 \def\cl@page{}
5 \def\pagenumbering#1{%
6   \global\c@page \cne \gdef\thepage{\csname \#1\endcsname
7   \c@page}}
8 
```

File C

ltxref.dtx

1 Cross Referencing

The user writes `\label{<foo>}` to define the following cross-references:

`\ref{<foo>}`: value of most recently incremented referencable counter. in the current environment. (Chapter, section, theorem and enumeration counters are referencable, footnote counters are not.)

`\pageref{<foo>}`: page number at which `\label{foo}` command appeared. where foo can be any string of characters not containing ‘\’, ‘{’ or ‘}’.

Note: The scope of the `\label` command is delimited by environments, so
`\begin{theorem} \label{foo} ... \end{theorem} \label{bar}`
defines `\ref{foo}` to be the theorem number and `\ref{bar}` to be the current section number.

Note: `\label` does the right thing in terms of spacing – i.e., leaving a space on both sides of it is equivalent to leaving a space on either side.

1.1 Cross Referencing

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```
1 /*2ekernel)
2 \message{x-ref,}
```

This is implemented as follows. A referencable counter CNT is incremented by the command `\refstepcounter{CNT}`, which sets `\@currentlabel == {CNT}\eval(\p@cnt\theCNT)`. The command `\label{FOO}` then writes the following on file `\auxout` :

```
\newlabel{FOO}{\eval(\@currentlabel)\eval(\thepage)}
```

```
\ref{FOO} ==
BEGIN
  if \r@foo undefined
    then @refundefined := G T
    ??
    Warning: 'reference foo on page ... undefined'
  else \@car \eval(\r@FOO)\@nil
fi
END
```

```
\pageref{foo} =
BEGIN
  if \r@foo undefined
    then @refundefined := G T
    ??
    Warning: 'reference foo on page ... undefined'
  else \@cdr \eval(\r@FOO)\@nil
fi
END
```

End of historical L^AT_EX 2.09 comments.

`\labelformat`

A reference via `\ref` produces by default the data associated with the corresponding `\label` command (typically a number); any additional formatting has to be provided by the user. If, for example, references to equations are always to be typeset as “equation (number)”, one has to code “`equation (\ref{key})`”. With `\labelformat` there is a possibility to generate such frills automatically without resorting to low-level coding. The command takes two arguments: the first is the name of a counter and the second is its representation when referenced. This means that for a successful usage, one has to know the counter name being used for generating the label, though in practice this should not pose a problem. The current counter number is picked up as an argument. Here are two examples:

```
\labelformat{section}{section~#1}
\labelformat{equation}{equation~(#1)}}
```

`\Ref`

A side effect of using `\labelformat` is that, depending on the defined formatting, it becomes impossible to use `\ref` at the beginning of a sentence (if its replacement text starts with a lowercase letter). To overcome this problem we introduce the command `\Ref` that behave like `\ref` except that it uppercases the first token of the generated string.

To make `\Ref` work properly the very first token in the second argument of `\labelformat` has to be a simple ASCII or UTF-8 letter, otherwise the capitalization will fail or worse, you will end up with some error messages. If you actually need something more complicated in this place (e.g., an accented letter not written as a UTF-8 character) you have to explicitly surround it with braces, to identify the part that needs to be capitalized. For example, for figure references in the Hungarian language you might want to write `\labelformat{figure}{{'a}bra~\thefigure}` or use `\labelformat{figure}{\'abra~\thefigure}` which avoids the brace problem.

`\G@refundefinedtrue`
`\@refundefined`

This does not save on name-space (since `\G@refundefinedfalse` was never needed) but it does make the implementation of such one-way switches more consistent. The extra macro to make the change is used since this change appears several times.

Note despite its name, `\G@refundefinedtrue` does *not* correspond to an `\if` command, and there is no matching `\else`. It would be more natural to call the command `\G@refundefined` (as inspection of the change log will reveal) but unfortunately such a change would break any package that had defined a `\ref`-like command that mimicked the definition of `\ref`, calling `\G@refundefinedtrue`. Inspection of the T_EX archives revealed several such packages, and so this command has been named `\...true` so that the definition of `\ref` need not be changed, and the packages will work without change.

```
3 % \newif\ifG@refundefined
4 % \def\G@refundefinedtrue{\global\let\ifG@refundefined\iftrue}
5 % \def\G@refundefinedfalse{\global\let\ifG@refundefined\iffalse}
6 \def\G@refundefinedtrue{%
7   \gdef\@refundefined{%
8     \@latex@warning@no@line{There were undefined references}}}
9 \let\@refundefined\relax
```

(*End definition for `\G@refundefinedtrue` and `\@refundefined`.*)

\ref Referencing a \label. RmS 91/10/25: added a few extra \reset@font, as suggested by Bernd Raichle
 \pageref RmS 92/08/14: made \ref and \pageref robust
 RmS 93/09/08: Added setting of refundefined switch.

```

10 \def\@setref#1#2#3{%
11   \ifx#1\relax
12   \protect\G@refundefinedtrue
13   \nfss@text{\reset@font\bfseries ??}%
14   \@latex@warning{Reference '#3' on page \thepage \space
15           undefined}%
16 \else
17   \expandafter#2#1\null
18 \fi}
19 \def\ref#1{\expandafter\@setref\csname r@#1\endcsname\@firstoftwo{#1}}
20 \def\pageref#1{\expandafter\@setref\csname r@#1\endcsname
21           \@secondoftwo{#1}}

```

(End definition for \ref, \pageref, and \@setref.)

\newlabel This command will be written to the .aux file to pass label information from one run to another.

\@newl@bel The internal form of \newlabel and \bibtex. Note that this macro does it's work inside a group. That way the local assignments it needs to do don't clutter the save stack. This prevents large documents with many labels to run out of save stack.

```

22 \def\@newl@bel#1#2#3{%
23   \@ifundefined{#1@#2}%
24   \relax
25   {\gdef \@multiplelabels {%
26     \@latex@warning{no@line{There were multiply-defined labels}}%
27     \@latex@warning{no@line{Label '#2' multiply defined}}%
28   }%
29   \def\newlabel{\@newl@bel r}%
30   \onlypreamble\@newl@bel

```

(End definition for \newlabel and \@newl@bel.)

\if@multiplelabels This is redefined to produce a warning if at least one label is defined more than once. It is executed by the \enddocument command.

```

31 \let \@multiplelabels \relax

```

(End definition for \if@multiplelabels and \@multiplelabels.)

\label The commands \label and \refstepcounter have been changed to allow \protect'ed commands to work properly. For example,

```
\def\thechapter{\protect\foo{\arabic{chapter}}.\roman{section}}
```

will cause a \label{bar} command to define \ref{bar} to expand to something like \foo{4.d}. Change made 20 Jul 88.

```

32 \def\label#1{\@bsphack
33   \protected@write\@auxout{}{%
34     {\string\newlabel{#1}{\@currentlabel}\{\thepage\}}%
35   }\@esphack}

```

```

(End definition for \label1.)

36  {/2ekernel}
37  {*2ekernel | latexrelease}
38  <latexrelease>\IncludeInRelease{2020/10/01}%
39  <latexrelease>           {\refstepcounter}{Add \@currentcounter}%

```

\refstepcounter Step the counter and allow for labels to point to its current value.

```

40  \def\@currentcounter{}
41  \def\refstepcounter#1{\stepcounter{#1}%
42    \edef\@currentcounter{#1}%
43    \protected@edef\@currentlabel

```

By generating the second csname first the \p@... command can grab it as an argument which can be helpful for more complicated typesetting arrangements.

The trick is to ensure that \csname the#1\endcsname is turned into a single token before \p@... is expanded further. This way, if the \p@... command is a macro with one argument it will receive \the.... With the original kernel code (i.e., without the \expandafter) it will instead pick up \csname which would be disastrous.

Using \expandafter instead of braces delimiting the argument is better because, assuming that the \p@... command is not defined as a macro with one argument, the braces will stay and prohibit kerning that might otherwise happen between the glyphs generated by \the... and surrounding glyphs.

```

44  {\csname p@\#1\expandafter\endcsname\csname the#1\endcsname}%
45  }

```

(End definition for \refstepcounter.)

\labelformat A shortcut to set the \p@... macro for a counter. It will pick up the counter representation as an argument so that it can be specially formatted.

```

46  \def\labelformat#1{\expandafter\def\csname p@\#1\endcsname##1}

```

(End definition for \labelformat.)

\Ref This macro expands the result of \ref and then uppercases the first token. Only useful if the label was generated via \labelformat and contains some lower case letter at its start. If the label starts with a complicated construct (e.g., an accented letter that is provided via a command, e.g., \"a instead of a UTF-8 character like ä) one has to surround everything that needs uppercasing in a brace group in the definition of \labelformat.¹⁷

```

47  \DeclareRobustCommand\Ref[1]{\protected@edef\@tempa{\ref{#1}}%
48  \expandafter\MakeUppercase\@tempa}

```

(End definition for \Ref.)

```

49  {/2ekernel | latexrelease}
50  <latexrelease>\EndIncludeInRelease
51  <latexrelease>\IncludeInRelease{2019/10/01}%
52  <latexrelease>           {\refstepcounter}{Add \labelformat and \Ref}%
53  <latexrelease>\let\@currentcounter\@undefined
54  <latexrelease>\def\refstepcounter#1{\stepcounter{#1}%
55  <latexrelease>           \protected@edef\@currentlabel

```

¹⁷There is one problem with this approach: the braces are kept in a normal \ref which might spoil kerning. Perhaps one day this needs redoing.

```

56 〈latexrelease〉      {\csname p@#1\expandafter\endcsname\csname the#1\endcsname}%
57 〈latexrelease〉}
58 〈latexrelease〉\def\labelformat#1{\expandafter\def\csname p@#1\endcsname##1}
59 〈latexrelease〉\DeclareRobustCommand\Ref[1]{\protected@edef\@tempa{\ref{#1}}}
60 〈latexrelease〉  \expandafter\MakeUppercase\@tempa}
61 〈latexrelease〉\EndIncludeInRelease
62 〈latexrelease〉\IncludeInRelease{0000/00/00}%
63 〈latexrelease〉          {\refstepcounter}{Add \labelformat and \Ref}%
64 〈latexrelease〉
65 〈latexrelease〉\def\refstepcounter#1{\stepcounter{#1}%
66 〈latexrelease〉    \protected@edef\@currentlabel
67 〈latexrelease〉          {\csname p@#1\endcsname\csname the#1\endcsname}%
68 〈latexrelease〉}
69 〈latexrelease〉\let\labelformat\@undefined
70 〈latexrelease〉\let\Ref\@undefined
71 〈latexrelease〉
72 〈latexrelease〉\EndIncludeInRelease
73 〈*2ekernel〉

```

\@currentlabel Default for \label commands that come before any environment.

```
74  \def\@currentlabel{}
```

(End definition for \@currentlabel.)

```
75 〈/2ekernel〉
```

File D

ltmiscen.dtx

1 Miscellaneous Environments

This section implements the basic environment mechanism, and also a few specific environments including `document`, The math environments and related commands, the ‘flushing’ environments, (`center`, `flushleft`, `flushright`), and `verbatim`.

```
1  {*2ekernel}
2  \message{environments,}
```

1.1 Environments

`\begin{foo}` and `\end{foo}` are used to delimit environment `foo`.

`\begin{foo}` starts a group and calls `\foo` if it is defined, otherwise it does nothing.

`\end{foo}` checks to see that it matches the corresponding `\begin` and if so, it calls `\endfoo` and does an `\endgroup`. Otherwise, `\end{foo}` does nothing.

If `\end{foo}` needs to ignore blanks after it, then `\endfoo` should globally set the `@ignore` switch true with `\@ignoretrue` (this will automatically be global).

NOTE: `\@end` is defined to be the `\end` command of TeX82.

`\enddocument` is the user’s command for ending the manuscript file.

`\stop` is a panic button — to end TeX in the middle.

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```
\enddocument ==
BEGIN
  \@checkend{document} %% checks for unmatched \begin
  \clearpage
  \begingroup
    if @filesw = true
      then close file @mainaux
      if G@refundefined = true
        then LaTeX Warning: 'There are undefined references.' fi
    if @multiplelabels = true
      then LaTeX Warning:
        'One or more label(s) multiply defined.'
    else
      \@setckpt {ARG1}{ARG2} == null
      \newlabel{LABEL}{VAL} ==
        BEGIN
          \reserved@a == VAL
          if def(\reserved@a) = def(\r@LABEL)
            else @tempswa := true           fi
        END
      \bibcite{LABEL}{VAL} == null
      BEGIN
        \reserved@a == VAL
        if def(\reserved@a) = def(\g@LABEL)
          else @tempswa := true           fi
      
```

```

        END
@tempswa := false
make @ a letter
\input \jobname.AUX
if @tempswa = true
    then LaTeX Warning: 'Label may have changed.
                                Rerun to get cross-references right.'
fi      fi      fi
\endgroup
finish up
END

```

```

\@writefile{EXT}{ENTRY} ==
if tf@EXT undefined
else \write\tf@EXT{ENTRY}
fi

```

End of historical L^AT_EX 2.09 comments.

\@currenvir The name of the current environment. Initialized to **document** so that **\end{document}** works correctly.

```

3 \def\@currenvir{document}
```

(End definition for \@currenvir.)

```

\if@ignore
\@ignorettrue
\@ignorefalse
4 \def\@ignorefalse{\global\let\if@ignore\iffalse}
5 \def\@ignorettrue {\global\let\if@ignore\iftrue}
6 \@ignorefalse

```

(End definition for \if@ignore, \@ignorettrue, and \@ignorefalse.)

\ignorespacesafterend

```

7 \let\ignorespacesafterend\@ignorettrue
```

(End definition for \ignorespacesafterend.)

\enddocument

```

8 </2ekernel>
9 <*2ekernel | latexrelease>
10 <latexrelease>\IncludeInRelease{2020/10/01}%
11 <latexrelease>          {\enddocument}{Use Hooks}%
12 \def\enddocument{%
```

The **\end{document}** hook is executed first. If necessary it can contain a **\clearpage** to output dangling floats first. In this position it can also contain something like **\end{foo}** so that the whole document effectively starts and ends with some special environment. However, this must be used with care, eg if two applications would use this without knowledge of each other the order of the environments will be wrong after all. **\AtEndDocument** is redefined at this point so that and such commands that get into the hook do not chase their tail...

```

13 \UseOneTimeHook{\enddocument}%
14 \@kernel@after\enddocument
```

```

15  \@checkend{document}%
16  \clearpage
17  \UseOneTimeHook{enddocument/afterlastpage}%
18  \@kernel@after@enddocument@afterlastpage
19  \begingroup
20  \if@filesw
21    \immediate\closeout\mainaux
22    \let\@setckpt\gobbletwo
23    \let\@newl@bel\@testdef

```

The previous line is equiv to setting

```

\def\newlabel{\@testdef r}%
\def\bibcite{\@testdef b}%

```

We use `\@@input` to load the .aux file, so that it doesn't show up in the list of files produced by `\listfiles`.

```

24  \@tempswafalse
25  \makeatletter \@@input\jobname.aux
26  \fi
27  \UseOneTimeHook{enddocument/afteraux}%

```

Next hook is expect to contain only code for writing info messages on the terminal.

```

28  \UseOneTimeHook{enddocument/info}%
29  \endgroup
30  \UseOneTimeHook{enddocument/end}%
31  \deadcycles{z@\@@end}%

```

The public hooks used in `\enddocument`:

```

32 \NewHook{enddocument}
33 \NewHook{enddocument/afterlastpage}
34 \NewHook{enddocument/afteraux}
35 \NewHook{enddocument/info}
36 \NewHook{enddocument/end}

```

This is one of the few places where we already add data and rules to a hook already in the kernel.

```

37 \AddToHook{enddocument/info}[kernel/filelist]{\@dofilelist}
38 \AddToHook{enddocument/info}[kernel/warnings]{\@enddocument@kernel@warnings}
39 \DeclareHookRule{enddocument/info}{kernel/filelist}{before}{kernel/warnings}
(End definition for \enddocument.)

```

`\@enddocument@kernel@warnings`

```

40 \def\@enddocument@kernel@warnings{%

```

First we check for font size substitution bigger than `\fontsubfuzz`. The `\relax` is necessary because this is a macro not a register.

```

41 \ifdim \font@submax >\fontsubfuzz\relax

```

In case you wonder about the `\gobbletwo` inside the message below, this is a horrible hack to remove the tokens `\on@line`. that are added by `\font@warning` at the end.

```

42   \@font@warning{Size substitutions with differences\MessageBreak
43     up to \font@submax\space have occurred.\gobbletwo}%
44 \fi

```

The macro `\@defaultsubs` is initially `\relax` but gets redefined to produce a warning if there have been some default font substitutions.

```
45     \@defaultsubs
```

The macro `\@refundefined` is initially `\relax` but gets redefined to produce a warning if there are undefined refs.

```
46     \@refundefined
```

If a label is defined more than once, `\@tempswa` will always be true and thus produce a “Label(s) may ...” warning. But since a rerun will not solve that problem (unless one uses a package like `variorom` that generates labels on the fly), we suppress this message.

```
47     \if@filesw
48         \ifx \@multiplelabels \relax
49             \if@tempswa
50                 \@latex@warning@no@line{Label(s) may have changed.
51                 Rerun to get cross-references right}%
52             \fi
53         \else
54             \@multiplelabels
55         \fi
56         \ifx \@extra@page@added \relax
57             \@latex@warning@no@line{Temporary extra page added at the end.
58             Rerun to get it removed}%
59         \fi
60     \fi
61 }
```

We could think of adding a warning that nothing can be corrected while `\nofiles` is in force. In the past the warnings related to the `.aux` file are simply suppressed in this case.

```
62 
```

$$\begin{aligned}
63 & \langle /2ekernel | latexrelease \rangle \\
64 & \langle latexrelease \rangle \EndIncludeInRelease \\
65 & \langle latexrelease \rangle \IncludeInRelease{0000/00/00} \% \\
66 & \langle latexrelease \rangle \end{document}\{Use Hooks\} \% \\
67 & \langle latexrelease \rangle \def\enddocument{\% \\
68 & \langle latexrelease \rangle \let\AtEndDocument\@firstofone \\
69 & \langle latexrelease \rangle \Cenddocumenthook \\
70 & \langle latexrelease \rangle \Ccheckend{document} \% \\
71 & \langle latexrelease \rangle \clearpage \\
72 & \langle latexrelease \rangle \begingroup \\
73 & \langle latexrelease \rangle \if@filesw \\
74 & \langle latexrelease \rangle \immediate\closeout\mainaux \\
75 & \langle latexrelease \rangle \let\@setckpt\@gobbletwo \\
76 & \langle latexrelease \rangle \let\@newlbel\@testdef \\
77 & \langle latexrelease \rangle \tempswafalse \\
78 & \langle latexrelease \rangle \makeatletter \@@input\jobname.aux \\
79 & \langle latexrelease \rangle \fi \\
80 & \langle latexrelease \rangle \odofilelist \\
81 & \langle latexrelease \rangle \ifdim \font@submax > \fontsubfuzz \relax \\
82 & \langle latexrelease \rangle \font@warning{Size substitutions with differences\MessageBreak \\
83 & \langle latexrelease \rangle up to \font@submax\space have occurred.\@gobbletwo} \% \\
\end{aligned}$$

```

84 〈latexrelease〉      \fi
85 〈latexrelease〉      \@defaultsubs
86 〈latexrelease〉      \@refundefined
87 〈latexrelease〉      \if@filesw
88 〈latexrelease〉          \ifx \@multiplelabels \relax
89 〈latexrelease〉              \if@tempswa
90 〈latexrelease〉                  \@latex@warning@no@line{Label(s) may have changed.
91 〈latexrelease〉                      Rerun to get cross-references right}%
92 〈latexrelease〉      \fi
93 〈latexrelease〉      \else
94 〈latexrelease〉          \@multiplelabels
95 〈latexrelease〉      \fi
96 〈latexrelease〉      \fi
97 〈latexrelease〉      \endgroup
98 〈latexrelease〉      \deadcycles\z@\@end}
99 〈latexrelease〉
100 〈latexrelease〉\let\@enddocument@kernel@warnings\@undefined
101 〈latexrelease〉
102 〈latexrelease〉\EndIncludeInRelease
103 〈*2ekernel〉

\@testdef
104 \def\@testdef #1#2#3{%
105   \def\reserved@a{#3}\expandafter \ifx \csname #1#2\endcsname
106   \reserved@a \else \@tempswatru\fi}

```

(*End definition for \@testdef.*)

Reading data from auxiliary files (like `.toc` normally happens in vertical mode and it therefore doesn't matter if line endings are converted to spaces by TeX during that process.

However, especially the `.toc` file might be read in L-R mode (in cases the `\tableofcontents` attempts to put, say a list of sub-sections as a paragraph. In that case the newlines after a line like

```
\contentsline {subsubsection}{\numberline {1.1.1}A C-head}{2}
```

might result in spurious spaces (e.g., when that level is not included).

That could be fixed by reading in the file using `\endlinechar=-1` but that has the danger that it drops some valid endlines that should be converted to spaces (for example when the user edited the TOC and then used `\nofiles` to preserve it.

So the approach taken instead is this:

- `\addcontentsline` adds the command `\protected@file@percent` to the end of the second argument of `\@writefile` that is written to the `.aux`. As the name indicates this is a protected macro so it doesn't change if it is written out.
- When the `.aux` is read back in at the end of the run, `\@writefile` is executed and writes its second argument unmodified to the file with the extension given by its first argument. Or rather that was how it was in the past.
- Instead we change `\@writefile` slightly: basically it looks at the second argument and if the last token in there is `\protected@file@percent` then it is replaced by a percent character and that is then written out. If not (for example, if the data came from a user issued `\addtocontents`, or from some package that uses `\@writefile` for writing its own files) then the command behaves exactly as before.

<code>\protected@file@percent</code>	Dummy cs to be replaced by a percent sign inside <code>\@writefile</code> . If it survives (when used incorrectly) it will expand to nothing in a typesetting context.
	<pre> 107 {/2ekernel} 108 {*2ekernel latexrelease} 109 {latexrelease}\IncludeInRelease{2018/12/01}% 110 {latexrelease} {\protected@file@percent}{Mask line endings}% 111 \protected\def\protected@file@percent{}</pre>
	(End definition for <code>\protected@file@percent</code> .)
<code>\add@percent@to@temptokena</code>	Helper function which is used to inspect a sequence of tokens (the second argument of <code>\@writefile</code> and if the last token is <code>\protected@file@percent</code> it will replace it by a harmless percent. The result is saved in <code>\@temptokena</code> for later use.
	<pre> 112 \catcode`^A=9 113 \long\gdef\add@percent@to@temptokena 114 #1\protected@file@percent#2\add@percent@to@temptokena</pre>
	When we call this macro in <code>\@writefile</code> we stick in <code>\empty</code> at the beginning, so that in case the tokenlist consists of a single brace group the braces aren't stripped. The <code>\expandafter</code> then expands this extra token away again.
	<pre> 115 {\expandafter\ifx\expandafter X\detokenize{#2}X\expandafter\dont@add@percent@to@temptokena 116 \expandafter\do@add@percent@to@temptokena\fi{#1}} 117 \long\def\dont@add@percent@to@temptokena#1{% 118 \@temptokena\expandafter{#1}}</pre>
	<code>latexrelease</code> will read this code in high-speed mode in certain situations. During that it will only look for <code>\if</code> tests but not actually execute the <code>\catcode</code> change above. As a result it will drop anything after the <code>%</code> character in the definition. Therefore the <code>\fi</code> needs to be on the next line and we need locally another comment character to avoid getting spaces into the definition—a weird problem :-)
	<pre> 119 \begingroup 120 \catcode`\%=12 121 \catcode`^A=14 122 \long\gdef\do@add@percent@to@temptokena#1{\@temptokena\expandafter{#1}%^A</pre>
	Can't be on the same line as the <code>%</code> — see above.
	<pre> 123 } 124 \endgroup</pre>
	(End definition for <code>\add@percent@to@temptokena</code> .)
<code>\@writefile</code>	
	<pre> 125 \long\def\@writefile#1#2{% 126 @ifundefined{tf@#1}\relax 127 {% 128 \add@percent@to@temptokena 129 \empty#2\protected@file@percent 130 \add@percent@to@temptokena 131 \immediate\write\csname tf@#1\endcsname{\the\@temptokena}% 132 }% 133 }</pre>

```

134  {/2ekernel | latexrelease}
135  \latexrelease\EndIncludeInRelease
136  \latexrelease\IncludeInRelease{0000/00/00}%
137  \latexrelease{\protected@file@percent}{Mask line endings}%
138  \latexrelease\let\protected@file@percent\@undefined
139  \latexrelease\let\add@percent@to@temptokena\@undefined
140  \latexrelease\let\do@add@percent@to@temptokena\@undefined
141  \latexrelease\let\dont@add@percent@to@temptokena\@undefined
142  \latexrelease\long\def\@writefile#1#2{%
143  \ifundefined{tf@#1}\relax
144  {\@temptokena{#2}%
145  \immediate\write\csname tf@#1\endcsname{\the\@temptokena}%
146  }%
147  \else\@temptokena{#2}\fi}%
148  \EndIncludeInRelease
149  {*2ekernel}

```

(End definition for `\@writefile`.)

`\stop`

```

150  \def\stop{\clearpage\deadcycles\z@\let\par\@@par\@@end}

```

(End definition for `\stop`.)

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```

151  \everypar{\@nodocument} %% To get an error if text appears before the
152  \nullfont %% \begin{document}

```

`\begin`, `\end`, and `\@checkend` changed so `\end{document}` will catch an unmatched `\begin`. Changed 24 May 89 as suggested by Frank Mittelbach and Rainer Sch"opf.

```

\begin{NAME} ==
BEGIN
  IF \NAME undefined THEN \reserved@a == BEGIN report error END
    ELSE \reserved@a ==
      (\@currenvir :=L NAME) \NAME

```

FI

@ignore :=G F %% Added 30 Nov 88

\begingroup

\@endpe := F

\@currenvir :=L NAME

\NAME

END

```

\end{NAME} ==
BEGIN
  \endNAME
  \@checkend{NAME}
  \endgroup
  IF @endpe = T %% @endpe set True by \endparenv
    THEN \doendpe %% \doendpe redefines \par and \everypar

```

```

        %% to suppress paragraph indentation in
        %% immediately following text
    FI
    IF @ignore = T
        THEN @ignore :=G F
            \ignorespaces
    FI
END

\@checkend{NAME} ==
BEGIN
    IF \@currenvir = NAME
        ELSE \@badend{NAME}
    FI
END

```

End of historical L^AT_EX 2.09 comments.

```

\begin
153  </2ekernel>
154  {*2ekernel | latexrelease}
155  <latexrelease>\IncludeInRelease{2020/10/01}%
156  <latexrelease>                                {\begin}{Use hook system}%
157  \DeclareRobustCommand*\begin[1]{%
158      \UseHook{env/#1/before}%
159      \@ifundefined{#1}%
160          {\def\reserved@a{\@latex@error{Environment #1 undefined}\@eha}}%
161          {\def\reserved@a{\def\@currenvir{#1}%
162              \edef\@currenvline{\on@line}%
163              \@execute@begin@hook{#1}%
164              \csname #1\endcsname}%
165          \@ignorefalse%
166          \begingroup\@endpefalse\reserved@a}

```

Before the `\document` code is executed we have to first undo the `\endgroup` as there should be none for this environment to avoid that changes on top-level unnecessarily go to TeX's savestack, and we have to initialize all hooks in the hook system. So we need to test for this environment name. But once it has been found all this testing is no longer needed and so we redefine `\@execute@begin@hook` to simply use the hook.

```

167  \def\@execute@begin@hook #1{%
168      \expandafter\ifx\csname #1\endcsname\document
169          \endgroup
170          \gdef\@execute@begin@hook##1{\UseHook{env/##1/begin}}%
171          \@expl@@@initialize@all@@
172      \fi

```

If this is an environment before `\begin{document}` we just run the hook so this can be outside the test.

```

173      \UseHook{env/#1/begin}%
174  }

```

The top level definition for `\end`. for an explanation see below (this is the same as the 2019 version where it was introduced, but for rollback we have to repeat it).

```

175 \edef\end
176   {\unexpanded{%
177     \romannumeral
178     \ifx\protect\@typeset@protect
179     \expandafter    %1
180     \expandafter    %2
181     \expandafter    %1
182     \expandafter    %3 expands the \csname inside \end<space>
183     \expandafter    %1
184     \expandafter    %2 expands \end<space>
185     \expandafter    %1 expands the \else
186     \z@
187   \else
188     \expandafter\z@\expandafter\protect
189   \fi
190 }
191 \expandafter\noexpand\csname end \endcsname
192 }
```

Version that adds hooks (so different from the 2019 version). It fixes tlb3722 but the change should perhaps be made in `tabularx` instead.

```

193 \@namedef{end }#1{%
194   \romannumeral
195   \IfHookEmptyTF{env/#1/end}{%
196     {\expandafter\z@}{%
197       {\z@\UseHook{env/#1/end}}{%
198         \csname end#1\endcsname\@checkend{#1}{%
199           \expandafter\endgroup\if@endpe\@doendpe\fi
200           \UseHook{env/#1/after}{%
201             \if@ignore\@ignorefalse\ignorespaces\fi
202           }}}
```

Version without the fix for tlb3722 for the record:

```

203 \%@\namedef{end }#1{%
204 \% \UseHook{env/#1/end}{%
205 \% \csname end#1\endcsname\@checkend{#1}{%
206 \% \expandafter\endgroup\if@endpe\@doendpe\fi
207 \% \UseHook{env/#1/after}{%
208 \% \if@ignore\@ignorefalse\ignorespaces\fi}{%
209 </2ekernel | latexrelease>
210 <latexrelease>\EndIncludeInRelease
211 <latexrelease>\IncludeInRelease{2019/10/01}{%
212 <latexrelease>          {\begin}{Making \begin/\end robust}{%
213 <latexrelease>\DeclareRobustCommand\begin[1]{%
214 <latexrelease> \@ifundefined{#1}{%
215 <latexrelease>   {\def\reserved@a{\@latex@error{Environment #1 undefined}\@eha}}{%
216 <latexrelease>   {\def\reserved@a{\def\currenvir{#1}}{%
217 <latexrelease>     \edef\currenvline{\on@line}{%
218 <latexrelease>     \csname #1\endcsname}}{%
219 <latexrelease> \if@ignorefalse
220 <latexrelease> \begingroup\endpefalse\reserved@a}
```

A version that doesn't start out with `\relax` when in typesetting mode would be the following, but since `\begin` issues a `\begingroup` it wouldn't help much with respect to allowing things like `\noalign` or `\multicolumn` inside.

```

221  \%edef\begin
222  %  {\unexpanded{%
223  %    \ifx\protect\@typeset@protect
224  %      \expandafter\@gobble
225  %    \fi
226  %    \protect
227  %  }%
228  %  \expandafter\noexpand\csname begin \endcsname
229  %
230  \%@\namedef{begin }#1{%
231  %  \@ifundefined{#1}{%
232  %    {\def\reserved@a{\@latex@error{Environment #1 undefined}\@eha}}%
233  %    {\def\reserved@a{\def\@currenvir{#1}}%
234  %     \edef\@currenvline{\on@line}%
235  %     \csname #1\endcsname}%
236  %  \@ignorefalse
237  %  \begingroup\@endpefalse\reserved@a}

```

`\end` While `\begin` was made robust simply by using `\DeclareRobustCommand` we need to be a bit more subtle with `\end` as there are packages out there that try to look into the top-level contents of `\end{foo}` (that is at the expansion of `\endfoo`) to see if it contains certain macros. This is done by hitting `\end{foo}` with three `\expandafters`, the first to get

```
\csname endfoo\endcsname      \@checkend{foo}% etc.
```

the second to expand the `\csname`, i.e., to get to

```
\endfoo      \@checkend{foo}% etc.
```

and the third to finally get to the top-level content of `\endfoo`, i.e.

```
<top-level content of \endfoo> \@checkend{foo}% etc.
```

Therefore a robust replacement should produce the same results after three expansions (there first is obviously different).

Basically the definition of `\end` should either produce `\protect\end` (when not doing typesetting) or it should produce `\end` (without the `\protect`) when doing typesetting. Furthermore, it should (when in typesetting mode) show exactly the same result as `\end` (which is the original fragile definition of `\end`) when you expand either of them twice, i.e.,

```
\endfoo      \@checkend{foo}% etc.
```

That is achieved with the code below (which is worth studying carefully).

There is some trickery involved here: in particular we use `\romannumeral` to change a single expansion into three successive expansions in one go. That primitive expands until it has scanned a number (0 in this case, so it doesn't produce any output) and so it allows us to place arbitrary many `\expandafters` inside that are all going to be executed when `\romannumeral` is hit by a single `\expandafter`.

```

238  \if@latexrelease\edef\end

```

```

239 <latexrelease> {\unexpanded{%
240 <latexrelease> \romannumeral
241 <latexrelease> \ifx\protect\@typeset@protect
242 <latexrelease> \expandafter    %1
243 <latexrelease> \expandafter    %2
244 <latexrelease> \expandafter    %1
245 <latexrelease> \expandafter    %3 expands the \csname inside \end<space>
246 <latexrelease> \expandafter    %1
247 <latexrelease> \expandafter    %2 expands \end<space>
248 <latexrelease> \expandafter    %1 expands the \else
249 <latexrelease> \z@%
250 <latexrelease> \else
251 <latexrelease> \expandafter\z@\expandafter\protect
252 <latexrelease> \fi
253 <latexrelease> }%
254 <latexrelease> \expandafter\noexpand\csname end \endcsname
255 <latexrelease> }

```

And here is the original definition of `\end` the way it was in L^AT_EX for several decades now hidden in `\endL`.

```

256 <latexrelease>\@namedef{end }#1{%
257 <latexrelease> \csname end#1\endcsname\@checkend{#1}%
258 <latexrelease> \expandafter\endgroup\if@endpe\@doendpe\fi
259 <latexrelease> \if@ignore\@ignorefalse\ignorespaces\fi}
260 <latexrelease>\EndIncludeInRelease

```

An here the rollback in case that is ever needed.

```

261 <latexrelease>\IncludeInRelease{0000/00/00}%
262 <latexrelease> {\begin}{Making \begin/\end robust}%
263 <latexrelease>\def\begin#1{%
264 <latexrelease> \@ifundefined{#1}%
265 <latexrelease> {\def\reserved@a{\@latex@error{Environment #1 undefined}\@eha}}%
266 <latexrelease> {\def\reserved@a{\def\currenvir{#1}}%
267 <latexrelease> \edef\currenvline{\on@line}%
268 <latexrelease> \csname #1\endcsname}%
269 <latexrelease> \@ignorefalse
270 <latexrelease> \begingroup\@endpefalse\reserved@a}
271 <latexrelease>\def\end#1{%
272 <latexrelease> \csname end#1\endcsname\@checkend{#1}%
273 <latexrelease> \expandafter\endgroup\if@endpe\@doendpe\fi
274 <latexrelease> \if@ignore\@ignorefalse\ignorespaces\fi}
275 <latexrelease>
276 <latexrelease>\EndIncludeInRelease
277 {*2ekernel}

```

(*End definition for `\begin` and `\end`.*)

```

\@checkend
278 \def\@checkend#1{\def\reserved@a{#1}\ifx
279 \reserved@a\@currenvir \else\@badend{#1}\fi}

```

(*End definition for `\@checkend`.*)

\@currenvline We do need a default value for `\@currenvline` on top-level since the document environment cancels the brace group. This means that a mismatch with `\begin{document}` will

not produce a line number. Thus the outer default must be `\@empty` or we will end up with two spaces.

```
280 \let\@currenvline\@empty
```

(*End definition for `\@currenvline`.*)

We provide 4 high-level hook interfaces directly, the others only when etoolbox is loaded

```
\AtBeginEnvironment
\AtEndEnvironment
\BeforeBeginEnvironment
\AfterEndEnvironment
281 </2ekernel>
282 <*2ekernel | latexrelease>
283 <latexrelease>\IncludeInRelease{2020/10/01}%
284 <latexrelease>          {\AtBeginEnvironment}{Hooks for environments}%
285 \newcommand\AtBeginEnvironment[2] [...] {\AddToHook{env/#2/begin}[]{#1}}
286 \newcommand\AtEndEnvironment[2] [...] {\AddToHook{env/#2/end}[]{#1}}
287 \newcommand\BeforeBeginEnvironment[2] [...] {\AddToHook{env/#2/before}[]{#1}}
288 \newcommand\AfterEndEnvironment[2] [...] {\AddToHook{env/#2/after}[]{#1}}
289 </2ekernel | latexrelease>
290 <latexrelease>\EndIncludeInRelease
291 <latexrelease>\IncludeInRelease{0000/00/00}%
292 <latexrelease>          {\AtBeginEnvironment}{Hooks for environments}%
293 <latexrelease>
294 <latexrelease>\let\AtBeginEnvironment\@undefined
295 <latexrelease>\let\AtEndEnvironment\@undefined
296 <latexrelease>\let\BeforeBeginEnvironment\@undefined
297 <latexrelease>\let\AfterEndEnvironment\@undefined
298 <latexrelease>
299 <latexrelease>\EndIncludeInRelease
300 <*2ekernel>
```

(*End definition for `\AtBeginEnvironment` and others. These functions are documented on page 117.*)

1.2 Center, Flushright, Flushleft

```
301 \message{center,}
```

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```
\center, \flushright and \flushleft set
\rightskip = 0pt or \flushglue (as appropriate)
\leftskip = 0pt or \flushglue (as appropriate)
\parindent = 0pt
\parfillskip = 0pt. (except \flushleft)
\\ == \par \vskip -\parskip
\\[LENGTH] == \\ \vskip LENGTH
\\* == \par \penalty 10000 \vskip -\parskip
\\*[LEN] == \\* \vskip LENGTH
```

They invoke the trivlist environment to handle vertical spacing before and after them.

`\centering`, `\raggedright` and `\raggedleft` are the declaration analogs of the above.

`\raggedright` has a more universal effect, however. It sets
`\@rightskip` := `flushglue`. Every environment, like the list
environments,
that set `\rightskip` to its 'normal' value set it to `\@rightskip`

End of historical L^AT_EX 2.09 comments.

`\@centercr`

```

302  </2ekernel>
303  {*2ekernel | latexrelease}
304  <latexrelease>\IncludeInRelease{2020/02/02}%
305  <latexrelease>          {\@centercr}{Make robust}%
306  \protected\def\@centercr{\ifhmode \unskip\else \nolnerr\fi
307    \par\@ifstar{\nobreak\@xcentercr}\@xcentercr}
308  </2ekernel | latexrelease>

309  <latexrelease>\EndIncludeInRelease
310  <latexrelease>\IncludeInRelease{0000/00/00}%
311  <latexrelease>          {\@centercr}{Make robust}%
312  <latexrelease>
313  <latexrelease>\def\@centercr{\ifhmode \unskip\else \nolnerr\fi
314  <latexrelease>          \par\@ifstar{\nobreak\@xcentercr}\@xcentercr}
315  <latexrelease>
316  <latexrelease>\EndIncludeInRelease
317  {*2ekernel}

```

(*End definition for `\@centercr`.*)

`\@xcentercr`

```

318  \def\@xcentercr{\addvspace{-\parskip}\@ifnextchar
319    [\@icentercr\ignorespaces]

```

(*End definition for `\@xcentercr`.*)

`\@icentercr`

```

320  </2ekernel>
321  {*2ekernel | latexrelease}
322  <latexrelease>\IncludeInRelease{2020/10/01}%
323  <latexrelease>          {\@icentercr}{centering, etc support calc}%
324  \def\@icentercr[#1]{\@vspace@calcify{#1}\ignorespaces}
325  </2ekernel | latexrelease>
326  <latexrelease>\EndIncludeInRelease
327  <latexrelease>\IncludeInRelease{0000/00/00}%
328  <latexrelease>          {\@icentercr}{centering, etc support calc}%
329  <latexrelease>
330  <latexrelease>\def\@icentercr[#1]{\vskip #1\ignorespaces}
331  <latexrelease>\EndIncludeInRelease
332  {*2ekernel}

```

(*End definition for `\@icentercr`.*)

`center` We use `\relax` to prevent `\item` scanning too far.

```

333  \def\center{\trivlist \centering\item\relax}
334  \def\endcenter{\endtrivlist}

```

```

335  </2ekernel>
336  <*2ekernel | latexrelease>
337  <latexrelease>\IncludeInRelease{2020/10/01}%
338  <latexrelease>           {\centering}{Set finalhyphendemerits}%

\centering
339 \DeclareRobustCommand\centering{%
340   \let\\@centercr
341   \rightskip\@flushglue\leftskip\@flushglue
342   \finalhyphendemerits=\z@
343   \parindent\z@\parfillskip\z@skip}

(End definition for \centering.)

\raggedright
344 \DeclareRobustCommand\raggedright{%
345   \let\\@centercr\rightskip\@flushglue \rightskip\@rightskip
346   \finalhyphendemerits=\z@
347   \leftskip\z@skip
348   \parindent\z@}

(End definition for \raggedright.)

\raggedleft
349 \DeclareRobustCommand\raggedleft{%
350   \let\\@centercr
351   \rightskip\z@skip\leftskip\@flushglue
352   \finalhyphendemerits=\z@
353   \parindent\z@\parfillskip\z@skip}

(End definition for \raggedleft.)

354 </2ekernel | latexrelease>
355 <latexrelease>\EndIncludeInRelease
356 <latexrelease>\IncludeInRelease{2019/10/01}%
357 <latexrelease>           {\centering}{Make commands robust}%
358 <latexrelease>
359 <latexrelease>\DeclareRobustCommand\centering{%
360 <latexrelease> \let\\@centercr
361 <latexrelease> \rightskip\@flushglue\leftskip\@flushglue
362 <latexrelease> \parindent\z@\parfillskip\z@skip}
363 <latexrelease>\DeclareRobustCommand\raggedright{%
364 <latexrelease> \let\\@centercr\rightskip\@flushglue \rightskip\@rightskip
365 <latexrelease> \leftskip\z@skip
366 <latexrelease> \parindent\z@}
367 <latexrelease>\DeclareRobustCommand\raggedleft{%
368 <latexrelease> \let\\@centercr
369 <latexrelease> \rightskip\z@skip\leftskip\@flushglue
370 <latexrelease> \parindent\z@\parfillskip\z@skip}
371 <latexrelease>\EndIncludeInRelease
372 <latexrelease>
373 <latexrelease>\IncludeInRelease{0000/00/00}%
374 <latexrelease>           {\centering}{Make commands robust}%
375 <latexrelease>
376 <latexrelease>\kernel@make@fragile\centering

```

```

377 〈latexrelease〉\kernel@make@fragile\raggedright
378 〈latexrelease〉\kernel@make@fragile\raggedleft
379 〈latexrelease〉
380 〈latexrelease〉\EndIncludeInRelease
381 (*2ekernel)

\@rightskip
382 \newskip\@rightskip \z@skip
(End definition for \@rightskip.)
```

flushleft We use `\relax` to prevent `\item` scanning too far.

```

383 \def\flushleft{\trivlist \raggedright\item\relax}
384 \def\endflushleft{\endtrivlist}
```

flushright We use `\relax` to prevent `\item` scanning too far.

```

385 \def\flushright{\trivlist \raggedleft\item\relax}
386 \def\endflushright{\endtrivlist}
```

1.3 Verbatim

```

387 \message{verbatim,}

The verbatim environment uses the fixed-width \ttfamily font, turns blanks into spaces, starts a new line for each carriage return (or sequence of consecutive carriage returns), and interprets every character literally. I.e., all special characters \, {, $, etc. are \catcode'd to 'other'.
```

The command `\verb` produces in-line verbatim text, where the argument is delimited by any pair of characters. E.g., `\verb #...#` takes '...' as its argument, and sets it verbatim in `\ttfamily` font.

The `*`-variants of these commands are the same, except that spaces print as the TeXbook's space character instead of as blank spaces.

```

\@vobeyspaces
388 {\catcode`\\ =\active%
389 \gdef\@vobeyspaces{\catcode`\\ \active\let \xobeysp{}}

(End definition for \@vobeyspaces.)
```

```

\xobeysp
(End definition for \xobeysp.)
```

```

\@xverbatim
\@sxverbatim
390 \begingroup \catcode `|=0 \catcode '['= 1
391 \catcode']=2 \catcode '\{=12 \catcode '\}=12
392 \catcode`\\=12 \gdef\@xverbatim#1\end{verbatim}#[#1\end[verbatim]]
393 \gdef\@sxverbatim#1\end{verbatim*}#[#1\end[verbatim*]]
394 \endgroup

(End definition for \@xverbatim and \@sxverbatim.)
```

@verbatim Real start of verbatim environment We use \relax to prevent \item scanning too far.

```
395  </2ekernel>
396  {*2ekernel | latexrelease}
397  <latexrelease>\IncludeInRelease{2017-04-15}{\@verbatim}%
398  <latexrelease>                                {Disable hyphenation in verbatim}%
399  \def\@verbatim{\trivlist \item\relax
400    \if@minipage\else\vskip\parskip\fi
401    \leftskip\@totalleftmargin\rightskip\z@skip
402    \parindent\z@\parfillskip\@flushglue\parskip\z@skip}
```

Added \@@par to clear possible \parshape definition from a surrounding list (the verbatim guru says). Switch language when in vertical mode.

```
403  \@@par
```

Set \language here to suppress hyphenation. Done this way rather than setting \hyphenchar as that is a global setting.

```
404  \language\l@nohyphenation
405  \tempswafalse
406  \def\part{%
407    \if@tempswa
```

A \leavevmode added: needed if, for example, a blank verbatim line is the first thing in a list item (wow!).

```
408      \leavevmode \null \@@par\penalty\interlinepenalty
409      \else
410        \tempswatrue
411        \ifhmode\@@par\penalty\interlinepenalty\fi
412      \fi} %
```

To allow customization we hide the font used in a separate macro.

```
413  \let\do\@makeother \dospecials
414  \obeylines \verbatim@font \noligs
```

To avoid a breakpoint after the labels box, we remove the penalty put there by the list macros: another use of \unpenalty!

```
415  \everypar \expandafter{\the\everypar \unpenalty}%
416  }
417  </2ekernel | latexrelease>
418  <latexrelease>\EndIncludeInRelease
419  <latexrelease>\IncludeInRelease{0000-00-00}{\@verbatim}%
420  <latexrelease>                                {Disable hyphenation in verbatim}%
421  <latexrelease>\def\@verbatim{\trivlist \item\relax
422  <latexrelease> \if@minipage\else\vskip\parskip\fi
423  <latexrelease> \leftskip\@totalleftmargin\rightskip\z@skip
424  <latexrelease> \parindent\z@\parfillskip\@flushglue\parskip\z@skip
425  <latexrelease> \@@par
426  <latexrelease> \tempswafalse
427  <latexrelease> \def\par{%
428    \if@tempswa
429      \leavevmode \null \@@par\penalty\interlinepenalty
430    \else
431      \tempswatrue
432      \ifhmode\@@par\penalty\interlinepenalty\fi
433    \fi} %
434  <latexrelease> \let\do\@makeother \dospecials
```

```

435 <|latexrelease> \obeylines \verbatim@font \onoligs
436 <|latexrelease> \hyphenchar\font\m@ne
437 <|latexrelease> \everypar \expandafter{\the\everypar \unpenalty}%
438 <|latexrelease>
439 <|latexrelease>\EndIncludeInRelease
440 {*2ekernel}

```

(*End definition for \verbatim.*)

\verbbatim (RmS 93/09/19) Protected against ‘missing item’ error message triggered by empty verbatim environment.

```

441 \def\verbbatim{\@verbatim \frenchspacing\@vobeyspaces \xverbatim}
442 \def\endverbatim{\if@newlist \leavevmode\fi\endtrivlist}

```

(*End definition for \verbbatim and \endverbatim.*)

\verbatim@font Macro to select the font used for verbatim typesetting. It also does other work if necessary for the font used.

```
443 \def\verbbatim@font{\normalfont\ttfamily}
```

(*End definition for \verbbatim@font.*)

```

444 
```

```
445 {*2ekernel | latexrelease}
446 <|latexrelease>\IncludeInRelease{2018/12/01}%
447 <|latexrelease> \verbvisible{Setup visible space for \verb}%

```

\asciispace The character in slot 32, in typewriter fonts (historically) a visible space but in other fonts a real space or something else

```
448 \DeclareRobustCommand\asciispace{\char 32 }
```

(*End definition for \asciispace.*)

\verbvisible This defines how to get a visible space in \verb* and friends. In classic TeX this is just the slot 32, but in TU encoded fonts we switch fonts and take the character from cmtt.

```

449 \ifx\Umathcode\undefined
450   \let\verbvisible\asciispace % PdfTeX version
451 \else
452   \DeclareRobustCommand\verbvisible
453     {\leavevmode{\usefont{OT1}{cmtt}{m}{n}\asciispace}} % xetex/luatex version
454 \fi

```

(*End definition for \verbvisible.*)

\@setupverbvisible In pdfTeX a catcode 12 space will produce the character in slot 32 which is assumed to be a visible space character (in a typewriter font in OT1 or T1 encoding). In XeTeX or LuaTeX a font in TU encoding is normally used and that has a real space in this slot. So what we do in this case is this: we check the definition of \verbvisible and if it is \asciispace we assume that the char32 can be used (e.g., in pdfTeX). We then redefine \xobeysp so that after running \@vobeyspaces we get characters from slot 32 for each active space.

```

455 \def\@setupverbvisible{%
456   \ifx\verbvisible\asciispace
457     \let\xobeysp\asciispace
458   \else

```

Otherwise we measure the width of a character in the mon-spaced current font and place a `\verbvisible` into a box of the right width which we are then using as the character for a space. By default this will be the space character from OT1 cmtt but by changing `\verbvisible` one could use, for example, the `\textvisible` of the current typewriter font.

```

459   \setbox\z@\hbox{x}%
460   \setbox\@verbvisiblebox\hbox to\wd\z@{\hss\verbvisible\hss}%
461   \def\xobeysp{\leavevmode\copy\@verbvisiblebox}%
462   \fi
463 }
```

(End definition for `\@setupverbvisible`.)

`\@verbvisiblebox` The box to hold the visible space character if it isn't in slot 32 in the current typewriter font.

```
464 \newbox\@verbvisiblebox
```

(End definition for `\@verbvisiblebox`.)

`verbatim*` For `verbatim*` we also set up the correct visible space character definition and then run `\@vobeyspaces`. As this code is not called as part of the normal verbatim environment (the method is done the other way around this time) we don't have to check if space is already active—it shouldn't be.

```

465 \namedef{verbatim*}{\@verbatim
466   \@setupverbvisible
467   \frenchspacing\@vobeyspaces\@xverbatim}
468 \expandafter\let\csname endverbatim*\endcsname =\endverbatim

469 </2ekernel | latexrelease>
470 \endIncludeInRelease
471 <latexrelease>\IncludeInRelease{0000/00/00}%
472 <latexrelease>           {\verbvisible}{Setup visible space for \verb}%
473 <latexrelease>
474 <latexrelease>\namedef{verbatim*}{\@verbatim\@xverbatim}
475 <latexrelease>
476 <latexrelease>\let\asciispace \undefined
477 <latexrelease>\let\verbvisible \undefined
478 <latexrelease>\let\@setupverbvisible\undefined
479 <latexrelease>\let\@verbvisiblebox \undefined
480 <latexrelease>\endIncludeInRelease
481 <2ekernel>
```

`\@sverb` Definitions of `\@sverb` and `\@verb` changed so `\verb+ foo+` does not lose leading blanks when it comes at the beginning of a line. Change made 24 May 89. Suggested by Frank Mittelbach and Rainer Schöpf.

```

482 </2ekernel>
483 <2ekernel | latexrelease>
484 <latexrelease>\IncludeInRelease{2020/10/01}%
485 <latexrelease>           {\@sverb}{Drop spaces before \verb delimiter}%
```

If the users types `\verb !~! foo` then surprisingly we would get the space as the delimiter and thus “`!~!foo`” in the output. To avoid this scenario we check if #1 has the character code of a space, if so we recurse otherwise we call `\@sverb` (which is the original definition of `\@sverb`).

```
486 \def\@sverb#1{\if\noexpand#1 \expandafter\@sverb\else\@sverb{#1}\fi}
```

```

487 \def\@sverb#1{%
488   \catcode`#1\active
489   \lccode`\~`#1%
490   \gdef\verb@balance@group{\verb@egroup
491     \@latex@error{\noexpand\verb illegal in command argument}\@ehc}%
492   \aftergroup\verb@balance@group
493   \lowercase{\let~\verb@egroup}%

```

If `\@sverb` is called from `\verb` then space is already active and supposed to produce a real space. In this case we do nothing. Otherwise we run `\@setupverbvisiblespace` to setup the right visible space char and afterwards `\@vobeyspaces` to make it the definition for the active space character.

```

494 \ifnum\catcode`\ =\active
495   \else  \@setupverbvisiblespace \@vobeyspaces \fi
496 }
497 </2ekernel | latexrelease>
498 <latexrelease>\EndIncludeInRelease
499 <latexrelease>\IncludeInRelease{2018/12/01}%
500 <latexrelease>          {\@sverb}{Setup visible space for \verb}%
501 <latexrelease>
502 <latexrelease>\def\@sverb#1{%
503 <latexrelease>  \catcode`#1\active
504 <latexrelease>  \lccode`\~`#1%
505 <latexrelease>  \gdef\verb@balance@group{\verb@egroup
506 <latexrelease>    \@latex@error{\noexpand\verb illegal in command argument}\@ehc}%
507 <latexrelease>  \aftergroup\verb@balance@group
508 <latexrelease>  \lowercase{\let~\verb@egroup}%
509 <latexrelease>  \ifnum\catcode`\ =\active
510 <latexrelease>  \else  \@setupverbvisiblespace \@vobeyspaces \fi
511 <latexrelease>
512 <latexrelease>\let\@sverb\@undefined
513 <latexrelease>\EndIncludeInRelease
514 <latexrelease>
515 <latexrelease>\IncludeInRelease{0000/00/00}%
516 <latexrelease>          {\@sverb}{Setup visible space for \verb}%
517 <latexrelease>\def\@sverb#1{%
518 <latexrelease>  \catcode`#1\active
519 <latexrelease>  \lccode`\~`#1%
520 <latexrelease>  \gdef\verb@balance@group{\verb@egroup
521 <latexrelease>    \@latex@error{\noexpand\verb illegal in command argument}\@ehc}%
522 <latexrelease>  \aftergroup\verb@balance@group
523 <latexrelease>  \lowercase{\let~\verb@egroup}%
524 <latexrelease>
525 <latexrelease>\EndIncludeInRelease
526 {*2ekernel}

```

(End definition for `\@sverb` and `\@sverb`.)

```
\@makeother
527 \def\@makeother#1{\catcode`#112\relax}
```

(End definition for `\@makeother`.)

```
\verb@balance@group
528 \let\verb@balance@group\@empty
```

(End definition for \verb@balance@group.)

\verb@egroup

529 \def\verb@egroup{\global\let\verb@balance@group\@empty\egroup}

(End definition for \verb@egroup.)

\verb@eol@error

530 \begingroup
531 \obeylines%
532 \gdef\verb@eol@error{\obeylines%
533 \def^~M{\verb@egroup\@latex@error{
534 \noexpand\verb ended by end of line}\@ehc}}%
535 \endgroup

(End definition for \verb@eol@error.)

\verb Typesetting a small piece verbatim.

536 </2ekernel>
537 {*2ekernel | latexrelease}
538 <latexrelease>\IncludeInRelease{2017-04-15}{\verb} %
539 <latexrelease> {Disable hyphenation in verb} %
540 \def\verb{\relax\ifmmode\hbox\else\leavevmode\null\fi
541 \bgroup
542 \verb@eol@error \let\do\@makeother \dospecials
543 \verbatim@font\@noligs

Set \language here to suppress hyphenation. Done this way rather than setting \hyphenchar as that is a global setting.

544 \language\l@nohyphenation
545 \@ifstar\@sverb\@verb}
546 </2ekernel | latexrelease>
547 <latexrelease>\EndIncludeInRelease
548 <latexrelease>\IncludeInRelease{0000-00-00}{\verb} %
549 <latexrelease> {Disable hyphenation in verb} %
550 <latexrelease>\def\verb{\relax\ifmmode\hbox\else\leavevmode\null\fi
551 <latexrelease> \bgroup
552 <latexrelease> \verb@eol@error \let\do\@makeother \dospecials
553 <latexrelease> \verbatim@font\@noligs
554 <latexrelease> \@ifstar\@sverb\@verb}
555 <latexrelease>\EndIncludeInRelease
556 {*2ekernel}

(End definition for \verb.)

\@verb

557 \def\@verb{\@vobeyspaces \frenchspacing \@sverb}

(End definition for \@verb.)

\verbatim@nolig@list

558 \def\verbatim@nolig@list{\do`\'\do\<\do\>\do\,\do\`\'\do\-\`}

(End definition for \verbatim@nolig@list.)

```
\do@noligs
559 \def\do@noligs#1{%
560   \catcode`#1\active
561   \begingroup
562     \lccode`\~`#1\relax
563     \lowercase{\endgroup\def~{\leavevmode\kern\z@\char`#1}}}
```

(End definition for `\do@noligs`.)

`\@noligs` To stay compatible with packages that use `\@noligs` we keep it.

```
564 \def\@noligs{\let\do\do@noligs \verbatim@nolig@list}
```

(End definition for `\@noligs`.)

```
565 
```

```
</2ekernel>
```

File E

ltmath.dtx

1 Math setup

This file contains a lot of the original plain T_EX code, as well as the L^AT_EX environments for math. It still needs sorting out.

```
1  {*2ekernel}
2  \message{math definitions,}
```

1.1 Math commands based on plain T_EX

1.1.1 The log-like functions

\log The standard operators:

```
3  \DeclareRobustCommand\log{\mathop{\operator@font log}\nolimits}
4  \DeclareRobustCommand\lg{\mathop{\operator@font lg}\nolimits}
5  \DeclareRobustCommand\ln{\mathop{\operator@font ln}\nolimits}
6  \DeclareRobustCommand\lim{\mathop{\operator@font lim}\nolimits}
7  \DeclareRobustCommand\limsup{\mathop{\operator@font lim\,,sup}\nolimits}
8  \DeclareRobustCommand\liminf{\mathop{\operator@font lim\,,inf}\nolimits}
9  \DeclareRobustCommand\sin{\mathop{\operator@font sin}\nolimits}
10 \DeclareRobustCommand\arcsin{\mathop{\operator@font arcsin}\nolimits}
11 \DeclareRobustCommand\sinh{\mathop{\operator@font sinh}\nolimits}
12 \DeclareRobustCommand\cos{\mathop{\operator@font cos}\nolimits}
13 \DeclareRobustCommand\arccos{\mathop{\operator@font arccos}\nolimits}
14 \DeclareRobustCommand\cosh{\mathop{\operator@font cosh}\nolimits}
15 \DeclareRobustCommand\tan{\mathop{\operator@font tan}\nolimits}
16 \DeclareRobustCommand\arctan{\mathop{\operator@font arctan}\nolimits}
17 \DeclareRobustCommand\tanh{\mathop{\operator@font tanh}\nolimits}
18 \DeclareRobustCommand\cot{\mathop{\operator@font cot}\nolimits}
19 \DeclareRobustCommand\coth{\mathop{\operator@font coth}\nolimits}
20 \DeclareRobustCommand\sec{\mathop{\operator@font sec}\nolimits}
21 \DeclareRobustCommand\csc{\mathop{\operator@font csc}\nolimits}
22 \DeclareRobustCommand\max{\mathop{\operator@font max}\nolimits}
23 \DeclareRobustCommand\min{\mathop{\operator@font min}\nolimits}
24 \DeclareRobustCommand\sup{\mathop{\operator@font sup}\nolimits}
25 \DeclareRobustCommand\inf{\mathop{\operator@font inf}\nolimits}
26 \DeclareRobustCommand\arg{\mathop{\operator@font arg}\nolimits}
27 \DeclareRobustCommand\ker{\mathop{\operator@font ker}\nolimits}
28 \DeclareRobustCommand\dim{\mathop{\operator@font dim}\nolimits}
29 \DeclareRobustCommand\hom{\mathop{\operator@font hom}\nolimits}
30 \DeclareRobustCommand\det{\mathop{\operator@font det}\nolimits}
31 \DeclareRobustCommand\exp{\mathop{\operator@font exp}\nolimits}
32 \DeclareRobustCommand\Pr{\mathop{\operator@font Pr}\nolimits}
33 \DeclareRobustCommand\gcd{\mathop{\operator@font gcd}\nolimits}
34 \DeclareRobustCommand\deg{\mathop{\operator@font deg}\nolimits}
```

(End definition for \log.)

\bmod And some operators have to be done by hand:

```

35 \DeclareRobustCommand\bmod{%
36   \nonscript\mskip-\medmuskip\mkern5mu%
37   \mathbin{\operator@font mod}\penalty900\mkern5mu%
38   \nonscript\mskip-\medmuskip}

```

(End definition for `\bmod`.)

`\pmod`

```

39 \DeclareRobustCommand\pmod[1]{%
40   \allowbreak\mkern18mu(\operator@font mod}\,,\,#1)}

```

(End definition for `\pmod`.)

1.1.2 Biggggg

`\big` Variants on `\big` and friends for use with delimiters:

```

41 \DeclareRobustCommand\bigl{\mathopen\big}
42 \DeclareRobustCommand\bigm{\mathrel\big}
43 \DeclareRobustCommand\bigr{\mathclose\big}
44 \DeclareRobustCommand\Bigl{\mathopen\Big}
45 \DeclareRobustCommand\Bigm{\mathrel\Big}
46 \DeclareRobustCommand\Bigr{\mathclose\Big}
47 \DeclareRobustCommand\biggl{\mathopen\bigg}
48 \DeclareRobustCommand\biggm{\mathrel\bigg}
49 \DeclareRobustCommand\biggr{\mathclose\bigg}
50 \DeclareRobustCommand\Biggl{\mathopen\Bigg}
51 \DeclareRobustCommand\Biggm{\mathrel\Bigg}
52 \DeclareRobustCommand\Biggr{\mathclose\Bigg}

```

(End definition for `\big`.)

1.1.3 The UNSORTED Rest

The other math commands are lifted from plain TeX.

`\jot`

```

53 \newdimen\jot
54 \jot=3pt

```

(End definition for `\jot`.)

`\interdisplaylinepenalty`

```

55 \newcount\interdisplaylinepenalty
56 \interdisplaylinepenalty=100

```

(End definition for `\interdisplaylinepenalty`.)

`\choose`

```

57 \def\choose{\atopwithdelims()}

```

(End definition for `\choose`.)

`\brack`

```

58 \def\brack{\atopwithdelims[]}

```

(End definition for `\brack`.)

```

\brace
59 \def\brace{\atopwithdelims\{\}}
(End definition for \brace.)

\mathpalette
60 \def\mathpalette#1#2{%
61   \mathchoice
62     {#1\displaystyle{#2}}%
63     {#1\textstyle{#2}}%
64     {#1\scriptstyle{#2}}%
65     {#1\scriptscriptstyle{#2}}}
(End definition for \mathpalette.)

\root
\rootbox
66 \newbox\rootbox
\root@t
67 \def\root#1{\of{%
68   \setbox\rootbox\hbox{$\m@th\scriptscriptstyle{#1}$}%
69   \mathpalette\root@t}}
\def\root@t#1#2{%
70   \setbox\z@\hbox{$\m@th\sqrt{#2}$}%
71   \dimen@\ht\z@\advance\dimen@-\dp\z@
72   \mkern5mu\raise.6\dimen@\copy\rootbox
73   \mkern-10mu\box\z@}
(End definition for \root, \rootbox, and \root@t.)

\phantom
\hphantom
75 \newif\ifv@
\phantom
76 \newif\ifh@
77 </2ekernel>
78 <*2ekernel | latexrelease>
79 <latexrelease>\IncludeInRelease{2019/10/01}%
80 <latexrelease>           {\vphantom}{Make commands robust}%
81 \DeclareRobustCommand\vphantom{\v@true\h@false\ph@nt}
82 \DeclareRobustCommand\hphantom{\v@false\h@true\ph@nt}
83 \DeclareRobustCommand\phantom{\v@true\h@true\ph@nt}

84 \DeclareRobustCommand\mathstrut{\vphantom{}}

\mathstrut
85 </2ekernel | latexrelease>
86 <latexrelease>\EndIncludeInRelease
87 <latexrelease>\IncludeInRelease{0000/00/00}%
88 <latexrelease>           {\vphantom}{Make commands robust}%
89 <latexrelease>
90 <latexrelease>\kernel@make@fragile\vphantom
91 <latexrelease>\kernel@make@fragile\hphantom
92 <latexrelease>\kernel@make@fragile\phantom
93 <latexrelease>\kernel@make@fragile\mathstrut
94 <latexrelease>
95 <latexrelease>\EndIncludeInRelease
96 <*2ekernel>

```

```

97 \def\ph@nt{%
98   \ifmmode
99     \expandafter\mathpalette\expandafter\mathph@nt
100   \else
101     \expandafter\makeph@nt
102   \fi}
103 \def\makeph@nt#1{%
104   \setbox\z@\hbox{\color@begingroup#1\color@endgroup}\finph@nt}
105 \def\mathph@nt#1#2{%
106   \setbox\z@\hbox{$\m@th#1{#2}$}\finph@nt}
107 </2ekernel>
108 <*2ekernel | latexrelease>
109 <latexrelease>\IncludeInRelease{2018/12/01}%
110 <latexrelease>          {\finph@nt}{Start LR-mode}%
111 \def\finph@nt{%
112   \setbox\tw@\null
113   \ifv@ \ht\tw@\ht\z@ \dp\tw@\dp\z@\fi
114   \ifh@ \wd\tw@\wd\z@\fi
115   \leavevemode@ifvmode\box\tw@}
116 </2ekernel | latexrelease>
117 <latexrelease>\EndIncludeInRelease
118 <latexrelease>\IncludeInRelease{0000/00/00}%
119 <latexrelease>          {\finph@nt}{Start LR-mode}%
120 <latexrelease>\def\finph@nt{%
121 <latexrelease> \setbox\tw@\null
122 <latexrelease> \ifv@ \ht\tw@\ht\z@ \dp\tw@\dp\z@\fi
123 <latexrelease> \ifh@ \wd\tw@\wd\z@\fi \box\tw@}
124 <latexrelease>\EndIncludeInRelease
125 <*2ekernel>

```

(End definition for *\phantom* and others.)

```

\smash
126 \DeclareRobustCommand\smash{%
127   \relax % \relax, in case this comes first in \halign
128   \ifmmode
129     \expandafter\mathpalette\expandafter\mathsm@sh
130   \else
131     \expandafter\makesm@sh
132   \fi}
133 \def\makesm@sh#1{%
134   \setbox\z@\hbox{\color@begingroup#1\color@endgroup}\finsm@sh}
135 \def\mathsm@sh#1#2{%
136   \setbox\z@\hbox{$\m@th#1{#2}$}\finsm@sh}
137 </2ekernel>
138 <*2ekernel | latexrelease>
139 <latexrelease>\IncludeInRelease{2018/12/01}%
140 <latexrelease>          {\finsm@sh}{Start LR-mode}%
141 \def\finsm@sh{\ht\z@\z@ \dp\z@\z@ \leavevemode@ifvmode\box\z@}
142 </2ekernel | latexrelease>
143 <latexrelease>\EndIncludeInRelease

```

```

144  ⟨latexrelease⟩\IncludeInRelease{0000/00/00}%
145  ⟨latexrelease⟩                               {⟨finsm@sh⟩{Start LR-mode}%
146  ⟨latexrelease⟩\def\finsm@sh{⟨ht⟩⟨z@⟩⟨dp⟩⟨z@⟩⟨box⟩⟨z@⟩}
147  ⟨latexrelease⟩\EndIncludeInRelease
148  ⟨*2ekernel⟩

(End definition for \smash.)
```

\buildrel

```

149 \def\buildrel#1\over#2{\mathrel{\mathop{\kern\z@#2}\limits^{#1}}}
```

(End definition for \buildrel.)

```

150 ⟨/2ekernel⟩
151 ⟨*2ekernel | latexrelease⟩
152 ⟨latexrelease⟩\IncludeInRelease{2019/10/01}%
153 ⟨latexrelease⟩                           {⟨cases⟩{Make commands robust}%
```

\cases

```

154 \DeclareRobustCommand*⟨cases[1]⟩{⟨left⟩{⟨,⟩⟨vcenter{⟨normalbaselines⟩}⟩
155   ⟨ialign{##}⟨hfil⟩⟨quad{##}⟨hfil⟩⟨crrc#1⟩⟨crrc⟩⟩⟨right⟩.}}
```

(End definition for \cases.)

\matrix

```

156 \DeclareRobustCommand*⟨matrix[1]⟩{⟨null⟩,⟨vcenter{⟨normalbaselines⟩}⟩
157   ⟨ialign{⟨hfil⟩##$⟨hfil⟩&&⟨quad{⟨hfil⟩##$⟨hfil⟩⟨crrc⟩}⟩⟨crrc⟩}⟩
158   ⟨mathstrut⟩⟨crrc⟩⟨noalign{⟨kern-⟩⟨baselineskip⟩}
159   ⟨#1⟩⟨crrc⟩⟨mathstrut⟩⟨crrc⟩⟨noalign{⟨kern-⟩⟨baselineskip⟩}⟩}⟩,}
```

(End definition for \matrix.)

\pmatrix

```

160 \DeclareRobustCommand*⟨pmatrix[1]⟩{⟨left(⟨matrix{#1}⟩right)⟩}
```

(End definition for \pmatrix.)

```

161 ⟨/2ekernel | latexrelease⟩
162 ⟨latexrelease⟩\EndIncludeInRelease
163 ⟨latexrelease⟩\IncludeInRelease{0000/00/00}%
164 ⟨latexrelease⟩                           {⟨cases⟩{Make commands robust}%
165 ⟨latexrelease⟩
166 ⟨latexrelease⟩\kernel@make@fragile⟨cases
167 ⟨latexrelease⟩\kernel@make@fragile⟨matrix
168 ⟨latexrelease⟩\kernel@make@fragile⟨pmatrix
169 ⟨latexrelease⟩
170 ⟨latexrelease⟩\EndIncludeInRelease
171 ⟨*2ekernel⟩
```

\bordermatrix

```

172 \def\bordermatrix#1{⟨begingroup⟩⟨math@th
173   ⟨@tempdima 8.75\p@⟩
174   ⟨setbox⟩⟨z@⟩⟨vbox{%
175     ⟨def⟩⟨cr⟩⟨crrc⟩⟨noalign{⟨kern2⟩⟨p@⟩⟨global⟩⟨let⟩⟨cr⟩⟨endline⟩}⟩%
176     ⟨ialign{##$⟨hfil⟩⟨kern2⟩⟨p@⟩⟨kern⟩⟨@tempdima⟩⟨thinspace⟩⟨hfil⟩##$⟨hfil
177     &&⟨quad⟩⟨hfil⟩##$⟨hfil⟩⟨crrc⟩
```

```

178      \omit\strut\hfil\crcr\noalign{\kern-\baselineskip}%
179      #1\crcr\omit\strut\cr}%
180 \setbox\tw@{\vbox{\unvcopy\z@\global\setbox\one\lastbox}%
181 \setbox\tw@{\hbox{\unhbox\one\unskip\global\setbox\one\lastbox}%
182 \setbox\tw@{\hbox{$\kern\wd\one\kern-\tempdima\left(\kern-\wd\one
183 \global\setbox\one\vbox{\box\one\kern2\p@}%
184 \vcenter{\kern-\ht\one\unvbox\z@\kern-\baselineskip}\,,\right)$}%
185 \null\; \vbox{\kern\ht\one\box\tw@}\endgroup}
```

(End definition for `\bordermatrix`.)

`\openup`

```

186 \def\openup{\afterassignment\openup\dimen@}
187 \def\openup{\advance\lineskip\dimen@%
188 \advance\baselineskip\dimen@%
189 \advance\lineskiplimit\dimen@}
```

(End definition for `\openup`.)

`\displaylines`

```

190 \newif\ifdt@p
191 \def\displ@y{\global\dt@ptrue\openup\jot\m@th
192 \everycr{\noalign{\ifdt@p \global\dt@pfalse \ifdim\prevdepth>-1000\p@
193 \vskip-\lineskiplimit \vskip\normalineskiplimit \fi
194 \else \penalty\interdisplaylinepenalty \fi}}}
195 \def\@lign{\tabskip\z@skip\everycr{}% restore inside \displ@y
196 \def\displaylines#1{\displ@y \tabskip\z@skip
197 \halign{\hb@xt@{\displaywidth{$\@lign\hfil\displaystyle##\hfil$}}\crcr
198 #1\crcr}}
```

(End definition for `\displaylines`.)

`\sp`

```

\sb 199 \let\sp=^
200 \let\sb=_
```

(End definition for `\sp` and `\sb`.)

`\tmspace`

```

\thinspace
\thickspace
\negthinspace
\negthickspace
```

Originally L^AT_EX only provided a small set of spacing commands for use in text and math, some of the commands like `\;` were only supported in manth mode. `amsmath` normalized and provided all of them in text and math. This code has now been moved to the kernel so that it is generally available.

```

\medspace
\negmedspace
\thickspace
\negthickspace
```

`\tmspace` is really meant to be an internal command so it doesn't necessarily has to be robust but it was robust in `amsmath` so we leave it like that.

```

201 </2ekernel>
202 <*2ekernel | latexrelease>
203 <latexrelease>\IncludeInRelease{2020/10/01}%
204 <latexrelease> \tmspace{amsmath spacing commands}%
205 \DeclareRobustCommand\tmspace[3]{%
206 \ifmmode\mskip#1#2\else\leavevmode\kern#1#3\fi\relax}
```

In `amsmath` the text kern is `.16667em`. For compatibility reasons we keep the longer one.

```
207 \DeclareRobustCommand\,{\tmspace+\thinmuskip{.16667em}}
208 \let\thinspace\,
209 \DeclareRobustCommand\!{\tmspace-\thinmuskip{.16667em}}
210 \let\negthinspace\!
211 \DeclareRobustCommand\:{\tmspace+\medmuskip{.2222em}}
212 \let\medspace\:
```

LATEX has a second name for this in its manual:

```
213 \let\>=\  

214 \DeclareRobustCommand\negmedspace{\tmspace-\medmuskip{.2222em}}
215 \DeclareRobustCommand\;{\tmspace+\thickmuskip{.2777em}}
216 \let\thickspace\  

217 \DeclareRobustCommand\negthickspace{\tmspace-\thickmuskip{.2777em}}
218 </2ekernel | latexrelease>
219 <latexrelease>\EndIncludeInRelease  

220 <latexrelease>\IncludeInRelease{0000/00/00}%
221 <latexrelease>           {\tmspace}{amsmath spacing commands}%
222 <latexrelease>
223 <latexrelease>\let\tmspace\@undefined
224 <latexrelease>\DeclareRobustCommand\,{\,}%
225 <latexrelease>  \relax\ifmmode\mskip\thinmuskip\else\thinspace\fi}
226 <latexrelease>\DeclareRobustCommand\thinspace{\leavevmode@ifvmode\kern .16667em }
227 <latexrelease>\DeclareRobustCommand\negthinspace{\leavevmode@ifvmode\kern-.16667em }
228 <latexrelease>\def\>{\mskip\medmuskip}
229 <latexrelease>\let\:=\>
230 <latexrelease>\def\;{\mskip\thickmuskip}
231 <latexrelease>\def\!{\mskip-\thinmuskip}
232 <latexrelease>  

233 <latexrelease>\let\negmedspace\@undefined
234 <latexrelease>\let\negthickspace\@undefined
235 <latexrelease>
236 <latexrelease>\EndIncludeInRelease
237 <*2ekernel>
```

(*End definition for `\tmspace` and others.*)

*

```
238 \DeclareRobustCommand\*{\discretionary{\thinspace\the\textfont2\char2}{}{}}
```

(*End definition for *.*)

\!: Nickname for the medium space since `\>` is not available inside `tabbing`.

```
239 \%let\:=\>
```

(*End definition for \::*)

`\active@math@prime` This is the definition of the active math prime.

```
240 \def\active@math@prime{\^bgroup\prim@s}
```

(*End definition for \active@math@prime.*)

```

\prime@s
241 {\catcode`'=active \global\let'\active@math@prime}
242 \def\prime@s{%
243   \prime\futurelet@\let@token\prime@s}
244 \def\prime@s{%
245   \ifx`\@let@token
246     \expandafter\prime@s
247   \else
248     \ifx^`\@let@token
249       \expandafter\expandafter\expandafter\prime@ct
250     \else
251       \egroup
252     \fi
253   \fi}
254 \def\prime@s{\prime@s}
255 \def\prime@t{\prime@s\egroup}

(End definition for \prime@s.)
```

256 {\catcode`_=active \gdef_`_{\prime@t} % _ in math is
257 % either subscript or _

1.2 Math Environments

- \(\backslash(\) Produces \$...\$ with checks that \(\backslash(\) isn't used in math mode, and that \(\backslash)\) is only used in math mode begun with \(\backslash(\).

```

258 {/2ekernel}
259 <latexrelease>\IncludeInRelease{2015/01/01}{\{}{\Make \(\backslash(\ robust)}%
260 {*2ekernel | latexrelease}
261 \DeclareRobustCommand\(\{%
262   \relax\ifmmode\@badmath\else$\fi\}%
263 \DeclareRobustCommand\){%
264   \relax\ifmmode\ifinner$\else\@badmath\fi\else \@badmath\fi\}%
265 {/2ekernel | latexrelease}
266 <latexrelease>\EndIncludeInRelease
267 <latexrelease>\IncludeInRelease{0000/00/00}{\{}{\Make \(\backslash(\ robust)}%
268 <latexrelease>\def\(\{%
269 <latexrelease> \relax\ifmmode\@badmath\else$\fi\}%
270 <latexrelease>\expandafter\let\csname\string(\ \endcsname\@undefined
271 <latexrelease>\def\){%
272 <latexrelease> \relax\ifmmode\ifinner$\else\@badmath\fi\else \@badmath\fi\}%
273 <latexrelease>\expandafter\let\csname\string)\ \endcsname\@undefined
274 <latexrelease>\EndIncludeInRelease
275 {*2ekernel}
```

(End definition for \(\backslash(\) and \(\backslash)\).

- \(\backslash[\) Produces \$\$...\$\$ with checks that \(\backslash[\) isn't used in math mode, and that \(\backslash]\) is only used in display math mode (though there is no real test that this display math started with \(\backslash[\) and not with \$\$).

```

276 {/2ekernel}
277 <latexrelease>\IncludeInRelease{2015/01/01}{\[]{\Make \(\backslash[\ robust)}%
```

```

278 {*2ekernel | latexrelease}
279 \DeclareRobustCommand\[{%
280   \relax\ifmmode
281     \@badmath
282   \else
283     \ifvmode
284       \nointerlineskip
285       \makebox[.6\linewidth]{}%
286     \fi
287     $$$%$$$ BRACE MATCH HACK
288   \fi
289 }%
290 \DeclareRobustCommand\]{%
291   \relax\ifmmode
292     \ifinner
293       \@badmath
294     \else
295       $$$%$$$ BRACE MATCH HACK
296     \fi
297   \else
298     \@badmath
299   \fi
300   \ignorespaces
301 }%
302 //2ekernel | latexrelease)
303 <latexrelease>\EndIncludeInRelease
304 <latexrelease>\IncludeInRelease{0000/00/00}{\[]}{\Make \[ robust}%
305 <latexrelease>\def\[{%
306 <latexrelease> \relax\ifmmode
307 <latexrelease> \@badmath
308 <latexrelease> \else
309 <latexrelease> \ifvmode
310 <latexrelease> \nointerlineskip
311 <latexrelease> \makebox[.6\linewidth]{}%
312 <latexrelease> \fi
313 <latexrelease> $$$%$$$ BRACE MATCH HACK
314 <latexrelease> \fi
315 <latexrelease>}%
316 <latexrelease>\expandafter\let\csname\string[ \endcsname\@undefined
317 <latexrelease>\def\]{%
318 <latexrelease> \relax\ifmmode
319 <latexrelease> \ifinner
320 <latexrelease> \@badmath
321 <latexrelease> \else
322 <latexrelease> $$$%$$$ BRACE MATCH HACK
323 <latexrelease> \fi
324 <latexrelease> \else
325 <latexrelease> \@badmath
326 <latexrelease> \fi
327 <latexrelease> \ignorespaces
328 <latexrelease>}%
329 <latexrelease>\expandafter\let\csname\string] \endcsname\@undefined
330 <latexrelease>\EndIncludeInRelease

```

```

331  {*2ekernel}

(End definition for \[ and \].)

math Disguises for \(\dots\) and \[\dots\].
displaymath
332 \let\math=\(
333 \let\endmath=\)
334 \def\displaymath{[]}
335 \def\enddisplaymath[]\ignoretrue

\c@equation Numbered equations, using the counter \c@equation. Note: The document style must define \theequation etc., and do the appropriate \caddtoreset. It should also redefine \c@eqnnum if another format for the equation number is desired other than the standard (...), or to move the equation numbers to the flushleft. (See comment on the \def of \c@eqnnum.)
336 \definecounter{equation}
337 \def\equation{$$\refstepcounter{equation}}
338 \def\endequation{\eqno \hbox{\c@eqnnum}$$\ignoretrue
(End definition for \c@equation.)

\c@eqnnum Produces the equation number for equation and eqnarray environments. The following definition is for flushright numbers; for flushleft numbers, see leqno.clo. The equation number is set in black roman type even if an eqnarray environment appears in an italic environment.
339 \def\c@eqnnum{{\normalfont \normalcolor (\theequation)}}

(End definition for \c@eqnnum.)

\stackrel A disguise for plain TEX's buildrel.
340 \DeclareRobustCommand\stackrel[2]{\mathrel{\mathop{\#2}\limits^{\#1}}}

(End definition for \stackrel.)

\frac A disguise for plain TEX's \over.
341 \DeclareRobustCommand\frac[2]{{\begingroup\#1\endgroup\over\#2} }

(End definition for \frac.)

\sqrt Add an optional argument to plain's \sqrt to give the nth root of an expression  $\sqrt[n]{e}$ .
\c@sqrt
342 \DeclareRobustCommand\sqrt{\c@ifnextchar[\c@sqrt\sqrtsign}
343 \def\c@sqrt[#1]{\root #1\of}

(End definition for \sqrt and \c@sqrt.)

\eqnarray Here's the eqnarray environment: Default is for left-hand side of equations to be flushright. To make them flushleft, \let\c@eqnse = \hfil.
\c@eqpen
\c@eqnsw
344 \newcount\c@eqcnt
345 \newcount\c@eqpen
346 \newif\c@eqnsw\c@eqnswtrue
347 \newskip\c@centering
348 \c@centering = 0pt plus 1000pt

```

To get a proper `\@currentlabel` we have to redefine it for the whole display. Note that we can't use `\refstepcounter` as this results in `\@currentlabel` getting restored at the wrong and thus always writing the first label to the `.aux` file.

```

349 \def\eqnarray{%
350   \stepcounter{equation}%
351   \def\@currentlabel{\p@equation\theequation}%
352   \global\@eqnswtrue
353   \m@th
354   \global\@eqcnt\z@
355   \tabskip\@centering
356   \let\\@\eqncr
357   $$\everycr{}\halign{to\displaywidth\bgroup
358     \hskip\@centering$\displaystyle\tabskip\z@skip\#\$\@eqnsel
359     &\global\@eqcnt\@ne\hskip \tw@\arraycolsep \hfil\#\$\hfil
360     &\global\@eqcnt\tw@\hskip \tw@\arraycolsep
361     $\displaystyle\#\$\hfil\tabskip\@centering
362     &\global\@eqcnt\thr@@ \hb@xt@\z@\bgroup\hss##\egroup
363     \tabskip\z@skip
364   \cr
365 }
366 \def\endeqnarray{%
367   \@@eqncr
368   \egroup
369   \global\advance\c@equation\m@ne
370   $$\@ignorespace
371 }
372 \let\@eqnse=\relax

```

(*End definition for `\@eqcnt` and others.*)

`\nonumber` Switches off equation numbering.

```
373 \def\nonumber{\global\@eqnswfalse}
```

(*End definition for `\nonumber`.*)

```

\@eqncr
\@xeqncr 374 \def\@eqncr{%
\@yeqncr 375   {\ifnum0='}\fi
376   \@ifstar{%
377     \global\@eqpen\@M\@yeqncr
378   }{%
379     \global\@eqpen\interdisplaylinepenalty\@yeqncr
380   }%
381 }
382 \def\@yeqncr{\@testopt\@xeqncr\z@skip}

383 </2ekernel>
384 <*2ekernel | latexrelease>
385 <latexrelease>\IncludeInRelease{2020/10/01}%
386 <latexrelease>           {\@xeqncr}{eqnarray support calc syntax}%
387 \def\@xeqncr[#1]{%
388   \ifnum0='}\fi}%
389   \@@eqncr

```

```

390   \noalign{\penalty\eqpen\vskip\jot\@vspace\calcify{#1}}%
391 }
392 </2ekernel | latexrelease>
393 <latexrelease>\EndIncludeInRelease
394 <latexrelease>\IncludeInRelease{0000/00/00}%
395 <latexrelease>           {\@xeqncr}{eqnarray support calc syntax}%
396 <latexrelease>
397 <latexrelease>\def\@xeqncr[#1]{%
398 <latexrelease>    \ifnum0='{\fi}%
399 <latexrelease>    \@@eqncr
400 <latexrelease>    \noalign{\penalty\eqpen\vskip\jot\vskip #1\relax}%
401 <latexrelease>}
402 <latexrelease>\EndIncludeInRelease
403 <*2ekernel>

```

(*End definition for \@eqncr, \@xeqncr, and \@yeqncr.*)

\@eqncr

```

404 \def\@eqncr{\let\reserved@a\relax
405   \ifcase\@eqcnt \def\reserved@a{& &}\or \def\reserved@a{& &}%
406   \or \def\reserved@a{&}\else
407     \let\reserved@a\empty
408     \@latex@error{Too many columns in eqnarray environment}\@ehc\fi
409   \reserved@a \if@eqnsw\@eqnnum\stepcounter{equation}\fi
410   \global\@eqnswtrue\global\@eqcnt\z@\cr}

```

(*End definition for \@eqncr.*)

eqnarray* Here's the eqnarray* environment:

```

411 \let\@seqncr=\@eqncr
412 \Qnamedef{eqnarray*}{\def\@eqncr{\nonumber\@seqncr}\eqnarray}
413 \Qnamedef{endeqnarray*}{\nonumber\endeqnarray}

```

(*End definition for \@seqncr.*)

\lefteqn \lefteqn{FORMULA} typesets FORMULA in display math style flushleft in a box of width zero.

```
414 \def\lefteqn#1{\rlap{$\displaystyle #1$}}
```

(*End definition for \lefteqn.*)

\ensuremath In math mode, \ensuremath{text} is equivalent to text; in LR or paragraph mode, it is equivalent to \$text\$. \relax is not needed in front of the \ifmmode as \protect will be \let to \relax. This version (due to Donald Arseneau) avoids duplicating its argument in the 'then' and 'else' part of the \ifmath which is necessary in nested 'tabular' like environments. See amslatex/2104.

```

415 \DeclareRobustCommand{\ensuremath}{%
416   \ifmmode
417     \expandafter\@firstofone
418   \else
419     \expandafter\@ensuredmath
420   \fi}

```

(*End definition for \ensuremath.*)

\@ensuredmath The `\relax` stops `\ensuremath{}` starting display math.

```
421 \long\def\@ensuredmath#1{$\relax#1$}
(End definition for \@ensuredmath.)
```

422 ⟨/2ekernel⟩

1.3 External options to the standard document classes

1.3.1 Left equation numbering

\@eqnnum To put the equation number on the left side of an equation we have to use a little trick. The number is shifted `\displaywidth` to the left inside a box of (approximately) zero width. This fails when the quation is too wide, the equation number than may overprint the equation itself.

```
423 (*leqno)
424 \renewcommand\@eqnnum{\hb@xt@.01\p@{}%
425 \rlap{\normalfont\normalcolor
426 \hskip -\displaywidth(\theequation)}}
427 /leqno
```

(End definition for \@eqnnum.)

1.3.2 Flush left equations

To get the displayed math environments to print the contents flush left (with an indentation) we have to redefine all of L^AT_EX 2_ε's displayed math environments.

\mathindent The amount of indentation of the equations is stored in a register.

```
428 (*fleqn)
429 \newskip\mathindent
```

The setting of `\mathindent` has to be deferred until the class file has been processed, because `\leftmargini` is still 0pt wide at the moment `fleqn.clo` is read in.

```
430 \AtEndOfClass{\mathindent\leftmargini}
```

(End definition for \mathindent.)

\[Begin display math;

```
431 \IncludeInRelease{2015/01/01}{\[]}{\Make \[\ robust}%
432 \DeclareRobustCommand\[\relax
433 \ifmmode\@badmath
434 \else
435 \begin{trivlist}%
436 \begin{parpenalty}\predisplaypenalty
437 \end{parpenalty}\postdisplaypenalty
438 \item[]\leavevmode
439 \hb@xt@\linewidth\bgroup \$\m@th\displaystyle %$
440 \hskip\mathindent\bgroup
441 \fi}
442 \EndIncludeInRelease
```

```

443 \IncludeInRelease{0000/00/00}{[]}{\Make \[ robust}%
444 \renewcommand[]{\relax
445     \ifmmode\@badmath
446     \else
447         \begin{trivlist}%
448             \begin{parpenalty}\predisplaypenalty
449             \end{parpenalty}\postdisplaypenalty
450             \item[]\leavevmode
451             \hb@xt@\linewidth\bgroup \$\m@th\displaystyle \$%
452             \hskip\mathindent\bgroup
453         \fi}
454 \EndIncludeInRelease

```

(End definition for \[.)

\] end display math;

```

455 \IncludeInRelease{2015/01/01}{[]}{\Make \] robust}%
456 \DeclareRobustCommand]{\relax
457     \ifmmode
458         \egroup \$\hfil\$%
459         \egroup
460         \end{trivlist}%
461     \else \@badmath
462     \fi}
463 \EndIncludeInRelease
464 \IncludeInRelease{0000/00/00}{[]}{\Make \] robust}%
465 \renewcommand[]{\relax
466     \ifmmode
467         \egroup \$\hfil\$%
468         \egroup
469         \end{trivlist}%
470     \else \@badmath
471     \fi}
472 \EndIncludeInRelease

```

(End definition for \].)

equation The equation environment

```

473 \renewenvironment{equation}%
474     {\begin{parpenalty}\predisplaypenalty
475     \end{parpenalty}\postdisplaypenalty
476     \refstepcounter{equation}%
477     \trivlist \item[]\leavevmode
478     \hb@xt@\linewidth\bgroup \$\m@th\$%
479     \displaystyle
480     \hskip\mathindent}%

```

Ensure that there is at least a space between formula and equation number so that they don't bump in each other.

```

481   { $\hskip .3em minus.3em\hfil \$%
482     \displaywidth\linewidth\hbox{\eqnnum}%
483     \egroup
484     \endtrivlist}%

```

eqnarray The eqnarray environment

```
485 \renewenvironment{eqnarray}{%
486   \stepcounter{equation}%
487   \def\@currentlabel{\p@equation\theequation}%
488   \global\@eqnswtrue\m@th
489   \global\@eqcnt\z@
490   \tabskip\mathindent
491   \let\\=\@eqncr
492   \setlength\abovedisplayskip{\topsep}%
493   \ifvmode
494     \addtolength\abovedisplayskip{\partopsep}%
495   \fi
```

When the documentclass uses a non-zero \parskip setting the \topsep might have a negative value to compensate for that. Therefore we add \parskip to \abovedisplayskip.

```
496 \addtolength\abovedisplayskip{\parskip}%
497 \setlength\belowdisplayskip{\abovedisplayskip}%
498 \setlength\belowdisplayshortskip{\abovedisplayskip}%
499 \setlength\abovedisplayshortskip{\abovedisplayskip}%
500 $$\everycr{}\halign to\linewidth{}$$
501 \bgroup
502   \hskip\@centering
503   \$\displaystyle\tabskip\z@skip{##}@\eqnsel&%
504   \global\@eqcnt\@ne \hskip \tw@\arraycolsep \hfil{##}\hfil&%
505   \global\@eqcnt\@ne \hskip \tw@\arraycolsep
506   \$\displaystyle{##}\hfil \tabskip\@centering&%
507   \global\@eqcnt\thr@@
508   \hb@xt@\z@\bgroup\hss##\egroup\tabskip\z@skip\cr}%
509   {\@eqncr
510 \egroup
511 \global\advance\c@equation\m@ne$$\$%
512 \ignorespace
513 }
514 
```

File F

ltlists.dtx

1 List, and related environments

The generic commands for creating an indented environment – `enumerate`, `itemize`, `quote`, etc – are:

```
\list{\LABEL}{{COMMANDS}} ... \endlist
```

which can be invoked by the user as the list environment. The *LABEL* argument specifies item labeling. *COMMANDS* contains commands for changing the horizontal and vertical spacing parameters.

Each item of the environment is begun by the command `\item[ITEMLABEL]` which produces an item labeled by *ITEMLABEL*. If the argument is missing, then the *LABEL* argument of the `\list` command is used as the item label.

The label is formed by putting `\makelabel{\ITEMLABEL}` in an hbox whose width is either its natural width or else `\labelwidth`, whichever is larger. The `\list` command defines `\makelabel` to have the default definition:

```
\makelabel{\ARG} == BEGIN \hfil ARG END
```

which, for a label of width less than `\labelwidth`, puts the label flushright, `\labelsep` to the left of the item's text. However, `\makelabel` can be `\let` to another command by the `\list`'s *COMMANDS* argument.

A `\usecounter{\foo}` command in the second argument causes the counter *foo* to be initialized to zero, and stepped by every `\item` command without an argument. (`\label` commands within the list refer to this counter.)

When you leave a list environment, returning either to an enclosing list or normal text mode, LaTeX begins a new paragraph if and only if you leave a blank line after the `\end` command. This is accomplished by the `\@endparenv` command.

Blank lines are ignored every other reasonable place—i.e.:

- Between the `\begin{list}` and the first `\item`,
- Between the `\item` and the text of that item,
- Between the end of the last item and the `\end{list}`.

For an environment like quotation, in which items are not labeled, the entire environment is a single item. It is defined by letting `\quotation == \list{}{\relax}`. (Note the `\relax`, there in case the first character in the environment is a '['.) The spacing parameters provide a great deal of flexibility in designing the format, including the ability to let the indentation of the first paragraph be different from that of the subsequent ones.

The trivlist environment is equivalent to a list environment whose second argument sets the following parameter values:

`\leftmargin = 0`: causes no indentation of left margin

`\labelwidth = 0`: see below for precise effect this has.

`\itemindent = 0`: with a null label, makes first paragraph have no indentation. Succeeding paragraphs have `\parindent` indentation. To give first paragraph same indentation, set `\itemindent = \parindent` before the `\item[]`.

Every `\item` in a trivlist environment must have an argument—in many cases, this will be the null argument (`\item[]`). The trivlist environment is mainly used for paragraphing environments, like verbatim, in which there is no margin change. It provides the same vertical spacing as the list environment, and works reasonably well when it occurs immediately after an `\item` command in an enclosing list.

1.1 List and Trivlist

The following variables are used inside a list environment:

`\@totalleftmargin` The distance that the prevailing left margin is indented from the outermost left margin,

`\linewidth` The width of the current line. Must be initialized to `\hsize`.

`\@listdepth` A count for holding current list nesting depth.

`\makelabel` A macro with a single argument, used to generate the label from the argument (given or implied) of the `\item` command. Initialized to `\@mklab` by the `\list` command. This command must produce some stretch—i.e., an `\hfil`.

`\@inlabel` A switch that is false except between the time an `\item` is encountered and the time that TeX actually enters horizontal mode. Should be tested by commands that can be messed up by the list environment's use of `\everypar`.

`\box\@labels` When `\@inlabel = true`, it holds the labels to be put out by `\everypar`.

`\@noparitem` A switch set by `\list` when `\@inlabel = true`. Handles the case of a `\list` being the first thing in an item.

`\@noparlist` A switch set true for a list that begins an item. No `\topsep` space is added before or after `\item`'s such a list.

`\@newlist` Set true by `\list`, set false by the first text (by `\everypar`).

`\@noitemarg` Set true when executing an `\item` with no explicit argument. Used to save space. To save time, make two separate `\item` commands.

`\@nmbrrlist` Set true by `\usecounter` command, causes list to be numbered.

`\@listctr` \def'ed by `\usecounter` to name of counter.

`\@noskipsec` A switch set true by a sectioning command when it is creating an in-text heading with `\everypar`.

Throughout a list environment, `\hsize` is the width of the current line, measured from the outermost left margin to the outermost right margin. Environments like tabbing should use `\linewidth` instead of `\hsize`.

Here are the parameters of a list that can be set by commands in the `\list`'s COMMANDS argument. These parameters are all TeX skips or dimensions (defined by `\newskip` or `\newdimen`), so the usual TeX or L^AT_EX commands can be used to set them. The commands will be executed in vmode if and only if the `\list` was preceded by a `\par` (or something like an `\end{list}`), so the spacing parameters can be set according to whether the list is inside a paragraph or is its own paragraph.

1.2 Vertical Spacing (skips)

\topsep: Space between first item and preceding paragraph.

\partopsep: Extra space added to \topsep when environment starts a new paragraph (is called in vmode).

\itemsep: Space between successive items.

\parsep: Space between paragraphs within an item – the \parskip for this environment.

1.3 Penalties

\begin{parpenalty}: put at the beginning of a list

\endparpenalty: put at end of list

\itempenalty: put between items.

1.4 Horizontal Spacing (dimens)

\leftmargin: space between left margin of enclosing environment (or of page if top level list) and left margin of this list. Must be nonnegative.

\rightmargin: analogous.

\listparindent: extra indentation at beginning of every paragraph of a list except the one started by the \item command. May be negative! Usually, labeled lists have \listparindent equal to zero.

\itemindent: extra indentation added right BEFORE an item label.

\labelwidth: nominal width of box that contains the label. If the natural width of the label <= \labelwidth, then the label is flushed right inside a box of width \labelwidth (with an \hfil). Otherwise, a box of the natural width is employed, which causes an indentation of the text on that line.

\labelsep: space between end of label box and text of first item.

1.5 Default Values

Defaults for the list environment are set as follows. First, \rightmargin, \listparindent and \itemindent are set to 0pt. Then, one of the commands \@listi, \@listii, ..., \@listvi is called, depending upon the current level of the list. The \@list ... commands should be defined by the document style. A convention that the document style should follow is to set \leftmargin to \leftmargini, ..., \leftmarginvi for the appropriate level. Items that aren't changed may be left alone, but everything that could possibly be changed must be reset. *Historical L^AT_EX 2.09 comments (not necessarily accurate any more)*:

```
\list{LABEL}{COMMANDS} ==
BEGIN
  if \@listdepth > 5
    then LaTeX error: 'Too deeply nested'
    else \@listdepth :=G \@listdepth + 1
```

```

fi
\rightmargin      := 0pt
\listparindent   := 0pt
\itemindent      := 0pt
\eval(@list \romannumeral\the\@listdepth) %% Set default values:
\@itemlabel      :=L LABEL
\makelabel       == \@mklab
@nmbrlist        :=L false
COMMANDS

\@trivlist          % commands common to \list and \trivlist

\parskip      :=L \parsep
\parindent    :=L \listparindent
\linewidth    :=L \linewidth - \rightmargin -\leftmargin
\@totalleftmargin :=L \@totalleftmargin + \leftmargin
\parshape 1 \@totalleftmargin \linewidth
\ignorespaces           % gobble space up to \item
END

\endlist == BEGIN \listdepth :=G \listdepth -1
               \endtrivlist
END

\@trivlist ==
BEGIN
if @newlist = T then \noitemerr fi
                  %% This command removed for some forgotten reason.
\@topsepadd :=L \topsep
if @noskipsec then leave vertical mode fi %% Added 11 Jun 85
if vertical mode
  then \@topsepadd :=L \@topsepadd + \partopsep
  else \unskip \par           % remove glue from end of last line
fi
if @inlabel = true
  then @noparitem :=L true
      @noparlist :=L true
  else @noparlist :=L false
      \@topsep :=L \@topsepadd
fi
\@topsep      :=L \@topsep + \parskip %% Change 4 Sep 85
\leftskip     :=L 0pt           % Restore paragraphing parameters
\rightskip    :=L \@rightskip
\parfillskip   :=L 0pt + 1fil

NOTE: \setpar called on every \list in case \par has been
temporarily munged before the \list command.
\setpar{if @newlist = false then {\@par} fi}
\newlist      :=G T
\outerparskip :=L \parskip

```

```

END

\trivlist ==
BEGIN
  \parsep      := \parskip
  @nmbrlist := F
  \ctrivlist
  \labelwidth := 0
  \leftmargin := 0
  \itemindent := \parindent
  \citemlabel :=L "empty"           %% added 93/12/13
  \makelabel{LABEL} == LABEL
END

\endtrivlist ==
BEGIN
  if @inlabel = T then \indent fi
  if horizontal mode then \unskip \par fi
  if @noparlist = true
    else if \lastskip > 0
      then \tempskipa := \lastskip
          \vskip - \lastskip
          \vskip \tempskipa - \outerparskip + \parskip
      fi
    \endparenv
  fi
END

\endparenv ==
BEGIN
  \addpenalty{@endparpenalty}
  \addvspace{@topsepadd}
  \endgroup %% ends the \begin command's \begingroup
  \par == BEGIN
    \restorepar
    \everypar{}
    \par
  END
  \everypar == BEGIN remove \lastbox \everypar{} END
  \begingroup %% to match the \end commands \endgroup
END

\item == BEGIN if math mode then WARNING fi
  if next char = [
  then \item
  else @noitemarg := true
        \item[@citemlabel]
END

\item[LAB] ==

```

```

BEGIN
if @noparitem = true
then @noparitem := false
    % NOTE: then clause hardly every taken,
    % so made a macro \odonoparitem
\box\@labels :=G \hbox{\hskip -\leftmargin
\box\@labels
\hskip \leftmargin }

if @minipage = false then
    \tempskipa := \lastskip
    \vskip -\lastskip
    \vskip \tempskipa + \outerparskip - \parskip
fi
else if @inlabel = true
    then \indent \par % previous item empty.
fi
if hmode then 2 \unskip's
    % To remove any space at end of prev.
    % paragraph that could cause a blank line.
\par
fi
if @newlist = T
    then if @nobreak = T % Kludge if list follows \section
        then \addvspace{\outerparskip - \parskip}
        else \addpenalty{\beginparpenalty}
            \addvspace{\topsep}
            \addvspace{\parskip} %% added 4 Sep 85
        fi
    else \addpenalty{\itempenalty}
        \addvspace{\itemsep}
    fi
    @inlabel :=G true
fi

\everypar{ @minipage :=G F
    @newlist :=G F
    if @inlabel = true
        then @inlabel :=G false
            \hskip -\parindent
            \box\@labels
            \penalty 0
            %% 3 Oct 85 - allow line break here
            \box\@labels :=G null
        fi
    \everypar{} }
@nobreak :=G false
if @noitemarg = true
then @noitemarg := false
if @nmbrlist
then \refstepcounter{\listctr}

```

```

        fi      fi
        \@tempboxa :=L \hbox{\makelabel{LAB}}
        \box\@labels :=G \@labels \hskip \itemindent
                      \hskip - (\labelwidth + \labelsep)
                      if \wd \@tempboxa > \labelwidth
                        then \box\@tempboxa
                        else \hbox to \labelwidth {\unhbox\@tempboxa}
        fi
        \hskip\labelsep
        \ignorespaces                                %% gobble space up to text
END

```

\makelabel{LABEL} == ERROR %% default to catch lonely \item

```

\usecounter{CTR} == BEGIN @nmbrlist :=L true
                      \@listctr == CTR
                      \setcounter{CTR}{0}
END

```

DEFINE \dimen's and \count
End of historical L^AT_EX 2.09 comments.

```

\topskip
\partopsep 1 /*2ekernel*/
\itemsep 2 \newskip\topsep
\parsep 3 \newskip\partopsep
\@topsep 4 \newskip\itemsep
\@topsepadd 5 \newskip\parsep
\outerparskip 6 \newskip\@topsep
7 \newskip\@topsepadd
8 \newskip\@outerparskip

```

(*End definition for \topskip and others.*)

```

\leftmargin
\rightmargin
\listparindent
\itemindent
\labelwidth
\labelsep
\@totallleftmargin
9 \newdimen\leftmargin
10 \newdimen\rightmargin
11 \newdimen\listparindent
12 \newdimen\itemindent
13 \newdimen\labelwidth
14 \newdimen\labelsep
15 \newdimen\linewidth
16 \newdimen\@totallleftmargin \@totallleftmargin=\z@

```

(*End definition for \leftmargin and others.*)

```

\leftmargini
\leftmarginii      17 \newdimen\leftmargini
\leftmarginiii     18 \newdimen\leftmarginii
\leftmarginiv      19 \newdimen\leftmarginiii
\leftmarginv       20 \newdimen\leftmarginiv
\leftmarginvi      21 \newdimen\leftmarginv
\leftmarginvii     22 \newdimen\leftmarginvi

(End definition for \leftmargini and others.)

@listdepth
@itempenalty      23 \newcount\@listdepth \@listdepth=0
@beginparpenalty   24 \newcount\@itempenalty
@endparpenalty     25 \newcount\@beginparpenalty
                   26 \newcount\@endparpenalty

(End definition for \@listdepth and others.)

@labels
 27 \newbox\@labels

(End definition for \@labels.)

@if@inlabel
@inlabelfalse      28 \newif\if@inlabel \@inlabelfalse
@inlabeltrue
(End definition for \if@inlabel, \@inlabelfalse, and \@inlabeltrue.)

@if@newlist
@newlistfalse      29 \newif\if@newlist \@newlistfalse
@newlisttrue
(End definition for \if@newlist, \@newlistfalse, and \@newlisttrue.)

@if@noparitem
@noparitemfalse    30 \newif\if@noparitem \@noparitemfalse
@noparitemtrue
(End definition for \if@noparitem, \@noparitemfalse, and \@noparitemtrue.)

@if@noparlist
@noparlistfalse    31 \newif\if@noparlist \@noparlistfalse
@noparlisttrue
(End definition for \if@noparlist, \@noparlistfalse, and \@noparlisttrue.)

@if@noitemarg
@noitemargfalse    32 \newif\if@noitemarg \@noitemargfalse
@noitemargtrue
(End definition for \if@noitemarg, \@noitemargfalse, and \@noitemargtrue.)

@if@newlist
@newlistfalse      33 \newif\if@nmbrlist \@nmbrlistfalse
@newlisttrue
(End definition for \if@newlist, \@newlistfalse, and \@newlisttrue.)

```

```

\list
 34 \def\list#1#2{%
 35   \ifnum \clistdepth >5\relax
 36     \toodeep
 37   \else
 38     \global\advance\clistdepth\one
 39   \fi
 40   \rightmargin\z@%
 41   \listparindent\z@%
 42   \itemindent\z@%
 43   \csname @list\romannumeral\the\clistdepth\endcsname
 44   \def\@itemlabel{\#1}%
 45   \let\makelabel\mklabel
 46   \nmblistfalse
 47   #2\relax
 48   \trivlist
 49   \parskip\parsep
 50   \parindent\listparindent
 51   \advance\linewidth -\rightmargin
 52   \advance\linewidth -\leftmargin
 53   \advance\@totalleftmargin \leftmargin
 54   \parshape \one \@totalleftmargin \linewidth
 55   \ignorespaces}
  (End definition for \list.)

```

```

\par@deathcycles
 56 \newcount\par@deathcycles
  (End definition for \par@deathcycles.)

```

- \@trivlist** Because `\par` is sometimes made a no-op it is possible for a missing `\item` to produce a loop that does not fill memory and so never gets trapped by T_EX. We thus need to trap this here by setting `\par` to count the number of times a paragraph is called with no progress being made started.

```

 57 \def\@trivlist{%
 58   \if@noskipsec \leavevmode \fi
 59   \topsepadd \topsep
 60   \ifvmode
 61     \advance\topsepadd \partopsep
 62   \else
 63     \unskip \par
 64   \fi
 65   \if@inlabel
 66     \noparitemtrue
 67     \noparlisttrue
 68   \else
 69     \if@newlist \noitemerr \fi
 70     \noparlistfalse
 71     \topsep \topsepadd
 72   \fi
 73   \advance\topsep \parskip
 74   \leftskip \z@skip
 75   \rightskip \rightskip
 76   \parfillskip \flushglue

```

```

77  \par@deathcycles \z@ 
78  \setpar{\if@newlist
79      \advance\par@deathcycles \cne
80      \ifnum \par@deathcycles >\cm
81          \noitemerr
82          {\@par}%
83      \fi
84  \else
85      {\@par}%
86  \fi}%
87  \global \cnewlisttrue
88  \outerparskip \parskip}

```

(End definition for \trivlist.)

```

\trivlist
89 \def\trivlist{%
90   \parsep\parskip
91   \cnewlistfalse
92   \trivlist
93   \labelwidth\z@
94   \leftmargin\z@
95   \itemindent\z@

```

We initialise \itemlabel so that a trivlist with an \item not having an optional argument doesn't produce an error message.

```

96   \let\itemlabel\empty
97   \def\makelabel##1{##1}

```

(End definition for \trivlist.)

```

\endlist
98 \def\endlist{%
99   \global\advance\clistdepth\mone
100  \endtrivlist}

```

(End definition for \endlist.)

The definition of \trivlist used to be in ltspace.dtx so that other commands could be ‘let to it’. They now use \def.

```

\endtrivlist
101 \def\endtrivlist{%
102   \if@inlabel
103     \leavevmode
104     \global \cnewlistfalse
105   \fi
106   \if@newlist
107     \noitemerr
108     \global \cnewlistfalse
109   \fi
110   \ifhmode\unskip \par

```

We also check if we are in math mode and issue an error message if so (hoping that \currenvir resolves suitably). Otherwise the usual “perhaps a missing item” error will get triggered later which is confusing.

```

111   \else

```

```

112      \@inmatherr{\end{\@currenvir}}%
113      \fi
114      \if@nopalst \else
115          \ifdim\lastskip >\z@
116              \tempskipa\lastskip \vskip -\lastskip
117              \advance\tempskipa\parskip \advance\tempskipa -\outerparskip
118              \vskip\tempskipa
119          \fi
120          \endparenv
121      \fi
122 }

```

(End definition for `\endtrivlist`.)

`\@endparenv` To suppress the paragraph indentation in text immediately following a paragraph-making environment, `\everypar` is changed to remove the space, and `\par` is redefined to restore `\everypar`. Instead of redefining `\par` and `\everypar`, `\@endparenv` was changed to set the `@endpe` switch, letting `\end` redefine `\par` and `\everypar`.

This allows paragraph-making environments to work right when called by other environments. (Changed 27 Oct 86)

```

123 \def\@endparenv{%
124   \addpenalty\@endparpenalty\addvspace\@topsepadd\@endpetrue}
125 \if@latexrelease\IncludeInRelease{2015/01/01}{\@doendpe}{clubpenalty fix}%
126 \def\@doendpe{\@endpetrue
127   \def\par{\@restorepar}

```

If a section heading changes `\clubpenalty` to keep lines after it together then this modification is restored via the `\everypar` mechanism at the start of the next paragraph. As we destroy the contents of this token here we explicitly set `\clubpenalty` back to its default.

```

128   \clubpenalty\@clubpenalty
129   \everypar{}{\par\@endpefalse}\everypar

```

Use `\setbox0=\lastbox` instead of `\hskip -\parindent` so that a `\noindent` becomes a no-op when used before a line immediately following a list environment(23 Oct 86).

```

130   {\setbox\z@\lastbox}%
131   \everypar{}{\@endpefalse}%
132 \if@latexrelease\EndIncludeInRelease
133 \if@latexrelease\IncludeInRelease{0000/00/00}{\@doendpe}{clubpenalty fix}%
134 \if@latexrelease\def\@doendpe{\@endpetrue
135 \if@latexrelease\def\par{\@restorepar\everypar{}{\par\@endpefalse}\everypar
136 \if@latexrelease{\setbox\z@\lastbox}\everypar{}{\@endpefalse}%
137 \if@latexrelease\EndIncludeInRelease

```

(End definition for `\@endparenv` and `\@doendpe`.)

```

\if@endpe
\@endpefalse
138 \newif\if@endpe
139 \@endpefalse

```

(End definition for `\if@endpe`, `\@endpefalse`, and `\@endpeltrue`.)

```

\@mklab
140 \def\@mklab#1{\hfil #1}
(End definition for \@mklab.)

\item
141 \def\item{%
142   \ifinmatherr\item
143   \else [\@item{ \ifnoitemargtrue \@item[\@itemlabel]} ]\fi
(End definition for \item.)

\@donoparitem
144 \def\@donoparitem{%
145   \ifnoparitemfalse
146   \global\setbox\@labels\hbox{\hskip -\leftmargin
147                           \unhbox\@labels
148                           \hskip \leftmargin}%
149   \ifminipage\else
150     \tempskipa\lastskip
151     \vskip -\lastskip
152     \advance\tempskipa\outerparskip
153     \advance\tempskipa -\parskip
154     \vskip\tempskipa
155   \fi}
(End definition for \@donoparitem.)

\@item
156 \def\@item[#1]{%
157   \ifnoparitem
158   \else [\@donoparitem] \fi
159   \ifinlabel
160     \indent \par
161   \fi
162   \ifhmode
163     \unskip\unskip \par
164   \fi
165   \ifnewlist
166     \ifnobreak
167       \nbitem
168     \else
169       \addpenalty\beginparpenalty
170       \addvspace\topsep
171       \addvspace{-\parskip}%
172     \fi
173   \else
174     \addpenalty\itempenalty
175     \addvspace\itemsep
176   \fi
177   \global\inlabeltrue
178   \fi
179   \everypar{%
180     \ifminipagefalse
181     \global\newlistfalse
182   }

```

This `\if@inlabel` check is needed in case an item starts of inside a group so that `\everypar` does not become empty outside that group.

```
183     \if@inlabel
184         \global\@inlabelfalse
```

The paragraph indent is now removed by using `\setbox...` since this makes `\noindent` a no-op here, as it should be. Thus the following comment is redundant but is left here for the sake of future historians: this next command was changed from an `hskip` to a `kern` to avoid a break point after the parindent box: the skip could cause a line-break if a very long label occurs in `raggedright` setting. If `\noindent` was used after `\item` want to cancel the `\itemindent` skip. This case can be detected as the indentation box will be void.

```
185     {\setbox\z@\lastbox
186     \ifvoid\z@
187         \kern-\itemindent
188     \fi}%
189     \box@\labels
190     \penalty\z@
191 \fi
```

This code is intended to prevent a page break after the first line of an item that comes immediately after a section title. It may be sensible to always forbid a page break after one line of an item? As with all such settings of `\clubpenalty` it is local so will have no effect if the item starts in a group.

Only resetting `\nobreak` when it is true is now essential since now it is sometimes set locally.

```
192     \if@nobreak
193         \nobreakfalse
194         \clubpenalty \z@M
195     \else
196         \clubpenalty \z@clubpenalty
197         \everypar{}%
198     \fi}%
199     \if@noitemarg
200         \noitemargfalse
201         \if@nmbrlist
202             \refstepcounter\listctr
203         \fi
204     \fi
```

We use `\sbox` to support colour commands.

```
205     \sbox\@tempboxa{\makelabel{#1}}%
206     \global\setbox\@labels\hbox{%
207         \unhbox\@labels
208         \hskip \itemindent
209         \hskip -\labelwidth
210         \hskip -\labelsep
211         \ifdim \wd\@tempboxa >\labelwidth
212             \box\@tempboxa
```

```

213     \else
214         \hbox to\labelwidth {\unhbox\@tempboxa}%
215     \fi
216     \hskip \labelsep\%
217     \ignorespaces}

```

(End definition for `\@item`.)

```

\makelabel
218 \def\makelabel#1{%
219   \@latex@error{Lonely \string\item--perhaps a missing
220   list environment}\@ehc}

```

(End definition for `\makelabel`.)

```

\@nbitem
221 \def\@nbitem{%
222   \@tempskipa\@outerparskip
223   \advance\@tempskipa -\parskip
224   \addvspace\@tempskipa}

```

(End definition for `\@nbitem`.)

```

\usecounter
225 \def\usecounter#1{\@nmbrlisttrue\def\@listctr{#1}\setcounter{#1}\z@}

```

(End definition for `\usecounter`.)

1.6 Itemize and Enumerate

Enumeration is done with four counters: `enumi`, `enumii`, `enumiii` and `enumiv`, where `enumN` controls the numbering of the Nth level enumeration. The label is generated by the commands `\labelenumi` ... `\labelenumiv`, which should be defined by the document style. Note that `\p@enumN\theenumN` defines the output of a `\ref` command. A typical definition might be:

```

\def\theenumii{\alph{enumii}}
\def\p@enumii{\theenumii}
\def\labelenumii{(\theenumii)}

```

which will print the labels as ‘(a)’, ‘(b)’, ... and print a `\ref` as ‘3a’.

The item numbers are moved to the right of the label box, so they are always a distance of `\labelsep` from the item.

`\@enumdepth` holds the current enumeration nesting depth.

Itemization is controlled by four commands: `\labelitemi`, `\labelitemii`, `\labelitemiii`, and `\labelitemiv`. To cause the second-level list to be bulleted, you just define `\labelitemii` to be `•`. `\@itemspacing` and `\@itemdepth` are the analogs of `\@listspacing` and `\@listdepth`.

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```

\enumerate ==
BEGIN
if \@enumdepth > 3
  then errormessage: "Too deeply nested".
  else \@enumdepth :=L \@enumdepth + 1

```

```

    \c@enumctr :=L eval(enum@\romannumeral\the\c@enumdepth)
    \list{\label(\c@enumctr)}
        {\usecounter{\c@enumctr}
         \makelabel{LABEL} == \hss \llap{LABEL}}
    fi
END

```

\endenumerate == \endlist
End of historical L^AT_EX 2.09 comments.

```

\c@enumdepth
226 \newcount\c@enumdepth \c@enumdepth = 0
(End definition for \c@enumdepth.)

```

```

\c@enumi
\c@enumii 227 \c@definecounter{enumii}
\c@enumiii 228 \c@definecounter{enumiii}
\c@enumiv 229 \c@definecounter{enumiv}
230 \c@definecounter{enumiv}

```

(End definition for \c@enumi and others.)

```

enumerate
231 \def\enumerate{%
232   \ifnum \c@enumdepth > \thr@@\c@toodeep\else
233     \advance\c@enumdepth\@ne
234     \edef\c@enumctr{enum\romannumeral\the\c@enumdepth}%
235     \expandafter
236     \list
237       \csname label\c@enumctr\endcsname
238       {\usecounter{\c@enumctr}\def\makelabel##1{\hss\llap{##1}}\%}
239   \fi}
240 \let\endenumerate =\endlist

```

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```

\itemize ==
BEGIN
  if \c@itemdepth > 3
    then errormessage: 'Too deeply nested'.
    else \c@itemdepth :=L \c@itemdepth + 1
      \c@itemitem == eval(labelitem\romannumeral\the\c@itemdepth)
      \list{\c@nameuse{\c@itemitem}}
            {\makelabel{LABEL} == \hss \llap{LABEL}}
  fi
END

```

\enditemize == \endlist

End of historical L^AT_EX 2.09 comments.

```

\@itemdepth
241 \newcount\@itemdepth \@itemdepth = 0
(End definition for \@itemdepth.)
```

```

itemize
242 \def\itemize{%
243   \ifnum \@itemdepth >\thr@@\@toodeep\else
244     \advance\@itemdepth\@ne
245     \edef\@itemitem{\labelitem\romannumeral\the\@itemdepth}%
246     \expandafter
247     \list
248       \csname\@itemitem\endcsname
249       {\def\makelabel##1{\hss\llap{##1}}}\%
250   \fi}
251 \let\enditemize =\endlist
252 ⟨/2ekernel⟩
```

File G

ltboxes.dtx

1 L^AT_EX Box commands

\makebox \makebox[⟨wid⟩][⟨pos⟩]{⟨obj⟩}
Puts ⟨obj⟩ in an \hbox of width ⟨wid⟩, positioned by ⟨pos⟩.
The possible ⟨pos⟩ are:
s stretched,
l flushleft,
r flushright,
c (default) centred.
If ⟨wid⟩ is missing, then ⟨pos⟩ is also missing and ⟨obj⟩ is put in an \hbox of its natural width.
\makebox(⟨x⟩,⟨y⟩)[⟨pos⟩]{⟨obj⟩}
Puts ⟨obj⟩ in an \hbox of width $x * \unitlength$ and height $y * \unitlength$.
⟨pos⟩ arguments are s, l, r or c (default) for stretched, flushleft, flushright or centred, and t or b for top, bottom – or combinations like tr or rb. Default for horizontal and vertical are centered. Note that in this picture mode version of \makebox a [b] aligns on the *bottom* of the text as documented. If you want to align on the *baseline* use \makebox(,)[b]{\raisebox{0pt}[\height][0pt]{xyz}} or \makebox(,)[b]{\smash{xyz}}
\mbox \mbox{⟨obj⟩} The same as \makebox{⟨obj⟩}, but is more efficient as no checking for optional arguments is done.
\newsavebox \newsavebox{⟨cmd⟩} : If \cmd is undefined, then defines it to be a T_EX box register.
\savebox \savebox{⟨cmd⟩} ... : \cmd is defined to be a T_EX box register, and the '...' are any \makebox arguments. It is like \makebox, except it doesn't produce text but saves the value in \box \cmd.
\sbox \sbox{⟨cmd⟩}{⟨obj⟩} is an efficient abbreviation for
\savebox{⟨cmd⟩}{⟨obj⟩}.
\lrbox \begin{lrbox}{⟨cmd⟩}{⟨text⟩}\end{lrbox} is equivalent to
\sbox{⟨cmd⟩}{⟨text⟩}
except that any white space at the beginning and end of ⟨text⟩ is ignored.
\framebox \framebox ... : like \makebox, except it puts a 'frame' around the box. The frame is made of lines of thickness \fboxrule, separated by space \fboxsep from the text – except for \framebox(X,Y) ... , where the thickness of the lines is as for the picture environment, and there is no separation added.
\fbox \fbox{⟨obj⟩} is an abbreviation for \framebox{⟨obj⟩}.
\parbox \parbox[⟨pos⟩][⟨height⟩][⟨inner-pos⟩]{⟨width⟩}{⟨text⟩} : Makes a box with \hsize ⟨width⟩, positioned by ⟨pos⟩ as follows: c : \vcenter (placed in \$...\$ if not in math mode) b : \vbox t : \vtop default value is c. Sets \hsize := ⟨width⟩ and calls \parboxrestore, which does the following: Restores the original definitions of:
\par
\
\-
\'
\`
\=

Resets the following parameters:
 $\parindent = \text{opt}$
 $\parskip = \text{opt}$ added 20 Jan 87
 $\ linewidth = \text{\hsize}$
 $\@totalleftmargin = \text{opt}$
 $\leftskip = \text{opt}$
 $\rightskip = \text{opt}$
 $\@rightskip = \text{opt}$
 $\parfillskip = \text{opt plus 1fil}$
 $\lineskip = \text{\normallineskip}$
 $\baselineskip = \text{\normalbaselineskip}$
 Calls `\sloppy`
 Note: `\arrayparboxrestore` same as `\parboxrestore` but it doesn't restore `\`.`.
`minipage`: Similar to `\parbox`, except it also makes this look like a page by setting
 $\text{textwidth} == \text{columnwidth} == \text{box width}$
 changes footnotes by redefining:
 $\@mpfn == \text{mpfootnote}$
 $\thempfn == \text{thempfootnote}$
 $\@footnotetext == \@mpfootnotetext$
 resets the following list environment parameters:
 $\@listdepth == \@mplistdepth$
 where $\@mplistdepth$ is initialized to zero,
 and executes `\minipagerestore` to allow the document style to reset any other parameters it desires. It sets `@minipage` true, and resets `\everypar` to set it false. This switch keeps `\addvspace` from putting space at the top of a minipage.
 Change added 24 May 89: `\minipage` sets `@minipage` globally; `\endminipage` resets it false.
`\rule` : Makes a $\langle width \rangle * \langle height \rangle$ rule, raised $\langle raised \rangle$.
`\underline` : Makes an underlined hbox with $\langle text \rangle$ in it.
`\raisebox` : Raises $\langle box \rangle$ up by $\langle distance \rangle$ length (down if $\langle distance \rangle$ negative). Makes TeX think that the new box extends $\langle height \rangle$ above the line and $\langle depth \rangle$ below, for a total vertical length of $\langle height \rangle + \langle depth \rangle$. Default values of $\langle height \rangle$ & $\langle depth \rangle$ = actual height and depth of box in new position.
 $\begin{array}{l} 1 \quad \langle *2ekernel \rangle \\ 2 \quad \backslash message\{boxes,\} \end{array}$
`\makebox` User level command just looks for optional [or .
 $\begin{array}{l} 3 \quad \langle /2ekernel \rangle \\ 4 \quad \langle latexrelease \rangle \IncludeInRelease{2015/01/01}\% \\ 5 \quad \langle latexrelease \rangle \quad \{ \backslash makebox \} \{ \text{Make } \backslash makebox \text{ robust} \} \% \\ 6 \quad \langle *2ekernel | latexrelease \rangle \\ 7 \quad \text{DeclareRobustCommand} \backslash makebox \% \\ 8 \quad \backslash leavevmode \\ 9 \quad \backslash @ifnextchar (\% \\ 10 \quad \backslash @makepicbox \\ 11 \quad \{ \backslash @ifnextchar [\backslash @makebox \backslash mbox]\} \% \\ 12 \quad \langle /2ekernel | latexrelease \rangle \\ 13 \quad \langle latexrelease \rangle \EndIncludeInRelease \\ 14 \quad \langle latexrelease \rangle \IncludeInRelease{0000/00/00}\% \\ 15 \quad \langle latexrelease \rangle \quad \{ \backslash makebox \} \{ \text{Make } \backslash makebox \text{ robust} \} \% \end{array}$

```

16  <latexrelease>\def\makebox{%
17  <latexrelease>  \leavevmode
18  <latexrelease>  \@ifnextchar(%)
19  <latexrelease>    \makepicbox
20  <latexrelease>    {\ifnextchar[\@makebox\mbox}%
21  <latexrelease>\expandafter\let\csname makebox \endcsname\undefined
22  <latexrelease>\EndIncludeInRelease
23  {*2ekernel}

```

(End definition for `\makebox`.)

`\mbox` The basic horizontal box command for LATEX.

```
24  \DeclareRobustCommand\mbox[1]{\leavevmode\hbox{\#1}}
```

(End definition for `\mbox`.)

`\@makebox` Look for a possible second optional argument (defaults to c).

```

25  \def\@makebox[#1]{%
26  \ifnextchar [{\@imakebox[#1]}{\@imakebox[#1][c]}}

```

(End definition for `\@makebox`.)

`\@begin@tempboxa` Helper macro for supporting `\height`, `\width` etc. Grab #1 into `\@tempboxa` and measure it.

```

27  \long\def\@begin@tempboxa#1#2{%
28  \begingroup
29  \setbox\@tempboxa#1{\color@begingroup#2\color@endgroup}%
30  \def\width{\wd\@tempboxa}%
31  \def\height{\ht\@tempboxa}%
32  \def\depth{\dp\@tempboxa}%
33  \let\totalheight\ovr
34  \totalheight\height
35  \advance\totalheight\depth}

```

(End definition for `\@begin@tempboxa`.)

`\@end@tempboxa` End the group started by `\@begin@tempboxa`, so that the scope of `\height` only includes the ‘length’ argument to the user-command.

```
36  \let\@end@tempboxa\endgroup
```

(End definition for `\@end@tempboxa`.)

`\bm@c` Set up spacing.

```

37  \def\bm@c{\hss\unhbox\@tempboxa\hss}
38  \def\bm@l{\unhbox\@tempboxa\hss}\let\bm@t\bm@l
39  \def\bm@r{\hss\unhbox\@tempboxa}\let\bm@b\bm@r
40  \def\bm@s{\unhbox\@tempboxa}

```

(End definition for `\bm@c` and others.)

`\@imakebox` Internal form of `\makebox`.

```

41  \long\def\@imakebox[#1][#2]{%
42  \begin{\@tempboxa}\hbox{\#3}%
43  \setlength\@tempdima{\#1}%
44  \hb@xt@{\@tempdima}{\csname bm@\#2\endcsname}%
45  \end{\@tempboxa}}

```

(End definition for \@imakepicbox.)

\@makepicbox Picture mode form of \makebox.

```
46 \def\@makepicbox(#1,#2){%
47   \@ifnextchar[{\@imakepicbox(#1,#2)}{\@imakepicbox(#1,#2)[ ]}}
```

(End definition for \@makepicbox.)

\@imakepicbox picture mode version

```
48 (/2ekernel)
49 (*2ekernel | latexrelease)
50 (<latexrelease>\IncludeInRelease{2020/10/01}%
51 <latexrelease>           {\@imakepicbox}{default units}%
52 \long\def\@imakepicbox(#1,#2)[#3]{%
53   \@defaultunitsset\@tempdimc{#2}\unitlength
54   \vbox to\@tempdimc
55     {\let\mb@b\vss \let\mb@l\hss\let\mb@r\hss
56      \let\mb@t\vss
57      \otfor\reserved@a :=#3\do{%
58        \if s\reserved@a
59          \let\mb@l\relax\let\mb@r\relax
60        \else
61          \expandafter\let\csname mb@\reserved@a\endcsname\relax
62        \fi}%
63      \mb@t
64      \@defaultunitsset\@tempdimc{#1}\unitlength
65      \hb@xt@{\@tempdimc}{\mb@l #4\mb@r}%
66      \mb@b}
```

This kern ensures that a b option aligns on the bottom of the text rather than the baseline. this is the documented behaviour in the L^AT_EX Book. The kern is removed in compatibility mode.

```
67 \kern\z@}
68 (/2ekernel | latexrelease)

69 (<latexrelease>\EndIncludeInRelease
70 <latexrelease>\IncludeInRelease{0000/00/00}%
71 <latexrelease>           {\@imakepicbox}{default units}%
72 <latexrelease>\long\def\@imakepicbox(#1,#2)[#3]{%
73   \vbox to#2\unitlength
74     {\let\mb@b\vss \let\mb@l\hss\let\mb@r\hss
75      \let\mb@t\vss
76      \otfor\reserved@a :=#3\do{%
77        \if s\reserved@a
78          \let\mb@l\relax\let\mb@r\relax
79        \else
80          \expandafter\let\csname mb@\reserved@a\endcsname\relax
81        \fi}%
82      \mb@t
83      \hb@xt@ #1\unitlength{\mb@l #4\mb@r}%
84      \mb@b
85      \kern\z@}
86 <latexrelease>\EndIncludeInRelease
87 (*2ekernel)
```

(End definition for `\@imakepicbox`.)

`\set@color` This macro is initially a no-op, but the colour package will redefine it to insert a `\special`.
88 `\let\set@color\relax`

(End definition for `\set@color`.)

`\color@begingroup` These macros are initially a no-op, but the colour package will redefine them to be
`\color@endgroup`, `\begingroup\color@begingroup`,
`\color@setgroup`, `\hbox\bgroup\color@begingroup\color@endgroup\egroup`. and *<set to main document colour>* respectively.
`\normalcolor`
`\color@hbox` 89 `\let\color@begingroup\relax`
`\color@vbox` 90 `\let\color@endgroup\relax`
`\color@endbox` 91 `\let\color@setgroup\relax`
92 `\let\normalcolor\relax`
93 `\let\color@hbox\relax`
94 `\let\color@vbox\relax`
95 `\let\color@endbox\relax`

(End definition for `\color@begingroup` and others.)

`\newsavebox` Allocate a new ‘savebox’.
96 `\def\newsavebox#1{\@ifdefinable{#1}{\newbox#1}}`

(End definition for `\newsavebox`.)

`\savebox` Save #1 in a box register.

97 `</2ekernel>`
98 `<latexrelease>\IncludeInRelease{2015/01/01}%`
99 `<latexrelease>` {`\savebox`{`Make \savebox robust`}%
100 `<*2ekernel | latexrelease>`
101 `\DeclareRobustCommand\savebox[1]{%`
102 `\@ifnextchar(%`
103 {`\@savepicbox#1\{\@ifnextchar[{\@savebox#1\{\sbox#1\}}]{}}%
104 </2ekernel | latexrelease>
105 <latexrelease>\EndIncludeInRelease
106 <latexrelease>\IncludeInRelease{0000/00/00}%
107 <latexrelease> {\savebox{Make \savebox robust}%
108 <latexrelease>\def\savebox#1{%
109 <latexrelease> \@ifnextchar(%
110 <latexrelease> {\@savepicbox#1\{\@ifnextchar[{\@savebox#1\{\sbox#1\}}]{}}%
111 <latexrelease>\expandafter\let\csname savebox \endcsname\@undefined
112 <latexrelease>\EndIncludeInRelease
113 <*2ekernel>`

(End definition for `\savebox`.)

`\sbox` Save #1 in a box register.

114 `\DeclareRobustCommand\sbox[2]{\setbox#1\hbox{%`
115 `\color@setgroup#2\color@endgroup}}`

(End definition for `\sbox`.)

\@savebox Look for second optional argument.

```
116 \def\@savebox#1[#2]{%
117   \@ifnextchar [{\@isavebox#1[#2]}{\@isavebox#1[#2][c]}}
118
119   \long\def\@isavebox#1[#2][#3]{%
120     \sbox#1{\@imakebox[#2][#3][#4]}}
121
122   {\@isavepicbox#1(#2,#3)}{\@isavepicbox#1(#2,#3)[]}}
123
124   \long\def\@isavepicbox#1(#2,#3)[#4]{%
125     \sbox#1{\@imakepicbox(#2,#3)[#4]{#5}}}
```

(End definition for \@savebox.)

\@isavebox

\@savepicbox Picture mode version of \savebox.

```
120 \def\@savepicbox#1(#2,#3){%
121   \@ifnextchar [%]
122     {\@isavepicbox#1(#2,#3)}{\@isavepicbox#1(#2,#3)[]}}
123
124   \long\def\@isavepicbox#1(#2,#3)[#4]{%
125     \sbox#1{\@imakepicbox(#2,#3)[#4]{#5}}}
```

(End definition for \@savepicbox.)

\@isavepicbox Picture mode version of \savebox.

```
123 \long\def\@isavepicbox#1(#2,#3)[#4]{%
124   \sbox#1{\@imakepicbox(#2,#3)[#4]{#5}}}
```

(End definition for \@isavepicbox.)

\lrbox lrbox: the new environment form of \sbox. Use \aftergroup tricks to enable a *local* assignment to be made to the box, in a way that it still has an effect *outside* the lrbox environment.

```
125 \def\lrbox#1{%
126   \edef\reserved@a{%
127     \endgroup
128     \setbox#1\hbox{%
129       \begingroup\aftergroup}%
130       \def\noexpand\currenvir{\currenvir}%
131       \def\noexpand\currenline{\on@line}%
132     \reserved@a
133     \endpefalse
134     \color@setgroup
135     \ignorespaces}}
```

(End definition for \lrbox.)

\endlrbox End the lrbox environment.

```
136 \def\endlrbox{\unskip\color@endgroup}
```

(End definition for \endlrbox.)

\usebox unchanged

```
137 \DeclareRobustCommand\usebox[1]{\leavevmode\copy #1\relax}
```

(End definition for \usebox.)

\frame The following definition of \frame was written by Pavel Curtis (Extra space removed 14 Jan 88) RmS 92/08/24: Replaced occurrence of \@halfwidth by \@wholewidth

```
138 \DeclareRobustCommand\frame[1]{%
139   \leavevmode
140   \hbox{%
141     \hskip-\@wholewidth
142     \vbox{%
143       \vskip-\@wholewidth
144       \hrule \height\@wholewidth
145       \hbox{%
146         \vrule\width\@wholewidth
147         #1%
148         \vrule\width\@wholewidth}%
149       \hrule\height\@wholewidth
150       \vskip-\@wholewidth}%
151     \hskip-\@wholewidth}}}
```

(End definition for \frame.)

\fboxrule user level parameters,

```
152 \newdimen\fboxrule
153 \newdimen\fboxsep
```

(End definition for \fboxrule and \fboxsep.)

\fbox Abbreviated framed box command.

```
154 \DeclareRobustCommand\fbox[1]{%
155   \leavevmode
156   \setbox\@tempboxa\hbox{%
157     \color@begingroup
158     \kern\fboxsep\#1\kern\fboxsep
159     \color@endgroup}%
160   \fboxb\relax}
```

(End definition for \fbox.)

\framebox Framed version of \makebox.

```
161 </2ekernel>
162 <latexrelease>\IncludeInRelease{2015/01/01}%
163 <latexrelease>           {\framebox}{\Make\framebox robust}%
164 (*2ekernel | latexrelease)
165 \DeclareRobustCommand\framebox{%
166   \ifnextchar(%)
167     \framepicbox{\ifnextchar[\@framebox\fbox}%
168   </2ekernel | latexrelease>
169   <latexrelease>\EndIncludeInRelease
170   <latexrelease>\IncludeInRelease{0000/00/00}%
171   <latexrelease>           {\framebox}{\Make\framebox robust}%
172   <latexrelease>\def\framebox{%
173   <latexrelease> \ifnextchar(%)
174     \framepicbox{\ifnextchar[\@framebox\fbox}%
175   <latexrelease>\expandafter\let\csname framebox \endcsname\undefined
176   <latexrelease>\EndIncludeInRelease
177 (*2ekernel)
```

(End definition for `\framebox`.)

`\@framebox` Deal with optional arguments.

```
178 \def\@framebox[#1]{%
179   \@ifnextchar[%]
180     {\@iframebox[#1]}%
181     {\@iframebox[#1][c]}}
```

(End definition for `\@framebox`.)

`\@iframebox` The handling the optional arguments. In order to set the whole box, including the frame to the specified dimension, we first determine that dimension from the natural size of the text, #3. calculated width.

```
182 \long\def\@iframebox[#1][#2][#3]{%
183   \leavevmode
184   \begin{tempboxa}\hbox{#3}%
185     \setlength\tempdima{#1}%
186     \setbox\tempboxa\hb@xt@\tempdima
187       \kern\fboxsep\csname bm@#2\endcsname\kern\fboxsep}%
188   \framebox@x{\kern-\fboxrule}%
189 \end{tempboxa}
```

(End definition for `\@iframebox`.)

`\@framebx` Common part of `\framebox` and `\fbox`. #1 is a negative kern in the `\framebox` case so that the vertical rules do not add to the width of the box.

```
190 \def\@framebx#1{%
191   \tempdima\fboxrule
192   \advance\tempdima\fboxsep
193   \advance\tempdima\dp\tempboxa
194   \hbox{%
195     \lower\tempdima\hbox{%
196       \vbox{%
197         \hrule\height\fboxrule
198         \hbox{%
199           \vrule\width\fboxrule
200             #1%
201           \vbox{%
202             \vskip\fboxsep
203             \box\tempboxa
204             \vskip\fboxsep}%
205             #1%
206             \vrule\width\fboxrule}%
207             \hrule\height\fboxrule}%
208           }%
209         }%
210 }
```

(End definition for `\@framebx`.)

`\@framepicbox` Picture mode version.

```
211 \def\@framepicbox(#1,#2){%
212   \@ifnextchar[{\@iframepicbox(#1,#2)}{\@framepicbox(#1,#2)[]}}
```

(End definition for `\@framepicbox`.)

```

\@ifframepicbox Picture mode version.

213 \long\def\@ifframepicbox(#1,#2)[#3]{%
214   \frame{\@imakepicbox(#1,#2)[#3]{#4}}}

(End definition for \@ifframepicbox.)

\parbox The main vertical-box command for LATEX.

215 </2ekernel>
216 <latexrelease>\IncludeInRelease{2015/01/01}%
217 <latexrelease>           {\parbox}{\Make \parbox robust}%
218 <*2ekernel | latexrelease>
219 \DeclareRobustCommand\parbox{%
220   \@ifnextchar[%]
221     \c@iparbox
222     {\c@iiparbox c\relax[s]}%}
223 </2ekernel | latexrelease>
224 <latexrelease>\EndIncludeInRelease
225 <latexrelease>\IncludeInRelease{0000/00/00}%
226 <latexrelease>           {\parbox}{\Make \parbox robust}%
227 <latexrelease>\def\parbox{%
228 <latexrelease>  \@ifnextchar[%]
229 <latexrelease>    \c@iparbox
230 <latexrelease>    {\c@iiparbox c\relax[s]}%
231 <latexrelease>\expandafter\let\csname parbox \endcsname\undefined
232 <latexrelease>\EndIncludeInRelease
233 <*2ekernel>

(End definition for \parbox.)

\c@iparbox Optional argument handling.

234 \def\c@iparbox[#1]{%
235   \@ifnextchar[%]
236     {\c@iiparbox{#1}}%
237     {\c@iiparbox{#1}\relax[s]{}}

(End definition for \c@iparbox.)

\c@iiparbox Optional argument handling.

238 \def\c@iiparbox#1[#2]{%
239   \@ifnextchar[%]
240     {\c@iiparbox{#1}{#2}}%
241     {\c@iiparbox{#1}{#2}[#1]}}

(End definition for \c@iiparbox.)

\c@iiparbox The internal version of \parbox.

\parboxto
242 \let\@parboxto\empty
243 \long\def\@iiparbox#1#2[#3]{%
244   \leavevmode
245   \pboxswfalse
246   \setlength\tempdima{#4}%
247   \begin\tmpboxa\vbox{\hspace\tempdima\parboxrestore\par}%
248   \ifx\relax#2\else
249     \setlength\tempdimb{#2}%
250     \edef\@parboxto{to\the\tempdimb}%

```

```

251     \fi
252     \if#1b\vbox
253     \else\if #1t\vtop
254     \else\ifmmode\vcenter
255     \else\@pboxswtrue \$\vcenter
256     \fi\fi\fi
257     \parboxto{\let\hss\vss\let\unhbox\unvbox
258         \csname bm@#3\endcsname}%
259     \if@pboxsw \m@th$\fi
260 \end@tempboxa}

```

(End definition for `\@iiiparbox` and `\@parboxto`.)

`\@arrayparboxrestore` Restore various paragraph parameters.

The rational for allowing two normally global flags to be set locally here was stated originally by Donald Arsenau and extended by Chris Rowley. It is because these flags are only set globally to true by section commands, and these should never appear within boxes or, indeed, in any group; and they are only ever set globally to false when they are definitely true.

If anyone is unhappy with this argument then both flags should be treated as in `\set@nobreak`; otherwise this command will be redundant.

```

261 </2ekernel>
262 <latexrelease>\IncludeInRelease{2017-04-15}%
263 <latexrelease>          {\normallineskiplimit}
264 <latexrelease>          {reset \lineskiplimit}%
265 <*2ekernel | latexrelease>
266 \def\@arrayparboxrestore{%
267   \let\if@nobreak\iffalse
268   \let\if@noskipsec\iffalse
269   \let\par\@par
270   \let\-\@dischyp

```

Redefined accents to allow changes in font encoding

```

271 \let\@\accii\let`\@accii\let=\@acciii
272 \parindent\z@\parskip\z@skip
273 \everypar{}%
274 \ linewidth\hsize
275 \totalleftmargin\z@
276 \leftskip\z@skip \rightskip\z@skip \rightskip\z@skip
277 \parfillskip\flushglue
278 \lineskip\normallineskip

279 \lineskiplimit\normallineskiplimit
280 \baselineskip\normalbaselineskip
281 \sloppy}
282 </2ekernel | latexrelease>

283 <latexrelease>\EndIncludeInRelease
284 <latexrelease>\IncludeInRelease{0000-00-00}%
285 <latexrelease>          {\normallineskiplimit}
286 <latexrelease>          {reset \lineskiplimit}%
287 <latexrelease>\def\@arrayparboxrestore{%
288 <latexrelease> \let\if@nobreak\iffalse
289 <latexrelease> \let\if@noskipsec\iffalse

```

```

290 <|latexrelease> \let\par\@@par
291 <|latexrelease> \let\-\@dischyp
292 <|latexrelease> \let`\@acci\let`\@accii\let`\@acciii
293 <|latexrelease> \parindent\z@\parskip\z@skip
294 <|latexrelease> \everypar{}%
295 <|latexrelease> \linewidth\hsize
296 <|latexrelease> \@totallleftmargin\z@
297 <|latexrelease> \leftskip\z@skip \rightskip\z@skip \@rightskip\z@skip
298 <|latexrelease> \parfillskip\@flushglue \lineskip\normallineskip
299 <|latexrelease> \baselineskip\normalbaselineskip
300 <|latexrelease> \sloppy}
301 <|latexrelease>\EndIncludeInRelease
302 <|2ekernel>

```

(*End definition for \arrayparboxrestore.*)

\parboxrestore Restore various paragraph parameters, and also \\.

```
303 \def\@parboxrestore{\@arrayparboxrestore\let\\\\@normalcr}
```

(*End definition for \parboxrestore.*)

\if@minipage Switch that is true at the start of a minipage.

```

304 \def\@minipagefalse{\global\let\if@minipage\iffalse}
305 \def\@minipagetrue {\global\let\if@minipage\iftrue}
306 \@minipagefalse

```

(*End definition for \if@minipage.*)

\minipage Essentially an environment form of \parbox.

```

307 \def\minipage{%
308   \@ifnextchar[%]
309     \@iminipage
310     {\@iiminipage c\relax[s]}}

```

(*End definition for \minipage.*)

\@iminipage Optional argument handling.

```

311 \def\@iminipage[#1]{%
312   \@ifnextchar[%]
313     {\@iiminipage{#1}}%
314     {\@iiminipage{#1}\relax[s]}}

```

(*End definition for \@iminipage.*)

\@iiminipage Optional argument handling.

```

315 \def\@iiminipage#1[#2]{%
316   \@ifnextchar[%]
317     {\@iiminipage{#1}{#2}}%
318     {\@iiminipage{#1}{#2}[#1]}}

```

(*End definition for \@iiminipage.*)

\@iiiminipage Internal form of `minipage`.

```

319 \def\@iiiminipage#1#2[#3]#4{%
320   \leavevmode
321   \pboxswfalse
322   \setlength\tempdima{#4}%
323   \def\@mpargs{{#1}{#2}[#3]{#4}}%
324   \setbox\tempboxa\vbox\bgroup
325     \color@begingroup
326       \hsize\tempdima
327       \textwidth\hsize \columnwidth\hsize
328       \parboxrestore
329       \def\mpfn{\footnote}\def\thempfn{\thefootnote}\c@mpfootnote\z@%
330       \let\footnotetext\mpfootnotetext
331       \let\listdepth\mplistdepth \mplistdepth\z@%
332       \minipagerestore
333       \setminipage}

```

(End definition for `\@iiiminipage`.)

\@minipagerestore Hook so that other styles can reset other commands in a minipage.

```

334 \let\@minipagerestore=\relax

```

(End definition for `\@minipagerestore`.)

\endminipage

```

335 \def\endminipage{%
336   \par
337   \unskip
338   \ifvoid\mpfootins\else
339     \vskip\skip\mpfootins
340     \normalcolor
341     \footnoterule
342     \unvbox\mpfootins
343   \fi
344   \minipagefalse %% added 24 May 89
345   \color@endgroup
346   \egroup
347   \expandafter\iiiparbox\@mpargs{\unvbox\tempboxa}}

```

(End definition for `\endminipage`.)

\@mplistdepth Versions of `\@listdepth` and `\footins` local to minipage.

\@mpfootins

```

348 \newcount\mplistdepth
349 \newinsert\mpfootins

```

(End definition for `\@mplistdepth` and `\@mpfootins`.)

\@mpfootnotetext Minipage version of `\footnotetext`.

Final `\strut` added 27 Mar 89, on suggestion by Don Hosek

```

350 \long\def\mpfootnotetext#1{%
351   \global\setbox\mpfootins\vbox{%
352     \unvbox\mpfootins
353     \reset@font\footnotesize
354     \hsize\columnwidth
355     \parboxrestore

```

```

356     \protected@edef{\currentlabel}
357         {\csname p@mpfootnote\endcsname\@thefnmark}%
358     \color@begingroup
359         \makefntext{%
360             \rule{z@\footnotesep\ignorespaces#1\@finalstrut\strutbox}%
361         \color@endgroup}%

```

(End definition for \mpfootnotetext.)

```
362 \newif\if@pboxsw
```

\rule Draw a rule of the specified size.

```

363 </2ekernel>
364 <| latexrelease|\IncludeInRelease{2015/01/01}%
365 <| latexrelease|           {\rule}{\rule robust}%
366 <| 2ekernel | latexrelease>
367 \DeclareRobustCommand{\rule}{\@ifnextchar[\@rule{\@rule[\z@]}}%
368 </2ekernel | latexrelease>
369 <| latexrelease|\EndIncludeInRelease
370 <| latexrelease|\IncludeInRelease{0000/00/00}%
371 <| latexrelease|           {\rule}{\rule robust}%
372 <| latexrelease|\def{\rule}{\@ifnextchar[\@rule{\@rule[\z@]}}%
373 <| latexrelease|\expandafter\let\csname rule \endcsname\@undefined
374 <| latexrelease|\EndIncludeInRelease
375 <| 2ekernel>

```

(End definition for \rule.)

\@rule Internal form of \rule.

```

376 \def{\rule}[#1]{#2#3}%
377   \leavevmode
378   \hbox{%
379     \setlength{\tempdima}{#1}%
380     \setlength{\tempdimb}{#2}%
381     \setlength{\tempdimc}{#3}%
382     \advance{\tempdimc}{\tempdima}
383     \vrule{\width}{\tempdimb}{\height}{\tempdimc}{\depth-\tempdima}%
}

```

(End definition for \@rule.)

\@@underline Saved primitive \underline.

```
384 \let{\@@underline}{\underline}
```

(End definition for \@@underline.)

\underline L^AT_EX version works outside math.

```

385 \DeclareRobustCommand{\underline}[1]{%
386   \relax
387   \ifmmode\@@underline{#1}%
388   \else $\@@underline{\hbox{#1}}\m@th$\relax\fi}

```

(End definition for \underline.)

\raisebox Raise a box, and change its vertical dimensions.

```

389  {/2ekernel}
390  <{latexrelease}>\IncludeInRelease{2015/01/01}%
391  <{latexrelease}>          {\raisebox}{\Make \raisebox robust}%
392  {*2ekernel | latexrelease}
393  \DeclareRobustCommand\raisebox[1]{%
394      \leavevmode
395      \@ifnextchar[{@\rsbox{\#1}}{\@irsbox{\#1}[]}}
396  {/2ekernel | latexrelease}
397  <{latexrelease}>\EndIncludeInRelease
398  <{latexrelease}>\IncludeInRelease{0000/00/00}%
399  <{latexrelease}>          {\raisebox}{\Make \raisebox robust}%
400  <{latexrelease}>\def\raisebox#1{%
401  <{latexrelease}>  \leavevmode
402  <{latexrelease}>  \@ifnextchar[{@\rsbox{\#1}}{\@irsbox{\#1}[]}}
403  <{latexrelease}>\expandafter\let\csname raisebox \endcsname\@undefined
404  <{latexrelease}>\EndIncludeInRelease
405  {*2ekernel}

```

(End definition for \raisebox.)

\@rsbox Optional argument handling.

```

406  \def\@rsbox[#2]{%
407      \@ifnextchar[{@\irsbox{\#1}[]{\@irsbox{\#1}[]}}}

```

(End definition for \@rsbox.)

\@argrsbox ...

(End definition for \@argrsbox.)

\@irsbox Internal version of \raisebox (less than two optional args).

```

408  \long\def\@irsbox#1[#2]#3{%
409      \begin{tempboxa}\hbox{#3}%
410      \setlength{\tempdima}{#1}%
411      \ifx\#2\else\setlength{\tempdimb}{#2}\fi
412      \setbox\@tempboxa\hbox{\raise\tempdima\box\@tempboxa}%
413      \ifx\#2\else\ht\@tempboxa\tempdimb\fi
414      \box\@tempboxa
415  \end{tempboxa}

```

(End definition for \@irsbox.)

\@iirsbox Internal version of \raisebox (two optional args).

```

416  \long\def\@iirsbox#1[#2][#3]#4{%
417      \begin{tempboxa}\hbox{#4}%
418      \setlength{\tempdima}{#1}%
419      \setlength{\tempdimb}{#2}%
420      \setlength{\dimen@}{#3}%
421      \setbox\@tempboxa\hbox{\raise\tempdima\box\@tempboxa}%
422      \ht\@tempboxa\tempdimb
423      \dp\@tempboxa\dimen@
424      \box\@tempboxa
425  \end{tempboxa}

```

(End definition for `\@iirsbox`.)

- `\@finalstrut` This macro adds a special strut the *depth* of the box given as #1, and height and width 0pt. It is used for ensuring that the last line of a paragraph has the correct depth in ‘p’ columns of tables and in footnotes. In vertical mode nothing is done, as adding the strut (as done in 2.09) would start a new paragraph. It would be possible to inspect `\prevdepth` to check the depth of the just-completed paragraph, but we do not do that here. Actually we do even less now, skip the vmode test as it broke tabular ‘p’ columns.

The `\nobreak` was added (1995/10/31) to allow hyphenation of the final word of the paragraph.

```
426 \def\@finalstrut#1{%
427   \unskip\ifhmode\nobreak\fi\vrule\@width\z@\@height\z@\@depth\dp#1}
```

(End definition for `\@finalstrut`.)

1.1 Some low-level constructs

The following commands are basically inherited from plain TeX.

- `\leftline` These macros place text on a full line either centred or left or right adjusted.
`\rightline` 428 `\def\@cline{\hb@xt@\hsize}`
`\centerline` 429 `\DeclareRobustCommand\leftline[1]{\@cline{\#1\hss}}`
 `\@line` 430 `\DeclareRobustCommand\rightline[1]{\@cline{\hss\#1}}`
 `\centerline` 431 `\DeclareRobustCommand\centerline[1]{\@cline{\hss\#1\hss}}`

(End definition for `\leftline` and others.)

- `\rlap` These macros place text to the left or right of the current reference point without taking up space.
`\llap`

```
432 \DeclareRobustCommand\rlap[1]{\hb@xt@\z@{\#1\hss}}
433 \DeclareRobustCommand\llap[1]{\hb@xt@\z@{\hss\#1}}
```

And here is the version that centers, it was initially introduced by `mathtools`.

```
434 \DeclareRobustCommand\clap[1]{\hb@xt@\z@{\hss\#1\hss}}
```

(End definition for `\rlap`, `\llap`, and `\clap`.)

435 `</2ekernel>`

File H

lttab.dtx

1 Tabbing, Tabular and Array Environments

This section deals with ‘Lining It Up in Columns’. First the `tabbing` environment is defined, and then in second part, `tabular` together with its variants, `tabular*` and `array`.

Note that the `tabular` defined here is essentially the original L^AT_EX 2.09 version, not the extended version described in *The L^AT_EX Companion*. Use the `array` package to obtain the extended version.

1.1 tabbing

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```
\dimen(\@firsttab + i) = distance of tab stop i from left margin
  0 <= i <= 15 (?).

\dimen\@firsttab is initialized to \totallmargin, so it starts
  at the prevailing left margin.

\@maxtab      = number of highest defined tab register
  probably = \@firsttab + 12
\@nxttabmar = tab stop number of next line's left margin
\@curtabmar = tab stop number of current line's left margin
\@curtab    = number of the current tab. At start of line,
  it equals \@curtabmar
\@hightab   = largest tab number currently defined.
\@tabpush   = depth of \pushtab's

\box\@curline     = contents of current line, excluding left margin
  skip, and excluding contents of current field
\box\@curfield   = contents of current field

@rjfield        = switch: T iff the last field of the line should
  be right-justified at the right margin.

\tabbingsep      = distance left by the \` command between the
  current position and the field that is
  “left-shifted”.

UTILITY MACROS
\@stopfield : closes the current field
\@addfield  : adds the current field to the current line.
\@contfield : continues the current field
\@startfield: begins the next field
\@stopline   : closes the current line and outputs it
```

```

\@startline : starts the next line
\@ifatmargin : an \if that is true iff the current line.
                 has width zero

\@startline ==
BEGIN
  \@curtabmar :=G \@nxttabmar
  \@curtab :=G \@curtabmar
  \box\@curline :=G null
  \@startfield
  \strut
END

\@stopline ==
BEGIN
  \unskip
  \@stopfield
  if @rjfield = T
    then @rjfield :=G F
      \tempdima := \totallmargin + \ linewidth
      \hbox@xt@ \tempdima{\itemfudge
        \hskip \dimen\@curtabmar
        \box\@curline
        \hfil
        \box\@curfield}
    else \addfield
      \hbox {\itemfudge
        \hskip \dimen\@curtabmar
        \box\@curline}
  fi
END

\@startfield ==
BEGIN
  \box\@curfield :=G \hbox {
END

\@stopfield ==
BEGIN
  }
END

\@contfield ==
BEGIN
  \box\@curfield :=G \hbox { \unhbox\@currfield %%} brace matching
END
\@addfield ==
BEGIN
  \box\@curline :=G \unbox\@curline * \unbox\@curfield
END

```

```

\@ifatmargin ==
BEGIN
  if dim of box\@curline = 0pt then
END

\tabbing ==
BEGIN
  \lineskip :=L 0pt
  \> == \@rtab
  \< == \@ltab
  \= == \@settab
  \+ == \@tabplus
  \- == \@tabminus
  \` == \@tabrj
  \' == \@tablab
  \\ == BEGIN \@stopline \@startline END
  \\[DIST] == BEGIN
    \@stopline \vskip DIST \@startline\ignorespaces END
  \\* == BEGIN \@stopline \penalty 10000 \@startline END
  \\*[DIST] == BEGIN \@stopline \penalty 10000 \vskip DIST
    \@startline\ignorespaces END
  \@hightab := \@nxttabmar :=G \@firsttab
  \@tabpush :=G 0
  \dimen\@firsttab := \@totallleftmargin
  @rjfield :=G F
  \trivlist \item\relax
  if @minipage = F then \vskip \parskip fi
  \box\@tabfbox = \rlap{\indent\the\everypar}
    % note: \the\everypar sets @inlabel :=G F
  \@itemfudge == BEGIN \box\@tabfbox END
  \@startline
  \ignorespaces
END

\@endtabbing ==
BEGIN
  \@stopline
  if \@tabpush > 0 then error message: "unmatched \poptabs" fi
  \endtrivlist
END

\@rtab ==
BEGIN
  \@stopfield
  \@addfield
  if \@curtab < \@hightab
    then \@curtab :=G \@curtab + 1
    else error message "Undefined Tab" fi

```

```

\@tempdima := \dimen\@curtab - \dimen\@curtabmar
              - width of box \@curline
\box\@curline :=G \hbox{\unhbox\@curline + \hskip\@tempdima}
\@startfield
END

\@settab ==
BEGIN
\@stopfield
\@addfield
if \@curtab < \@maxtab
  then \@curtab :=G \@curtab+1
  else error message: "Too many tabs"    fi
if \@curtab > \@hightab
  then \@hightab :=L \@curtab    fi
\dimen\@curtab :=L \dimen\@curtabmar + width of \box\@curline
\@startfield
END

\@ltab ==
BEGIN
\@ifatmargin
  then if \@curtabmar > \@firsttab
    then \@curtab :=G \@curtab - 1
    \@curtabmar :=G \@curtabmar - 1
    else error message "Too many untabs"    fi
  else error message "Left tab in middle of line"
  fi
END

\@tabplus ==
BEGIN
if \@nxttabmar < \@hightab
  then \@nxttabmar :=G \@nxttabmar+1
  else error message "Undefined tab"
fi
END

\@tabminus ==
BEGIN
if \@nxttabmar > \@firsttab
  then \@nxttabmar :=G \@nxttabmar-1
  else error message "Too many untabs"
fi
END

\@tabrj ==
BEGIN \@stopfield
\@addfield
@rjfield :=G T

```

```

    \@startfield
END

\@tablab ==
BEGIN \@stopfield
    \box\@curline G:= \hbox{\box\@curline %% ‘G’ added 17 Jun 86
                                \hskip - width of \box\@curfield
                                \hskip -\tabbingsep
                                \box\@curfield
                                \hskip \tabbingsep }

    \@startfield
END

\pushtabs ==
BEGIN
    \@stopfield
    \tabpush :=G \tabpush + 1
    \begingroup
    \@contfield
END

\poptabs ==
BEGIN
    \@stopfield
    if \tabpush > 0
        then \endgroup
            \tabpush :=G \tabpush - 1
        else error message: “Too many \poptabs”
    fi
    \@contfield
END

```

End of historical L^AT_EX 2.09 comments.

- \a The accents ‘`’, ‘’’, and ‘=’ that have been redefined inside a tabbing environment can be called by typing \a‘, \a’’, and \a=. The macro \a is defined in `ltoutenc.dtx`.

(*End definition for \a.*)

The ‘2ekernel’ code ensures that a \usepackage{autotabg} is essentially ignored if a ‘full’ format is being used that has picture mode already in the format.

1 \expandafter\let\csname ver@autotabg.sty\endcsname\fmtversion

```

\@firsttab
\@maxtab
  1 {*2ekernel}
  2 \newdimen\@tempa
  3 \chardef\@firsttab=\the\allocationnumber
  4 \newdimen\@tempa\newdimen\@tempa\newdimen\@tempa\newdimen\@tempa
  5 \newdimen\@tempa\newdimen\@tempa\newdimen\@tempa\newdimen\@tempa
  6 \newdimen\@tempa\newdimen\@tempa\newdimen\@tempa\newdimen\@tempa
  7 \newdimen\@tempa\newdimen\@tempa\newdimen\@tempa\newdimen\@tempa
  8 \newdimen\@tempa
  9 \chardef\@maxtab=\the\allocationnumber
10 \dimen\@firsttab=0pt

```

(End definition for `\@firsttab` and `\@maxtab`.)

```
\@nxttabmar  
\@curtabmar 11 \newcount\@nxttabmar  
\@curtab 12 \newcount\@curtabmar  
\@hightab 13 \newcount\@curtab  
\@tabpush 14 \newcount\@hightab  
15 \newcount\@tabpush
```

(End definition for `\@nxttabmar` and others.)

```
\@curline  
\@curfield 16 \newbox\@curline  
\@tabbbox 17 \newbox\@curfield  
18 \newbox\@tabbbox
```

(End definition for `\@curline`, `\@curfield`, and `\@tabbbox`.)

```
\if@rjfield  
19 \newif\if@rjfield
```

(End definition for `\if@rjfield`.)

`\@startline` It is, in some sense, an error if the current margin tab setting is higher than the value of `\@hightab` (which is a local variable). That this is allowed is a fundamental design flaw which is not going to be corrected now.

```
20 \def\@startline{  
21   \ifnum \@nxttabmar >\@hightab  
22     \@badtab  
23     \global\@nxttabmar \@hightab  
24   \fi  
25   \global\@curtabmar \@nxttabmar  
26   \global\@curtab \@curtabmar  
27   \global\setbox\@curline \hbox {}%  
28   \@startfield  
29   \strut}
```

(End definition for `\@startline`.)

```
\@stopline  
30 \def\@stopline{  
31   \unskip  
32   \@stopfield  
33   \if@rjfield  
34     \global\@rjfieldfalse  
35     \@tempdima\@totalleftmargin  
36     \advance\@tempdima\linewidth  
37     \hb@xt@\@tempdima{  
38       \itemfudge\hskip\dimen\@curtabmar  
39       \box\@curline  
40       \hfil  
41       \box\@curfield} %  
42   \else  
43     \addfield  
44     \hbox{\itemfudge\hskip\dimen\@curtabmar\box\@curline} %  
45   \fi}
```

```

(End definition for \@stopline.)

\@startfield
46 \def\@startfield{%
47   \global\setbox\@curfield\hbox\bgroup\color@begingroup}
48 (End definition for \@startfield.)

\@stopfield
49 \def\@stopfield{%
50   \color@endgroup\egroup}
51 (End definition for \@stopfield.)

\@contfield
52 \def\@contfield{%
53   \global\setbox\@curfield\hbox\bgroup\color@begingroup
54   \unhbox\@curfield}
55 (End definition for \@contfield.)

\@addfield
56 \def\@addfield{\global\setbox\@curline\hbox{\unhbox
57   \@curline\unhbox\@curfield}}
58 (End definition for \@addfield.)

\@ifatmargin
59 \def\@ifatmargin{\ifdim \wd\@curline =\z@}
60 (End definition for \@ifatmargin.)

\@tabcr
61 \def\@tabcr{\@stopline \@ifstar{\penalty \OM \@xtabcr}\@xtabcr}
62 (End definition for \@tabcr.)

\@xtabcr
63 \def\@xtabcr{\@ifnextchar[\@itabcr{\@startline\ignorespaces}}
64 (End definition for \@xtabcr.)

\@itabcr
65 </2ekernel>
66 <*2ekernel | latexrelease>
67 <latexrelease>\IncludeInRelease{2020/10/01}%
68 <latexrelease> \{@itabcr}{Tabbing calc syntax}%
69 \def\@itabcr[#1]{\@vspace@calcify[#1]\@startline\ignorespaces}
70 </2ekernel | latexrelease>
71 <latexrelease>\EndIncludeInRelease
72 <latexrelease>\IncludeInRelease{0000/00/00}%
73 <latexrelease> \{@itabcr}{Tabbing calc syntax}%
74 <latexrelease>
75 <latexrelease>\def\@itabcr[#1]{\vskip #1\@startline\ignorespaces}
76 <latexrelease>\EndIncludeInRelease
77 <*2ekernel>

```

```

tabbing We use \relax to prevent \item from scanning too far.
\tabbing 71 \def\tabbing{\lineskip \z@skip\let\>\@rtab\let\<\@ltab\let\=\@settab
72   \let\+\@tabplus\let\-\@tabminus\let\`{@tabrj\let\`{@tablab
73   \let\\=\@tabcr
74   \chightab\@firstab
75   \global\@nxttabmar\@firstab
76   \dimen\@firsttab\@totalleftmargin
77   \global\@tabpush\z@\global\@rjfieldfalse
78   \trivlist \item\relax
79   \if@minipage\else\vskip\parskip\fi
80   \setbox\@tabfbox\hbox{%
81     \rlap{\hskip\@totalleftmargin\indent\the\everypar}}%
82   \def\@itemfudge{\box\@tabfbox}%
83   \@startline\ignorespaces}

\endtabbing 84 \def\endtabbing{%
85   \@stopline\ifnum\@tabpush >\z@\badpoptabs \fi\endtrivlist}

Omitted \global added to \@rtab 17 Jun 86
\@rtab 86 \def\@rtab{\@stopfield\@addfield\ifnum \@curtab<\chightab
87   \global\advance\@curtab \one\else\badtab\fi
88   \tempdima\dimen\@curtab
89   \advance\@tempdima -\dimen\@curtabmar
90   \advance\@tempdima -\wd\@curline
91   \global\setbox\@curline\hbox{\unhbox\@curline\hskip\@tempdima}%
92   \@startfield\ignorespaces}

\@settab 93 \def\@settab{\@stopfield\@addfield
94   \ifnum \@curtab <\maxtab
95   \ifnum\@curtab =\chightab
96     \advance\chightab \one
97   \fi
98   \global\advance\@curtab \one
99   \else
100    \@latex@error{Tab overflow}\ehd
101   \fi
102   \dimen\@curtab \dimen\@curtabmar
103   \advance\dimen\@curtab \wd\@curline
104   \@startfield
105   \ignorespaces}

\@ltab 106 \def\@ltab{\@ifatmargin\ifnum\@curtabmar >\@firsttab
107   \global\advance\@curtab \m@ne \global\advance\@curtabmar \m@ne\else
108   \badtab\fi\else
109   \@latex@error{\string\<\space in mid line}\ehd\fi\ignorespaces}

\@tabplus 110 \def\@tabplus{%
111   \ifnum\@nxttabmar<\chightab

```

```

112      \global\advance\@nxttabmar\@ne
113  \else
114    \@badtab
115  \fi
116  \ignorespaces}

\@tabminus 117 \def\@tabminus{%
118   \ifnum\@nxttabmar>\@firsttab
119     \global\advance\@nxttabmar\m@ne
120   \else
121     \@badtab
122   \fi
123   \ignorespaces}

\@tabrj 124 \def\@tabrj{%
125   \@stopfield\@addfield\global\@rjfieldtrue\@startfield\ignorespaces}

\setbox\@curline made \global in \@tablab. 17 Jun 86

\@tablab 126 \def\@tablab{%
127   \@stopfield
128   \global\setbox\@curline\hbox{%
129     \box\@curline
130     \hskip-\wd\@curfield \hskip-\tabbingsep
131     \box\@curfield
132     \hskip\tabbingsep}%
133   \@startfield
134   \ignorespaces}

135 </2ekernel>
136 /*2ekernel | latexrelease>
137 <latexrelease>\IncludeInRelease{2019/10/01}%
138 <latexrelease>          {\pushtabs}{Make commands robust}%

\pushtabs 139 \DeclareRobustCommand\pushtabs{%
140   \@stopfield\@addfield\global\advance\@tabpush \@ne \begingroup
141   \@contfield}

```

It is, in some sense, an error if, after the endgroup, the current tab setting is higher than the new value of \chightab (which is a local variable). That this is allowed is a fundamental design flaw which is not going to be corrected now.

```

142 \DeclareRobustCommand\poptabs{\@stopfield\@addfield
143   \ifnum \@tabpush >\z@
144     \endgroup
145     \global\advance\@tabpush \m@ne
146   \ifnum \@curtab >\chightab
147     \global \@curtab \chightab
148     \@badtab
149   \fi
150 \else
151   \@badpoptabs
152 \fi
153 \@contfield}

```

```

154 \DeclareRobustCommand\kill{\@stopfield\@startline\ignorespaces}

(End definition for \@itabcr and others.)

155 </2ekernel | latexrelease>
156 <latexrelease>\EndIncludeInRelease
157 <latexrelease>\IncludeInRelease{0000/00/00}%
158 <latexrelease>          {\pushtabs}{Make commands robust}%
159 <latexrelease>
160 <latexrelease>\kernel@make@fragile\pushtabs
161 <latexrelease>\kernel@make@fragile\poptabs
162 <latexrelease>\kernel@make@fragile\kill
163 <latexrelease>
164 <latexrelease>\EndIncludeInRelease
165 {*2ekernel}

\tabbingsep
166 \newdimen\tabbingsep

(End definition for \tabbingsep.)

```

1.2 array and tabular environments

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

ARRAY PARAMETERS:

\arraycolsep	: half the width separating columns in an array environment
\tabcolsep	: half the width separating columns in a tabular environment
\arrayrulewidth	: width of rules
\doublerulesep	: space between adjacent rules in array or tabular
\arraystretch	: line spacing in array and tabular environments is done by placing a strut in every row of height and depth \arraystretch times the height and depth of the strut produced by an ordinary \strut command.

PREAMBLE:

The PREAMBLE argument of an array or tabular environment can contain the following:

l,r,c	: indicate where entry is to be placed.
	: for vertical rule
@{EXP}	: inserts the text EXP in every column. \arraycolsep or \tabcolsep spacing is suppressed.
*{N}{PRE}	: equivalent to writing N copies of PRE in the preamble. PRE may contain *{N'}{EXP'} expressions.
p{LEN}	: makes entry in parbox of width LEN.

SPECIAL ARRAY COMMANDS:

\multicolumn{N}{FORMAT}{ITEM} : replaces the next N column items by ITEM, formatted according to FORMAT.
 FORMAT should contain at most one l,r or c.
 If it contains none, then ITEM is ignored.

\vline : draws a vertical line the height of the current row. May appear in an array element entry.

\hline : draws a horizontal line between rows. Must appear either before the first entry (to appear above the first row) or right after a \\ command. If followed by another \hline, then adds a \vskip of \doublerulesep.

\cline{i-j} : draws horizontal lines between rows covering columns i through j, inclusive. Multiple commands may follow one another to provide lines covering several disjoint columns

\extracolsep{WIDTH} : for use inside an @ in the preamble. Causes a WIDTH space to be added between columns for the rest of the columns. This is in addition to the ordinary intercolumn space.

```

\array ==
BEGIN
  \@acol == \@arrayacol
  \@classz == \@arrayclassz
  \@classiv == \@arrayclassiv
  \\ == \@arraycr
  \@halignto == NULL
  \@tabarray
END

\endarray{NAME} == BEGIN \crcr } END

\tabular ==
BEGIN
  \@halignto == NULL
  \@tabular
END

\tabular*{WIDTH} ==
BEGIN
  \@halignto == to WIDTH
  \@tabular
END

\@tabular ==
BEGIN
  \leavemode
  \hbox { $
  \@acol == \@tabacol

```

```

\@classz == \@tabclassz
\@classiv == \@tabclassiv
\\ == \@tabularcr
\@tabarray
END

\endtabular == BEGIN \crcr{} $} END

\@tabarray == if next char = [ then \@array else \@array[c] fi

\@array[POS]{PREAMBLE} ==
BEGIN
  define \@arstrutbox to make \@arstrut produce strut of height
  and depth \arraystretch times the height and
  depth of a normal strut.
\@mkpream{PREAMBLE}
\@preamble == \halign \@halignto {\tabskip=0pt\@arstrut
                                     eval{\@preamble}\tabskip = 0pt\cr %}
\@startpbox == \@@startpbox
\@endpbox == \@@endpbox
if POS = t then \vtop
  else if POS = b then \vbox
    else \vcenter
  fi
  fi
{
\par ==L {} % changed 92/09/18
\@sharp == #
\protect == \relax
\lineskip :=L 0pt
\baselineskip :=L 0pt
\@preamble
END

\@arraycr ==
BEGIN
$ %% Prevents extra space at end of row's last entry.
if next char = [
  then \@argarraycr
  else $ \cr %% Needed to balance $
END

\@argarraycr[LENGTH] ==
BEGIN
$ %% Needed to balance $ of \@arraycr
if LENGTH > 0
  then \@tempdima := depth of \@arstrutbox + LENGTH
      \vrule height 0pt width 0pt depth \@tempdima
      \cr
  else \cr \noalign{\vskip LENGTH}

```

END

\@tabularcr and \@argtabularcr same as \@arraycr and \@argarraycr except without the extra \$'s.

End of historical L^AT_EX 2.09 comments.

- \extracolsep This command needs to expand during the tabular preamble construction so can't be robust.

167 \def\extracolsep#1{\tabskip #1\relax}

(*End definition for \extracolsep.*)

\array

168 \def\array{\let\@acol\@arrayacol \let\@classz\@arrayclassz
169 \let\@classiv\@arrayclassiv
170 \let\\@\@arraycr\let\@haligno\@empty\@tabarray}

(*End definition for \array.*)

\endarray

\endtabular 171 \def\endarray{\crcr\egroup\egroup}
\endtabular* 172 \def\endtabular{\crcr\egroup\egroup \$ \egroup
173 \expandafter \let \csname endtabular*\endcsname = \endtabular

(*End definition for \endarray, \endtabular, and \endtabular*.*)

\tabular

174 \def\tabular{\let\@haligno\@empty\@tabular}

(*End definition for \tabular.*)

\tabular*

Note that the change to use \setlength slightly alters the timing of the expansion and use of the length in #1 but this is very unlikely to have any practical effect.

175 \namedef{tabular*}{#1}{%
176 \setlength{\dimen@{#1}}%
177 \edef\@haligno{to\the\dimen@}\@tabular}

(*End definition for \tabular*.*)

\@tabular

178 \def\@tabular{\leavevmode \hbox \bgroup \\$\let\@acol\@tabacol
179 \let\@classz\@tabclassz
180 \let\@classiv\@tabclassiv \let\\@\@tabularcr\@tabarray}

(*End definition for \@tabular.*)

\@tabarray RmS 91/11/04 added \m@th.

181 \def\@tabarray{\m@th\@ifnextchar[\@array{\@array[c]}}

(*End definition for \@tabarray.*)

RmS 1993/11/03 changed \halign to \ialign and removed superfluous \tabskip assignment

\@array

182 \def\@array[#1]{#2}{%
183 \if #1t\vtop \else \if#1b\vbox \else \vcenter \fi\fi

```
184 \bgroup
```

This next bit of code sets up the strut and then builds the `halign` and its preamble according to the specification in the second argument.

This code has been moved inside the box. A side effect of this has been to expose what was a buglet in the previous version: since the `\@arstrut` below is expanded and contains an `\ifmmode` then it could produce an unnecessary extra box in every row, thus wasting ‘lots of’ main memory.

```
185 \setbox\@arstrutbox\hbox{%
186   \vrule \height\arraystretch\ht\strutbox
187   \depth\arraystretch \dp\strutbox
188   \width\z@\%
189   \mkpream{#2}%
190   \edef\@preamble{%
191     \ialign \noexpand\@halignto
192       \bgroup \@arstrut \@preamble \tabskip\z@skip \cr}%
193 }
```

That is the end of setting up the preamble; now we reset things before executing the `halign` built-up in `\@preamble`. The restorations could be done by introducing an extra group, thus saving tokens.

```
193 \let\@startpbox\@startpbox \let\@endpbox\@endpbox
194 \let\tabularnewline\\%
195   \let\par\empty
196   \let\sharp##%
197   \set@typeset@protect
198   \lineskip\z@skip\baselineskip\z@skip
```

If the parsing of the preamble goes wrong there may be some characters left which TeX then tries to typeset, i.e., we would be in horizontal mode. That would produce an endless loop because the `\halign` expects vertical mode thus issues a `\par` but that is a no-op at this point. So we better test this case issue some error message and make a crude recovery by ending that horizontal mode with force. A better fix would be to ensure that we never pick up more than a single character token (not done).

```
199 \ifhmode \preamerr\z@ \@@par\fi
200 \preamble}
```

(End definition for `\@array`.)

`\@arraycr` Array version of `\``.

```
201 \def\@arraycr{%
202   ${}\ifnum0='}\fi\@ifstar\@xarraycr\@xarraycr}
```

(End definition for `\@arraycr`.)

`\@arraycr`

```
203 \def\@xarraycr{\@ifnextchar[\@garraycr{\ifnum0='}\fi${}\cr}}
```

(End definition for `\@arraycr`.)

`\@garraycr`

```
204 \def\@garraycr[#1]{%
205   \ifnum0='}\fi${}\ifdim #1>\z@ \@xarraycr[#1]\else
206     \@yarraycr[#1]\fi}
```

(End definition for `\@garraycr`.)

```

\tabularnewline Tabular version of \\.
207 \let\tabularnewline\relax
(End definition for \tabularnewline.)

@tabularcr
208 \def@tabularcr{%
209   \ifnum0='}\fi\@ifstar\@xtabularcr\@xtabularcr}
(End definition for @tabularcr.)

\xtabularcr
210 \def\xtabularcr{\@ifnextchar[\@argtabularcr{\ifnum0='{\fi}\cr}}
(End definition for \xtabularcr.)

@argtabularcr
211 \def@argtabularcr[#1]{%
212   \ifnum0='{\fi}%
213   \ifdim #1>\z@%
214     \unskip\@xargarraycr{#1}%
215   \else
216     \@yargarraycr{#1}%
217   \fi}
(End definition for @argtabularcr.)

@xargarraycr
218 \def@xargarraycr#1{@tempdima #1\advance@tempdima \dp \arstrutbox
219   \vrule \height\z@ \depth\@tempdima \width\z@ \cr}
(End definition for @xargarraycr.)

@yargarraycr
220 </2ekernel>
221 <*2ekernel | latexrelease>
222 <latexrelease>\IncludeInRelease{2020/10/01}%
223 <latexrelease>          {\@yargarraycr}{tabular support calc syntax}%
224 \def@yargarraycr#1{\cr\noalign{\vspace@calcify{#1}}}
225 </2ekernel | latexrelease>
226 <latexrelease>\EndIncludeInRelease
227 <latexrelease>\IncludeInRelease{0000/00/00}%
228 <latexrelease>          {\@yargarraycr}{tabular support calc syntax}%
229 <latexrelease>
230 <latexrelease>\def@yargarraycr#1{\cr\noalign{\vskip #1}}
231 <latexrelease>\EndIncludeInRelease
232 <*2ekernel>
(End definition for @yargarraycr.)

```

\multicolumn *Historical L^AT_EX 2.09 comments (not necessarily accurate any more):*

```
\multicolumn{NUMBER}{FORMAT}{ITEM} ==
BEGIN
\multispan{NUMBER}
\begingroup
\caddamp == null
\mkpream{FORMAT}
\sharp == ITEM
\protect == \relax
\startpbox == \@@startpbox
\endpbox == \@@endpbox
\carstrut
\preamble
\endgroup
END
```

End of historical L^AT_EX 2.09 comments.

The command \def\caddamp{} was removed from \multicolumn on 6 Dec 86 because it caused embedded array environments not to work. I think that it was included originally to prevent an error message if the 2nd argument to the \multicolumn command had two column specifiers.

8 Feb 89 — \hbox{} added after \preamble to correct bug that occurred if \multicolumn preceded \\[D] with D > 0, caused by \\[] command doing an \unskip, which removed \tabcolsep glue inserted by \multicolumn.

This has been made long so that, for example, a p-column can contain multiple paragraphs; maybe the arguments of @-expressions should also be able to contain multiple paragraphs.

```
233 \long\def\multicolumn#1#2#3{\multispan{#1}\begingroup
234   \mkpream{#2}%
235   \def\sharp{#3}\set@typeset@protect
236   \let\startpbox\@@startpbox\let\endpbox\@@endpbox
237   \carstrut \preamble\hbox{}\endgroup\ignorespaces}
```

(End definition for \multicolumn.)

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

Codes for classes and character numbers of array, tabular and multicolumn arguments.

Character	Class	Number
c	0	0
l	0	1
r	0	2
	1	-
@	2	-
p	3	-
{@-exp}	4	-
{p-arg}	5	-

\@testpach \foo : expands \foo, which should be an array parameter

token, and sets `\@chclass` and `\@chnum` to its class and number. Uses `\@lastchclass` to distinguish 4 and 5

Preamble error codes

- 0: 'illegal character'
- 1: 'Missing @-exp'
- 2: 'Missing p-arg'

```
\@addamp ==
BEGIN if @firststamp = true then @firststamp := false
else & fi
END

\@mkpream TOKENLIST ==
BEGIN
  @firststamp := T
  \@lastchclass := 6
  \@preamble == null
  \@sharp == \relax
  \@protect == BEGIN \noexpand\protect\noexpand END
  \@startpbox == \relax
  \@endpbox == \relax
  \@expast{TOKENLIST}
  for \@nextchar := expand(\reserved@a)
    do \@testpach{\@nextchar}
      case of \@chclass
        0 -> \@classz
        1 -> \@classi
        ...
        5 -> \@classv
      end case
      \@lastchclass := \@chclass
    od
  case of \@lastchclass
    0 -> \hskip \arraycolsep % lrc
    1 -> % |
    2 -> \@preamerr1 % 'Missing @-exp' % @
    3 -> \@preamerr2 % 'Missing p-arg' % p
    4 -> % @-exp
    5 -> \hskip \arraycolsep % p-exp
  end case
END

\@arrayclassz ==
BEGIN
  \@preamble := \@preamble *
  case of \@lastchclass
    0 -> \hskip \arraycolsep \@addamp \hskip \arraycolsep
    1 -> \@addamp \hskip \arraycolsep
    2 -> % impossible
```

```

            3 -> % impossible
            4 -> \@addamp
            5 -> \hskip \arraycolsep \@addamp \hskip \arraycolsep
            6 -> \@addamp \hskip \arraycolsep
        end case
    * case of \@chnum
        0 -> \hfil$\relax\sharp$\hfil
        1 -> $\relax\sharp$\hfil
        2 -> \hfil$\relax\sharp$\hfil
    end case
END

\@tabclassz == similar to \@arrayclassz

\@classi ==
BEGIN
    \@preamble := \@preamble *
    case of \@lastchclass
        0 -> \hskip \arraycolsep \arrayrule
        1 -> \hskip \doublerulesep \arrayrule
        2 -> % impossible
        3 -> % impossible
        4 -> \arrayrule
        5 -> \hskip \arraycolsep \arrayrule
        6 -> \@arrayrule
    end case
END

\@classii ==
BEGIN
    \@preamble := \@preamble *
    case of \@lastchclass
        0 ->
        1 -> \hskip .5\arrayrulewidth
        2 -> % impossible
        else ->
    end case
END

\@classiii ==
BEGIN
    \@preamble := \@preamble *
    case of \@lastchclass
        0 -> \hskip \arraycolsep \@addamp \hskip \arraycolsep
        1 -> \@addamp \hskip \arraycolsep
        2 -> % impossible
        3 -> % impossible
        4 -> \@addamp
        5 -> \hskip \arraycolsep \@addamp \hskip \arraycolsep
        6 -> \@addamp \hskip \arraycolsep

```

```

        end case
END

\@arrayclassiv ==
BEGIN \@preamble := \@preamble * $ \@nextchar$ END

\@tabclassiv == same as \@arrayclassv except without the $ ... $

\@classv ==
BEGIN
  \@preamble :=
    \@preamble * \@startpbox{\@nextchar}\ignorespaces\@sharp
      \@endpbox
END

\@expast{S}:
Sets \reserved@a := S with all instances of *{N}{STRING}
replaced by N copies of STRING, where N > 0. An *
appearing inside braces is ignored, but *-expressions
inside STRING are expanded, so nested *-expressions are
handled properly.

\@expast{S} == BEGIN \@xexpast S *0x\@c END

\@xexpast S1 *{N}{S2} S3 \@c ==
BEGIN
  \reserved@a := S1
  \tempcnta := N
  if \tempcnta > 0
    then while \tempcnta > 0 do \reserved@a := \reserved@a S2
        \tempcnta := \tempcnta - 1 od
    \reserved@b == \@xexpast
  else \reserved@b == \@xexnoop
  fi
  \expandafter \reserved@b \reserved@a S3 \@c
END
End of historical LATEX 2.09 comments.
```

```
\@xexnoop
238 \def\@xexnoop #1\@c{}  

(End definition for \@xexnoop.)
```

```
\@expast
239 \def\@expast#1{\@xexpast #1*0x\@c}  

(End definition for \@expast.)
```

```

\@xexpast

240 \def\@xexpast#1##2##3##4@@{%
241   \edef\reserved@a{#1}%
242   \tempcnta#2\relax
243   \ifnum\tempcnta>\z@
244     \whilenum\tempcnta>\z@\do
245       {\edef\reserved@a{\reserved@a#3}\advance\tempcnta \m@ne}%
246       \let\reserved@b\@xexpast
247   \else
248     \let\reserved@b\@x noop
249   \fi
250   \expandafter\reserved@b\reserved@a #4@@}

```

(End definition for `\@xexpast`.)

```

\if@firstamp
\addamp 251 \newif\if@firstamp

252 \def\addamp{%
253   \if@firstamp
254     \if@firstampfalse
255   \else
256     \edef\@preamble{\@preamble &}%
257   \fi}

```

(End definition for `\if@firstamp` and `\addamp`.)

```

\arrayacol
\tabacol 258 \def\arrayacol{\edef\@preamble{\@preamble \hskip \arraycolsep}}
\campacol 259 \def\tabacol{\edef\@preamble{\@preamble \hskip \tabcolsep}}
\cacolampacol 260 \def\campacol{\@addamp \cacol}
261 \def\cacolampacol{\cacol\@addamp\cacol}

```

(End definition for `\arrayacol` and others.)

```

\mkpream
262 \def\mkpream#1{\if@firstamptrue\lastchclass{%
263   \let\@preamble\empty
264   \let\protect\unexpandable\protect
265   \let\sharp\relax
266   \let\startpbox\relax\let\endpbox\relax
267   \expast{\#1}%
268   \expandafter\@tfor \expandafter
269     \nextchar \expandafter:\expandafter=\reserved@a\do
270       {\@testpach\nextchar
271        \ifcase \chclass \classz \or \classi \or \classii \or \classiii
272          \or \classiv \or \classv \fi\lastchclass\chclass}%
273   \ifcase \lastchclass \cacol
274     \or \or \preamerr \one\or \preamerr \tw@ \or \or \cacol \fi}

```

(End definition for `\mkpream`.)

```

\@arrayclassz

275 \def\@arrayclassz{\ifcase \lastchclass \acolampacol \or \campacol \or
276   \or \or \addamp \or
277   \acolampacol \or \firststampfalse \acol \fi
278 \edef\@preamble{\@preamble
279   \ifcase \chnum
280     \hfil$\relax\sharp$\hfil \or $\relax\sharp$\hfil
281     \or \hfil$\relax\sharp$\hfil\fi}

```

(End definition for \@arrayclassz.)

\@tabclassz RmS 91/08/14 inserted extra braces around entry for NFSS

```

282 \def\@tabclassz{%
283   \ifcase\lastchclass
284     \acolampacol
285   \or
286     \campacol
287   \or
288   \or
289   \or
290     \addamp
291   \or
292     \acolampacol
293   \or
294     \firststampfalse\acol
295   \fi
296 \edef\@preamble{%
297   \@preamble{%
298     \ifcase\chnum
299       \hfil
300         \hskip1sp%
301         \ignorespaces\sharp\unskip\hfil
302       \or
303         \hskip1sp\ignorespaces\sharp\unskip\hfil
304       \or
305         \hfil\hskip1sp\ignorespaces\sharp\unskip
306         \fi}}}

```

(End definition for \@tabclassz.)

```

\@classi

307 \def\@classi{%
308   \ifcase\lastchclass
309     \acol\arrayrule
310   \or
311     \addtopreamble{\hskip \doublerulesep}\arrayrule
312   \or
313   \or
314   \or
315     \arrayrule
316   \or
317     \acol\arrayrule
318   \or

```

```

319      \@arrayrule
320      \fi}

(End definition for \@classi.)
```

\@classii

```

321 \def\@classii{%
322   \ifcase\@lastchclass
323     \or
324       \addtopreamble{\hspace{.5\arrayrulewidth}%
325     \fi}

(End definition for \@classii.)
```

\@classiii

```

326 \def\@classiii{\ifcase \@lastchclass \acolampacol \or
327   \addamp\acol \or
328   \or \or \addamp \or
329   \acolampacol \or \ampacol \fi}

(End definition for \@classiii.)
```

\@tabclassiv

```

330 \def\@tabclassiv{\addtopreamble\@nextchar}

(End definition for \@tabclassiv.)
```

\@arrayclassiv

```

331 \def\@arrayclassiv{\addtopreamble{$\@nextchar$} }
```

(End definition for \@arrayclassiv.)

\@classv

```

332 \def\@classv{\addtopreamble{\startpbox{\@nextchar}\ignorespaces
333 \sharp\endpbox}}
```

(End definition for \@classv.)

\@addtopreamble

```

334 \def\@addtopreamble#1{\edef\@preamble{\@preamble #1}}
```

(End definition for \@addtopreamble.)

\@chclass

\@lastchclass

```

335 \newcount\@chclass
```

\@chnum

```

336 \newcount\@lastchclass
337 \newcount\@chnum
```

(End definition for \@chclass, \@lastchclass, and \@chnum.)

\arraycolsep

\tabcolsep

```

338 \newdimen\arraycolsep
```

\arrayrulewidth

```

339 \newdimen\tabcolsep
```

\doublerulesep

```

340 \newdimen\arrayrulewidth
341 \newdimen\doublerulesep
```

(End definition for `\arraycolsep` and others.)

`\arraystretch`

342 `\def\arraystretch{1} % Default value.`

(End definition for `\arraystretch`.)

`\@arstrutbox`

343 `\@arstrut \newbox\@arstrutbox`

344 `\def\@arstrut{%`

345 `\relax\ifmmode\copy\@arstrutbox\else\unhcopy\@arstrutbox\fi}`

(End definition for `\@arstrutbox` and `\@arstrut`.)

`\@arrayrule`

346 `\def\@arrayrule{\@addtopreamble{\hskip -.5\arrayrulewidth`

347 `\vrule \width \arrayrulewidth\hskip -.5\arrayrulewidth}}`

(End definition for `\@arrayrule`.)

`\@testpatch`

348 `\def\@testpatch#1{\@chclass \ifnum \@lastchclass=\tw@ 4 \else`

349 `\ifnum \@lastchclass=3 5 \else`

350 `\z@ \if #1c\@chnum \z@ \else`

351 `\if #11\@chnum \one \else`

352 `\if #1r\@chnum \tw@ \else`

353 `\@chclass \if #1|\one \else`

354 `\if #1@\tw@ \else`

355 `\if #1p3 \else \z@ \preamerr 0\fi`

356 `\fi \fi \fi \fi \fi \fi`

357 `\fi}`

(End definition for `\@testpatch`.)

`\hline`

358 `\def\hline{%`

359 `\noalign{\ifnum0='}\fi\hrule \height \arrayrulewidth \futurelet`

360 `\reserved@a\@xhline}`

(End definition for `\hline`.)

`\@xhline`

361 `\def\@xhline{\ifx\reserved@a\hline`

362 `\vskip\doublerulesep`

Measure from the middle of the rules.

363 `\vskip-\arrayrulewidth`

364 `\fi`

365 `\ifnum0='{\fi}}`

(End definition for `\@xhline`.)

`\vline`

366 `\def\vline{\vrule \width \arrayrulewidth}`

(End definition for `\vline`.)

`\cline` The old L^AT_EX2.09 implementation of `\cline` used up quite a lot of memory and two precious count registers. This new (1995/09/14) implementation does not use any count registers. It is coded in a way that depends heavily on the definition of `\multispan` so that command has been moved here from the file `lplain.dtx`.

These counters are no longer declared.

```

\newcount\@cla
\newcount\@clb

367 \def\cline#1{\@cline#1\@nil}

368 \def\@cline#1-#2\@nil{%
369   \omit

```

Use the counter from `\multispan`.

```

370   \multicnt#1%
371   \advance\multispan\m@ne
372   \ifnum\multicnt=\@ne\@firstofone{\&\omit}\fi
373   \multicnt#2%
374   \advance\multicnt-#1%
375   \advance\multispan\@ne

```

The original had `\unskip` at this point, but how could a skip get here ???

```

376 \leaders\hrule\@height\arrayrulewidth\hfill
377 \cr

```

This is back spacing is fairly horrible, but it is what happened in the old version... An alternative would be to make `\cline` look ahead for a following `\cline` as does `\hline`. This would alter the spacing in existing documents so keep the old version in the kernel. Perhaps a package should do this differently.

```
378 \noalign{\vskip-\arrayrulewidth}}
```

(End definition for `\cline` and `\@cline`.)

`\mscount` The `\mscount` counter is no longer declared, saving a csname and a register. It is declared in compatibility mode.

(End definition for `\mscount`.)

`\multispan` Modify `\multispan` slightly from its plain T_EX definition to allow more efficient code sharing with `\multicolumn`. Also share a count register with `\multiput`.

```

\sp@n 379 \def\multispan{\omit\@multispan}
380 \def\@multispan#1{%
381   \multicnt#1\relax
382   \loop\ifnum\multicnt>\@ne \sp@n\repeat}
383 \def\sp@n{\span\omit\advance\multicnt\m@ne}

```

(End definition for `\multispan`, `\@multispan`, and `\sp@n`.)

`\@startpbox` Helper macros for ‘p’ columns.

```

\@endpbox 384 \def\@startpbox#1{\vtop\bgroup \setlength\hsize{#1}\@arrayparboxrestore}
           \@startpbox{width} text \egroup is essentially \parbox{width}{text}
           \@endpbox is essentially \unskip \strut \par \egroup\hfil (Changed 14 Jan 89)
           (changed again 1994/05/13)

```

```
384 \def\@startpbox#1{\vtop\bgroup \setlength\hsize{#1}\@arrayparboxrestore}
```

```
385 \def\@endpbox{\@finalstrut\@arstrutbox\par\egroup\hfil}
14 Jan 89: Def of \@endpbox changed from
\def\@endpbox{\par\vskip\dp\@arstrutbox\egroup\hfil}
so vertical spacing works out right if the last line of a ‘p’ entry has a descender.
```

(*End definition for \@startpbox and \@endpbox.*)

```
\@@startpbox
\@@endpbox
386 \let\@@startpbox=\@startpbox
387 \let\@@endpbox=\@endpbox
```

(*End definition for \@startpbox and \@endpbox.*)

```
388 </2ekernel>
```

File I

ltpictur.dtx

1 Picture Mode

Picture mode commands. In addition to the commands available in L^AT_EX2.09, This section adds the new \qbezier command for drawing curves.

\qbezier [⟨N⟩] ⟨⟨AX,AY⟩⟩⟨⟨BX,BY⟩⟩⟨⟨CX,CY⟩⟩ plots a quadratic Bezier curve from ⟨⟨AX,AY⟩⟩ to ⟨⟨CX,CY⟩⟩, with ⟨⟨BX,BY⟩⟩ as the third Bezier point, using $N+1$ points equally spaced parametrically. If $N = 0$ (the default value), then a sufficient number of points are used to draw a connected curve—except that at most \qbeziermax+1 points are drawn. A “point” is a square of side \@wholewidth.

\bezier In addition, to be compatible with the old **bezier** package, a variant of this command, \bezier, is defined, in which the first argument is not optional.

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

\unitlength	= value of dimension argument
\@wholewidth	= current line width
\@halfwidth	= half of current line width
\@linefnt	= font for drawing lines
\@circlefnt	= font for drawing circles

\linethickness{DIM} : Sets the width of horizontal and vertical lines in a picture to DIM. Does not change width of slanted lines or circles. Width of all lines reset by \thinlines and \thicklines

```
\picture(XSIZE,YSIZE)(XORG,YORG)
BEGIN
  \@picht := L YSIZE * \unitlength
  box \@picbox :=
    \hb@xt@ XSIZE * \unitlength
    {\hskip -XORG * \unitlength
     \lower YORG * \unitlength
     \hbox{
       \ignorespaces      %% added 13 June 89
    }
  END
```

```
\endpicture ==
BEGIN
  } \hss }
height of \@picbox := \@picht
depth of \@picbox := 0
\mbox{\box\@picbox} %% change 26 Aug 91
END
```

```
\put(X, Y){OBJ} ==
BEGIN
```

```

\@killglue
\raise Y * \unitlength \hb@xt@ 0pt { \hskip X * \unitlength
                                         OBJ \hss }
\ignorespaces
END

\multiput(X,Y)(DELX,DELY){N}{OBJ} ==
BEGIN
\@killglue
\@multicnt := N
\@xdim := X * \unitlength
\@ydim := Y * \unitlength
while \@multicnt > 0
  do \raise \@ydim \hb@xt@ 0pt { \hskip \@xdim
                                         OBJ \hss }
\@multicnt := \@multicnt - 1
\@xdim := \@xdim + DELX * \unitlength
\@ydim := \@ydim + DELY * \unitlength
od
\ignorespaces
END

\shortstack[POS]{TEXT} : Makes a \vbox containing TEXT stacked as
a one-column array, positioned l, r or c as indicated by POS.

```

End of historical L^AT_EX 2.09 comments.

The ‘2ekernel’ code ensures that a \usepackage{autopict} is essentially ignored if a ‘full’ format is being used that has picture mode already in the format.

1 <2ekernel>\expandafter\let\csname ver@autopict.sty\endcsname\fmtversion

```

\@wholewidth
\@halfwidth
2 {*}2ekernel
3 \newdimen\@wholewidth
4 \newdimen\@halfwidth

```

(End definition for \@wholewidth and \@halfwidth.)

```

\unitlength
5 \newdimen\unitlength \unitlength =1pt

```

(End definition for \unitlength.)

```

\@picbox
\@picht
6 \newbox\@picbox
7 \newdimen\@picht

```

(End definition for \@picbox and \@picht.)

\@defaultunitsset Set a length register, #1, accepting number or an etex length expression, #2, with default unit, #3.

The register name in #1 can be prefixed by \advance so that the register is incremented by the supplied value.

```
 8  </2ekernel>
 9  {*2ekernel | latexrelease}
10 <latexrelease>\IncludeInRelease{2020/10/01}%
11 <latexrelease>          {\@defaultunitsset}{default units}%
12 \def\@defaultunitsset#1#2#3{%
13   \@defaultunits#1\dimexpr#2#3\relax\relax\@nnil}
14 </2ekernel | latexrelease>
```

This is used in all **picture** commands that take picture coordinates. So \put(2,2) as previously but now \put(\textwidth-5cm,0.4\textheight) Note that you can only use expressions with lengths, \put(1+2,0) is not supported.

```
15 <latexrelease>\EndIncludeInRelease
16 <latexrelease>\IncludeInRelease{0000/00/00}%
17 <latexrelease>          {\@defaultunitsset}{default units}%
18 <latexrelease>\let\@defaultunitsset\@undefined
19 <latexrelease>\EndIncludeInRelease
20 {*2ekernel}</2ekernel>
```

(End definition for \@defaultunitsset.)

\picture #1 should be white space.

#1 should be a ((eating any white space before the bracket),

```
21 \long\def\picture#1{\pictur@#1}
22 \def\pictur@(#1){%
23   \@ifnextchar({\@picture(#1)}{\@picture(#1)(0,0)}}</2ekernel>
```

(End definition for \picture and \pictur@.)

\@picture

```
24 </2ekernel>
25 {*2ekernel | latexrelease}
26 <latexrelease>\IncludeInRelease{2020/10/01}%
27 <latexrelease>          {\@picture}{default units}%
28 \def\@picture(#1,#2)(#3,#4){%
29   \@defaultunitsset\@picht{#2}\unitlength
30   \@defaultunitsset\@tempdimc{#1}\unitlength
31   \setbox\@picbox\hb@xt@\@tempdimc\bgroup
32   \@defaultunitsset\@tempdimc{#3}\unitlength
33   \hskip -\@tempdimc
34   \@defaultunitsset\@tempdimc{#4}\unitlength
35   \lower\@tempdimc\hbox\bgroup
36   \ignorespaces}
37 </2ekernel | latexrelease>
```

```

38  \langle latexrelease \rangle \EndIncludeInRelease
39  \langle latexrelease \rangle \IncludeInRelease{0000/00/00}%
40  \langle latexrelease \rangle \def \@picture{\default units}%
41  \langle latexrelease \rangle \def \@picture(#1,#2)(#3,#4){%
42  \langle latexrelease \rangle \@picht#2\unitlength
43  \langle latexrelease \rangle \setbox \@picbox\hb@xt@#1\unitlength\bgroup
44  \langle latexrelease \rangle \hskip -#3\unitlength
45  \langle latexrelease \rangle \lower #4\unitlength\hbox\bgroup
46  \langle latexrelease \rangle \ignorespaces}
47  \langle latexrelease \rangle \EndIncludeInRelease
48  {*2ekernel}

(End definition for \@picture.)

\endpicture
49 \def \endpicture{%
50   \egroup\hss\egroup
51   \ht\@picbox\@picht\dp\@picbox\z@%
52   \mbox{\box\@picbox}\}

(End definition for \endpicture.)
```

In the definitions of \put and \multiput, \hspace was replaced by \kern just in case arg #3 = “plus”. (Bug detected by Don Knuth. changed 20 Jul 87).

```

53  \langle /2ekernel |
54  \langle *2ekernel | latexrelease \rangle
55  \langle latexrelease \rangle \IncludeInRelease{2020/10/01}%
56  \langle latexrelease \rangle \put{\default units}%
57  \langle latexrelease \rangle \expandafter\let\csname put \endcsname\@undefined
58  \long\def\put(#1,#2)#3{%
59    \@killglue
60    \defaultunitsset\@tempdimc{#2}\unitlength
61    \raise\@tempdimc
62    \hb@xt@\z@{%
63      \defaultunitsset\@tempdimc{#1}\unitlength
64      \kern\@tempdimc
65      #3\hss}%
66    \ignorespaces}
67  \langle /2ekernel | latexrelease \rangle

68  \langle latexrelease \rangle \EndIncludeInRelease
69  \langle latexrelease \rangle \IncludeInRelease{0000/00/00}%
70  \langle latexrelease \rangle \put{\default units}%
71  \langle latexrelease \rangle \expandafter\let\csname put \endcsname\@undefined
72  \langle latexrelease \rangle \long\def\put(#1,#2)#3{%
73    \@killglue\raise#2\unitlength
74    \hb@xt@\z@{\kern#1\unitlength #3\hss}%
75    \ignorespaces}
76  \langle latexrelease \rangle \EndIncludeInRelease
77  {*2ekernel}

\multiput #3 had better be a .
78  \langle /2ekernel |
79  \langle *2ekernel | latexrelease \rangle
80  \langle latexrelease \rangle \IncludeInRelease{2020/10/01}%

```

```

81  \begin{macro}{\multiput}
82  \expandafter\let\csname multiput \endcsname\undefined
83  \def\multiput(#1,#2){%
84    \ifdim#1=0pt \def\unitlength{\unitlength}%
85    \ifdim#2=0pt \def\unitlength{\unitlength}%
86    \multiput{}%
87  }%
```

(End definition for `\multiput`.)

`\@multiput`

```

98  \begin{macro}{\@multiput}
99  \expandafter\let\csname @multiput \endcsname\undefined
100 \def\@multiput(#1,#2){%
101   \ifdim#1=0pt \def\unitlength{\unitlength}%
102   \ifdim#2=0pt \def\unitlength{\unitlength}%
103   \killglue\multicnt #3\relax
104   \whilenum \multicnt >\z@\do
105     {\raise\ydim\hb@xt@.0{\kern\@xdim #4\hss}}%
106     \advance\multicnt\m@ne
107     \ifdim#1>0pt \def\unitlength{\unitlength}%
108     \ifdim#2>0pt \def\unitlength{\unitlength}%
109     \ignorespaces}
110 }
```

(End definition for `\@multiput`.)

`\@killglue`

```

123 \def\@killglue{\unskip\whiledim \lastskip >\z@\do{\unskip}}
```

(End definition for `\@killglue`.)

```

\thinlines
\thicklines 124 \DeclareRobustCommand\thinlines{\let\@linefnt\tenln
125   \let\@circlefnt\tencirc
126   \@wholewidth\fontdimen8\tenln \@halfwidth .5\@wholewidth}
127 \DeclareRobustCommand\thicklines{\let\@linefnt\tenlnw
128   \let\@circlefnt\tencircw
129   \@wholewidth\fontdimen8\tenlnw \@halfwidth .5\@wholewidth}

(End definition for \thinlines and \thicklines.)

\linethickness
130 \DeclareRobustCommand*\linethickness[1]
131   {\@wholewidth #1\relax \@halfwidth .5\@wholewidth \ignorespaces}

(End definition for \linethickness.)

\isshortstack
132 \def\shortstack{\@ifnextchar[\@shortstack{\@shortstack[c]}}
(End definition for \isshortstack.)

\@ishortstack
133 \def\@shortstack[#1]{%
134   \leavevmode
135   \vbox\bgroun
136   \baselineskip-\p@\lineskip 3\p@
137   \let\mb@l\hss\let\mb@r\hss
138   \expandafter\let\csname mb@#1\endcsname\relax
139   \let\\@stackcr
140   \@ishortstack}

(End definition for \@ishortstack.)

\@ishortstack
141 \def\@ishortstack#1{\ialign{\mb@l {##}\unskip\mb@r\cr #1\crcr}\egroup}
(End definition for \@ishortstack.)

\@stackcr
\@ixstackcr 142 \def\@stackcr{\@ifstar\@ixstackcr\@ixstackcr}
143 \def\@ixstackcr{\@ifnextchar[\@istackcr{\cr\ignorespaces}{}}

(End definition for \@stackcr and \@ixstackcr.)

\@istackcr
144 </2ekernel>
145 <*2ekernel | latexrelease>
146 <latexrelease>\IncludeInRelease{2020/10/01}%
147 <latexrelease>          {\@istackcr}{\shortstack calc support}%
148 \def\@istackcr[#1]{\cr\noalign{\@vspace@calcify{#1}}\ignorespaces}
149 </2ekernel | latexrelease>

```

```

150  \end{macro}
151  \end{macro}
152  \end{macro}
153  \end{macro}
154  \def\@istackcr[#1]{\cr\noalign{\vskip #1}\ignorespaces}
155  \end{macro}
156  {*2ekernel}

(End definition for \@istackcr.)
Historical LATEX 2.09 comments (not necessarily accurate any more):
\line(X,Y){LEN} ==
BEGIN
  \carg := X
  \yarg := Y
  \clinenlen := LEN * \unitlength
  if \carg = 0
    then \vline
  else if \yarg = 0
    then \hline
  else \sline
    if
  if
END

\sline ==
BEGIN
  if \carg < 0
    then @negarg := T
    \carg := -\carg
    \yyarg := -\yarg
  else @negarg := F
    \yyarg := \yarg
  fi
  \tempcnta := |\yyarg|
  if \tempcnta > 6
    then error: 'LATEX ERROR: Illegal \line or \vector argument.'
    \tempcnta := 0
  fi
  \box\clinechar := \hbox{\clinefnt \getlinechar(\carg,\yyarg) }
  if \yarg > 0 then \upordown = \raise
    \clnht := 0
  else \upordown = \lower
    \clnht := height of \box\clinechar
  fi
  \clnwd := width of \box\clinechar
  if @negarg
    then \hskip - width of \box\clinechar
      \reserved@a == \hskip - 2* width of box \clinechar
    else \reserved@a == \relax
  fi
% Put out integral number of line segments

```

```

while \@clnwd < \@linelen
  do \upordown \@clnht \copy\@linechar
    \reserved@a
    \@clnht := \@clnht + ht of \box\@linechar
    \@clnwd := \@clnwd + width of \box\@linechar
  od

%% Put out last segment
\@clnht := \@clnht - height of \box\@linechar
\@clnwd := \@clnwd - width of \box\@linechar
\@tempdima := \@linelen - \@clnwd
\@tempdimb := \@tempdima - width of \box\@linechar
if @negarg then \hskip -\@tempdimb
  else \hskip \@tempdimb
fi
\@tempdima := 1000 * \@tempdima
\@tempcpta := \@tempdima / width of \box\@linechar
\@tempdima := (\@tempcpta * ht of \box\@linechar)/1000
\@clnht := \@clnht + \@tempdima
if \@linelen < width of box\@linechar
  then \hskip width of box\@linechar
  else \hbox{\upordown \@clnht \copy\@linechar}
fi
END

\@hline ==
BEGIN
  if \xarg < 0 then \hskip -\@linelen \fi
  \vrule height \halfwidth depth \halfwidth width \@linelen
  if \xarg < 0 then \hskip -\@linelen \fi
END

\@vline == if \yarg < 0 \downline else \upline fi

\@getlinechar(X,Y) ==
BEGIN
  \@tempcpta := 8*X - 9
  if Y > 0
    then \@tempcpta := \@tempcpta + Y
    else \@tempcpta := \@tempcpta - Y + 64
  fi
  \char\@tempcpta
END

\vector(X,Y){LEN} ==
BEGIN
  \xarg := X
  \yarg := Y
  \@linelen := LEN * \unitlength

```

```

if \@xarg = 0
  then \@vvector
else if \@yarg = 0
  then \@hvector
  else \@svector
  if
    if
END

\@hvector ==
BEGIN
  \@hline
  {\@linefnt if \@xarg < 0 then \@getlarrow(1,0)
   else \@getrarrow(1,0)
  fi}
END

\@vvector == if \@yarg < 0 \@downvector else \@upvector fi

\@svector ==
BEGIN
  \@sline
  \tempcnta := |\@yarg|
  if \tempcnta < 5
    then \hskip - width of \box\@linechar
        \@upordown \clnht \hbox
        {\@linefnt
         if @negarg then \@getlarrow(\@xarg,\@yyarg)
                     else \@getrarrow(\@xarg,\@yyarg)
        fi }
    else error: 'LATEX ERROR: Illegal \line or \vector argument.'
  fi
END

\@getlarrow(X,Y) ==
BEGIN
  if Y = 0
    then \tempcnta := '33
  else \tempcnta := 16 * X - 9
      \tempcntb := 2 * Y
      if \tempcntb > 0
        then \tempcnta := \tempcnta + \tempcntb
      else \tempcnta := \tempcnta - \tempcntb + 64
    fi
  fi
  \char\tempcnta
END

\@getrarrow(X,Y) ==
BEGIN

```

```

\@tempcntb := |Y|
case of \@tempcntb
  0 : \@tempcnta := '55
  1 : if X < 3
    then \@tempcnta := 24*X - 6
    else if X = 3
      then \@tempcnta := 49
      else \@tempcnta := 58 fi
    fi
  2 : if X < 3
    then \@tempcnta := 24*X - 3
    else \@tempcnta := 51      % X must = 3
    fi
  3 : \@tempcnta := 16*X - 2
  4 : \@tempcnta := 16*X + 7
endcase
if Y < 0
  then \@tempcnta := \@tempcnta + 64
fi
\char\@tempcnta
END

```

End of historical L^AT_EX 2.09 comments.

\if@negarg

157 \newif\if@negarg

(*End definition for \if@negarg.*)

\line

```

158 〈/2ekernel〉
159 〈*2ekernel | latexrelease〉
160 〈latexrelease〉\IncludeInRelease{2020/10/01}%
161 〈latexrelease〉          {\line}{default units}%
162 〈latexrelease〉\expandafter\let\csname line \endcsname\@undefined
163 \def\line(#1,#2)#3{\@xarg #1\relax \@yarg #2\relax
164   \@defaultunitsset\@linelen{#3}\unitlength
165   \ifdim\@linelen<\z@\@badlineararg\else
166     \ifnum\@xarg =\z@ \@vline
167     \else \ifnum\@yarg =\z@ \@hline \else \@sline\fi
168   \fi
169 \fi}
170 〈/2ekernel | latexrelease〉

171 〈latexrelease〉\EndIncludeInRelease
172 〈latexrelease〉\IncludeInRelease{0000/00/00}%
173 〈latexrelease〉          {\line}{default units}%
174 〈latexrelease〉\expandafter\let\csname line \endcsname\@undefined
175 〈latexrelease〉\def\line(#1,#2)#3{\@xarg #1\relax \@yarg #2\relax
176 〈latexrelease〉  \@linelen #3\unitlength
177 〈latexrelease〉  \ifdim\@linelen<\z@\@badlineararg\else
178 〈latexrelease〉    \ifnum\@xarg =\z@ \@vline
179 〈latexrelease〉    \else \ifnum\@yarg =\z@ \@hline \else \@sline\fi
180 〈latexrelease〉  \fi

```

```

181 〈latexrelease〉 \fi}
182 〈latexrelease〉\EndIncludeInRelease
183 {*2ekernel}

```

(End definition for \line.)

\@sline

```

184 \def\@sline{%
185   \ifnum\@xarg<\z@ \negargtrue \xarg -\xarg \yyarg -\yarg
186   \else \negargfalse \yyarg \yarg \fi
187   \ifnum \yyarg >\z@ \tempcpta\yyarg \else \tempcpta -\yyarg \fi
188   \ifnum\tempcpta>6 \badlinearg\tempcpta\z@ \fi
189   \ifnum\@xarg>6 \badlinearg\@xarg \ne \fi
190   \setbox\@linechar\hbox{\@linefnt\getlinechar(\@xarg,\@yarg)}%

```

If we have something like \line(5,5){30} the \@linechar will not contain a char and later on we will end in an infinite loop. So we check the width of the box and put in something as an emergency fix if necessary.

```

191 \ifdim\wd\@linechar=\z@
192   \setbox\@linechar\hbox{.}%
193   \badlinearg
194 \fi
195 \ifnum\@yarg >\z@ \let\upordown\raise \clnht\z@
196   \else\let\upordown\lower \clnht \ht\@linechar\fi
197 \clnwd \wd\@linechar
198 \if\negarg
199   \hskip -\wd\@linechar \def\reserved@a{\hskip -2\wd\@linechar}%
200 \else
201   \let\reserved@a\relax
202 \fi
203 \whiledim \clnwd <\linelen \do
204   {\upordown\clnht\copy\@linechar
205   \reserved@a
206   \advance\clnht \ht\@linechar
207   \advance\clnwd \wd\@linechar}%
208 \advance\clnht -\ht\@linechar
209 \advance\clnwd -\wd\@linechar
210 \tempdima\linelen\advance\tempdima -\clnwd
211 \tempdimb\tempdima\advance\tempdimb -\wd\@linechar
212 \if\negarg \hskip -\tempdimb \else \hskip \tempdimb \fi
213 \multiply\tempdima \m
214 \tempcpta\tempdima
215 \tempdima\wd\@linechar \divide\tempcpta \tempdima
216 \tempdima\ht\@linechar \multiply\tempdima \tempcpta
217 \divide\tempdima \m
218 \advance\clnht \tempdima
219 \ifdim \linelen <\wd\@linechar
220   \hskip \wd\@linechar

```

Warn if line gets so short that it can't be printed. But don't warn if it is exactly zero since that was probably deliberate (e.g., to get a vector head only).

```

221 \ifdim \linelen = \z@
222 \else
223   \picture@warn
224 \fi

```

```

225     \else\@upordown\@clnht\copy\@linechar\fi}

(End definition for \@sline.)
```

```

\@hline

226 \def\@hline{\ifnum \carg <\z@ \hskip -\linelen \fi
227 \vrule \height \halfwidth \depth \halfwidth \width \linelen
228 \ifnum \carg <\z@ \hskip -\linelen \fi}
```

(End definition for \@hline.)

```

\@getlinechar

229 \def\@getlinechar(#1,#2){\tempcnta#1\relax\multiply\tempcnta 8%
230   \advance\tempcnta -9\ifnum #2>\z@ \advance\tempcnta #2\relax\else
231   \advance\tempcnta -#2\relax\advance\tempcnta 64 \fi
232   \char\tempcnta}
```

(End definition for \@getlinechar.)

```

\vector

233 </2ekernel>
234 {*2ekernel | latexrelease>
235 <latexrelease>\IncludeInRelease{2020/10/01}%
236 <latexrelease>          {\vector}{default units}%
237 <latexrelease>\expandafter\let\csname vector \endcsname\undefined
238 \def\vector(#1,#2){\carg #1\relax \carg #2\relax
239   \tempcnta \ifnum\carg<\z@ -\carg\else\carg\fi
240   \ifnum\tempcnta<5\relax
241   \defaultunitsset\linelen{#3}\unitlength
242   \ifdim\linelen<\z@\badlinearg\else
243     \ifnum\carg =\z@ \vvector
244     \else \ifnum\carg =\z@ \hvector \else \svector\fi
245   \fi
246   \fi
247   \else\badlinearg\fi}
248 </2ekernel | latexrelease>

249 <latexrelease>\EndIncludeInRelease
250 <latexrelease>\IncludeInRelease{0000/00/00}%
251 <latexrelease>          {\vector}{default units}%
252 <latexrelease>\expandafter\let\csname vector \endcsname\undefined
253 <latexrelease>\def\vector(#1,#2){\carg #1\relax \carg #2\relax
254   \tempcnta \ifnum\carg<\z@ -\carg\else\carg\fi
255   \ifnum\tempcnta<5\relax
256   \linelen #3\unitlength
257   \ifdim\linelen<\z@\badlinearg\else
258     \ifnum\carg =\z@ \vvector
259     \else \ifnum\carg =\z@ \hvector \else \svector\fi
260   \fi
261   \fi
262   \else\badlinearg\fi}
263 <latexrelease>\EndIncludeInRelease
264 {*2ekernel>

(End definition for \vector.)
```

```

\@hvector
265 \def\@hvector{\@hline\hb@xt@\z@{\@linefnt
266 \ifnum \carg <\z@ \getlarrow(1,0)\hss\else
267 \hss\getrarrow(1,0)\fi}}
(End definition for \@hvector.)

\@vvector
268 \def\@vvector{\ifnum \carg <\z@ \downvector \else \upvector \fi}
(End definition for \@vvector.)

\@svector
269 \def\@svector{\@sline
270 \tempcnta\carg \ifnum\tempcnta <\z@ \tempcnta -\tempcnta\fi
271 \ifnum\tempcnta <5%
272 \hskip -\wd\@linechar
273 \upordown\clnht \hbox{\@linefnt \if@negarg
274 \getlarrow(\carg,\yyarg)\else \getrarrow(\carg,\yyarg)\fi}%
275 \else\badlinearg\fi}
(End definition for \@svector.)

\@getlarrow
276 \def\@getlarrow(#1,#2){\ifnum #2=\z@ \tempcnta 27 \% '33
277 \else
278 \tempcnta #1\relax\multiply\tempcnta \sixt@n
279 \advance\tempcnta -9 \tempcntb #2\relax\multiply\tempcntb \tw@%
280 \ifnum \tempcntb >\z@ \advance\tempcnta \tempcntb
281 \else\advance\tempcnta -\tempcntb\advance\tempcnta 64
282 \fi\fi\char\tempcnta}
(End definition for \@getlarrow.)

\@getrarrow
283 \def\@getrarrow(#1,#2){\tempcntb #2\relax
284 \ifnum\tempcntb <\z@ \tempcntb -\tempcntb\relax\fi
285 \ifcase \tempcntb\relax \tempcnta 45 \% '55
286 \or
287 \ifnum #1<\thr@ \tempcnta #1\relax\multiply\tempcnta
288 24\advance\tempcnta -6 \else \ifnum #1=\thr@ \tempcnta 49
289 \else\tempcnta 58 \fi\fi\or
290 \ifnum #1<\thr@ \tempcnta=#1\relax\multiply\tempcnta
291 24\advance\tempcnta -\thr@ \else \tempcnta 51 \fi\or
292 \tempcnta #1\relax\multiply\tempcnta
293 \sixt@n \advance\tempcnta -\tw@ \else
294 \tempcnta #1\relax\multiply\tempcnta
295 \sixt@n \advance\tempcnta 7 \fi\ifnum #2<\z@ \advance\tempcnta 64 \fi
296 \char\tempcnta}
(End definition for \@getrarrow.)

\@vline
297 \def\@vline{\ifnum \carg <\z@ \downline \else \upline\fi}

```

(End definition for \@vline.)

\@upline

```
298 \def\@upline{%
299   \hb@xt@z@{\hskip -\@halfwidth \vrule \@width \@wholewidth
300     \@height \@linelen \@depth \z@\hss}}
```

(End definition for \@upline.)

\@downline

```
301 \def\@downline{%
302   \hb@xt@z@{\hskip -\@halfwidth \vrule \@width \@wholewidth
303     \@height \z@ \@depth \@linelen \hss}}
```

(End definition for \@downline.)

\@upvector

```
304 \def\@upvector{\@upline\setbox\@tempboxa\hbox{\@linefnt\char 54}%
305   \raise \@linelen \hb@xt@z@{\lower \ht\@tempboxa\box\@tempboxa\hss}}
```

(End definition for \@upvector.)

\@downvector

```
306 \def\@downvector{\@downline\lower \@linelen
307   \hb@xt@z@{\@linefnt\char 63 \% '77
308     \hss}}
```

(End definition for \@downvector.)

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```
\dashbox{D}{X,Y} ==
BEGIN
leave vertical mode
\hb@xt@ 0pt {
  \baselineskip := 0pt
  \lineskip := 0pt
%% HORIZONTAL DASHES
  \dashdim := X * \unitlength
  \dashcnt := \dashdim + 200 % to prevent roundoff error
  \dashdim := D * \unitlength
  \dashcnt := \dashcnt / \dashdim
  if \dashcnt is odd
    then \dashdim := 0pt
    \dashcnt := (\dashcnt + 1) / 2
  else \dashdim := \dashdim / 2
    \dashcnt := \dashcnt / 2 - 1
  \box\@dashbox := \hbox{\vrule height \@halfwidth
    depth \@halfwidth width \@dashdim}
  \put(0,0){\copy\@dashbox}
  \put(0,Y){\copy\@dashbox}
  \put(X,0){\hskip -\dashdim\copy\@dashbox}
  \put(X,Y){\hskip -\dashdim\box\@dashbox}
  \dashdim := 3 * \dashdim
fi
```

```

\box\@dashbox := \hbox{\vrule height \@halfwidth
                      depth \@halfwidth width D * \unitlength
                      \hskip D * \unitlength}

\@tempcnta := 0
\put(0,0){\hskip \@dashdim
           while \@tempcnta < \@dascnt
             do \copy\@dashbox
                 \@tempcnta := \@tempcnta + 1
             od
         }
\@tempcnta := 0
\put(0,Y){\hskip \@dashdim
           while \@tempcnta < \@dascnt
             do \copy\@dashbox
                 \@tempcnta := \@tempcnta + 1
             od
         }

%% vertical dashes
\@dashdim := Y * \unitlength
\@dashcnt := \@dashdim + 200 % to prevent roundoff error
\@dashdim := D * \unitlength
\@dashcnt := \@dashcnt / \@dashdim
if \@dashcnt is odd
  then \@dashdim := 0pt
      \@dashcnt := (\@dashcnt + 1) / 2
  else \@dashdim := \@dashdim / 2
      \@dashcnt := \@dashcnt / 2 - 1
\box\@dashbox := \hbox{\hskip -\@halfwidth
                      \vrule width \@wholewidth
                      height \@dashdim }

\put(0,0){\copy\@dashbox}
\put(X,0){\copy\@dashbox}
\put(0,Y){\lower\@dashdim\copy\@dashbox}
\put(X,Y){\lower\@dashdim\copy\@dashbox}
\@dashdim := 3 * \@dashdim
fi
\box\@dashbox := \hbox{\vrule width \@wholewidth
                      height D * \unitlength } }

\@tempcnta := 0
\put(0,0){\hskip -\halfwidth
           \vbox{while \@tempcnta < \@dashcnt
                 do \vskip D*\unitlength
                     \copy\@dashbox
                     \@tempcnta := \@tempcnta + 1
                 od
                 \vskip \@dashdim
             } }

\@tempcnta := 0
\put(X,0){\hskip -\halfwidth

```

```

        \vbox{while \tempcnta < \dashcnt
            do \vskip D*\unitlength
                \copy\dashbox
                \tempcnta := \tempcnta + 1
            od
            \vskip \dashdim
        }
    }
}      % END DASHES

\@imakepicbox(X,Y)
END

```

End of historical L^AT_EX 2.09 comments.

```

\Dashbox
 309  {/2ekernel}
 310  {*2ekernel | latexrelease}
 311  {latexrelease}\IncludeInRelease{2020/10/01}%
 312  {latexrelease}          {\dashbox}{default units}%
 313  {latexrelease}\expandafter\let\csname dashbox \endcsname\@undefined
 314  \def\dashbox#1(#2,#3){\leavevmode\hb@xt@z@{\baselineskip \z@skip
 315  \lineskip \z@skip
 316  \defaultunitsset\dashdim{#2}\unitlength
 317  \dashcnt \dashdim \advance\dashcnt 200
 318  \defaultunitsset\dashdim{#1}\unitlength
 319  \divide\dashcnt \dashdim
 320  \ifodd\dashcnt \dashdim \z@
 321  \advance\dashcnt \one \divide\dashcnt \tw@
 322  \else \divide\dashdim \tw@ \divide\dashcnt \tw@
 323  \advance\dashcnt \m@ne
 324  \setbox\dashbox \hbox{\vrule \height \halfwidth \depth \halfwidth
 325  \width \dashdim}\put(0,0){\copy\dashbox}%
 326  \put(0,#3){\copy\dashbox}%
 327  \put(#2,0){\hskip-\dashdim\copy\dashbox}%
 328  \put(#2,#3){\hskip-\dashdim\box\dashbox}%
 329  \multiply\dashdim \thr@@
 330  \fi
 331  \setbox\dashbox \hbox{%
 332  \defaultunitsset\tempdimc{#1}\unitlength
 333  \vrule \height \halfwidth \depth \halfwidth \width \tempdimc
 334  \hskip\tempdimc}%
 335  \tempcnta\z@
 336  \put(0,0){\hskip\dashdim \whilenum \tempcnta <\dashcnt
 337  \do{\copy\dashbox\advance\tempcnta \one }{\tempcnta\z@
 338  \put(0,#3){\hskip\dashdim \whilenum \tempcnta <\dashcnt
 339  \do{\copy\dashbox\advance\tempcnta \one }{%
 340  \defaultunitsset\dashdim{#3}\unitlength
 341  \dashcnt \dashdim \advance\dashcnt 200
 342  \defaultunitsset\dashdim{#1}\unitlength
 343  \divide\dashcnt \dashdim
 344  \ifodd\dashcnt \dashdim \z@
 345  \advance\dashcnt \one \divide\dashcnt \tw@
 346  \else

```

```

347 \divide\@dashdim \tw@ \divide\@dashcnt \tw@
348 \advance\@dashcnt \m@ne
349 \setbox\@dashbox\hbox{\hskip -\@halfwidth
350 \vrule \@width \@wholewidth
351 \height \@dashdim}\put(0,0){\copy\@dashbox}%
352 \put(#2,0){\copy\@dashbox}%
353 \put(0,#3){\lower\@dashdim\copy\@dashbox}%
354 \put(#2,#3){\lower\@dashdim\copy\@dashbox}%
355 \multiply\@dashdim \thr@@
356 \fi
357 \defaultunitsset@\tempdimb{#1}\unitlength
358 \setbox\@dashbox\hbox{%
359   \vrule \@width \@wholewidth \height\@tempdimb}%
360 \tempcpta\z@
361 \put(0,0){\hskip -\@halfwidth \vbox{\@whilenum \tempcpta <\@dashcnt
362 \do{\vskip\@tempdimb\copy\@dashbox\advance\tempcpta \z@ }%
363 \vskip\@dashdim}}\tempcpta\z@
364 \put(#2,0){\hskip -\@halfwidth \vbox{\@whilenum \tempcpta<\@dashcnt
365 \do{\vskip\@tempdimb\copy\@dashbox\advance\tempcpta \z@ }%
366 \vskip\@dashdim}}\makepicbox(#2,#3)}
367 </2ekernel | latexrelease>

368 <latexrelease>\EndIncludeInRelease
369 <latexrelease>\IncludeInRelease{0000/00/00}%
370 <latexrelease>           {\dashbox}{default units}%
371 <latexrelease>\expandafter\let\csname dashbox \endcsname\undefined
372 <latexrelease>\def\dashbox#1{#2,#3}%
373 <latexrelease>\leavevmode\hb@xt@z@{\baselineskip \z@skip
374 <latexrelease>\lineskip \z@skip
375 <latexrelease>\@dashdim #2\unitlength
376 <latexrelease>\@dashcnt \@dashdim \advance\@dashcnt 200
377 <latexrelease>\@dashdim #1\unitlength\divide\@dashcnt \@dashdim
378 <latexrelease>\ifodd\@dashcnt\@dashdim \z@
379 <latexrelease>\advance\@dashcnt \z@ \divide\@dashcnt \tw@
380 <latexrelease>\else \divide\@dashdim \tw@ \divide\@dashcnt \tw@
381 <latexrelease>\advance\@dashcnt \m@ne
382 <latexrelease>\setbox\@dashbox\hbox{%
383 <latexrelease> \vrule \height \@halfwidth \depth \@halfwidth
384 <latexrelease> \width \@dashdim}\put(0,0){\copy\@dashbox}%
385 <latexrelease>\put(0,#3){\copy\@dashbox}%
386 <latexrelease>\put(#2,0){\hskip-\@dashdim\copy\@dashbox}%
387 <latexrelease>\put(#2,#3){\hskip-\@dashdim\box\@dashbox}%
388 <latexrelease>\multiply\@dashdim \thr@@
389 <latexrelease>\fi
390 <latexrelease>\setbox\@dashbox\hbox{%
391 <latexrelease> \vrule \height \@halfwidth \depth \@halfwidth
392 <latexrelease> \width #1\unitlength\hskip #1\unitlength\tempcpta\z@%
393 <latexrelease>\put(0,0){\hskip\@dashdim \@whilenum \tempcpta <\@dashcnt
394 <latexrelease>\do{\copy\@dashbox\advance\tempcpta \z@ }%\tempcpta\z@%
395 <latexrelease>\put(0,#3){\hskip\@dashdim \@whilenum \tempcpta <\@dashcnt
396 <latexrelease>\do{\copy\@dashbox\advance\tempcpta \z@ }%%
397 <latexrelease>\@dashdim #3\unitlength
398 <latexrelease>\@dashcnt \@dashdim \advance\@dashcnt 200
399 <latexrelease>\@dashdim #1\unitlength\divide\@dashcnt \@dashdim
400 <latexrelease>\ifodd\@dashcnt \@dashdim \z@
```

```

401 〈\latexrelease〉\advance\@dashcnt \@ne \divide\@dashcnt \tw@
402 〈\latexrelease〉\else
403 〈\latexrelease〉\divide\@dashdim \tw@ \divide\@dashcnt \tw@
404 〈\latexrelease〉\advance\@dashcnt \m@ne
405 〈\latexrelease〉\setbox\@dashbox\hbox{\hskip -\@halfwidth
406 〈\latexrelease〉\vrule \@width \@wholewidth
407 〈\latexrelease〉\@height \@dashdim\put(0,0){\copy\@dashbox}%
408 〈\latexrelease〉\put(#2,0){\copy\@dashbox}%
409 〈\latexrelease〉\put(0,#3){\lower\@dashdim\copy\@dashbox}%
410 〈\latexrelease〉\put(#2,#3){\lower\@dashdim\copy\@dashbox}%
411 〈\latexrelease〉\multiply\@dashdim \thr@@
412 〈\latexrelease〉\fi
413 〈\latexrelease〉\setbox\@dashbox\hbox{\vrule \@width \@wholewidth
414 〈\latexrelease〉\@height #1\unitlength}\@tempcnta\z@
415 〈\latexrelease〉\put(0,0){%
416 〈\latexrelease〉 \hskip -\@halfwidth \vbox{\@whilenum \@tempcnta <\@dashcnt
417 〈\latexrelease〉 \do{\vskip #1\unitlength\copy\@dashbox
418 〈\latexrelease〉 \advance\@tempcnta\@ne }%
419 〈\latexrelease〉 \vskip\@dashdim}\@tempcnta\z@
420 〈\latexrelease〉\put(#2,0){%
421 〈\latexrelease〉 \hskip -\@halfwidth \vbox{\@whilenum \@tempcnta<\@dashcnt
422 〈\latexrelease〉 \do{\vskip #1\unitlength\copy\@dashbox
423 〈\latexrelease〉 \advance\@tempcnta \@ne }%
424 〈\latexrelease〉 \vskip\@dashdim}}\@makepicbox(#2,#3)
425 〈\latexrelease〉\EndIncludeInRelease
426 〈*2ekernel〉

```

(End definition for \dashbox.)

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

CIRCLES AND OVALS

USER COMMANDS:

\circle{D} : Produces the circle with the diameter as close as possible to D * \unitlength. \put(X,Y){\circle{D}} puts the circle with its center at (X,Y).

\oval(X,Y) : Makes an oval as round as possible that fits in the rectangle of width X * \unitlength and height Y * \unitlength. The reference point is the center.

\oval(X,Y)[POS] : Save as \oval(X,Y) except it draws only the half or quadrant of the oval indicated by POS. E.G., \oval(X,Y)[t] draws just the top half and \oval(X,Y)[br] draws just the bottom right quadrant. In all cases, the reference point is the same as the unqualified \oval(X,Y) command.

\@ovvert {DELTA1} {DELTA2} : Makes a vbox containing either the left side or the right side of the oval being constructed. The baseline will coincide with the outside bottom edge of the oval; the left side of the box will coincide with the left edge of the vertical

rule. The width of the box will be `\@tempdima`.
 DELTA1 and DELTA2 are added to the character number in `\@tempcpta` to get the characters for the top and bottom quarter circle pieces.

`\@ovhorz` : Makes an hbox containing the straight rule for either the top or the bottom of the oval being constructed. The baseline will coincide with bottom edge of the rule; the left side of the box will coincide with the left side of the oval.
 The width of the box will be `\@ovxx`.

`\@getcirc {DIAM}` : Sets `\@tempcpta` to the character number of the top-right quarter circle with the largest diameter less than or equal to DIAM.
 Sets `\@tempboxa` to an hbox containing that character.
 Sets `\@tempdima` to `\wd \@tempboxa`, which is the distance from the circle's left outside edge to its right inside edge.
 (These characters are like those described in the TeXbook, pp. 389-90.)

```
\@getcirc {DIAM} ==
BEGIN
  \@tempcpta      := integer coercion of (DIAM + 2pt)
                     + 2pt added 1 Nov 88
  \@tempcpta      := \@tempcpta / integer coercion of 4pt
  if \@tempcpta > 10
    then \@tempcpta := 10 fi
  if \@tempcpta > 0
    then \@tempcpta := \@tempcpta-1
    else LaTeX Warning: Oval too small.
  fi
  \@tempcpta      := 4 * \@tempcpta
  \@tempboxa       := \hbox{\@circlefnt \char \@tempcpta}
  \@tempdima       := \wd \@tempboxa
END

\@put{X}{Y}{OBJ} ==
BEGIN
  \raise Y \hb@xt@ 0pt{\hskip X OBJ \hss}
END

\@oval(X,Y)[POS] ==
BEGIN
  \begingroup
  \boxmaxdepth := \maxdimen
  @ovt := @ovb := @ovl := @ovr := true
  for all E in POS
    do @ovE := false od
  \@ovxx      := X * \unitlength
  \@ovyy      := Y * \unitlength
```

```

\@tempdimb := min(\@ovxx,\@ovyy)
\@getcirc{\@tempdimb-2pt} %% "-2pt" added 7 Dec 89
\@ovro    := \ht \@tempboxa
\@ovri    := \dp \@tempboxa
\@ovdx    := \ovxx - \@tempdima
\@ovdx    := \@ovdx/2
\@ovdy    := \ovyy - \@tempdima
\@ovdy    := \ovyy/2
\@circlefnt
\@tempboxa :=
\hbox{
  if @ovr
    then \@ovvert{3}{2} \kern -\@tempdima
  fi
  if @ovl
    then \kern \ovxx \@ovvert{0}{1} \kern -\@tempdima
          \kern -\ovxx
  fi
  if @ovt
    then \ovhorz \kern -\ovxx
  fi
  if @ovb
    then \raise \ovyy \ovhorz
  fi
}
\@ovdx    := \@ovdx + \@ovro
\@ovdy    := \@ovdy + \@ovro
\ht\@tempboxa := \dp\@tempboxa := 0
\@put{-\@ovdx}{-\@ovdy}{\box\@tempboxa}
\endgroup
END

\@ovvert {DELTA1} {DELTA2} ==
BEGIN
  \vbox to \ovyy {
    if @ovb
      then \tempcntb := \tempcnta + DELTA1
            \kern -\ovro
            \hbox { \char \tempcntb }
            \nointerlineskip
      else \kern \ovri \kern \ovdy
    fi
    \leaders \vrule width \wholewidth \vfil
    \nointerlineskip
    if @ovt
      then \tempcntb := \tempcnta + DELTA2
            \hbox { \char \tempcntb }
      else \kern \ovdy \kern \ovro
    fi
  }

```

```

END

\@ovhorz ==
BEGIN
\hb@xt@ \@ovxx{
    \kern \@ovro
    if @ovr
        then
        else \kern \@ovdx
    fi
    \leaders \hrule height \@wholewidth \hfil
    if @ovl
        then
        else \kern \@ovdx
    fi
    \kern \@ovri
}
END

\circle{DIAM} ==
BEGIN
\begingroup
\boxmaxdepth := maxdimen
\@tempdimb := DIAM *\unitlength
if \@tempdimb > 15.5pt
    then \@getcirc{\@tempdimb}
        \@ovro := \ht \tempboxa
        \tempboxa := \hbox{
            \circleft
            \tempcpta := \tempcpta + 2
            \char \tempcpta
            \tempcpta := \tempcpta - 1
            \char \tempcpta
            \kern -2\tempdima
            \tempcpta := \tempcpta + 2
            \raise \tempdima \hbox { \char \tempcpta }
            \raise \tempdima \box\tempboxa
        }
        \ht\tempboxa := \dp\tempboxa := 0
        \put{-\ovro}{-\ovro}{\tempboxa}
    else
        \circ{\@tempdimb}{96}
    fi
\endgroup
END

\circle*{DIAM} == \dot{DIAM} == \circ{DIAM*\unitlength}{112}

\circ{DIAM}{CHAR} ==
BEGIN

```

```

\@tempcnta := integer coercion of (DIAM + .5pt)/1pt.
if \@tempcnta > 15 then \@tempcnta := 15 fi
if \@tempcnta > 1 then \@tempcnta := \@tempcnta - 1 fi
\@tempcnta := \@tempcnta + CHAR
\@circlefnt
\char \@tempcnta
END

```

End of historical L^AT_EX 2.09 comments.

```

\if@ovt If producing the Top Bottom Left or Right of an oval.
\if@ovb 427 \newif\if@ovt
\if@owl 428 \newif\if@ovb
\if@ovr 429 \newif\if@owl
430 \newif\if@ovr

```

(End definition for \if@ovt and others.)

```

\@ovxx
\@ovyy 431 \newdimen\@ovxx
\@ovdx 432 \newdimen\@ovyy
\@ovdy 433 \newdimen\@ovdx
\@ovro 434 \newdimen\@ovdy
\@ovri 435 \newdimen\@ovro
436 \newdimen\@ovri

```

(End definition for \@ovxx and others.)

\advance\@tempdima 2pt\relax added 1 Nov 88 to fix bug in which size of drawn circle not monotonic function of argument of \circle, caused by different rounding for dimensions of large and small circles.

```

\@getcirc
437 \def\@getcirc#1{\@tempdima #1\relax \advance\@tempdima 2\p@
438   \@tempcnta\@tempdima
439   \@tempdima 4\p@\divide\@tempcnta\@tempdima
440   \ifnum \@tempcnta >10\relax
441     \@picture@warn
442     \@tempcnta 10\relax
443   \fi
444   \ifnum \@tempcnta >\z@ \advance\@tempcnta\m@ne
```

Warn if requirements for oval or circle can't be met.

```

445   \else \@picture@warn \fi
446   \multiply\@tempcnta 4\relax
447   \setbox\@tempboxa \hbox{\@circlefnt
448     \char\@tempcnta}\@tempdima \wd\@tempboxa}
```

(End definition for \@getcirc.)

\@picture@warn Generic warning for lines, vectors (used in \@sline) and oval or circle (used in \@getcirc) are not available at right size.

```

449 \def\@picture@warn{\@latex@warning{%
450   \string\oval, \string\circle, or \string\line\space
451   size unavailable}}
```

(End definition for \@picture@warn.)

```
\@put  
452 \def\@put#1#2#3{\raise #2\hb@xt@z@{\hskip #1#3\hss}}
```

(End definition for \@put.)

```
\oval  
453 \def\oval(#1,#2){\@ifnextchar[{\@oval(#1,#2)}{\@oval(#1,#2)[ ]}}  
  
(End definition for \oval.)  
  
454 </2ekernel>  
455 <latexrelease>\IncludeInRelease{2016/03/31}%  
456 <latexrelease> {\@ovhlinetrue} %  
457 <latexrelease> {Avoid almost zero length leaders} %  
458 (*2ekernel | latexrelease)
```

\if@ovvline Tests whether horizontal or vertical lines are needed.

```
\if@ovhline  
459 \newif\if@ovvline \@ovvlinetrue  
460 \newif\if@ovhline \@ovhlinetrue  
461 % \begin{macrocode}  
462 </2ekernel | latexrelease>  
463 <latexrelease>\EndIncludeInRelease  
464 <latexrelease>\IncludeInRelease{0000/00/00}%  
465 <latexrelease> {\@ovhlinetrue} %  
466 <latexrelease> {Avoid almost zero length leaders} %  
467 <latexrelease>\let\if@ovvline\@undefined  
468 <latexrelease>\let\if@ovhline\@undefined  
469 <latexrelease>\EndIncludeInRelease  
470 (*2ekernel)
```

(End definition for \if@ovvline and \if@ovhline.)

```
\oval  
471 </2ekernel>  
472 (*2ekernel | latexrelease)  
473 <latexrelease>\IncludeInRelease{2020/10/01}%  
474 <latexrelease> {\@oval}{default units} %  
475 \def\@oval(#1,#2)[#3]{\begingroup\boxmaxdepth \maxdimen  
476 \@ovttrue \@ovbtrue \@ovltrue \@ovrtrue  
  
477 \@ovvlinefalse \@ovhlinefalse  
478 \tfor\reserved@a :=#3\do{ %  
479 \csname @ov\reserved@a false\endcsname} %  
480 \defaultunitsset\@ovxx{#1}\unitlength  
481 \defaultunitsset\@ovyy{#2}\unitlength  
  
482 \tempdimb \ifdim \@ovyy > \@ovxx \@ovxx \@ovvlinetrue  
483 \else \@ovyy \ifdim \@ovyy = \@ovxx \else \@ovhlinetrue \fi \fi  
484 \advance \tempdimb -2\p@  
485 \getcirc \tempdimb  
486 \ovro \ht \tempboxa \ovri \dp \tempboxa  
487 \ovdx \ovxx \advance \ovdx - \tempdima \divide \ovdx \tw@  
488 \ovdy \ovyy \advance \ovdy - \tempdima \divide \ovdy \tw@
```

```

489 \ifdim \@ovdx >\z@ \@ovhlinetrue \fi
490 \ifdim \@ovdy >\z@ \@ovvlinetrue \fi
491 \circlefnt \setbox\@tempboxa
492 \hbox{\if@vr \@ovvert32\kern -\@tempdima \fi
493 \if@vl \kern \@ovxx \@ovvert01\kern -\@tempdima \kern -\@ovxx \fi
494 \if@vt \@ovhorz \kern -\@ovxx \fi
495 \if@vb \raise \@ovyy \@ovhorz \fi}\advance\@ovdx\@ovro
496 \advance\@ovdy\@ovro \ht\@tempboxa\z@ \dp\@tempboxa\z@
497 \put{-\@ovdx}{-\@ovdy}{\box\@tempboxa}%
498 \endgroup
499 (//ekernel | latexrelease)

500 \EndIncludeInRelease
501 \IncludeInRelease{2016/03/31}%
502 \oval{[\@oval]{default units}}%
503 \def\oval(#1,#2)[#3]{\begin{group}\boxmaxdepth \maxdimen
504 \ovtrue \ovbtrue \ovltrue \ovrtrue
505 \ovlinefalse \ovhlinefalse
506 \tfor\reserved@a :=#3\do{%
507 \csname \ov\reserved@a false\endcsname}%
508 \ovxx #1\unitlength
509 \ovyy #2\unitlength
510 \tempdimb \ifdim \ovyy >\ovxx \ovxx \ovvlinetrue
511 \else \ovyy \ifdim \ovyy =\ovxx \else \ovhlinetrue
512 \fi\fi
513 \advance \tempdimb -2\p@
514 \getcirc \tempdimb
515 \ovro \ht\@tempboxa \ovri \dp\@tempboxa
516 \ovdx\ovxx \advance\ovdx -\tempdima \divide\ovdx \tw@
517 \ovdy\ovyy \advance\ovdy -\tempdima \divide\ovdy \tw@
518 \ifdim \ovdx >\z@ \ovhlinetrue \fi
519 \ifdim \ovdy >\z@ \ovvlinetrue \fi
520 \circlefnt \setbox\@tempboxa
521 \hbox{\if@vr \@ovvert32\kern -\@tempdima \fi
522 \if@vl
523 \kern \@ovxx \@ovvert01\kern -\@tempdima \kern -\@ovxx
524 \fi
525 \if@vt \@ovhorz \kern -\@ovxx \fi
526 \if@vb \raise \@ovyy \@ovhorz \fi}\advance\@ovdx\@ovro
527 \advance\@ovdy\@ovro \ht\@tempboxa\z@ \dp\@tempboxa\z@
528 \put{-\@ovdx}{-\@ovdy}{\box\@tempboxa}%
529 \endgroup
530 \EndIncludeInRelease

531 \IncludeInRelease{0000/00/00}%
532 \oval{[\@oval]{default units}}%
533 \def\oval(#1,#2)[#3]{\begin{group}\boxmaxdepth \maxdimen
534 \ovtrue \ovbtrue \ovltrue \ovrtrue
535 \tfor\reserved@a :=#3\do
536 \csname \ov\reserved@a false\endcsname}%
537 \ovxx #1\unitlength
538 \ovyy #2\unitlength
539 \tempdimb \ifdim \ovyy >\ovxx \ovxx\else \ovyy \fi
540 \advance \tempdimb -2\p@
541 \getcirc \tempdimb

```

```

542 <|latexrelease> \@ovro \ht\@tempboxa \@ovri \dp\@tempboxa
543 <|latexrelease> \@ovdx\@ovxx \advance\@ovdx -\@tempdima \divide\@ovdx \tw@
544 <|latexrelease> \@ovdy\@ovyy \advance\@ovdy -\@tempdima \divide\@ovdy \tw@
545 <|latexrelease> \@circlefnt \setbox\@tempboxa
546 <|latexrelease> \hbox{\if@ovr \@ovvert32\kern -\@tempdima \fi
547 <|latexrelease> \if@ovl
548 <|latexrelease> \kern \@ovxx \@ovvert01\kern -\@tempdima \kern -\@ovxx
549 <|latexrelease> \fi
550 <|latexrelease> \if@ovt \@ovhorz \kern -\@ovxx \fi
551 <|latexrelease> \if@ovb \raise \@ovyy \@ovhorz \fi}\advance\@ovdx\@ovro
552 <|latexrelease> \advance\@ovdy\@ovro \ht\@tempboxa\z@\dp\@tempboxa\z@
553 <|latexrelease> \@put{-\@ovdx}{-\@ovdy}{\box\@tempboxa}%
554 <|latexrelease> \endgroup
555 <|latexrelease>\EndIncludeInRelease
556 <|2ekernel>

```

(End definition for \@oval.)

\@ovvert

```

557 <|2ekernel>
558 <|latexrelease>\IncludeInRelease{2016/03/31}%
559 <|latexrelease> {\@ovvert}{Avoid almost zero length leaders}%
560 <|2ekernel | latexrelease>
561 \def\@ovvert#1#2{\vbox to\@ovyy{%
562   \if@ovb \@tempcntb \@tempcnta \advance \@tempcntb #1\relax
563   \kern -\@ovro \hbox{\char \@tempcntb}\nointerlineskip
564   \else \kern \@ovri \kern \@ovdy \fi
565   \if@ovvline \leaders\vrule \@width \@wholewidth \fi
566   \vfil \nointerlineskip
567   \if@ovt \@tempcntb \@tempcnta \advance \@tempcntb #2\relax
568   \hbox{\char \@tempcntb}%
569   \else \kern \@ovdy \kern \@ovro \fi}
570 <|2ekernel | latexrelease>
571 <|latexrelease>\EndIncludeInRelease
572 <|latexrelease>\IncludeInRelease{0000/00/00}%
573 <|latexrelease> {\@ovvert}{Avoid almost zero length leaders}%
574 <|latexrelease>\def\@ovvert#1#2{\vbox to\@ovyy{%
575   \if@ovb \@tempcntb \@tempcnta \advance \@tempcntb #1\relax
576   \kern -\@ovro \hbox{\char \@tempcntb}\nointerlineskip
577   \else \kern \@ovri \kern \@ovdy \fi
578   \leaders\vrule \@width \@wholewidth\vfil \nointerlineskip
579   \if@ovt \@tempcntb \@tempcnta \advance \@tempcntb #2\relax
580   \hbox{\char \@tempcntb}%
581   \else \kern \@ovdy \kern \@ovro \fi}
582 <|latexrelease>\EndIncludeInRelease
583 <|2ekernel>

```

(End definition for \@ovvert.)

\@ovhorz

```

584 <|2ekernel>
585 <|latexrelease>\IncludeInRelease{2016/03/31}%
586 <|latexrelease> {\@ovhorz}{Avoid almost zero length leaders}%

```

```

587  {*2ekernel | latexrelease}
588  \def\@ovhorz{\hb@xt@0\@ovxx{\kern \c@ovro
589    \if@ovr \else \kern \c@ovdx \fi
590    \if@ovhline \leaders \hrule \c@height \c@wholewidth \fi
591    \hfil
592    \if@ovl \else \kern \c@ovdx \fi
593    \kern \c@ovri}}
594  {/2ekernel | latexrelease}
595  \end{IncludeInRelease}
596  \IncludeInRelease{0000/00/00}%
597  \end{latexrelease} {\c@ovhorz}{Avoid almost zero length leaders}%
598  \def\@ovhorz{\hb@xt@0\@ovxx{\kern \c@ovro
599    \if@ovr \else \kern \c@ovdx \fi
600    \leaders \hrule \c@height \c@wholewidth \hfil
601    \if@ovl \else \kern \c@ovdx \fi
602    \kern \c@ovri}}
603  \end{IncludeInRelease}
604  {*2ekernel}

(End definition for \c@ovhorz.)
```

\circle

```

605  \def\circle{\c@inmatherr\circle\c@ifstar\c@dot\c@circle}
```

(End definition for \circle.)

\c@circle

```

606  {/2ekernel}
607  {*2ekernel | latexrelease}
608  \end{latexrelease} \IncludeInRelease{2020/10/01}%
609  \end{latexrelease} {\c@circle}{default units}%
610  \def\c@circle#1{%
611    \begingroup \boxmaxdepth \maxdimen
612    \c@defaultunitsset\c@tempdimb{#1}\unitlength
613    \ifdim \c@tempdimb >15.5\p@ \getcirc\c@tempdimb
614      \c@ovro\ht\c@tempboxa
615      \setbox\c@tempboxa\hbox{\c@circlefont
616        \advance\c@tempcnta\tw@ \char \c@tempcnta
617        \advance\c@tempcnta\m@ne \char \c@tempcnta \kern -2\c@tempdima
618        \advance\c@tempcnta\tw@
619        \raise \c@tempdima \hbox{\char\c@tempcnta}\raise \c@tempdima
620          \box\c@tempboxa\ht\c@tempboxa\z@ \dp\c@tempboxa\z@
621          \c@put{-\c@ovro}{-\c@ovro}{\box\c@tempboxa}%
622        \else \c@circ\c@tempdimb{96}\fi\endgroup
623  {/2ekernel | latexrelease}
624  \end{IncludeInRelease}
625  \IncludeInRelease{0000/00/00}%
626  \end{latexrelease} {\c@circle}{default units}%
627  \def\c@circle#1{%
628    \begingroup \boxmaxdepth \maxdimen \c@tempdimb #1\unitlength
629    \ifdim \c@tempdimb >15.5\p@ \getcirc\c@tempdimb
630      \c@ovro\ht\c@tempboxa
```

```

631 <|latexrelease> \setbox\@tempboxa\hbox{\@circlefnt
632 <|latexrelease> \advance\@tempcnta\tw@ \char \@tempcnta
633 <|latexrelease> \advance\@tempcnta\m@ne \char \@tempcnta
634 <|latexrelease> \kern -2\@tempdima
635 <|latexrelease> \advance\@tempcnta\tw@
636 <|latexrelease> \raise \@tempdima \hbox{\char\@tempcnta}%
637 <|latexrelease> \raise \@tempdima
638 <|latexrelease> \box\@tempboxa\ht\@tempboxa\z@ \dp\@tempboxa\z@
639 <|latexrelease> \put{-\@ovro}{-\@ovro}{\box\@tempboxa}%
640 <|latexrelease> \else \circ\@tempdimb{96}\fi\endgroup}
641 <|latexrelease>\EndIncludeInRelease
642 <|2ekernel>

```

(End definition for `\@circle`.)

`\@dot` Internal form of `\circle*`.

```

643 <|2ekernel>
644 <|2ekernel | latexrelease>
645 <|latexrelease>\IncludeInRelease{2020/10/01}%
646 <|latexrelease> {\@dot}{default units}%
647 \def\@dot#1{%
648   \@defaultunitsset\@tempdimb{#1}\unitlength
649   \circ\@tempdimb{112}}
650 <|2ekernel | latexrelease>
651 <|latexrelease>\EndIncludeInRelease
652 <|latexrelease>\IncludeInRelease{0000/00/00}%
653 <|latexrelease> {\@dot}{default units}%
654 <|latexrelease>\def\@dot#1{\@tempdimb #1\unitlength \circ\@tempdimb{112}}
655 <|latexrelease>\EndIncludeInRelease
656 <|2ekernel>

```

(End definition for `\@dot`.)

`\@circ`

```

657 \def\@circ#1#2{\@tempdima #1\relax \advance\@tempdima .5\p@
658   \atempcnta\@tempdima \atempdima \p@
659   \divide\atempcnta\@tempdima
660   \ifnum\atempcnta >15\relax \atempcnta 15\relax \fi
661   \ifnum \atempcnta >\z@ \advance\atempcnta\m@ne\fi
662   \advance\atempcnta #2\relax
663   \circlefnt \char\atempcnta}

```

(End definition for `\@circ`.)

`\@xarg` Counters used for manipulating the ‘slope’ arguments.

```

664 \newcount\@xarg
665 \newcount\@yarg
666 \newcount\@yyarg

```

(End definition for `\@xarg`, `\@yarg`, and `\@yyarg`.)

`\@multicnt` Counter used in `\multiput`, and also `\multicolumn`.

```

667 \newcount\@multicnt

```

(End definition for `\@multicnt`.)

```

\@xdim Length registers.
\@ydim 668 \newdimen\@xdim
669 \newdimen\@ydim

(End definition for \@xdim and \@ydim.)

\@linechar Box for holding a line segment character, for sloping lines.
670 \newbox\@linechar

(End definition for \@linechar.)

\@linelen Length of the line currently being built.
671 \newdimen\@linelen

(End definition for \@linelen.)

\@clnwd Height and width of current line segment.
\@clnht 672 \newdimen\@clnwd
673 \newdimen\@clnht

(End definition for \@clnwd and \@clnht.)

\@dashdim \dashbox internal registers.
\@dashbox 674 \newdimen\@dashdim
\@dashcnt 675 \newbox\@dashbox
676 \newcount\@dashcnt

(End definition for \@dashdim, \@dashbox, and \@dashcnt.)
Initialization: “\thinlines”
677 \let\@linefnt\tenln
678 \let\@circlefnt\tencirc
679 \wholewidth\fontdimen8\tenln
680 \halfwidth .5\wholewidth

```

1.1 Curves

The new `\qbezier` command, based on the old `\bezier` defined in `bezier.sty`.
Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```

\qbezier[N] == \bezier{N}

\bezier{N}(AX,AY)(BX,BY)(CX,CY) ==
BEGIN
  IF N = 0
    THEN \@xdim := |BX - AX|
          \@xb := |CX - BX|
          \@xa := Max(\@xa, \@xb)
          \@ya := |BY - AY|
          \@yb := |CY - BY|
          \@ya := Max(\@ya, \@yb)
          @sc := Max(\@xa, \@ya)
    %% The coefficient .5 below is the degree of overlap of
    %% successive points, where 1 is no overlap and 0 is

```

```

%% complete overlap. A coefficient of C multiplies
%% the number of points plotted by 1/C.
%%
\@xa := .5 * \halfwidth
@sc := @sc / \halfwidth
@sc := Max(@sc, qbeziermax)
ELSE @sc := N
@scp := @sc+1
\@xb := 2 * (BX - AX) * \unitlength
\@xa := ((CX-AX)*\unitlength - \@xb)/@sc
\@yb := 2 * (BY - AY) * \unitlength
\@ya := ((CY-AY)*\unitlength - \@yb)/@sc
\@pictdot := square rule of width \wholewidth
\count@ := 0
WHILE \count@ < @scp
    DO  \@xdim := ((\count@*\@xa + @xb) / @sc) * \count@
        \@ydim := ((\count@*\@ya + @yb) / @sc) * \count@
        plot pt with relative coords (\@xdim,\@ydim)
        \count@ := \count@+1
OD

```

End of historical L^AT_EX 2.09 comments.

\qbeziermax The maximum number of points to plot.

681 \def\qbeziermax{500}

(*End definition for \qbeziermax.*)

In the code below, to save registers \@a ... are not used. Instead other registers are reused.

```

\newcounter{@sc} -> \c@multicnt
\newcounter{@scp} -> \@tempcnta
\newdimen\@xa -> \@ovxx
\newdimen\@xb -> \@ovdx
\newdimen\@ya -> \@ovyy
\newdimen\@yb -> \@ovdy
\newsavebox{\@pictdot} -> \@tempboxa

```

\qbezier Main user-level command to plot quadratic bezier curves. #2 should be (.

682 \newcommand\qbezier[2][0]{\bezier{#1}{#2}}

(*End definition for \qbezier.*)

\bezier Form of \bezier compatible with 2.09 *bezier.sty*, but modified to ignore spaces between its arguments. #2 should be white space, and #4 should be (.

683 \def\bezier#1#2(#3)#4({\@bezier#1)(#3)()}

```

\@bezier 684 </2ekernel>
685 <*2ekernel | latexrelease>
686 <latexrelease>\IncludeInRelease{2020/10/01}%
687 <latexrelease>           {\@bezier}{default units}%
688 \def\@bezier#1(#2,#3)(#4,#5)(#6,#7){%
689   \ifnum #1=\z@
690     \@defaultunitsset{@ovxx{#4}\unitlength
691       \@defaultunitsset{\advance{@ovxx}{-#2}\unitlength
692         \ifdim \@ovxx<\z@ \c@ovxx -\@ovxx \fi
693       \@defaultunitsset{@ovdx{#6}\unitlength
694         \@defaultunitsset{\advance{@ovdx}{-#4}\unitlength
695           \ifdim \@ovdx<\z@ \c@ovdx -\@ovdx \fi
696           \ifdim \@ovxx<\@ovdx \c@ovxx \c@ovdx \fi
697         \@defaultunitsset{@ovy{#5}\unitlength
698           \@defaultunitsset{\advance{@ovy}{-#3}\unitlength
699             \ifdim \@ovy<\z@ \c@ovy -\@ovy \fi
700           \@defaultunitsset{@ovdy{#7}\unitlength
701             \@defaultunitsset{\advance{@ovdy}{-#5}\unitlength
702               \ifdim \@ovdy<\z@ \c@ovdy -\@ovdy \fi
703               \ifdim \@ovy<\@ovdy \c@ovy \c@ovdy \fi
704             \@multicnt
705               \ifdim \@ovxx>\c@ovy \c@ovxx \else \c@ovy \fi
706             \c@ovxx .5\@halfwidth \divide\@multicnt\c@ovxx
707             \ifnum \qbeziermax<\@multicnt
708               \c@multicnt\qbeziermax\relax
709             \fi
710           \else \c@multicnt#1\relax \fi
711           \tempcnta\@multicnt \advance\tempcnta\one
712           \@defaultunitsset{@ovdx{#4}\unitlength
713             \@defaultunitsset{\advance{@ovdx}{-#2}\unitlength
714               \multiply\c@ovdx \tw@
715             \@defaultunitsset{@ovxx{#6}\unitlength
716               \@defaultunitsset{\advance{@ovxx}{-#2}\unitlength
717                 \advance{@ovxx -\c@ovdx \divide\c@ovxx\@multicnt
718               \@defaultunitsset{@ovdy{#5}\unitlength
719               \@defaultunitsset{\advance{@ovdy}{-#3}\unitlength
720                 \multiply\c@ovdy \tw@
721               \@defaultunitsset{@ovy{#7}\unitlength
722               \@defaultunitsset{\advance{@ovy}{-#3}\unitlength
723                 \advance{@ovy -\c@ovdy \divide\c@ovy\@multicnt

724   \setbox\tempboxa\hbox{%
725     \hspace{-\@halfwidth}
726     \vrule \height\@halfwidth
727       \depth \@halfwidth
728       \width \wholewidth}%
729   \put(#2,#3){%
730     \count@\z@
731     \whilenum{\count@<\tempcnta}\do
732       {\@xdim\count@\c@ovxx
733         \advance\@xdim\c@ovdx
734         \divide\@xdim\@multicnt
735         \multiply\@xdim\count@

```

```

736      \@ydim\count@\@ovyy
737          \advance\@ydim\@ovdy
738          \divide\@ydim\@multicnt
739          \multiply\@ydim\count@
740          \raise \@ydim
741              \hb@xt@\z@{\kern\@xdim
742                  \unhcopy\@tempboxa\hss}%
743          \advance\count@\@ne}}}
744 /{2ekernel | latexrelease}

745 \end{IncludeInRelease}
746 \IncludeInRelease{0000/00/00} %
747 \bezier{default units}%
748 \def\bezier#1(#2,#3)(#4,#5)(#6,#7){%
749 \ifnum #1=\z@
750 \@ovxx #4\unitlength
751 \advance\@ovxx -#2\unitlength
752 \ifdim \@ovxx<\z@ \@ovxx -\@ovxx \fi
753 \@ovdx #6\unitlength
754 \advance\@ovdx -#4\unitlength
755 \ifdim \@ovdx<\z@ \@ovdx -\@ovdx \fi
756 \ifdim \@ovxx<\@ovdx \@ovxx \@ovdx \fi
757 \@ovyy #5\unitlength
758 \advance\@ovyy -#3\unitlength
759 \ifdim \@ovyy<\z@ \@ovyy -\@ovyy \fi
760 \@ovdy #7\unitlength
761 \advance\@ovdy -#5\unitlength
762 \ifdim \@ovdy<\z@ \@ovdy -\@ovdy \fi
763 \ifdim \@ovyy<\@ovdy \@ovyy \@ovdy \fi
764 \@multicnt
765 \ifdim \@ovxx>\@ovyy \@ovxx \else \@ovyy \fi
766 \@ovxx .5\@halfwidth \divide\@multicnt\@ovxx
767 \ifnum
768 \qbezier{max}{\@multicnt \@multicnt\qbezier{max}\relax}
769 \fi
770 \else \@multicnt#1\relax \fi
771 \@tempcnta\@multicnt \advance\@tempcnta\@ne
772 \@ovdx #4\unitlength \advance\@ovdx -#2\unitlength
773 \multiply\@ovdx \tw@
774 \@ovxx #6\unitlength \advance\@ovxx -#2\unitlength
775 \advance\@ovxx -\@ovdx \divide\@ovxx\@multicnt
776 \@ovdy #5\unitlength \advance\@ovdy -#3\unitlength
777 \multiply\@ovdy \tw@
778 \@ovyy #7\unitlength \advance\@ovyy -#3\unitlength
779 \advance\@ovyy -\@ovdy \divide\@ovyy\@multicnt
780 \setbox\@tempboxa\hbox{%
781 \hskip -\@halfwidth
782 \vrule \height\@halfwidth
783 \depth \@halfwidth
784 \width \@wholewidth} %
785 \put(#2,#3){%
786 \count@\z@
787 \whilenum{\count@<\@tempcnta}\do
788 {\@xdim\count@\@ovxx
789 \advance\@xdim\@ovdx

```

```

790  \divide\@xdim\@multicnt
791  \multiply\@xdim\count@
792  \ydim\count@\@ovyy
793  \advance\@ydim\@ovdy
794  \divide\@ydim\@multicnt
795  \multiply\@ydim\count@
796  \raise\@ydim
797  \hb@xt@{z}{\kern\@xdim}
798  \unhcopy\tempboxa\hss}%
799  \advance\count@\@ne}}}
800  \EndIncludeInRelease
801  {*2ekernel}

```

(End definition for `\bezier` and `\qbezier`.)

As the commands above all use “picture” interface we couldn’t define them with `\DeclareRobustCommand` so we do that now.

```

802  {/2ekernel}
803  {*2ekernel | latexrelease}
804  \IncludeInRelease{2019/10/01}%
805  \bezermake{Make commands robust}%
806  \MakeRobust\bezermake
807  \MakeRobust\circle
808  \MakeRobust\dashbox
809  \MakeRobust\line
810  \MakeRobust\linethickness
811  \MakeRobust\multiput
812  \MakeRobust\oval
813  \MakeRobust\put
814  \MakeRobust\qbezier
815  \MakeRobust\shortstack
816  \MakeRobust\thinlines
817  \MakeRobust\vector
818  {/2ekernel | latexrelease}
819  \IncludeInRelease{0000/00/00}%
820  \bezermake{Make commands robust}%
821  \bezermake
822  \EndIncludeInRelease
823  \kernel@make@fragile\bezermake
824  \kernel@make@fragile\circle
825  \kernel@make@fragile\dashbox
826  \kernel@make@fragile\line
827  \kernel@make@fragile\linethickness
828  \kernel@make@fragile\multiput
829  \kernel@make@fragile\oval
830  \kernel@make@fragile\put
831  \kernel@make@fragile\qbezier
832  \kernel@make@fragile\shortstack
833  \kernel@make@fragile\thinlines
834  \kernel@make@fragile\vector
835  \EndIncludeInRelease
836  {*2ekernel}
837  {/2ekernel}

```

File J

ltthm.dtx

1 Theorem Environments

The user creates his own theorem-like environments with the command

`\newtheorem{<name>}{<text>}[<counter>]` or
`\newtheorem{<name>}[<oldname>]{<text>}`

This defines the environment `<name>` to be just as one would expect a theorem environment to be, except that it prints `<text>` instead of “Theorem”.

If `<oldname>` is given, then environments `<name>` and `<oldname>` use the same counter, so using a `<name>` environment advances the number of the next `<name>` environment, and vice-versa.

If `<counter>` is given, then environment `<name>` is numbered within `<counter>`.

E.g., if `<counter>` = `subsection`, then the first `<name>` in subsection 7.2 is numbered `<text> 7.2.1`.

The way `<name>` environments are numbered can be changed by redefining `\the<name>`. *Historical L^AT_EX 2.09 comments (not necessarily accurate any more):*

DOCUMENT STYLE PARAMETERS

`\@thmcnter{COUNTER}` : A command such that

`\edef\theCOUNTER{\@thmcnter{COUNTER}}`

defines `\theCOUNTER` to produce a number for a theorem environment.

The default is:

`BEGIN \noexpand\arabic{COUNTER} END`

`\@thmcntersep` : A separator placed between a theorem number and the number of the counter within which it is numbered.

E.g., to make the third theorem of section 7.2 be numbered 7.2-3, `\@thmcntersep` should be `\def`’ed to ‘-’. Its default is ‘’.

`\@begintheorem{NAME}{NUMBER}` : A command that begins a theorem environment for a ‘theorem’ named ‘NAME NUMBER’ – e.g., `\@begintheorem{Lemma}{3.7}` starts Lemma 3.7.

`\@opargbegintheorem{NAME}{NUMBER}{OPARG}` :

A command that begins a theorem environment for a ‘theorem’ named ‘NAME NUMBER’ with optional argument OPARG – e.g., `\@begintheorem{Lemma}{3.7}{Jones}` starts ‘Lemma 3.7 (Jones):’.

`\@endtheorem` : A command that ends a theorem environment.

`\newtheorem{NAME}{TEXT}[COUNTER] ==`

`BEGIN`
if `\NAME` is definable

```

then \@definecounter{NAME}
    if COUNTER present
        then \@newctr{NAME}[COUNTER] fi
            \theNAME == BEGIN \theCOUNTER \@thmcOUNTERsep
                eval\@thmcOUNTER{NAME} END
            else \theNAME == BEGIN eval\@thmcOUNTER{NAME} END
                \NAME == \@thm{NAME}{TEXT}
                \endNAME == \@endtheorem
            else error
        fi
    END

\newtheorem{NAME}[OLDNAME]{TEXT} ==
BEGIN
    if counter OLDNAME nonexistent
        then ERROR
    else
        if \NAME is definable
            then BEGIN
                \theNAME == \theOLDNAME
                \NAME == \@thm{OLDNAME}{TEXT}
                \endNAME == \@endtheorem
            END
        else error
    fi
END

\@thm{NAME}{TEXT} ==
BEGIN
    \refstepcounter{NAME}
    if next char =
        then \@ythm{NAME}{TEXT}
        else \@xthm{NAME}{TEXT}
    fi
END

\@xthm{NAME}{TEXT} ==
BEGIN
    \@begintheorem{TEXT}{\theNAME}
    \ignorespaces
END

\@ythm{NAME}{TEXT}[OPARG] ==
BEGIN
    \@opargbegintheorem{TEXT}{\theNAME}{OPARG}
    \ignorespaces
END

```

End of historical L^AT_EX 2.09 comments.

\newtheorem \newtheorem ought really be allowed only in the preamble. Which would be good document style, and allow some main memory to be saved by declaring these commands to be @onlypreamble. Unfortunately the L^AT_EX book indicates that \newtheorem may be used anywhere in the document...

```

1  {*2ekernel}
2  \def\newtheorem#1{%
3    \@ifnextchar[\{@othm{#1}\}{\@nthm{#1}}}

```

(End definition for \newtheorem.)

\@nthm

```

4  \def\@nthm#1#2{%
5    \@ifnextchar[\{@xnthm{#1}{#2}\}{\@ynthm{#1}{#2}}}

```

(End definition for \@nthm.)

\@xnthm 92/09/18 RmS: Changed \@addtoreset to \@newctr to produce error message if counter #3 does not exist (to be consistent with behaviour of \newcounter)

```

6  \def\@xnthm#1#2[#3]{%
7    \expandafter\@ifdefinable\csname #1\endcsname
8      {\@definecounter{#1}\@newctr{#1}[#3]\%
9        \expandafter\xdef\csname the#1\endcsname{\%
10          \expandafter\noexpand\csname the#3\endcsname \@thmcOUNTERsep
11            \@thmcOUNTER{#1}\}%
12        \global\@namedef{#1}{\@thm{#1}{#2}}\%
13        \global\@namedef{end#1}{\@endtheorem}}}

```

(End definition for \@xnthm.)

\@ynthm

```

14 \def\@ynthm#1#2{%
15   \expandafter\@ifdefinable\csname #1\endcsname
16     {\@definecounter{#1}\%
17       \expandafter\xdef\csname the#1\endcsname{\@thmcOUNTER{#1}}\%
18       \global\@namedef{#1}{\@thm{#1}{#2}}\%
19       \global\@namedef{end#1}{\@endtheorem}}}

```

(End definition for \@ynthm.)

\@othm

```

20 \def\@othm#1[#2]{#3}{%
21   \@ifundefined{c@#2}{\@nocounterr{#2}}\%
22     {\expandafter\@ifdefinable\csname #1\endcsname
23       {\global\@namedef{the#1}{\@nameuse{the#2}}\%
24         \global\@namedef{#1}{\@thm{#2}{#3}}\%
25         \global\@namedef{end#1}{\@endtheorem}}}

```

(End definition for \@othm.)

\@thm

```

26 \def\@thm#1#2{%
27   \refstepcounter{#1}\%
28   \@ifnextchar[\{@ythm{#1}{#2}\}{\@xthm{#1}{#2}}}

```

(End definition for \@thm.)

```

\@xthm
\@ythm 29 \def\@xthm#1#2{%
30   \begin{theorem}{\csname the#1\endcsname}\ignorespaces}
31 \def\@ythm#1#2[#3]{%
32   \opargbegintheorem{#2}{\csname the#1\endcsname}{#3}\ignorespaces}

(End definition for \@xthm and \@ythm.)

Default values

\@thmcnter
\@thmcntersep 33 \def\@thmcnter#1{\noexpand\arabic{#1}}
34 \def\@thmcntersep{.}

(End definition for \@thmcnter and \@thmcntersep.)

\begin{theorem} Providing theorem defaults.
\opargbegintheorem
\endtheorem 35 \def\begintheorem#1#2{\trivlist
36   \item[\hspace*{1em}\bfseries #1\,\#2]\itshape}
37 \def\opargbegintheorem#1#2#3{\trivlist
38   \item[\hspace*{1em}\bfseries #1\,\#2\,\#3]\itshape}
39 \def\endtheorem{\endtrivlist}
40 \end{ekernel}

(End definition for \begintheorem, \opargbegintheorem, and \endtheorem.)

```

File K

ltsect.dtx

1 Sectioning Commands

This file defines the declarations such as `\author` which are used by `\maketitle`. `\maketitle` itself is defined by each class, not in the L^AT_EX kernel.

The second part of the file defines the generic commands used for defining sectioning commands such as `\chapter`. Again the actual document level commands are defined in the class files, in terms of these commands.

```
1 {*2ekernel}
2 \message{title,}
```

1.1 The Title

`\title` The user defines the title and author by the declarations `\title{<name>}`, `\author{<name>}`.
`\author` Similarly the date is declared with `\date{<date>}`.
`\date` Inside these, the `\thanks{<footnote text>}` command may be used to make acknowledgements, notice of address, etc. in a footnote. If there are multiple authors, they have to be separated with the `\and` command.
`\maketitle` And finally, the `\maketitle` command produces the actual title, using the information previously saved with the other commands.

```
3 </2ekernel>
4 {*2ekernel | latexrelease}
5 <latexrelease>\IncludeInRelease{2019/10/01}%
6 <latexrelease>           {\title}{Make commands robust}%

\title \title for use in \maketitle. If not given \maketitle will produce an error message.
7 \DeclareRobustCommand\title[1]{\gdef\@title{\#1}}
(End definition for \title.)
```

`\author` `\author` for use in `\maketitle`. If not given `\maketitle` will produce a warning message.

```
8 \DeclareRobustCommand*\author[1]{\gdef\@author{\#1}}
(End definition for \author.)
```

`\date` `\date` for use in `\maketitle`. If not given `\maketitle` will produce `\today` as the default.

```
9 \DeclareRobustCommand*\date[1]{\gdef\@date{\#1}}
(End definition for \date.)
```

`\thanks`

```
10 \DeclareRobustCommand\thanks[1]{\footnotemark
11   \protected@xdef\@thanks{\@thanks
12     \protect\footnotetext[\the\c@footnote]{\#1}}%
13 }
```

(End definition for `\thanks`.)

```

\and
14 \DeclareRobustCommand\and{%
15   \end{tabular}%
16   \hskip 1em \oplus .17fil%
17   \begin{tabular}[t]{c}}%      \end{tabular}

(End definition for \and.)

18 </2ekernel | latexrelease>
19 <latexrelease>\EndIncludeInRelease
20 <latexrelease>\IncludeInRelease{0000/00/00}%
21 <latexrelease>          {\title}{Make commands robust}%
22 <latexrelease>
23 <latexrelease>\kernel@make@fragile\title
24 <latexrelease>\kernel@make@fragile\author
25 <latexrelease>\kernel@make@fragile\date
26 <latexrelease>\kernel@make@fragile\thanks
27 <latexrelease>\kernel@make@fragile\and
28 <latexrelease>
29 <latexrelease>\EndIncludeInRelease
30 {*2ekernel}

\@title
31 \def\@title{\@latex@error{No \noexpand\title given}\@ehc}

(End definition for \@title.)

\@author
32 \def\@author{\@latex@warning@no@line{No \noexpand\author given}{}}

(End definition for \@author.)

\@date
33 \gdef\@date{\today}

(End definition for \@date.)

\@thanks
34 \let\@thanks\empty

(End definition for \@thanks.)

35 \message{sectioning,}


```

1.2 Sectioning

```

\@secpenalty
36 \newcount\@secpenalty
37 \@secpenalty = -300

(End definition for \@secpenalty.)

\if@noskipsec Way back in 1991 (08/26) FMi & RmS set the \@noskipsec switch to true for the
\@noskipsectrue preamble and to false in \document. This was done to trap lists and related text in the
preamble but it does not catch everything.
38 \newif\if@noskipsec \@noskipsectrue

```

(End definition for `\if@noskipsec` and `\@noskipsectrue`.)

`\@startsection` The `\@startsection{\name}{\level}{\indent}{\beforeskip}{\afterskip}{\style}` command is the mother of all the user level sectioning commands. The part after the `*`, including the `*` is optional.

name: e.g., 'subsection'

level: a number, denoting depth of section – e.g., chapter = 0, section = 1, etc.

indent: Indentation of heading from left margin

beforekip: Absolute value = skip to leave above the heading. If negative, then paragraph indent of text following heading is suppressed.

afterskip: if positive, then skip to leave below heading, else negative of skip to leave to right of run-in heading.

style: Commands to set style. Since June 1996 release the `last` command in this argument may be a command such as `\MakeUppercase` or `\fbox` that takes an argument. The section heading will be supplied as the argument to this command. So setting #6 to, say, `\bfseries\MakeUppercase` would produce bold, uppercase headings.

If '`*`' is missing, then increment the counter. If it is present, then there should be no `[altheading]` argument. The command uses the counter 'secnumdepth'. It contains a pointer to the highest section level that is to be numbered.

Warning: The `\@startsection` command should be at the same or higher grouping level as the text that follows it. For example, you should *not* do something like

```
\def\foo{ \begingroup ...
          \paragraph{...}
          \endgroup}
```

Pseudocode for the `\@startsection` command *Historical L^AT_EX 2.09 comments*
(not necessarily accurate any more):

```
\@startsection
{NAME}{LEVEL}{INDENT}{BEFORESKIP}{AFTERSKIP}{STYLE} ==
BEGIN
  IF @noskipsec = T THEN \leavevmode FI
    % true if previous section had no body.

  \par
  @tempskipa := BEFORESKIP
  @afterindent := T
  IF @tempskipa < 0 THEN @tempskipa := -@tempskipa
    @afterindent := F
  FI
  IF @nobreak = true
    THEN \everypar == null
    ELSE \addpenalty{@secpenalty}
      \addvspace{@tempskipa}
  FI
  IF * next
```

```

        THEN \@ssect{INDENT}{BEForeskip}{AFTerskip}{Style}
        ELSE \@dblarg{\@sect
                      {NAME}{LEVEL}{INDENT}
                      {BEForeskip}{AFTerskip}{Style}}
    FI
END
End of historical LATEX 2.09 comments.

39 \def\@startsection#1#2#3#4#5#6{%
40   \if@noskipsec \leavevmode \fi
41   \par
42   \tempskipa #4\relax
43   \if@afterindenttrue
44     \ifdim \tempskipa <\z@
45       \tempskipa -\tempskipa \if@afterindentfalse
46     \fi
47   \if@nobreak
48     \everypar{}%
49   \else
50     \addpenalty\secpenalty\addvspace\tempskipa
51   \fi
52   \ifstar
53     {\@ssect{#3}{#4}{#5}{#6}}%
54     {\@dblarg{\@sect{#1}{#2}{#3}{#4}{#5}{#6}}}}

```

(End definition for \@startsection.)

\@sect Pseudocode for the \@sect command *Historical L^AT_EX 2.09 comments (not necessarily accurate any more):*

```

\@sect{NAME}{LEVEL}
  {INDENT}{BEForeskip}{AFTerskip}
  {Style}[ARG1][ARG2]
  ==
BEGIN
  IF LEVEL > \c@secnumdepth
    THEN \svsec :=L null
    ELSE \refstepcounter{NAME}
          \svsec :=L BEGIN \secntformat{#1}\relax END
  FI
  IF AFTERSKIP > 0
    THEN \begingroup
          Style
          \hangfrom{\hskip INDENT\svsec}
          {\interlinepenalty 10000 ARG2\par}
        \endgroup
        \NAMEmark{ARG1}
        \addcontentsline{toc}{NAME}
        { IF LEVEL > \c@secnumdepth
            ELSE \protect\numberline{\theNAME} FI
            ARG1 }
    ELSE \svsechd == BEGIN Style
          \hskip INDENT\svsec

```

```

ARG2
\NAMEmark{ARG1}
\addcontentsline{toc}{NAME}
{ IF LEVEL > \c@secnumdepth
ELSE
    \protect\numberline{\theNAME}
FI
ARG1 }

END
FI
\@xsect{AFTERSKIP}
END

```

End of historical L^AT_EX 2.09 comments.

```

55 \def\@sect#1#2#3#4#5#6[#7]#8{%
56   \ifnum #2>\c@secnumdepth
57     \let\@svsec\@empty
58   \else
59     \refstepcounter{#1}%

```

Since \seccntformat might end with an improper \hskip which is scanning forward for plus or minus we end the definition of \@svsec with \relax as a precaution.

```

60   \protected@edef\@svsec{\@seccntformat{#1}\relax}%
61   \fi
62   \tempskipa #5\relax
63   \ifdim \tempskipa>\z@
64     \begingroup

```

This { used to be after the argument to \changefrom but was moved here to allow commands such as \MakeUppercase to be used at the end of #6.

```

65 #6{%
66   \changefrom{\hskip #3\relax\@svsec}%
67   \interlinepenalty \OM #8\@@par}%
68 \endgroup
69 \csname #1mark\endcsname{#7}%
70 \addcontentsline{toc}{#1}{%
71   \ifnum #2>\c@secnumdepth \else
72     \protect\numberline{\csname the#1\endcsname}%
73   \fi
74   #7}%
75 \else
\relax added 2 May 90
76 \def\@svsechd{%
77   #6{\hskip #3\relax
78   \@svsec #8}%
79   \csname #1mark\endcsname{#7}%
80   \addcontentsline{toc}{#1}{%
81     \ifnum #2>\c@secnumdepth \else
82       \protect\numberline{\csname the#1\endcsname}%
83     \fi
84     #7}%
85 \fi
86 \@xsect{#5}}

```

(End definition for \@sect.)

\@xsect Pseudocode for the \@xsect command *Historical L^AT_EX 2.09 comments (not necessarily accurate any more):*

```
\@xsect{AFTERSKIP} ==
BEGIN
  IF AFTERSKIP > 0
    THEN \par \nobreak
      \vskip AFTERSKIP
      \afterheading
  ELSE @nobreak :=G F
    @noskipsec :=G T
    \everypar{ IF @noskipsec = T
      THEN @noskipsec :=G F
        \clubpenalty := 10000 % local
        \hskip -\parindent
        \begingroup
          \svsechd
        \endgroup
        \unskip
        \hskip -AFTERSKIP \relax
        %% relax added 14 Jan 91
    ELSE \clubpenalty := \@clubpenalty % local
      \everypar := NULL
    FI
  }
  FI
END
```

End of historical L^AT_EX 2.09 comments.

```
87 \def\@xsect#1{%
88   \tempskipa #1\relax
89   \ifdim \tempskipa>\z@
```

Why not combine \@sect and \@xsect and save doing the same test twice? It is not possible to change this now as these have become hooks!

This \par seems unnecessary.

```
90   \par \nobreak
91   \vskip \tempskipa
92   \afterheading
93   \else
94     \nobreakfalse
95     \global\noskipsectrue
96     \everypar{%
97       \ifnoskipsec
98         \global\noskipsecfalse
99         {\setbox\lastbox}%
100         \clubpenalty\@M
101         \begingroup \svsechd \endgroup
102         \unskip
103         \tempskipa #1\relax
```

```

104      \hskip -\tempskipa
105      \else
106          \clubpenalty \clubpenalty
107          \everypar{}%
108          \fi}%
109      \fi
110      \ignorespaces}

```

(End definition for \@xsect.)

\@seccntformat This command formats the section number including the space following it.

```

111 \def\@seccntformat#1{\csname the#1\endcsname\quad}

```

(End definition for \@seccntformat.)

Pseudocode for the \@sect command *Historical L^AT_EX 2.09 comments (not necessarily accurate any more)*:

```

\@sect{INDENT}{BEFRESKIP}{AFTERSKIP}{STYLE}{ARG} ==
BEGIN
IF AFTERSKIP > 0
    THEN \begingroup
        STYLE
        \hangfrom{\hskip INDENT}
        {\interlinepenalty 10000 ARG\par}
    \endgroup
ELSE \svsechd == BEGIN STYLE
        \hskip INDENT
        ARG
    END
FI
\@xsect{AFTERSKIP}
END

```

End of historical L^AT_EX 2.09 comments.

Pseudocode for the \@afterheading command *Historical L^AT_EX 2.09 comments (not necessarily accurate any more)*:

```

\@afterheading ==
BEGIN
@nobreak :=G true
\everypar := BEGIN IF @nobreak = T
    THEN @nobreak :=G false
        \clubpenalty := 10000 % local
        IF @afterindent = F
            THEN remove \lastbox
        FI
    ELSE \clubpenalty := \clubpenalty % local
        \everypar := NULL
    FI
END

```

End of historical L^AT_EX 2.09 comments.

```

\@ssect
112 \def\@ssect#1#2#3#4#5{%
113   \@tempskipa #3\relax
114   \ifdim \@tempskipa>\z@
115     \begingroup

```

This { used to be after the argument to `\@hangfrom` but was moved here to allow commands such as `\MakeUppercase` to be used at the end of #4.

```

116   #4{%
117     \@hangfrom{\hskip #1}%
118     \interlinepenalty \OM #5\@par}%
119   \endgroup
120 \else
121   \def\@svsechd{#4{\hskip #1\relax #5}}%
122 \fi
123 \@xsect{#3}

```

(End definition for `\@ssect`.)

```

\if@afterindent
\@afterindenttrue
124 \newif\if@afterindent \@afterindenttrue

```

(End definition for `\if@afterindent` and `\@afterindenttrue`.)

`\@afterheading` This hook is used in setting up custom-built headings in classes.dtx.

```

125 \def\@afterheading{%
126   \nobreaktrue
127   \everypar{%
128     \ifnobreak
129       \nobreakfalse
130       \clubpenalty \OM
131       \if@afterindent \else
132         {\setbox\z@\lastbox}%
133       \fi
134     \else
135       \clubpenalty \clubpenalty
136       \everypar{}%
137     \fi}}

```

(End definition for `\@afterheading`.)

`\@hangfrom` `\@hangfrom{<text>}` : Puts `<text>` in a box, and makes a hanging indentation of the following material up to the first `\par`. Should be used in vertical mode.

```

138 \def\@hangfrom#1{\setbox\@tempboxa\hbox{#1}%
139   \hangindent \wd\@tempboxa\noindent\box\@tempboxa}

```

(End definition for `\@hangfrom`.)

```

\c@secnumdepth
\c@tocdepth
140 \newcount\c@secnumdepth
141 \newcount\c@tocdepth

```

(End definition for `\c@secnumdepth` and `\c@tocdepth`.)

```
\secdef \secdef{\{unstarcmds\}}{\{unstarcmds\}}{\{starcmds\}}
When defining a \chapter or \section command without using \startsection, you
can use \secdef as follows:
```

1. \def\chapter{ ... \secdef {\starcmd} {\unstarcmd} }
 2. \def{\starcmd}[#1]{#2{...}} % Command to define \chapter[...]{...}
 3. \def{\unstarcmd}{#1{...}} % Command to define \chapter*{...}
- ¹⁴² \def\secdef{\#1{\#2{\@ifstar{\#2}{\@dblarg{\#1}}}}}

(End definition for \secdef.)

1.2.1 Initializations

```
\sectionmark
\subsectionmark
\subsubsectionmark
\paragraphmark
\ subparagraphmark
143 \let\sectionmark\@gobble
144 \let\subsectionmark\@gobble
145 \let\subsubsectionmark\@gobble
146 \let\paragraphmark\@gobble
147 \let\ subparagraphmark\@gobble
```

(End definition for \sectionmark and others.)

¹⁴⁸ \message{contents,}

1.3 Table of Contents etc.

1.3.1 Convention

\tf@{foo} = file number for output for table foo. The file is opened only if @filesw = true.

1.3.2 Commands

A \l@{type}{\{entry\}}{\{page\}} Macro needs to be defined by document style for making an entry of type *type* in a table of contents, etc. E.g., the document style should define \l@chapter, \l@section, etc.

Note: When the \protect command is used in the *entry* or *text* of one of the commands below, it causes the following control sequence to be written on the file without being expanded. The sequence will be expanded when the table of contents entry is processed.

Surprise: Inside an \addcontentsline or \addtocontents command argument, the commands: \index, \glossary, and \label are no-ops. This could cause a problem if the user puts an \index or \label into one of the commands he writes, or into the optional ‘short version’ argument of a \section or \caption command.

\starttoc The \starttoc{\ext} command is used to define the commands:
\tableofcontents, \listoffigures, etc.

For example: \starttoc{lof} is used in \listoffigures. This command reads the .\ext file and sets up to write the new .\ext file.

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

\starttoc{EXT} ==

```

BEGIN
  \begingroup
    \makeatletter
    read file \jobname.EXT
    IF @filesw = true
      THEN open \jobname.EXT as file \tf@EXT
    FI
    @nobreak :=G FALSE %% added 24 May 89
  \endgroup
END

```

End of historical L^AT_EX 2.09 comments.

```

149 \def\@starttoc#1{%
150   \begingroup
151     \makeatletter
152     \cinput{\jobname.#1}%
153     \if@filesw
154       \expandafter\newwrite\csname tf@#1\endcsname
155       \immediate\openout \csname tf@#1\endcsname \jobname.#1\relax
156     \fi
157     \nobreakfalse
158   \endgroup}

```

(End definition for \@starttoc.)

\addcontentsline The \addcontentsline{\langle table\rangle}{\langle type\rangle}{\langle entry\rangle} command allows the user to add his/her own entry to a table of contents, etc. The command adds the entry \contentsline{\langle type\rangle}{\langle entry\rangle}{\langle page\rangle} to the .\langle table\rangle file.

This macro is implemented as an application of \addtocontents. Note that \thepage is not expandable during \protected@write therefore one gets the page number at the time of the \shipout.

```

159 </2ekernel>
160 <2ekernel | latexrelease>
161 <latexrelease>\IncludeInRelease{2020/10/01}%
162 <latexrelease>           {\addcontentsline}{fourth argument}%
163 \def\addcontentsline#1#2#3{%

```

We add an empty brace pair at the end of \contentsline so that the number of argument is identical in documents with and without hyperref.

```

164   \addtocontents{#1}{\protect\contentsline{#2}{#3}{\thepage}{}{}}%
165   \protected@file@percent}%
166 </2ekernel | latexrelease>
167 <latexrelease>\EndIncludeInRelease
168 <latexrelease>\IncludeInRelease{2018/12/01}%
169 <latexrelease>           {\addcontentsline}{Mask line endings}%
170 <latexrelease> \def\addcontentsline#1#2#3{%
171 <latexrelease>   \addtocontents{#1}{\protect\contentsline{#2}{#3}{\thepage}{}{}}%

```

We add \protected@file@percent at the end which is turned inside \@writefile into a percent character to mask the newline after the closing argument brace.

```

172 <latexrelease>           \protected@file@percent}%
173 <latexrelease>\EndIncludeInRelease
174 <latexrelease>\IncludeInRelease{0000/00/00}%
175 <latexrelease>           {\addcontentsline}{Mask line endings}%

```

```

176  <latexrelease>\def\addcontentsline#1#2#3{%
177  <latexrelease>  \addtocontents{#1}{\protect\contentsline{#2}{#3}{\thepage}}}
178  <latexrelease>\EndIncludeInRelease
179  {*2ekernel}

```

(End definition for `\addcontentsline`.)

\addtocontents The `\addtocontents{<table>}{<text>}` command adds `<text>` to the `.<table>` file, with no page number.

```

180  \long\def\addtocontents#1#2{%
181  \protected@write\@auxout
182  {\let\label\@gobble \let\index\@gobble \let\glossary\@gobble}%
183  {\string\@writefile{#1}{#2}}}

```

(End definition for `\addtocontents`.)

\contentsline The `\contentsline{<type>}{<entry>}{<page>}` macro produces a `<type>` entry in a table of contents, etc. It will appear in the `.toc` or other file. For example, The entry for subsection 1.4.3 in the table of contents for example, might be produced by:

```

\contentsline{subsection}
{\makebox{30pt}[r]{1.4.3} Gnats and Gnus}{22}

```

The `\protect` command causes command sequences to be written without expanding them.

```
184 \def\contentsline#1{\csname l@#1\endcsname}
```

(End definition for `\contentsline`.)

`\@dottedtocline{<level>}{<indent>}{{<numwidth>} {<title>}{<page>}}`: Macro to produce a table of contents line with the following parameters:

level If `<level>` > `\c@tocdepth`, then no line produced.

indent Total indentation from the left margin.

numwidth Width of box for number if the `<title>` has a `\numberline` command. As of 25 Jan 1988, this is also the amount of extra indentation added to second and later lines of a multiple line entry.

title Contents of entry.

page Page number.

Uses the following parameters, which must be set by the document style. They should be defined with `\def`'s.

pnumwidth Width of box in which page number is set.

tocrmarg Right margin indentation for all but last line of multiple-line entries.

dotsep Separation between dots, in mu units. Should be `\def`'d to a number like 2 or 1.7

```

\@dottedtocline
185  </2ekernel>
186  {*2ekernel | latexrelease}
187  <latexrelease>\IncludeInRelease{2018/12/01}%
188  <latexrelease>          {\@dottedtocline}{Prevent protrusion}%
189  \def\@dottedtocline#1#2#3#4#5{%
190    \ifnum #1>\c@tocdepth \else
191      \vskip \z@ \oplus .2\p@
192      {\leftskip #2\relax \rightskip \z@ \parfillskip -\rightskip
193       \parindent #2\relax \afterindenttrue
194       \interlinepenalty\OM
195       \leavevmode
196       \tempdima #3\relax
197       \advance\leftskip \tempdima \null\nobreak\hskip -\leftskip
198       {#4}\nobreak
199       \leaders\hbox{$\m@th
```

If a document uses fonts other than computer modern, the use of a dot from math can be very disturbing despite the fact that this might be the only place in a document that then uses computer modern. Therefore we surround the dot with an `\hbox` to escape to the surrounding text font.

```

200   \mkern \dotsep mu\hbox{.}\mkern \dotsep
201   mu$}\hfill
202   \nobreak
203   \hb@xt@\pnumwidth{\hfil\normalfont \normalcolor #5%
```

We finish off by preventing any protrusion if that is enabled. If protrusion happens the number may shift to the right and as a result you may end up with an additional dot in the toc line in some situations.

```

204   \kern-\p@\kern\p@}%
205   \par}%
206   \fi}
```

(End definition for \@dottedtocline.)

`\noprotrusion` This command, if placed directly to the right (or left) of a word, will prevent protrusion of that word into the margin. It is used in the toc entry lines as they shouldn't protrude. It is implemented as to kerns that cancel each other but being there hide the word so that protrusion is not added. Note that a zero kern or an empty box would not work as the protrusion mechanism will skip over those.

```

207 \DeclareRobustCommand\noprotrusion{\leavevmode\kern-\p@\kern\p@}
```

(End definition for \noprotrusion.)

```

208 </2ekernel | latexrelease>
209 <latexrelease>\EndIncludeInRelease
210 <latexrelease>\IncludeInRelease{0000/00/00}%
211 <latexrelease>          {\@dottedtocline}{Prevent protrusion}%
212 <latexrelease>\def\@dottedtocline#1#2#3#4#5{%
213 <latexrelease> \ifnum #1>\c@tocdepth \else
214 <latexrelease>   \vskip \z@ \oplus .2\p@
215 <latexrelease>   {\leftskip #2\relax \rightskip \z@ \parfillskip -\rightskip
216 <latexrelease>   \parindent #2\relax \afterindenttrue
217 <latexrelease>   \interlinepenalty\OM
```

```

218 〈latexrelease〉      \leavevmode
219 〈latexrelease〉      \@tempdima #3\relax
220 〈latexrelease〉      \advance\leftskip \@tempdima \null\nobreak\hskip -\leftskip
221 〈latexrelease〉      {#4}\nobreak
222 〈latexrelease〉      \leaders\hbox{$\m@th
223   \mkern \@dotsep mu\hbox{.}\mkern \@dotsep
224   mu$}\hfill
225 〈latexrelease〉      \nobreak
226 〈latexrelease〉      \hb@xt@\c@pnumwidth{\hfil\normalfont \normalcolor #5}%
227 〈latexrelease〉      \par}%
228 〈latexrelease〉      \fi}
229 〈latexrelease〉
230 〈latexrelease〉\let\noprotrusion\@undefined
231 〈latexrelease〉\EndIncludeInRelease
232 〈*2ekernel〉

```

Note: \nobreak's added 7 Jan 86 to prevent bad line break that left the page number dangling by itself at left edge of a new line.

Changed 25 Jan 88 to use \leftskip instead of \hangindent so leaders of multiple-line contents entries would line up properly.

\numberline \numberline{⟨number⟩}: For use in a \contentsline command. It puts ⟨number⟩ flush-left in a box of width \@tempdima (Before 25 Jan 88 change, it also added \@tempdima to the hanging indentation.)

```

233 \def\numberline#1{\hb@xt@\c@pnumwidth{\#1\hfil}}
234 〈/2ekernel〉

```

(End definition for \numberline.)

File L

ltfloat.dtx

1 Floats

The different types of floats are identified by a *<type>* name, which is the name of the counter for that kind of float. For example, figures are of type ‘figure’ and tables are of type ‘table’. Each *<type>* has associated a positive *<type number>*, which is a power of two. E.g.,

figures might be have type number 1, tables type number 2, programs type number 4, etc.

The locations where a float can go are specified by a *<placement specifier>*, which is a list of the possible locations, each denoted by a letter as follows:

- h : here — at the current location in the text.
- t : top — at the top of a text page.
- b : bottom — at the bottom of a text page.
- p : page — on a separate float page

In addition, in conjunction with these, you can use ‘!’ which means that the current values of the float positioning parameters are ignored for this float. (Has no effect on ‘p’, float page positioning.) For example, ‘pht’ specifies that the float can appear in any of three locations: page, here or top.

1.1 Floating Environments

```
1 {*2ekernel}
2 \message{floats,}
```

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

Where floats may appear on a page, and how many may appear there are specified by the following float placement parameters. The numbers are named like counters so the user can set them with the ordinary counter-setting commands.

```
\c@topnumber      : Number of floats allowed at the top of a column.
\topfraction     : Fraction of column that can be devoted to floats.
\c@dbltopnumber, \dbltopfraction
                  : Same as above, but for double-column floats.
\c@bottomnumber, \bottomfraction
                  : Same as above for bottom of page.
\c@totalnumber   : Number of floats allowed in a single column,
                  including in-text floats.
{textfraction}   : Minimum fraction of column that must contain text.
{floatpagefraction}: Minimum fraction of page that must be taken
                   up by float page.
{dblfloatpagefraction}
                  : Same as above, for double-column floats.
```

The document style must define the following.

```
\fps@TYPE   : The default placement specifier for floats of type
               TYPE.

\ftype@TYPE : The type number for floats of type TYPE.

\ext@TYPE   : The file extension indicating the file on which the
               contents list for float type TYPE is stored.
               For example, \ext@figure = 'lof'.

\fnum@TYPE  : A macro to generate the figure number for a caption.
               For example, \fnum@TYPE == Figure \thefigure.

\@makecaption{NUM}{TEXT} :
               A macro to make a caption, with NUM the value
               produced by \fnum@... and TEXT the text of the caption.
               It can assume it's in a \parbox of the appropriate width.

\@float{TYPE}[PLACEMENT] : This macro begins a float environment for a
               single-column float of type TYPE with PLACEMENT as the placement
               specifier. The default value of PLACEMENT is defined by
               \fps@TYPE. The environment is ended by \end@float.
               E.g., \figure == \@float{figure}, \endfigure == \end@float.

\@float{TYPE}[PLACEMENT] ==
BEGIN
  if hmode then \@bsphack
    \@floatpenalty := -10002
  else \@floatpenalty := -10003
  fi
  \@capttype ==L TYPE
  \@dblflset
  \@fps ==L PLACEMENT
  \@onellevel@sanitize \@fps
  add default PLACEMENT if at most ! in PLACEMENT ==
\@fpsadddefault
  if inner
    then LaTeX Error: 'Not in outer paragraph mode.'
    \@floatpenalty := 0
  else if \@freelist nonempty
    then \@currbox :=L head of \@freelist
    \@freelist :=G tail of \@freelist
    \count@\currbox :=G 32*\ftype@TYPE +
               bits determined by PLACEMENT
  else \@floatpenalty := 0
    LaTeX Error: 'Too many unprocessed floats'
  fi
  fi
  \@currbox :=G \color@vbox
```

```

\normalcolor
\vbox{
%% 15 Dec 87 -
%% removed \boxmaxdepth :=L 0pt
%% that made box 0 depth because it screwed
%% things up. Instead, added \vskip0pt at end
\hsize = \columnwidth
\@parboxrestore
\@floatboxreset
END

\caption ==
BEGIN
\refstepcounter{@capter}
\@dblarg{@caption{@capter}}
END

```

In following definition, `\par` moved from after `\addcontentsline` to before `\addcontentsline` because the `\write` could cause an extra blank line to be added to the paragraph above the caption. (Change made 12 Jun 87)

```

\@caption{TYPE}[STEXT]{TEXT} ==
BEGIN
\par
\addcontentsline{\ext@TYPE}{TYPE}{\numberline{\theTYPE}{STEXT}}
\begingroup
\@parboxrestore
\@normalsize
\@makecaption{\fnum@TYPE}{TEXT}
\par
\endgroup
END

```

`\@dblfloat{TYPE}[PLACEMENT]` : Macro to begin a float environment for a double-column float of type TYPE with PLACEMENT as the placement specifier. The default value of PLACEMENT is 'tp'. The environment is ended by `\end@dblfloat`.
E.g., `\figure*` == `\@dblfloat{figure}`,
`\endfigure*` == `\end@dblfloat`.

```

\@dblfloat{TYPE}[PLACEMENT] ==
Identical to \@float{TYPE}[PLACEMENT] except \hsize and \linewidth
are set to \textwidth.
End of historical LATEX 2.09 comments.

```

`\@floatpenalty`

³ `\newcount\@floatpenalty`

(*End definition for `\@floatpenalty`.*)

`\caption` This is set to be an error message outside a float since no `capttype` is defined there; this may need to be changed by some classes.

```

4  \def\caption{%
5   \ifx\@capttype\undefined
6     \@latex@error{\noexpand\caption outside float}\@ehd
7     \expandafter\@gobble
8   \else
9     \refstepcounter\@capttype
10    \expandafter\@firstofone
11   \fi
12 { \@dblarg{\@caption\@capttype} }%
13 }
```

(End definition for `\caption`.)

`\@caption`

```

14 \long\def\@caption#1[#2]#3{%
15   \par
16   \addcontentsline{\csname ext@\#1\endcsname}{\#1}%
17   {\protect\numberline{\csname the#\#1\endcsname}{\ignorespaces #2}}%
18   \begingroup
```

The paragraph setting parameters are normalised at this point, however `\@parboxrestore` resets `\everypar` which is not correct in this context so `\@setminipage` is called if needed.

The float mechanism, like `minipage`, sets the flag `@minipage` true before executing the user-supplied text. Many L^AT_EX constructs test for this flag and do not add vertical space when it is true. The intention is that this emulates T_EX's 'top of page' behaviour. The flag must be set false at the start of the first paragraph. This is achieved by a redefinition of `\everypar`, but the call to `\@parboxrestore` removes that redefinition, so it is re-inserted if needed. If the flag is already false then the `\caption` was not the first entry in the float, and so some other paragraph has already activated the special `\everypar`. In this case no further action is needed.

```

19   \@parboxrestore
20   \if@minipage
21     \@setminipage
22   \fi
23   \normalsize
24   \makecaption{\csname fnum@\#1\endcsname}{\ignorespaces #3}\par
25 \endgroup
```

(End definition for `\@caption`.)

`\@float`

```

\@dblfset 26 \def\@float#1{%
27   \@ifnextchar[%]
28     {\@xflocat{\#1}}%
29     {\edef\reserved@a{\noexpand\@xfloat{\#1}[\csname fps@\#1\endcsname]}%
30      \reserved@a}}
```

(End definition for `\@float` and `\@dblfset`.)

`\@dblffloat`

```

31 \def\@dblffloat{%
32   \if@twocolumn\let\reserved@a\@dbflft\else\let\reserved@a\@float\fi
33   \reserved@a}
```

(End definition for \dblfloat.)

\fps@dbl Note that all double floats have default fps ‘tp’.

(End definition for \fps@dbl.)

\@setfps This sets the fps, dealing with error conditions by adding the default.

(End definition for \@setfps.)

\@xfloat The first part of this sets the count register that stores all the information about the type and fps of the float.

We assume here that the default specifiers already contain no active characters.

It may be better to store the defaults as numbers, rather than symbol strings.

```
34  </2ekernel>
35  <latexrelease>\IncludeInRelease{2015/01/01}%
36  <latexrelease>                                {\@xfloat}{Check float options}%
37  <*2ekernel | latexrelease>
38  \def\@xfloat #1[#2]{%
39    \@nодокумент
40    \def \@capttype {#1}%
41    \def \@fps {#2}%
42    \@onelvlsanitize \@fps
43    \def \@reserved@b {!}%
44    \ifx \@reserved@b \@fps
45      \@fpsadddefault
46    \else
47      \ifx \@fps \@empty
48        \@fpsadddefault
49      \fi
50    \fi
51    \@ifhmode
52      \@bsphack
53      \@floatpenalty -\@Mii
54    \else
55      \@floatpenalty-\@Miii
56    \fi
57    \@inner
58      \@parmoderr\@floatpenalty\z@
59  \else
60    \@next@\currbox\@freelist
61    {%
62      \@tempcnta \sixt@n
63      \expandafter \tfor \expandafter \reserved@a
64      \expandafter :\expandafter =\@fps
65      \do
```

Start of changes, use a nested if structure, ending in an error.

```
66    {%
67      \if \@reserved@a h%
68        \ifodd \@tempcnta
69        \else
70          \advance \@tempcnta \one
71        \fi
```

```

72          \else\if \reserved@a t%
73              \@setfpsbit \tw@%
74          \else\if \reserved@a b%
75              \@setfpsbit 4%
76          \else\if \reserved@a p%
77              \@setfpsbit 8%
78          \else\if \reserved@a !%
79              \ifnum \tempcnta>15
80                  \advance\tempcnta -\sixt@@n\relax
81              \fi
82          \else
83              \@latex@error{Unknown float option `\'\reserved@a'}%
84              {Option `\'\reserved@a' ignored and `p' used.}%
85              \@setfpsbit 8%
86          \fi\fi\fi\fi\fi
87      }%

```

End of changes

```

88      \tempcntb \csname ftype@\capttype \endcsname
89      \multiply \tempcntb \xxxii
90      \advance \tempcnta \tempcntb
91      \global \count\currbox \tempcnta
92      }%
93      \fltovf
94  \fi

```

The remainder sets up the box in which the float is typeset, and the typesetting environment to be used. It is essential to have the extra box to avoid the unwanted space that would otherwise often be put at the top of the float.

It ends with a hook; not sure how useful this is but it is needed at present to deal with double-column floats.

```

95  \global \setbox\currbox
96  \color@vbox
97  \normalcolor
98  \vbox \bgroup
99  \hsize\columnwidth
100 \parboxrestore
101 \floatboxreset
102 }%
103 </2ekernel | latexrelease>
104 <latexrelease>\EndIncludeInRelease
105 <latexrelease>\IncludeInRelease{0000/00/00}%
106 <latexrelease>           {\@xfloat}{Check float options}%
107 <latexrelease>\def\@xfloat #1[#2]{%
108 <latexrelease> \nодокумент
109 <latexrelease> \def \@capttype {#1}%
110 <latexrelease> \def \@fps {#2}%
111 <latexrelease> \onelevel@sanitize \@fps
112 <latexrelease> \def \reserved@b {!}%
113 <latexrelease> \ifx \reserved@b \@fps
114 <latexrelease>     \@fpsadddefault
115 <latexrelease> \else
116 <latexrelease>     \ifx \@fps \empty
117 <latexrelease>         \@fpsadddefault

```

```

118 <|latexrelease>      \fi
119 <|latexrelease>      \fi
120 <|latexrelease>      \ifhmode
121   <|latexrelease>      \@bsphack
122   <|latexrelease>      \@floatpenalty -\@Mii
123   <|latexrelease>      \else
124     <|latexrelease>      \@floatpenalty-\@Miii
125   <|latexrelease>      \fi
126   <|latexrelease>      \ifinner
127     <|latexrelease>      \@parmoderr\@floatpenalty\z@\@next\@currbox\@freelist
128   <|latexrelease>      \else
129     <|latexrelease>      \%
130   <|latexrelease>      \@tempcnta \sixt@@n
131   <|latexrelease>      \expandafter \@tfor \expandafter \reserved@a
132     <|latexrelease>      \expandafter :\expandafter =\@fps
133   <|latexrelease>      \do
134     <|latexrelease>      \%
135   <|latexrelease>      \if \reserved@a h%
136     <|latexrelease>      \ifodd \@tempcnta
137   <|latexrelease>      \else
138     <|latexrelease>      \advance \@tempcnta \one
139   <|latexrelease>      \fi
140   <|latexrelease>      \fi
141   <|latexrelease>      \if \reserved@a t%
142     <|latexrelease>      \@setfpsbit \tw@
143   <|latexrelease>      \fi
144   <|latexrelease>      \if \reserved@a b%
145     <|latexrelease>      \@setfpsbit 4%
146   <|latexrelease>      \fi
147   <|latexrelease>      \if \reserved@a p%
148     <|latexrelease>      \@setfpsbit 8%
149   <|latexrelease>      \fi
150   <|latexrelease>      \if \reserved@a !%
151     <|latexrelease>      \ifnum \@tempcnta>15
152       <|latexrelease>      \advance\@tempcnta -\sixt@@n\relax
153     <|latexrelease>      \fi
154   <|latexrelease>      \fi
155   <|latexrelease>      \%
156   <|latexrelease>      \%
157   <|latexrelease>      \@tempcntb \csname ftype@\@capttype \endcsname
158   <|latexrelease>      \multiply \@tempcntb \xxxii
159   <|latexrelease>      \advance \@tempcnta \@tempcntb
160   <|latexrelease>      \global \count\@currbox \@tempcnta
161   <|latexrelease>      \%
162   <|latexrelease>      \@fltovf
163   <|latexrelease>      \fi
164   <|latexrelease>      \global \setbox\@currbox
165   <|latexrelease>      \color@vbox
166   <|latexrelease>      \normalcolor
167   <|latexrelease>      \vbox \bgroup
168   <|latexrelease>      \hsize\columnwidth
169   <|latexrelease>      \parboxrestore
170   <|latexrelease>      \floatboxreset
171   <|latexrelease> \}%

```

```

172  ⟨latexrelease⟩\EndIncludeInRelease
173  ⟨*2ekernel⟩

(End definition for \@xfloat.)
```

\@floatboxreset The rational for allowing these normally global flags to be set locally here, via \parboxrestore, was stated originally by Donald Arseneau and extended by Chris Rowley. It is because these flags are only set globally to true by section commands, and these should never appear within marginals or floats or, indeed, in any group; and they are only ever set globally to false when they are definitely true.

If anyone is unhappy with this argument then both flags should be treated as in \setnobreak; otherwise this command will be redundant.

```

174 \def \@floatboxreset {%
175   \reset@font
176   \normalsize
177   \@setminipage
178 }
```

(End definition for \@floatboxreset.)

\@setnobreak

```

179 \def \@setnobreak{%
180   \if@nobreak
181     \let\outer@nobreak\@nobreaktrue
182   \else
183     \fi
184 }
```

(End definition for \@setnobreak.)

\@setminipage

```

185 \def \@setminipage{%
186   \ominipagetrue
187   \everypar{\ominipagefalse\everypar{}}
188 }
```

(End definition for \@setminipage.)

\end@float

```

189 \def\end@float{%
190   \endfloatbox
191   \ifnum\@floatpenalty <\z@
```

We make sure that we never exceed \textheight, otherwise float will never get typeset (91/03/15 FMi).

```

192   \largefloatcheck
193   \cons\currlist\currbox
194   \ifnum\@floatpenalty <-\@Mii
195     \penalty -\@Miv
```

Saving and restoring \prevdepth added 26 May 87 to prevent extra vertical space when used in vertical mode.

```

196   \tempdima\prevdepth
197   \vbox{}%
198   \prevdepth\tempdima
```

```

199      \penalty\@floatpenalty
200
201      \else
202          \vadjust{\penalty -\@Miv \vbox{} \penalty\@floatpenalty}\@EspHack
203      \fi
204  \fi
205 }

```

(End definition for \end@float.)

\end@dblfloat

```

205 </2ekernel>
206 <|latexrelease|\IncludeInRelease{2015/01/01}%
207 <|latexrelease|           {\end@dblfloat}{float order in 2-column}%
208 <*2ekernel | latexrelease>
209 \def\end@dblfloat{%
210     \if@twocolumn
211         \endfloatbox
212         \ifnum\@floatpenalty <\z@
213             \largefloatcheck

```

Force the depth of two column float boxes.

```
214     \global\dp\@currbox1sp %
```

What follows is essentially \end@float without a starting \endfloatbox.

```

215     \cons\@currlist\@currbox
216     \ifnum\@floatpenalty <-\@Mi
217         \penalty -\@Miv
218         \tempdima\prevdepth
219         \vbox{}%
220         \prevdepth\tempdima
221         \penalty\@floatpenalty
222     \else
223         \vadjust{\penalty -\@Miv \vbox{} \penalty\@floatpenalty}\@EspHack
224     \fi
225
226     \fi
227 \else
228     \end@float
229 \fi
230 }%
231 </2ekernel | latexrelease>
232 <|latexrelease|\EndIncludeInRelease
233 <|latexrelease|\IncludeInRelease{0000/00/00}%
234 <|latexrelease|\def\end@dblfloat{%
235 <|latexrelease|\if@twocolumn
236 <|latexrelease|\endfloatbox
237 <|latexrelease|\ifnum\@floatpenalty <\z@

```

We make sure that we never exceed \textheight, otherwise float will never get typeset (91/03/15 FMI).

```

238 <|latexrelease|     \largefloatcheck
239 <|latexrelease|     \cons\@dbldeferlist\@currbox
240 <|latexrelease|   \fi

```

RmS 92/03/18 changed \@esphack to \@Eshack.

```
241 〈\latexrelease〉    \ifnum \@floatpenalty =-\@Mii \@Eshack\fi
242 〈\latexrelease〉\else
243 〈\latexrelease〉  \end@float
244 〈\latexrelease〉\fi
245 〈\latexrelease〉}%
246 〈\latexrelease〉\EndIncludeInRelease
247 {*2ekernel}〉
```

(*End definition for \enddblfloat.*)

\@endfloatbox This macro is not intended to be a hook; it is designed to help maintain the integrity of this code, which is used twice and, as can be seen, is subject to frequent changes.

```
248 \def \@endfloatbox{%
249     \par\vskip\z@skip      %% \par\vskip\z@ added 15 Dec 87
250     \minipagetrue
251     \outer@nobreak
252     \egroup                  %% end of vbox
253     \color@endbox
254 }
```

(*End definition for \@endfloatbox.*)

\outer@nobreak

```
255 \let\outer@nobreak\empty
```

(*End definition for \outer@nobreak.*)

\@largefloatcheck This calculates by how much a float is oversize for the page and prints this in a warning message.

```
256 \def \@largefloatcheck{%
257     \ifdim \ht\@currbox>\textheight
258     \tempdima -\textheight
259     \advance \tempdima \ht\@currbox
260     \@latex@warning {Float too large for page by \the\tempdima}%
261     \ht\@currbox \textheight
262     \fi
263 }
```

(*End definition for \@largefloatcheck.*)

\@dbfltnothing
\@dblfloat

```
264 \def\@dbfltnothing{\ifnextchar[{\@dblfloat[#1]}{\@dblfloat[#1][tp]}}
265 \def\@dblfloat[#2]{%
266     \xfloat[#1][#2]\hsize\textwidth\linewidth\textwidth}
```

(*End definition for \@dbfltnothing and \@dblfloat.*)

Moved to ltoutput 93/12/16

```
267 \%newcount\c@topnumber
268 \%newcount\c@dbltopnumber
269 \%newcount\c@bottomnumber
270 \%newcount\c@totalnumber
```

\@floatplacement	An analysis of \@floatplacement: This should be called whenever \@colht has been set.
	<pre> 271 \def\@floatplacement{\global\@topnum\c@topnumber 272 % Textpage bit, global: 273 \global\@toproom \topfraction\@colht 274 \global\@botnum \c@bottomnumber 275 \global\@botroom \bottomfraction\@colht 276 \global\@colnum \c@totalnumber 277 % Floatpage bit, local: 278 \@fpmin \floatpagefraction\@colht} 279 </pre> <p>(End definition for \@floatplacement.)</p>
\@dblfloatplacement	This should be called only within a group. Now changed to provide extra checks in \@addtoblcol, needed when processing a BANG float.
	<pre> 280 <texreleas>\IncludeInRelease{2015/01/01}% 281 <texreleas> {\@dblfloatplacement}{float order in 2-column}% 282 {*2ekernel texreleas>} </pre> <p>When making two column float area, look for floats with 1sp depth.</p> <pre> 283 \def\@dblfloatplacement{\global\@dbltopnum\c@dbltopnumber 284 \global\@dbltoproom \dbltopfraction\@colht 285 \@textmin \@colht 286 \advance \@textmin -\@dbltoproom 287 \@fpmin \dblfloatpagefraction\textheight 288 \@fptop \@dblftop 289 \@fpsep \@dblfpsep 290 \@fpbot \@dblfpbot </pre> <p>\f@depth is used in \@testwrongwidth to look for either column or dbl-column floats. A value of 1sp signals the latter. Because of this setting here, \@dblfloatplacement needs to be called inside a group which is a questionable design.</p> <pre> 291 \def\f@depth{1sp}% 292 </pre> <p>Textpage bit: global, but need not be.</p> <pre> 297 <texreleas> \global\@dbltopnum\c@dbltopnumber 298 <texreleas> \global\@dbltoproom \dbltopfraction\@colht </pre> <p>This new bit uses \@textmin to locally store the amount of extra room in the column.</p> <pre> 299 <texreleas> \@textmin \@colht 300 <texreleas> \advance \@textmin -\@dbltoproom </pre> <p>Floatpage bit: must be local.</p> <pre> 301 <texreleas> \@fpmin \dblfloatpagefraction\textheight 302 <texreleas> \@fptop \@dblftop 303 <texreleas> \@fpsep \@dblfpsep 304 <texreleas> \@fpbot \@dblfpbot 305 <texreleas>}% 306 <texreleas>\EndIncludeInRelease 307 {*}2ekernel} </pre>

(End definition for \dblfloatplacement.)

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

MARGINAL NOTES:

Marginal notes use the same mechanism as floats to communicate with the \output routine. Marginal notes are distinguished from floats by having a negative placement specification. The command \marginpar [LTEXT]{RTEXT} generates a marginal note in a parbox, using LTEXT if it's on the left and RTEXT if it's on the right. (Default is RTEXT = LTEXT.) It uses the following parameters.

```
\marginparwidth : Width of marginal notes.  
\marginparsep  : Distance between marginal note and text.  
                  the page layout to determine how to move the marginal  
                  note into the margin. E.g., \@leftmarginskip ==  
                  \hskip -\marginparwidth \hskip -\marginparsep .  
\marginparpush : Minimum vertical separation between \marginpar's
```

Marginal notes are normally put on the outside of the page if @mparswitch = true, and on the right if @mparswitch = false. The command \reversemarginpar reverses the side where they are put. \normalmarginpar undoes \reversemarginpar. These commands have no effect for two-column output.

SURPRISE: if two marginal notes appear on the same line of text, then the second one could appear on the next page, in a funny position.

```
\marginpar [LTEXT]{RTEXT} ==  
BEGIN  
  if hmode then \@bsphack  
    \@floatpenalty := -10002  
  else \@floatpenalty := -10003  
  fi  
  if inner  
    then LaTeX Error: 'Not in outer paragraph mode.'  
    \@floatpenalty := 0  
  else if \@freelist has two elements:  
    then get \@marbox, \@currbox from \@freelist  
    \count\@marbox := G -1  
  else \@floatpenalty := 0  
    LaTeX Error: 'Too many unprocessed floats'  
    \@currbox, \@marbox := \@tempboxa %%use \def  
  fi  
  fi  
  if optional argument  
  then %% \@xmpar ==  
    \@savemarbox\@marbox{LTEXT}  
    \@savemarbox\@currbox{RTEXT}
```

```

else %% \@ympar ==
    \@savemarbox\@marbox{RTEXT}
        \box\@currbox :=G \box\@marbox
    fi
    \@xympar
END

\reversemarginpar == BEGIN \@mparbottom :=G 0
                           @reversemargin :=G true
END

\normalmarginpar == BEGIN \@mparbottom :=G 0
                           @reversemargin :=G false
END

```

End of historical L^AT_EX 2.09 comments.

```

\marginpar
308 \def\marginpar{%
309   \ifhmode
310     \bsphack
311     \floatpenalty -\Mii
312   \else
313     \floatpenalty-\Miii
314   \fi
315   \ifinner
316     \parmoderr
317     \floatpenalty\z@
318   \else
319     \next\@currbox\@freelist{}{%
320       \next\@marbox\@freelist{\global\count\@marbox\m@ne}%
321         \floatpenalty\z@
322         \f@tovf\def\@currbox{\tempboxa}\def\@marbox{\tempboxa}%
323   \fi
324   \ifnextchar [\@xmpar\@ympar}

```

(End definition for \marginpar.)

```

\@xmpar
325 \long\def\@xmpar[#1]{%
326   \@savemarbox\@marbox{#1}%
327   \@savemarbox\@currbox{#2}%
328   \@xympar}

```

(End definition for \@xmpar.)

```

\@ympar
329 \long\def\@ympar#1{%
330   \@savemarbox\@marbox{#1}%
331   \global\setbox\@currbox\copy\@marbox
332   \@xympar}

```

(End definition for \@ympar.)

```

\@savemarbox
 333 \long\def \@savemarbox #1#2{%
 334   \global\setbox #1%
 335   \color@vbox
 336   \vtop{%
 337     \hsize\marginparwidth
 338     \parboxrestore
 339     \marginparreset
 340     #2%
 341     \minipagetrue
 342     \outer@nobreak
 343     }%
 344   \color@endbox
 345 }

```

(End definition for `\@savemarbox`.)

`\marginparreset` The rational for allowing these normally global flags to be set locally here, via `\parboxrestore` was stated originally by Donald Arsenau and extended by Chris Rowley. It is because these flags are only set globally to true by section commands, and these should never appear within marginals or floats or, indeed, in any group; and they are only ever set globally to false when they are definitely true.

If anyone is unhappy with this argument then both flags should be treated as in `\set@nobreak`; otherwise this command will be redundant.

```

346 \def \marginparreset {%
 347   \reset@font
 348   \normalsize
 349   \if\nobreak\iffalse
 350   \if\noskipsec\iffalse
 351   \setnobreak
 352   \setminipage
 353 }

```

(End definition for `\marginparreset`.)

`\xympar`

Setting the box here is done only because the code uses `\end@float`; it will be empty and gets discarded.

```

354 \def \xympar{%
 355   \ifnum\floatpenalty <\z@\cons\currlist\marbox\fi
 356   \setbox\tempboxa
 357   \color@vbox
 358   \vbox \bgroup
 359   \end@float
 360   \ignorespace
 361   \esphack
 362 }

```

(End definition for `\xympar`.)

`\reversemarginpar`

`\normalmarginpar`

```

363 \def\reversemarginpar{\global\mparbottom\z@\reversemargintrue}
364 \def\normalmarginpar{\global\mparbottom\z@\reversemarginfalse}

```

(End definition for `\reversemarginpar` and `\normalmarginpar`.)

365 \message{footnotes,}

1.2 Footnotes

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

`\footnote{NOTE}` : User command to insert a footnote.

`\footnote[NUM]{NOTE}`: User command to insert a footnote numbered NUM, where NUM is a number – 1, 2, etc. For example, if footnotes are numbered *, **, etc. within pages, then `\footnote[2]{...}` produces footnote **. This command does not step the footnote counter.

`\footnotemark[NUM]` : Command to produce just the footnote mark in the text, but no footnote. With no argument, it steps the footnote counter before generating the mark.

`\footnotetext[NUM]{TEXT}` : Command to produce the footnote but no mark. `\footnote` is equivalent to `\footnotemark \footnotetext`.

As in PLAIN, footnotes use `\insert\footins`, and the following parameters:

`\footnotesize` : Size-changing command for footnotes.

`\footnotesep` : The height of a strut placed at the beginning of every footnote.

`\skip\footins` : Space between main text and footnotes. The rule separating footnotes from text occurs in this space. This space lies above the strut of height `\footnotesep` which is at the beginning of the first footnote.

`\footnoterule` : Macro to draw the rule separating footnotes from text. It is executed right after a `\vspace` of `\skip\footins`. It should take zero vertical space—i.e., it should do a negative skip to compensate for any positive space it occupies. (See PLAIN.TEX.)

`\interfootnotelinepenalty` : Interline penalty for footnotes.

`\thefootnote` : In usual L^AT_EX style, produces the footnote number. If footnotes are to be numbered within pages, then the document style file must include an `\@addtoreset`

command to cause the footnote counter to be reset when the page counter is stepped. This is not a good idea, though, because the counter will not always be reset in time to ensure that the first footnote on a page is footnote number one.

`\@thefnmark` : Holds the current footnote's mark—e.g., `\dag` or '1' or 'a'.

`\@mpfnnumber` : A macro that generates the numbers for `\footnote` and `\footnotemark` commands. It == `\thefootnote` outside a minipage environment, but can be changed inside to generate numbers for `\footnote`'s.

`\@makefnmark` : A macro to generate the footnote marker from `\@thefnmark`. The default definition was `\hbox{$^{\@thefnmark}$}`.

This is now replaced by
`\@thefnmark`

`\@makefn{text}{NOTE}` :

Must produce the actual footnote, using `\@thefnmark` as the mark of the footnote and NOTE as the text. It is called when effectively inside a `\parbox`, with `\hsize = \columnwidth`.

For example, it might be as simple as

`$^{\@thefnmark} NOTE`

In a minipage environment, `\footnote` and `\footnotetext` are redefined so that

- (a) they use the counter `mpfootnote`
 - (b) the footnotes they produce go at the bottom of the minipage.
- The switch is accomplished by letting `\@mpfn` == footnote or `mpfootnote` and `\thempfn` == `\thefootnote` or `\thempfootnote`, and by redefining `\@footnotetext` to be `\@mpfootnotetext` in the minipage.

```
\footnote{NOTE} ==
BEGIN
  \stepcounter{\@mpfn}
  begingroup
    \protect == \noexpand
    \@thefnmark :=G eval (\thempfn)
  endgroup
  \footnotemark
  \footnotetext{NOTE}
END
```

```
\footnote[NUM]{NOTE} ==
BEGIN
```

```

begingroup
  \protect == \noexpand
  counter \@mpfn :=L NUM
  \@thefnmark :=G eval (\thempfn)
endgroup
\@footnotemark
\@footnotetext{NOTE}
END

\footnotemark == 
BEGIN \stepcounter{footnote}
begingroup
  \protect == \noexpand
  \@thefnmark :=G eval(\thefootnote)
endgroup
\@footnotemark
END

\footnotemark[NUM] ==
BEGIN
begingroup
  footnote counter :=L NUM
  \protect == \noexpand
  \@thefnmark :=G eval(\thefootnote)
endgroup
\@footnotemark
END

\@footnotemark ==
BEGIN
\leavevmode
IF hmode THEN \c@sf := \the\spacefactor FI
\@makefnmark % put number in main text
IF hmode THEN \spacefactor := \c@sf FI
END

\footnotetext ==
BEGIN begingroup \protect == \noexpand
  \@thefnmark :=G eval (\thempfn)
endgroup
\@footnotetext
END

\footnotetext[NUM] ==
BEGIN begingroup counter \@mpfn :=L NUM
  \protect == \noexpand
  \@thefnmark :=G eval (\thempfn)
endgroup
\@footnotetext
END

```

End of historical L^AT_EX 2.09 comments.

\footins L^AT_EX does use the same insert for footnotes as PLAIN.

366 \newinsert\footins

L^AT_EX leaves these initializations for the \footins insert.

367 \skip\footins=\bigskipamount % space added when footnote is present
368 \count\footins=1000 % footnote magnification factor (1 to 1)
369 \dimen\footins=8in % maximum footnotes per page

(*End definition for \footins.*)

\footnoterule L^AT_EX keeps PLAIN T_EX's \footnoterule as the default.

370 \def\footnoterule{\kern-3\p@}

371 \hrule \width 2in \kern 2.6\p@} % the \hrule is .4pt high

(*End definition for \footnoterule.*)

\thefootnote

372 \Qdefinecounter{footnote}

373 \def\thefootnote{\Qarabic\c@footnote}

(*End definition for \thefootnote.*)

\thempfootnote The default display for the footnote counter in minipages is to use italic letters. We use \itshape not \textit as the latter would add an italic correction.

374 \Qdefinecounter{mpfootnote}

375 \def\thempfootnote{\itshape\Qalph\c@mpfootnote}}

(*End definition for \thempfootnote.*)

\Qmakefnmark Default definition.

376 \% \def\Qmakefnmark{\hbox{\$^{\Qthefnmark}\m@th\$}}

377 \def\Qmakefnmark{\hbox{\normalfont\Qthefnmark}}

(*End definition for \Qmakefnmark.*)

\textsuperscript This command provides superscript characters in the current text font. It's implementation might change!!!

378 \DeclareRobustCommand*\textsuperscript[1]{%

379 \selectfont#1}

(*End definition for \textsuperscript.*)

\Qtextsuperscript This command should not be used directly, but may be used to define other commands \textsuperscript, \Qmakefnmark. #1 should always start with a font selection command, to activate the font size switch.

380 \/2ekernel

381 (*2ekernel | latexrelease)

382 \ latexrelease\IncludeInRelease{2020/10/01}%

383 \ latexrelease \Qtextsuperscript{superscript baseline}%

384 \def\Qtextsuperscript#1{%

385 \m@th\ensuremath{\tilde{\mbox{\normalsize\sf@size\sf@size#1}}}}

386 \/2ekernel | latexrelease}

387 \ latexrelease\EndIncludeInRelease

```

388 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
389 〈\latexrelease〉                                {\ $\text{\textsuperscript}$ }{{superscript baseline}}%
390 〈\latexrelease〉
391 〈\latexrelease〉\def\@textsuperscript#1{%
392 〈\latexrelease〉  {\m@th\ensuremath{\^{\mbox{\{\\fontsize\sf@size\z@#1\}}}}}}}
393 〈\latexrelease〉\EndIncludeInRelease
394 (*2ekernel)

(End definition for \@textsuperscript.)
```

\textsubscript

```

395 〈/2ekernel〉
396 〈\latexrelease〉\IncludeInRelease{2015/01/01}%
397 〈\latexrelease〉                                {\ $\text{\textsubscript}$ }{{\textsubscript}}%
398 〈*2ekernel | \latexrelease〉

399 \DeclareRobustCommand*\textsubscript[1]{%
400   \ $\text{\textsubscript}$ {\selectfont#1}}%

401 〈/2ekernel | \latexrelease〉
402 〈\latexrelease〉\EndIncludeInRelease
403 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
404 〈\latexrelease〉                                {\ $\text{\textsubscript}$ }{{\textsubscript}}%
405 〈\latexrelease〉\let\textsubscript\@undefined
406 〈\latexrelease〉\EndIncludeInRelease
407 (*2ekernel)
```

(End definition for \textsubscript.)

\@textsubscript

```

408 〈/2ekernel〉
409 〈*2ekernel | \latexrelease〉
410 〈\latexrelease〉\IncludeInRelease{2020/10/01}%
411 〈\latexrelease〉                                {\ $\text{\textsubscript}$ }{{\textsubscript baseline}}%
412 \def\@textsubscript#1{%
413   {\m@th\ensuremath{\_{\mbox{\{\\fontsize\sf@size\sf@size\#1\}}}}}}
414 〈/2ekernel | \latexrelease〉
415 〈\latexrelease〉\EndIncludeInRelease

416 〈\latexrelease〉\IncludeInRelease{2015/01/01}%
417 〈\latexrelease〉                                {\ $\text{\textsubscript}$ }{{\textsubscript baseline}}%
418 〈\latexrelease〉
419 〈\latexrelease〉\def\@textsubscript#1{%
420 〈\latexrelease〉  {\m@th\ensuremath{\_{\mbox{\{\\fontsize\sf@size\z@#1\}}}}}}
421 〈\latexrelease〉\EndIncludeInRelease
422 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
423 〈\latexrelease〉                                {\ $\text{\textsubscript}$ }{{\textsubscript baseline}}%
424 〈\latexrelease〉\let\@textsubscript\@undefined
425 〈\latexrelease〉\EndIncludeInRelease
426 (*2ekernel)
```

(End definition for \@textsubscript.)

\footnotesep

```

427 \newdimen\footnotesep
```

```

(End definition for \footnotesep.)

\footnote
428 \def\footnote{\@ifnextchar[\@xfootnote{\stepcounter{\thempfn}%
429   \protected@xdef\@thefnmark{\thempfn}%
430   \@footnotemark\@footnotetext}\}
431
(End definition for \footnote.)}

\@xfootnote
431 \def\@xfootnote[#1]{%
432   \begingroup
433     \csname c@\thempfn\endcsname #1\relax
434     \unrestored@protected@xdef\@thefnmark{\thempfn}%
435   \endgroup
436   \@footnotemark\@footnotetext}\}
437
(End definition for \@xfootnote.)}

\@footnotetext
437 \long\def\@footnotetext#1{\insert\footins{%
438   \reset@font\footnotesize
439   \interlinepenalty\interfootnotelinepenalty
440   \splittopskip\footnotesep
441   \splitmaxdepth \dp\strutbox \floatingpenalty \z@MM
442   \hsize\columnwidth \parboxrestore
443   \protected@edef\@currentlabel{%
444     \csname p@footnote\endcsname\@thefnmark
445   }%
446   \color@begingroup
447     \makefntext{%
448       \rule{z@\footnotesep}{\ignorespaces#1\finalstrut\strutbox}%
449     }\color@endgroup}\}%
450
(End definition for \@footnotetext.)}

\footnotemark
450 \def\footnotemark{%
451   \@ifnextchar[\@xfootnotemark
452   {\stepcounter{footnote}%
453   \protected@xdef\@thefnmark{\thefootnote}%
454   \@footnotemark}\}
455
(End definition for \footnotemark.)}

\@xfootnotemark
455 \def\@xfootnotemark[#1]{%
456   \begingroup
457     \c@footnote #1\relax
458     \unrestored@protected@xdef\@thefnmark{\thefootnote}%
459   \endgroup
460   \@footnotemark}\}
461
(End definition for \@xfootnotemark.)}

```

```

\@footnotemark
 461 \def\@footnotemark{%
 462   \leavevmode
 463   \ifhmode\edef\@x@sf{\the\spacefactor}\nobreak\fi
 464   \@makefnmark
 465   \ifhmode\spacefactor\@x@sf\fi
 466   \relax}
 467
 468 (End definition for \@footnotemark.)
```

```

\footnotetext
 467 \def\footnotetext{%
 468   \@ifnextchar [\@xfootnotenext
 469     {\protected@xdef\@thefnmark{\thempfn}%
 470   \@footnotetext}}
 471
 472 (End definition for \footnotetext.)
```

```

\@xfootnotenext
 471 \def\@xfootnotenext[#1]{%
 472   \begingroup
 473     \csname c@\@mpfn\endcsname #1\relax
 474     \unrestored@protected@xdef\@thefnmark{\thempfn}%
 475   \endgroup
 476   \@footnotetext}
 477
 478 (End definition for \@xfootnotenext.)
```

```

\thempfn
 477 \def\@mpfn{footnote}
 478 \def\thempfn{\thefootnote}
 479 </2ekernel>
 480
 481 (End definition for \thempfn and \@mpfn.)
```

File M

ltidxglo.dtx

1 Index and Glossary Generation

Index and Glossary commands.

```
\makeindex          A preamble command to turn on indexing.  
\makeglossary     A preamble command to turn on making glossary entries.  
  \index           Make an index entry for #1.  
  \glossary        Make a glossary entry for #1.  
Historical LATEX 2.09 comments (not necessarily accurate any more):  
\makeindex ==  
  BEGIN  
    \index ==  BEGIN \@bsphack  
      \begingroup  
        \protect{X} == \string X\space  
        %% added 3 Feb 87 for \index commands  
        %% in \footnotes  
        re-\catcode special characters  
        to 'other'  
        \@wrindex  
  END  
  
\@wrindex{ITEM} ==  
  BEGIN  
    write of {\indexentry{ITEM}{page number}}  
    \endgroup  
    \@esphack  
  END  
  
INITIALIZATION:  
  
\index == BEGIN \@bsphack  
  \begingroup  
    re-\catcode special characters (in case '%' there)  
  \@index  
END  
  
\@index{ITEM} == BEGIN \endgroup \@esphack END  
  
Changes made 14 Apr 89 to write \glossaryentry's instead of  
\indexentry's on the .glo file.  
End of historical LATEX 2.09 comments.
```

¹ {*2ekernel}
² \message{index,}

```

\makeindex

3 \def\makeindex{%
4   \newwrite\@indexfile
5   \immediate\openout\@indexfile=\jobname.idx
6   \def\index{\@bsphack\begingroup
7     \@sanitize
8     \wrindex}\typeout
9   {Writing index file \jobname.idx}%

```

Opening the write channel should be done only once since on some OS multiple opens are forbidden and in any case it is useless. So we turn this into a no-op after use.

```

10  \let\makeindex\empty
11 }
12 \onlypreamble\makeindex

```

(End definition for \makeindex.)

```

\@wrindex

13 \def\@wrindex#1{%
14   \protected@write\@indexfile{}{%
15     \string\indexentry{#1}{\thepage}}%
16   \endgroup
17   \esphack}

```

(End definition for \@wrindex.)

```

\index

18 \def\index{\@bsphack\begingroup \@sanitize\@index}

```

(End definition for \index.)

```

\@index

19 \def\@index#1{\endgroup\esphack}

```

(End definition for \@index.)

```

\makeglossary

20 \def\makeglossary{%
21   \newwrite\@glossaryfile
22   \immediate\openout\@glossaryfile=\jobname.glo
23   \def\glossary{\@bsphack\begingroup
24     \@sanitize
25     \wrglossary}\typeout
26   {Writing glossary file \jobname.glo }%

```

Opening the write channel should be done only once since on some OS multiple opens are forbidden and in any case it is useless. So we turn this into a no-op after use.

```

27 \let\makeglossary\empty
28 }
29 \onlypreamble\makeglossary

```

(End definition for \makeglossary.)

```
\@wrglossary
30 \def\@wrglossary#1{%
31   \protected@write\@glossaryfile{}{%
32     {\string\glossaryentry{\#1}{\thepage}}%
33   \endgroup
34   \@esphack}
(End definition for \@wrglossary.)
```

```
\glossary
35 \def\glossary{\@bsphack\begingroup\@sanitize\@index}
(End definition for \glossary.)
36 </2ekernel>
```

File N

ltbibl.dtx

1 Bibliography Generation

A bibliography is created by the `thebibliography` environment, which generates a title such as “References”, and a list of entries. The BIBTEX program will create a file containing such an environment, which will be read in by the `\bibliography` command. With BIBTEX, the following commands will be used.

`\bibliography`

`\bibliography{<file1,<file2, ...,<filen>}` : specifies the bibdata files. Writes a `\bibdata` entry on the `.aux` file and tries to read in `mainfile.bbl`.

`\bibliographystyle{<style>}` : Writes a `\bibstyle` entry on the `.aux` file.

The `thebibliography` environment is a list environment. To save the use of an extra counter, it should use `enumiv` as the item counter. Instead of using `\item`, items in the bibliography are produced by the following commands:

`\bibitem{<name>}` : Produces a numbered entry cited as `<name>`.

`\bibitem[<label>]{<name>}` : Produces an entry labeled by `<Label>` and cited by `<name>`.

The former is used for bibliographies with citations like [1], [2], etc.; the latter is used for citations like [Knuth82].

The document class must define the `thebibliography` environment. This environment has a single argument, which is the widest bibliography label— e.g., if the [Knuth67] is the widest entry, then this argument will be Knuth67. The `\thebibliography` command must begin a list environment, which the `\endthebibliography` command ends.

Entries are cited by the command `\cite{<name>}`.

`\nocite{<citations>}` puts information on the `.aux` file that causes BIBTEX to include the `{<citations>}` list in the bibliography, but puts nothing in the text.

`\nocite{*}` is special: it tells BIBTEX to put the whole of a collection of references into the bibliography.

1 `(*2ekernel)`
2 `\message{bibliography,}`

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

PARAMETERS

`\@cite` : A macro such that `\@cite{LABEL1,LABEL2}{NOTE}` produces the output for a `\cite[NOTE]{FOO1,FOO2}` command, where entry FOOi is defined by `\bibitem[LABELi]{FOOi}`.

The switch @tempswa is true if the optional NOTE argument is present.

The default definition is :

```
\@cite{LABELS}{NOTE} ==
BEGIN [LABELS
      IF @tempswa = T THEN , NOTE FI
      ]
END
```

`\@biblabel` : A macro to produce the label in the bibliography entry. For `\bibitem[LABEL]{NAME}`, the label is

generated by `\@biblabel{LABEL}`. It has the default definition `\@biblabel{LABEL} -> [LABEL]`.

CONVENTION

`\b@FOO` : The name or number of the reference created by `\cite{FOO}`
E.g., if `\cite{FOO} -> [17]`, then `\b@FOO -> 17`.

End of historical L^AT_EX 2.09 comments.

```
\bibitem
 3 \def\bibitem{\@ifnextchar[\@lbibitem\@bibitem}
```

(End definition for \bibitem.)

```
\@lbibitem
 4 \def@\lbibitem[#1]#2{\item[\@biblabel{#1}\hfill]\if@filesw
 5   {\let\protect\noexpand
 6    \immediate
 7    \write\auxout{\string\bibcite{#2}{#1}}}\fi\ignorespaces}
```

(End definition for \@lbibitem.)

```
\@bibitem
 8 \def@\bibitem#1{\item\if@filesw \immediate\write\auxout
 9   {\string\bibcite{#1}{\the\value{@listctr}}}\fi\ignorespaces}
```

(End definition for \@bibitem.)

```
\bibcite
10 \def\bibcite{\newl@bel b}
```

(End definition for \bibcite.)

```
\citation
11 \let\citation@gobble
```

(End definition for \citation.)

```
\cite
12 \DeclareRobustCommand\cite{%
13   \@ifnextchar [{\@tempswatrue\@citex}{\@tempswafalse\@citex[]}}
```

(End definition for \cite.)

`\@citex` `\penalty\@m` added to definition of `\@citex` to allow a line break after the ‘,’ in citations like [Jones80,Smith77] (Added 23 Oct 86)
space added after the ‘,’ (21 Nov 87)

```
14 \def@\citex[#1]#2{\leavevmode
15   \let@\citea\@empty
16   \@cite{\@for\@citeb:=#2\do
17     {\@citea\def\@citea{,\penalty\@m\ }%
18      \edef\@citeb{\expandafter\@firstofone\@citeb\@empty}%
19      \if@filesw\immediate\write\auxout{\string\citation{\@citeb}}\fi
```

Using `\hbox` instead of `\mbox` is fine because of the `\leavevmode` above. In fact the use of a box around the citation contents is more than questionable in my view (FMi), but within 2e I have to keep that for compatibility reasons as it would probably change too many existing documents. Its main reason is to avoid hyphenation of labels such as [FOOB89] into [FOO- B89] so in certain styles it makes sense; but, for example, in author year citations it becomes more than questionable.

So Chris added yet another hook here, as suggested by, at least, Donald Arsenau. Note that this one is inside the first argument of the `\@cite` hook. This decouples the top-level typesetting of the citation from the details of the other business conducted here. All this really needs a complete rethink to get the right modularity.

```

20      \@ifundefined{b@\@citeb}{\hbox{\reset@font\bfseries ?}}%
21          \G@refundefinedtrue
22          \G@latex@warning
23              {Citation ‘\@citeb’ on page \thepage \space undefined}%
24      {\@cite@ofmt{\csname b@\@citeb\endcsname}}}\#1}

```

(End definition for `\@citex`.)

```

\bibdata
\bibstyle 25 \let\bibdata=\gobble
26 \let\bibstyle=\gobble

```

(End definition for `\bibdata` and `\bibstyle`.)

```

\bibliography
27 \def\bibliography#1{%
28   \if@files w
29     \immediate\write\auxout{\string\bibdata{\zap@space#1 \empty}%
30   \fi
31   \cinput{\jobname.bbl}}

```

(End definition for `\bibliography`.)

```

\bibliographystyle
32 \def\bibliographystyle#1{%
33   \ifx\@begindocumenthook\undefined\else
34     \expandafter\AtBeginDocument
35   \fi
36   {\if@files w
37     \immediate\write\auxout{\string\bibstyle{#1}}%
38   \fi}}

```

(End definition for `\bibliographystyle`.)

`\nocite` (Added 14 Jun 85)

This puts information on the `.aux` file that causes BIBTEX to include the citation list in the bibliography, but puts nothing in the text.

RmS 93/08/06: Made loop for `\nocite` like that for `\@citex`, to get rid of leading spaces.

```

39 \def\nocite#1{\@bsphack

```

With the implementation designed already in L^AT_EX 2.09 the `\nocite` command will not work before `\begin{document}` since it tries to write to the `.aux` file which is not open before that point. As a result the “reference” will appear on the terminal and nothing else will happen.

This would be easy to fix, but then a document using the fix will silently fail on an older release of L^AT_EX, missing all citations done with `\nocite`. Thus we do only generate an error message and leave the fix for a L^AT_EX 2 _{ε} successor.

```
40 \ifx\@onlypreamble\document
```

Since we are after `\begin{document}` we can do the citations:

```
41 \@for\@citeb:=#1\do{%
42   \edef\@citeb{\expandafter\@firstofone\@citeb}%
43   \if@filesw\immediate\write\auxout{\string\citation{\@citeb}}\fi
44   \@ifundefined{b@\@citeb}{\G@refundefinedtrue
45     \G@refundefinedfalse\@latex@warning{Citation '\@citeb' undefined}{}}
46 \else
```

But before `\begin{document}` we raise an error message:

```
47 \@latex@error{Cannot be used in preamble}\@eha
```

Without the compatibility problems we could fix the problem as follows:

```
48 % \AtBeginDocument{\nocite{#1}}
49 \fi
50 \@esphack}
```

Since `\nocite{*}` should not produce a warning about undefined citation keys (see PR 557), we need to set the control sequence ‘`\b@*`’ to something other than `\relax`. As a result `\cite{*}` will not warn either (but that never worked with BiB_TE_X in the first place).

```
51 \expandafter\let\csname b@\endcsname\empty
```

(*End definition for `\nocite`.*)

1.1 Default definitions

This hook determines the ‘relative formatting’ of the two logical parts of a citation with comment.

```
\@cite
52 \def\@cite#1#2{[#1\if@tempswa , #2\fi]}
```

(*End definition for `\@cite`.*)

`\@cite@ofmt` This is, in general, a command that appears to have one argument whose value is, in the kernel, a single cs whose name is the expansion of `b@\@citeb`; the expansion of this cs will typically be some hmode material that produces the detailed typeset form of just the citations themselves.

```
53 \let\@cite@ofmt\hbox
```

(*End definition for `\@cite@ofmt`.*)

```
\@biblabel
54 \def\@biblabel#1{[#1]}
55 \langle/2ekernel\rangle
```

(*End definition for `\@biblabel`.*)

File O

ltpage.dtx

1 Page styles and related commands

1.1 Page Style Commands

\pagestyle{\{style\}} : sets the page style of the current and succeeding pages to *style*
\thispagestyle{\{style\}} : sets the page style of the current page only to *style*.
To define a page style *style*, you must define \ps@*style* to set the page style parameters.

1.2 How a page style makes running heads and feet

The \ps@... command defines the macros \oddhead, \oddfoot, \evenhead, and \evenfoot to define the running heads and feet. (See output routine.) To make headings determined by the sectioning commands, the page style defines the commands \chaptermark, \sectionmark, etc., where \chaptermark{\{text\}} is called by \chapter to set a mark. The \...mark commands and the \...head macros are defined with the help of the following macros.

(All the \...mark commands should be initialized to no-ops.)

1.3 marking conventions

LATEX extends TEX's \mark facility by producing two kinds of marks a 'left' and a 'right' mark, using the following commands:

\markboth{\{left\}}{\{right\}} : Adds both marks.

\markright{\{right\}} : Adds a 'right' mark.

\leftmark : Used in the output routine, gets the current 'left' mark. Works like TEX's \botmark.

\rightmark : Used in the output routine, gets the current 'right' mark. Works like TEX's \firstmark. The marking commands work reasonably well for right marks 'numbered within' left marks—e.g., the left mark is changed by a \chapter command and the right mark is changed by a \section command. However, it does produce somewhat anomalous results if 2 \markboth's occur on the same page.

Commands like \tableofcontents that should set the marks in some page styles use a \cmkboth command, which is \let by the pagestyle command (\ps@...) to \markboth for setting the heading or to \gobbletwo to do nothing.

1 (*2ekernel)

\pagestyle User command to set the page style for this and following pages.

```
2 \def\pagestyle#1{%
3   \@ifundefined{ps@#1}%
4     \undefinedpagestyle
5     {\@nameuse{ps@#1}}}
```

(End definition for \pagestyle.)

\thispagestyle User command to set the page style for this page only.

```

6  \def\thispagestyle#1{%
7   \@ifundefined{ps@#1}%
8     \undefinedpagestyle
9     {\global\@specialpagetrue\gdef\@specialstyle{#1}}}

```

(End definition for \thispagestyle.)

\ps@empty The empty page style: No head or foot line.

```

10 \def\ps@empty{%
11   \let\@mkboth\@gobbletwo\let\@oddhead\@empty\let\@oddfoot\@empty
12   \let\@evenhead\@empty\let\@evenfoot\@empty}

```

(End definition for \ps@empty.)

\ps@plain The plain page style: No head, centred page number in foot.

```

13 \def\ps@plain{\let\@mkboth\@gobbletwo
14   \let\@oddhead\@empty\def\@oddfoot{\reset@font\hfil\thepage
15   \hfil}\let\@evenhead\@empty\let\@evenfoot\@oddfoot}

```

(End definition for \ps@plain.)

\@leftmark \@rightmark We implement \@leftmark and \@rightmark in terms of already defined commands to save token space. We can't get rid of them since they are sometimes used in applications.

```

16 \let\@leftmark\@firstoftwo
17 \let\@rightmark\@secondoftwo

```

(End definition for \@leftmark and \@rightmark.)

```

18 </2ekernel>
19 <*2ekernel | latexrelease>
20 <latexrelease>\IncludeInRelease{2019/10/01}%
21 <latexrelease>           {\markboth}{Make commands robust}%

```

\markboth User commands for setting L^AT_EX marks.

\markright Test for \nobreak added 15 Apr 86 in \markboth and \markright letting \label and \index to \relax added 22 Feb 86 so these commands can appear in sectioning command arguments RmS 91/06/21 Same for \glossary

```

22 \DeclareRobustCommand*\markboth[2]{%
23   \begingroup
24     \let\label\relax \let\index\relax \let\glossary\relax
25     \unrestored@protected@xdef\@themark {{#1}{#2}}%
26     \emptokena \expandafter{\@themark}%
27     \mark{\the\emptokena}%
28   \endgroup
29   \ifnobreak\ifvmode\nobreak\fi\fi}

30 \DeclareRobustCommand*\markright[1]{%
31   \begingroup
32     \let\label\relax \let\index\relax \let\glossary\relax

```

Protection is handled inside \markright.

```

33   \expandafter\@markright\@themark {#1}%
34   \emptokena \expandafter{\@themark}%
35   \mark{\the\emptokena}%
36 \endgroup
37 \ifnobreak\ifvmode\nobreak\fi\fi}

```

```

(End definition for \markboth and \markright.)

38 </2ekernel | latexrelease>
39 <latexrelease>\EndIncludeInRelease
40 <latexrelease>\IncludeInRelease{0000/00/00}%
41 <latexrelease>                                {\markboth}{Make commands robust}%
42 <latexrelease>
43 <latexrelease>\kernel@make@fragile\markboth
44 <latexrelease>\kernel@make@fragile\markright
45 <latexrelease>
46 <latexrelease>\EndIncludeInRelease
47 <*2ekernel>

\@markright
\leftmark 48 \def\@markright#1#2{\@temptokena {#1}%
\rightmark 49   \unrestored@protected\xdef\@themark{{\the\@temptokena}{#3}}}
50 \def\leftmark{\expandafter\@leftmark\botmark\@empty\@empty}
51 \def\rightmark{\expandafter\@rightmark\firstmark\@empty\@empty}

(End definition for \@markright, \leftmark, and \rightmark.)

\@themark Initialise LATEX's marks without setting a TEX mark <whatsit>.
52 \def\@themark{}{}

(End definition for \@themark.)

\mark Test versions of LATEX 2 $\varepsilon$  initialised TEX's \mark system at this point, but this was
removed before the first release.

AtBeginDocument{\mark{}{}}

(End definition for \mark.)

\raggedbottom \raggedbottom typesets pages with no vertical stretch, so they have their natural height
instead of all being exactly the same height. (Uses a space of .0001fil to avoid interfering
with the 1fil space of \newpage.)
53 \DeclareRobustCommand\raggedbottom{%
54   \def\@textbottom{\vskip \z@ \oplus .0001fil}\let\@texttop\relax}

(End definition for \raggedbottom.)

\flushbottom \flushbottom: Inverse of \raggedbottom — makes all pages the same height.
55 \DeclareRobustCommand\flushbottom{%
56   \let\@textbottom\relax \let\@texttop\relax}

(End definition for \flushbottom.)

\sloppy \sloppy will never (well, hardly ever) produce overfull boxes, but may produce underfull
ones. (14 June 85)
57 \DeclareRobustCommand\sloppy{%
58   \tolerance 9999%
59   \emergencystretch 3em%
60   \hfuzz .5\p@
61   \vfuzz\hfuzz}

(End definition for \sloppy.)

```

sloppypar A sloppypar environment is equivalent to {\par \sloppy ... \par}.

```
62 \def\sloppypar{\par\sloppy}
63 \def\endsloppypar{\par}
```

\fussy Resets T_EX's parameters to their normal finicky values.

```
64 \DeclareRobustCommand\fussy{%
65   \emergencystretch\z@
66   \tolerance 200%
67   \hfuzz .1\p@
68   \vfuzz\hfuzz}
```

(End definition for \fussy.)

\overfullrule L_AT_EX default is no overfull box rule. Changed by document class option.

```
69 \overfullrule Opt
```

(End definition for \overfullrule.)

```
70 </2ekernel>
```

File P

ltclass.dtx

1 Introduction

This file implements the following declarations, which replace `\documentstyle` in L^AT_EX 2_E documents.

Note that old documents containing `\documentstyle` will be run using a compatibility option—thus keeping everyone happy, we hope!

The overall idea is that there are two types of ‘style files’: ‘class files’ which define elements and provide a default formatting for them; and ‘packages’ which provide extra functionality. One difference between L^AT_EX 2_E and L^AT_EX 2.09 is that L^AT_EX 2_E packages may have options. Note that options to classes packages may be implemented such that they input files, but these file names are not necessarily directly related to the option name.

2 User interface

`\documentclass[⟨main-option-list⟩]{⟨class⟩}[⟨version⟩]`

There must be exactly one such declaration, and it must come first. The *⟨main-option-list⟩* is a list of options which can modify the formatting of elements which are defined in the *⟨class⟩* file as well as in all following `\usepackage` declarations (see below). The *⟨version⟩* is a version number, beginning with a date in the format YYYY/MM/DD. If an older version of the class is found, a warning is issued.

`\documentstyle[⟨main-option-list⟩]{⟨class⟩}[⟨version⟩]`

The `\documentstyle` declaration is kept in order to maintain upward compatibility with L^AT_EX 2.09 documents. It is similar to `\documentclass`, but it causes all options in *⟨main-option-list⟩* that the *⟨class⟩* does not use to be passed to `\RequirePackage` after the options have been processed. This maintains compatibility with the 2.09 behaviour. Also a flag is set to indicate that the document is to be processed in L^AT_EX 2.09 compatibility mode. As far as most packages are concerned, this only affects the warnings and errors L^AT_EX generates. This flag does affect the definition of font commands, and `\sloppy`.

`\usepackage[⟨package-option-list⟩]{⟨package-list⟩}[⟨version⟩]`

There can be any number of these declarations. All packages in *⟨package-list⟩* are called with the same options.

Each *⟨package⟩* file defines new elements (or modifies those defined in the *⟨class⟩*), and thus extends the range of documents which can be processed. The *⟨package-option-list⟩* is a list of options which can modify the formatting of elements defined in the *⟨package⟩* file. The *⟨version⟩* is a version number, beginning with a date in the format YYYY/MM/DD. If an older version of the package is found, a warning is issued.

Each package is loaded only once. If the same package is requested more than once, nothing happens, unless the package has been requested with options that were not given the first time it was loaded, in which case an error is produced.

As well as processing the options given in the *⟨package-option-list⟩*, each package processes the *⟨main-option-list⟩*. This means that options that affect all of the packages can be given globally, rather than repeated for every package.

filecontents

Note that class files have the extension `.cls`, packages have the extension `.sty`.

The environment `filecontents` is intended for passing the contents of packages, options, or other files along with a document in a single file. It has one argument, which is the name of the file to create. If that file already exists (maybe only in the current directory if the OS supports a notion of a ‘current directory’ or ‘default directory’) then nothing happens (except for an information message) and the body of the environment is bypassed. Otherwise, the body of the environment is written verbatim to the file name given as the first argument, together with some comments about how it was produced.

The environment can also be called with an optional argument which is used to alter some of its behavior: option `force` or `overwrite` will allow for overwriting existing files, option `nosearch` will only check the current directory when looking if the file exists. This can be useful if you want to generate a local (modified) copy of some file that is already in the search tree of TeX. Finally, you can use `noheader` to prevent it from writing the standard blurb at the top of the file (this is actually the same as using the star form of the environment).

The environment is now allowed anywhere in the document, but to ensure that all packages or options necessary are available when the document is run, it is normally best to place it at the top of your file (before `\documentclass`). A possible use case for using it inside the document body is if you want to reuse some text several times in the document you could then write it and later use `\input` to retrieve it where needed.

The begin and end tags should each be on a line by itself.

2.1 Option processing

When the options are processed, they are divided into two types: *local* and *global*:

- For a class, the options in the `\documentclass` command are local.
- For a package, the options in the `\usepackage` command are local, and the options in the `\documentclass` command are global.

The options for `\documentclass` and `\usepackage` are processed in the following way:

1. The local and global options that have been declared (using `\DeclareOption` as described below) are processed first.

In the case of `\ProcessOptions`, they are processed in the order that they were declared in the class or package.

In the case of `\ProcessOptions*`, they are processed in the order that they appear in the option-lists. First the global options, and then the local ones.

2. Any remaining local options are dealt with using the default option (declared using the `\DeclareOption*` declaration described below). For document classes, this usually does nothing, but records the option on a list of unused options. For packages, this usually produces an error.

Finally, when `\begin{document}` is reached, if there are any global options which have not been used by either the class or any package, the system will produce a warning.

3 Class and Package interface

3.1 Class name and version

\ProvidesClass A class can identify itself with the \ProvidesClass{\name}{\version} command. The \version should begin with a date in the format YYYY/MM/DD.

3.2 Package name and version

\ProvidesPackage A package can identify itself with the \ProvidesPackage{\name}{\version} command. The \version should begin with a date in the format YYYY/MM/DD.

3.3 Requiring other packages

\RequirePackage Packages or classes can load other packages using \RequirePackage[\options]{\name}{\version}. If the package has already been loaded, then nothing happens unless the requested options are not a subset of the options with which it was loaded, in which case an error is called.

\LoadClass Similar to \RequirePackage, but for classes, may not be used in package files.

\PassOptionsToPackage Packages can pass options to other packages using:

\PassOptionsToPackage{\options}{\package}.

This adds the \options to the options list of any future \RequirePackage or \usepackage command. For example:

```
\PassOptionsToPackage{foo,bar}{fred}
```

is the same as:

```
\RequirePackage[foo,bar,baz]{fred}
```

\LoadClassWithOptions \LoadClassWithOptions{\name}{\version}:

This is similar to \LoadClass, but it always calls class \name with exactly the same option list that is being used by the current class, rather than an option explicitly supplied or passed on by \PassOptionsToClass. \RequirePackageWithOptions is the analogous command for packages.

This is mainly intended to allow one class to simply build on another, for example:

```
\LoadClassWithOptions{article}
```

This should be contrasted with the slightly different construction

```
\DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
\ProcessOptions
\LoadClass{article}
```

As used here, the effects are more or less the same, but the version using \LoadClassWithOptions is slightly quicker (and less to type). If, however, the class declares options of its own then the two constructions are different; compare, for example:

```
\DeclareOption{landscape}{...}
\ProcessOptions
\LoadClassWithOptions{article}
```

with:

```
\DeclareOption{landscape}{...}
\DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
\ProcessOptions
\LoadClass{article}
```

In the first case, the `article` class will be called with option `landscape` precisely when the current class is called with this option; but in the second example it will not as in that case `article` is only passed options by the default option handler, which is not used for `landscape` as that option is explicitly declared.

```
\@ifpackageloaded
  \@ifclassloaded
\@ifpackagelater
  \@ifclasslater
\@ifpackagewith
  \@ifclasswith
```

To find out if a package has already been loaded, use

```
\@ifpackageloaded{<package>}{{true}}{{false}}.
```

To find out if a package has already been loaded with a version equal to or more recent than `<version>`, use

```
\@ifpackagelater{<package>}{{version}}{{true}}{{false}}.
```

To find out if a package has already been loaded with at least the options `<options>`, use

```
\@ifpackagewith{<package>}{{options}}{{true}}{{false}}.
```

There exists one package that can't be tested with the above commands: the `fontenc` package pretends that it was never loaded to allow for repeated reloading with different options (see `ltoutenc.dtx` for details).

3.4 Declaring new options

Options for classes and packages are built using the same macros.

To define a builtin option, use `\DeclareOption{<name>}{{<code>}}`.

To define the default action to perform for local options which have not been declared, use `\DeclareOption*{{<code>}}`.

Note: there should be no use of

`\RequirePackage`, `\DeclareOption`, `\DeclareOption*` or `\ProcessOptions` inside `\DeclareOption` or `\DeclareOption*`.

Possible uses for `\DeclareOption*` include:

```
\DeclareOption*{}
```

Do nothing. Silently accept unknown options. (This suppresses the usual warnings.)

```
\DeclareOption*{\@unkownoptionerror}
```

Complain about unknown local options. (The initial setting for package files.)

```
\DeclareOption*{\PassOptionsToPackage{\CurrentOption}{<pkg-name>}}
```

Handle the current option by passing it on to the package `<pkg-name>`, which will presumably be loaded via `\RequirePackage` later in the file. This is useful for building ‘extension’ packages, that perhaps handle a couple of new options, but then pass everything else on to an existing package.

```
\DeclareOption*{\InputIfFileExists{xx-\CurrentOption.yyy}%
  {}%
  {\OptionNotUsed}}
```

Handle the option `foo` by loading the file `xx-foo.yyy` if it exists, otherwise do nothing, but declare that the option was not used. Actually the `\OptionNotUsed` declaration is only needed if this is being used in class files, but does no harm in package files.

3.5 Safe Input Macros

\InputIfFileExists	\InputIfFileExists{\file}{\then}{\else} Inputs <code>\file</code> if it exists. Immediately before the input, <code>\then</code> is executed. Otherwise <code>\else</code> is executed.
\IfExists	As above, but does not input the file. One thing you might like to put in the <code>\else</code> clause is
\@missingfileerror	This starts an interactive request for a filename, supplying default extensions. Just hitting return causes the whole input to be skipped and entering x quits the current run,
\input	This has been redefined from the L ^A T _E X2.09 definition, in terms of the new commands \InputIfFileExists and \@missingfileerror.
\listfiles	Giving this declaration in the preamble causes a list of all files input via the ‘safe input’ commands to be listed at the end. Any strings specified in the optional argument to \ProvidesPackage are listed alongside the file name. So files in standard (and other non-standard) distributions can put informative strings in this argument.

4 Implementation

1	(*2ekernel)
\if@compatibility	The flag for compatibility mode.
2	\newif\if@compatibility
	(End definition for \if@compatibility.)
\@documentclasshook	This legacy hook is called after the first \documentclass command. It is <i>not</i> integrated with the new 2020 hook management system! By default this checks to see if \normalsize is undefined, and if so, sets it to \normalsize.
3	\def\@documentclasshook{%
4	\ifx\@normalsize\undefined
5	\let\@normalsize\normalsize
6	\fi
7	}
	(End definition for \@documentclasshook.)
\@declaredoptions	This list is automatically built by \DeclareOption. It is the list of options (separated by commas) declared in the class or package file and it defines the order in which the the corresponding \ds@\option commands are executed. All local \option{s} which are not declared will be processed in the order defined by the optional argument of \documentclass or \usepackage.
8	\let\@declaredoptions\empty
	(End definition for \@declaredoptions.)
\@classoptionslist	List of options of the main class.
9	\let\@classoptionslist\relax
10	\onlypreamble\@classoptionslist
	(End definition for \@classoptionslist.)

\@unusedoptionlist	List of options of the main class that haven't been declared or loaded as class option files.
	<pre> 11 \let\@unusedoptionlist\@empty 12 \onlypreamble\@unusedoptionlist </pre>
	(End definition for \@unusedoptionlist.)
\CurrentOption	Name of current package or option.
	<pre> 13 \let\CurrentOption\@empty </pre>
	(End definition for \CurrentOption.)
\@currpath	Path to the current file if explicitly given.
	<pre> 14 </pre> <ol style="list-style-type: none"> 15 16 17 18 19 20 21 22 23 24 25 26 27
	(End definition for \@currpath.)
\@currname	Name of current package or option.
	<pre> 28 \let\@currname\@empty </pre>
	(End definition for \@currname.)
\@currext	The current file extension.
	<pre> 29 \global\let\@currext=\@empty </pre>
	(End definition for \@currext.)
\@clsextension	The two possible values of \@currext.
\@pkgextension	<pre> 30 \def\@clsextension{cls} 31 \def\@pkgextension{sty} 32 \onlypreamble\@clsextension 33 \onlypreamble\@pkgextension </pre>
	(End definition for \@clsextension and \@pkgextension.)
\@pushfilename	Commands to push and pop the file name and extension.
\@popfilename	#1 current name.
\@currnamestack	#2 current extension. #3 current catcode of @. #4 Rest of the stack.
	<pre> 34 </pre> <ol style="list-style-type: none"> 35 36

```

37  \langle latexrelease \rangle \IncludeInRelease{2020/10/01}{\@pushfilename}%
38  \langle latexrelease \rangle {Add \Expl@push@filename@@ and \Expl@push@filename@aux@@}%
39  \def\@pushfilename{%

```

The push and pop macros are injected in `\@pushfilename` and `\@popfilename` so that they correctly keep track of the hook labels.

This needs cleanup with the `expl3` interfaces also playing here, e.g., `\Expl@push@filename@@` needs cleanup and (and should probably not have this name either).

```

40  \Expl@push@filename@@
41  \xdef\@currnamestack{%
42  {\@currname}%
43  {\@currext}%
44  {\the\catcode`\@}%
45  \@currnamestack}%

```

Temporarily add a stack for `\@currpath` here. This should be integrated in the main file stack eventually, but other packages rely on `\@currnamestack` having three elements per file, so that isn't a trivial change. The prefix `\@kernel@...` hopefully discourages people from using it.

```

46  \xdef\@kernel@currpathstack{%
47  {\@currpath}%
48  \@kernel@currpathstack}%
49  \Expl@push@filename@aux@@
50 \langle latexrelease \rangle \EndIncludeInRelease

```

The following version of `\@pushfilename` didn't formally exist in this file, but in the 2020/02/02 release, `expl3` was preloaded and it patched `\@pushfilename` (and `\@popfilename`) by adding some hooks in there. But rolling back to 2020/02/02, `expl3` doesn't patch these macros again, so rolling back has to take those hooks into account. Same goes for `\@popfilename`.

```

51 \langle latexrelease \rangle
52 \langle latexrelease \rangle \IncludeInRelease{2020/02/02}{\@pushfilename}%
53 \langle latexrelease \rangle {Add \Expl@push@filename@@}%
54 \langle latexrelease \rangle \def\@pushfilename{%
55 \langle latexrelease \rangle \Expl@push@filename@@
56 \langle latexrelease \rangle \xdef\@currnamestack{%
57 \langle latexrelease \rangle {\@currname}%
58 \langle latexrelease \rangle {\@currext}%
59 \langle latexrelease \rangle {\the\catcode`\@}%
60 \langle latexrelease \rangle \@currnamestack}%
61 \langle latexrelease \rangle \Expl@push@filename@aux@@
62 \langle latexrelease \rangle \EndIncludeInRelease
63 \langle latexrelease \rangle
64 \langle latexrelease \rangle \IncludeInRelease{0000/00/00}{\@pushfilename}%
65 \langle latexrelease \rangle {Add \Expl@push@filename@@ and \Expl@push@filename@aux@@}%
66 \langle latexrelease \rangle \def\@pushfilename{%
67 \langle latexrelease \rangle \xdef\@currnamestack{%
68 \langle latexrelease \rangle {\@currname}%
69 \langle latexrelease \rangle {\@currext}%
70 \langle latexrelease \rangle {\the\catcode`\@}%
71 \langle latexrelease \rangle \@currnamestack}%
72 \langle latexrelease \rangle \EndIncludeInRelease
73 \onlypreamble\@pushfilename

```

```

74  \def\@popfilename{\@expl@@hook@curr@name@pop@@
75  \expandafter\@p@filename\@currnamestack\@nil
76  {Add \@expl@pop@filename@@}%
77  \def\@popfilename{\@expl@@hook@curr@name@pop@@
78  \expandafter\@p@filename\@currnamestack\@nil

```

Same for popping:

```

79  \expandafter\@p@filepath\@kernel@currpathstack\@nil
80  \@expl@pop@filename@@
81  \def\@popfilename{\@expl@@hook@curr@name@pop@@
82  {Add \@expl@push@filename@@}%
83  \def\@popfilename{\@expl@@hook@curr@name@pop@@
84  \expandafter\@p@filename\@currnamestack\@nil
85  \@expl@pop@filename@@
86  \def\@popfilename{\@expl@@hook@curr@name@pop@@
87  {Add \@expl@push@filename@@}%
88  \def\@popfilename{\@expl@@hook@curr@name@pop@@
89  \expandafter\@p@filename\@currnamestack\@nil
90  \@expl@push@filename@@ and \@expl@push@filename@aux@@}%
91  \def\@popfilename{\expandafter\@p@filename\@currnamestack\@nil
92  \def\@popfilename{\@expl@pop@filename@@
93  \def\@popfilename{\@onlypreamble\@popfilename
94  \def\@popfilename{\@onlypreamble\@popfilename
95  \def\@popfilename{\@onlypreamble\@popfilename
96  \def\@popfilename{\@onlypreamble\@popfilename
97  \def\@popfilename{\@onlypreamble\@popfilename
98  \def\@popfilename{\@onlypreamble\@popfilename
99  \def\@popfilename{\@onlypreamble\@popfilename
100 \def\@popfilename{\@onlypreamble\@popfilename
101 \def\@popfilename{\@onlypreamble\@popfilename
102 \def\@popfilename{\@onlypreamble\@popfilename
103 \def\@popfilename{\@onlypreamble\@popfilename
104 \def\@popfilename{\@onlypreamble\@popfilename
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108 \def\@popfilename{\@onlypreamble\@popfilename
109 \def\@popfilename{\@onlypreamble\@popfilename
110 \def\@popfilename{\@onlypreamble\@popfilename
111 \def\@popfilename{\@onlypreamble\@popfilename
112 \def\@popfilename{\@onlypreamble\@popfilename
113 \def\@popfilename{\@onlypreamble\@popfilename
114 \def\@popfilename{\@onlypreamble\@popfilename
115 \def\@popfilename{\@onlypreamble\@popfilename
116 \def\@popfilename{\@onlypreamble\@popfilename
117 \def\@popfilename{\@onlypreamble\@popfilename
118 \def\@popfilename{\@onlypreamble\@popfilename
119 \def\@popfilename{\@onlypreamble\@popfilename

```

(End definition for `\@pushfilename`, `\@popfilename`, and `\@currnamestack`.)

`\@kernel@currpathstack` Path to the current file if explicitly given. The auxiliary is needed here to insert a `\@empty` to prevent the loss of braces.

```

104 \def\@popfilename{\@onlypreamble\@popfilename
105 \def\@popfilename{\@onlypreamble\@popfilename
106 \def\@popfilename{\@onlypreamble\@popfilename
107 \def\@popfilename{\@onlypreamble\@popfilename
108 \def\@popfilename{\@onlypreamble\@popfilename
109 \def\@popfilename{\@onlypreamble\@popfilename
110 \def\@popfilename{\@onlypreamble\@popfilename
111 \def\@popfilename{\@onlypreamble\@popfilename
112 \def\@popfilename{\@onlypreamble\@popfilename
113 \def\@popfilename{\@onlypreamble\@popfilename
114 \def\@popfilename{\@onlypreamble\@popfilename
115 \def\@popfilename{\@onlypreamble\@popfilename
116 \def\@popfilename{\@onlypreamble\@popfilename
117 \def\@popfilename{\@onlypreamble\@popfilename
118 \def\@popfilename{\@onlypreamble\@popfilename
119 \def\@popfilename{\@onlypreamble\@popfilename

```

```

120  \let\@p@filepath@aux\@undefined
121  \EndIncludeInRelease
122  
```

(*End definition for \@kernel@currpathstack.*)

\@optionlist Returns the option list of the file.

```

124  \def\@optionlist#1{%
125    \@ifundefined{opt@#1}\@empty{\csname opt@#1\endcsname}%
126    \onlypreamble\@optionlist

```

(*End definition for \@optionlist.*)

\@ifpackageloaded \@ifpackageloaded{\langle name\rangle} Checks to see whether a file has been loaded.

\@ifclassloaded

```

127  \def\@ifpackageloaded{\@ifl@aded\@pkgextension}
128  \def\@ifclassloaded{\@ifl@aded\@clsextension}
129  
```

\onlypreamble\@ifpackageloaded

```

130  
```

\onlypreamble\@ifclassloaded

```

131  \def\@ifl@aded#1#2{%
132    \expandafter\ifx\csname ver@#2.#1\endcsname\relax
133      \expandafter\@secondoftwo
134    \else
135      \expandafter\@firstoftwo
136    \fi}
137  
```

\onlypreamble\@ifl@aded

(*End definition for \@ifpackageloaded and \@ifclassloaded.*)

\@ifpackagelater \@ifpackagelater{\langle name\rangle}{YYYY/MM/DD}{\langle true code\rangle}{\langle false code\rangle} Checks that the package loaded is more recent or equal to the given date. A better name for it would therefore been \@ifpackagelaterorequal but it is in use for more than 30 years, so ...

\@ifclasslater

```

138  \def\@ifpackagelater{\@ifl@ter\@pkgextension}
139  \def\@ifclasslater{\@ifl@ter\@clsextension}
140  
```

\onlypreamble\@ifpackagelater

```

141  
```

\onlypreamble\@ifclasslater

(*End definition for \@ifpackagelater and \@ifclasslater.*)

\IfPackageAtLeastTF \IfFormatAtLeastTF{YYYY/MM/DD}{\langle true code\rangle}{\langle false code\rangle} Test if the format is later or equal to the given date.

\IfClassAtLeastTF

```

142  
```

(/2ekernel)

```

143  
```

(*2ekernel | latexrelease)

```

144  
```

(latexrelease)\IncludeInRelease{2020/10/01}%

```

145  
```

\IfFormatAtLeastTF{\Test format date}%

```

146  
```

\def\IfFormatAtLeastTF{\@ifl@t@r\fmtversion}

```

147  
```

\let\IfPackageAtLeastTF\@ifpackagelater

```

148  
```

\let\IfClassAtLeastTF\@ifclasslater

```

149  
```

\onlypreamble\IfFormatAtLeastTF

```

150  
```

\onlypreamble\IfPackageAtLeastTF

```

151  
```

\onlypreamble\IfClassAtLeastTF

For rollback pretend it was available since the beginning of dawn.

```
152  </2ekernel | latexrelease>
153  <latexrelease>\EndIncludeInRelease
154  <latexrelease>\IncludeInRelease{0000/00/00}%
155  <latexrelease>                                {\IfFormatAtLeastTF}{Test format date}%
156  <latexrelease>\def\IfFormatAtLeastTF{\@ifl@t@r\fmtversion}
157  <latexrelease>\let\IfPackageAtLeastTF\@ifpackagelater
158  <latexrelease>\let\IfClassAtLeastTF\@ifclasslater
159  <latexrelease>\EndIncludeInRelease
160  {*2ekernel}
```

(*End definition for \IfPackageAtLeastTF, \IfClassAtLeastTF, and \IfFormatAtLeastTF.*)

\@ifl@ter

```
161  \def\@ifl@ter#1#2{%
162    \expandafter\@ifl@t@r
163    \csname ver@#2.#1\endcsname
164  \onlypreamble\@ifl@ter
165  </2ekernel>

This internal macro is also used in \NeedsTeXFormat.

166 <latexrelease>\IncludeInRelease{2018/04/01}%
167 <latexrelease>                                {\@ifl@t@r}{Guard against bad input}%
168 <*2ekernel | latexrelease>
169 \def\@ifl@t@r#1#2{%
170   \ifnum\expandafter\@parse@version@#1//00\@nil<%
171     \expandafter\@parse@version@#2//00\@nil
172     \expandafter\@secondoftwo
173   \else
174     \expandafter\@firstoftwo
175   \fi}
176 \def\@parse@version@#1{\@parse@version@#1}
177 </2ekernel | latexrelease>
178 <latexrelease>\EndIncludeInRelease
179 <latexrelease>\IncludeInRelease{0000/00/00}%
180 <latexrelease>                                {\@ifl@t@r}{Guard against bad input}%
181 <latexrelease>\def\@ifl@t@r#1#2{%
182   \ifnum\expandafter\@parse@version#1//00\@nil<%
183   \expandafter\@parse@version#2//00\@nil
184   \expandafter\@secondoftwo
185   \else
186     \expandafter\@firstoftwo
187   \fi}
188 <latexrelease>\let\@parse@version@\@undefined
189 <latexrelease>\EndIncludeInRelease
190 {*2ekernel}
```

(*End definition for \@ifl@ter.*)

```
192 </2ekernel>
193 <*2ekernel | latexreleasefirst>
194 \def\@parse@version#1/#2/#3#4#5\@nil{%
195 \@parse@version@dash#1-#2-#3#4\@nil
196 }
```

The \if test here ensures that an argument with no / or - produces 0 (actually 00).

```
197 \def\@parse@version@dash#1-#2-#3#4#5@nil{%
198   \if\relax#2\relax\else#1\fi#2#3#4 }
199 {/2ekernel | latexreleasefirst}
200 {*2ekernel}

\@ifpackagewith {\@ifpackagewith{\langle name\rangle }{\langle option-list\rangle }} Checks that \langle option-list\rangle is a subset of the options with which \langle name\rangle was loaded.

201 \def\@ifpackagewith{\@if@options\@pkgextension}
202 \def\@ifclasswith{\@if@options\@clsextension}
203 \@onlypreamble\@ifpackagewith
204 \@onlypreamble\@ifclasswith

205 \def\@if@options#1#2{%
206   \@expandtwoargs\@if@pti@ns{\@optionlist{#2.#1}}}
207 \@onlypreamble\@if@options

Probably shouldn't use \CurrentOption here... (changed to \reserved@b.)

208 {/2ekernel}
209 {/latexrelease}\IncludeInRelease{2017/01/01}%
210 {/latexrelease}           {\@if@pti@ns}{Spaces in option clash check}%
211 {*2ekernel | latexrelease}
212 \def\@if@pti@ns#1#2{%
213   \let\reserved@a\@firstoftwo

214 \edef\reserved@b{\zap@space#2 \empty}%
215 \@for\reserved@b:=\reserved@b\do{%
216   \ifx\reserved@b\empty
217   \else
218     \expandafter\in@\expandafter{\expandafter,\reserved@b,}{,#1,}%
219     \ifin@
220     \else
221       \let\reserved@a\@secondoftwo
222     \fi
223   \fi
224 }%
225 \reserved@a}
226 {/2ekernel | latexrelease}
227 {/latexrelease}\EndIncludeInRelease
228 {/latexrelease}\IncludeInRelease{0000/00/00}%
229 {/latexrelease}           {\@if@pti@ns}{Spaces in option clash check}%
230 {/latexrelease}\def\@if@pti@ns#1#2{%
231 {/latexrelease} \let\reserved@a\@firstoftwo
232 {/latexrelease} \@for\reserved@b:=#2\do{%
233 {/latexrelease} \ifx\reserved@b\empty
234 {/latexrelease} \else
235 {/latexrelease} \expandafter\in@\expandafter
236 {/latexrelease} {\expandafter,\reserved@b,}{,#1,}%
237 {/latexrelease} \ifin@
238 {/latexrelease} \else
239 {/latexrelease} \let\reserved@a\@secondoftwo
240 {/latexrelease} \fi
241 {/latexrelease} \fi
242 {/latexrelease} }%
243 {/latexrelease} \reserved@a}
```

```

244  ⟨latexrelease⟩\EndIncludeInRelease
245  ⟨*2ekernel⟩
246  \onlypreamble\@if@pti@ns

(End definition for \ProvidesPackage and \IfClassWith.)
```

\ProvidesPackage Checks that the current filename is correct, and defines \ver@filename.

```

247  ⟨/2ekernel⟩
248  ⟨latexrelease⟩\IncludeInRelease{2020/10/01}%
249  ⟨latexrelease⟩  {\ProvidesPackage}{Check name with \strcmp}%
250  ⟨*2ekernel | latexrelease⟩
251  \def\ProvidesPackage#1{%
252    \xdef\@gtempa{#1}%
253 }
```

Here \@currpath is explicitly added to the file name to report when a package or class is loaded using an explicit path. Loading using a path in the argument is supported but not encouraged.

```

253  \expandtwoargs\expl@str@if@eq@nnTF
254    {\@gtempa}{\@currpath\@currname}{}{%
255      \@latex@warning@no@line{You have requested
256        \@cls@pkg\space`\@currpath\@currname',\MessageBreak
257        but the \@cls@pkg\space provides '#1'}}%
258  }%
259  \@ifnextchar[\@pr@videopackage{\@pr@videopackage[]}]%
260  \onlypreamble\ProvidesPackage
261  ⟨/2ekernel | latexrelease⟩
262  ⟨latexrelease⟩\EndIncludeInRelease
263  %
264  ⟨latexrelease⟩\IncludeInRelease{0000/00/00}%
265  ⟨latexrelease⟩  {\ProvidesPackage}{Undo: check name with \strcmp}%
266  ⟨latexrelease⟩\def\ProvidesPackage#1{%
267    ⟨latexrelease⟩  \xdef\@gtempa{#1}%
268    ⟨latexrelease⟩  \ifx\@gtempa\@currname\else
269    ⟨latexrelease⟩    \@latex@warning@no@line{You have requested
270    ⟨latexrelease⟩      \@cls@pkg\space`\@currname',\MessageBreak
271    ⟨latexrelease⟩      but the \@cls@pkg\space provides '#1'}}%
272  ⟨latexrelease⟩  \fi
273  ⟨latexrelease⟩  \ifnextchar[\@pr@videopackage{\@pr@videopackage[]}]%
274  ⟨latexrelease⟩\EndIncludeInRelease
275  ⟨*2ekernel⟩
```

(End definition for \ProvidesPackage.)

\@pr@videopackage This is the helper command for \ProvidesPackage. It tries to be cautious when handling the identification string in case it contains UTF-8 characters.

```

276  ⟨/2ekernel⟩
277  ⟨*2ekernel | latexrelease⟩
278  ⟨latexrelease⟩\IncludeInRelease{2020/10/01}%
279  ⟨latexrelease⟩          {\@pr@videopackage}{Allow for package substitution}%
280  \def\@pr@videopackage[#1]{%
281    \expandafter\protected@xdef%      <-- protected...
282    \csname ver@\@currname.\@current\endcsname{#1}\% Loaded package
283    \expandafter\let%
284    \csname ver@\@currpkg@reqd\expandafter\endcsname % Requested package
```

```

285      \csname ver@\@currname.\@currext\endcsname
286      \ifx\@currext\@clsextension
287          \typeout{Document Class: \@gtempa\space#1}%
288      \else
289          \protected@wlog{Package: \@gtempa\space#1}%
290          <--- protected
291      \fi}

(End definition for \pr@videopackage.)
```

\protected@wlog This is like plain TeX's \wlog but gracefully handles protected commands.

```

291 \long\def\protected@wlog#1{\begingroup
292     \set@display@protect
293     \immediate \write \m@ne {#1}\endgroup }

(End definition for \protected@wlog.)
```

```

294 (/2ekernel | latexrelease)
295 <latexrelease>\EndIncludeInRelease
296 <latexrelease>\IncludeInRelease{2020/02/02}%
297 <latexrelease>           {\@pr@videopackage}{Protection for package info}%
298 <latexrelease>
299 <latexrelease>\def\@pr@videopackage[#1]{%
300 <latexrelease>   \expandafter\protected@xdef%           <-- protected...
301 <latexrelease>       \csname ver@\@currname.\@currext\endcsname{#1}%
302 <latexrelease>\ifx\@currext\@clsextension
303 <latexrelease>       \typeout{Document Class: \@gtempa\space#1}%
304 <latexrelease>       \else
305 <latexrelease>       \protected@wlog{Package: \@gtempa\space#1}%
306 <latexrelease>       <--- protected
307 <latexrelease>       \fi}
308 <latexrelease>
309 <latexrelease>\EndIncludeInRelease
310 <latexrelease>\IncludeInRelease{0000/00/00}%
311 <latexrelease>           {\@pr@videopackage}{Protection for package info}%
312 <latexrelease>
313 <latexrelease>\def\@pr@videopackage[#1]{%
314 <latexrelease>   \expandafter\xdef\csname ver@\@currname.\@currext\endcsname{#1}%
315 <latexrelease>   \ifx\@currext\@clsextension
316 <latexrelease>       \typeout{Document Class: \@gtempa\space#1}%
317 <latexrelease>       \wlog{Package: \@gtempa\space#1}%
318 <latexrelease>       \fi}
319 <latexrelease>\let\protected@wlog\@undefined
320 <latexrelease>
321 <latexrelease>\EndIncludeInRelease
322 (*2ekernel)

323 \@onlypreamble\pr@videopackage
```

\ProvidesClass Like \ProvidesPackage, but for classes. This needs a dummy \latexrelease block to copy the definition of \ProvidesPackage as it changes across releases.

```

324 (/2ekernel)
325 <latexrelease>\IncludeInRelease{0000/00/00}%
326 <latexrelease> {\ProvidesClass}{Track \ProvidesPackage}%
327 (*2ekernel | latexrelease)
328 \let\ProvidesClass\ProvidesPackage
329 \@onlypreamble\ProvidesClass
```

```

330  {/2ekernel | latexrelease}
331  <latexrelease>\EndIncludeInRelease
332  {*2ekernel}

```

(End definition for \ProvidesClass.)

- \ProvidesFile Like \ProvidesPackage, but for arbitrary files. Do not apply \onlypreamble to these, as we may want to label files input during the document.

```

\@providesfile 333 \def\ProvidesFile#1{%
334   \begingroup
335     \catcode`\ 10 %
336     \ifnum \endlinechar<256 %
337       \ifnum \endlinechar>\m@ne
338         \catcode\endlinechar 10 %
339       \fi
340     \fi
341     \makeother\%
342     \makeother\&%
343   \kernel@ifnextchar[{\@providesfile{#1}}{\@providesfile{#1}[]}}

```

During initex a special version of \@providesfile is used. The real definition is installed right at the end, in ltfinal.dtx.

```

def\@providesfile#1[#2]{%
  \wlog{File: #1 #2}%
  \expandafter\xdef\csname ver@#1\endcsname{#2}%
  \endgroup}

```

(End definition for \ProvidesFile and \@providesfile.)

- \PassOptionsToPackage If the package has been loaded, we check that it was first loaded with the options.
 \PassOptionsToClass Otherwise we add the option list to that of the package.

```

344  {/2ekernel}
345  <latexrelease>\IncludeInRelease{2020/10/01}{\@passoptions}
346  <latexrelease> {Add file replacement in \@passoptions}%
347  {*2ekernel | latexrelease}
348  \def\@passoptions#1#2#3{%
349    \expl@filehook@set@curr@file@nN
350    {\expl@filehook@resolve@file@subst@w #3.#1@nil}%
351    \reserved@a\reserved@b
352    \expl@filehook@clear@replacement@flag@%
353    \expandafter\xdef\csname opt@\reserved@a\endcsname{%
354      \ifundefined{opt@\reserved@a}\empty
355        {\csname opt@\reserved@a\endcsname,}%
356        \zap@space#2 \empty}%
357    \expandafter\let
358      \csname opt@#3.#1\expandafter\endcsname
359      \csname opt@\reserved@a\endcsname}
360  {/2ekernel | latexrelease}
361  <latexrelease>\EndIncludeInRelease
362  %
363  <latexrelease>\IncludeInRelease{0000/00/00}{\@passoptions}

```

```

364 〈\latexrelease〉 {＼@pass@options}%
365 〈\latexrelease〉\def＼@pass@options#1#2#3{%
366 〈\latexrelease〉 \expandafter\xdef\csname opt@#3.#1\endcsname{%
367 〈\latexrelease〉 \@ifundefined{opt@#3.#1}\@empty
368 〈\latexrelease〉 {\csname opt@#3.#1\endcsname,}%
369 〈\latexrelease〉 \zap@space#2 \@empty}%
370 〈\latexrelease〉\EndIncludeInRelease
371 {*2ekernel}
372 \onlypreamble\@pass@options
373 \def\PassOptionsToPackage{\@pass@options\@pkgextension}
374 \def\PassOptionsToClass{\@pass@options\@clsextension}
375 \onlypreamble\PassOptionsToPackage
376 \onlypreamble\PassOptionsToClass

```

(End definition for `\PassOptionsToPackage` and `\PassOptionsToClass`.)

`\DeclareOption` Adds an option as a `\ds@` command, or the default `\default@ds` command.

```

\DeclareOption* 377 \def\DeclareOption{%
378   \let\@fileswith@pti@ns\@badrequireerror
379   \@ifstar\@defdefault@ds\@declareoption}
380   \long\def\@declareoption#1#2{%
381     \xdef\@declaredoptions{\@declaredoptions,#1}%
382     \toks@{#2}%
383     \expandafter\edef\csname ds@#1\endcsname{\the\toks@}%
384   \long\def\@defdefault@ds#1{%
385     \toks@{#1}%
386     \edef\default@ds{\the\toks@}%
387   \onlypreamble\DeclareOption
388   \onlypreamble\@declareoption
389   \onlypreamble\@defdefault@ds

```

(End definition for `\DeclareOption` and `\DeclareOption*`.)

`\OptionNotUsed` If we are in a class file, add `\CurrentOption` to the list of unused options. Otherwise, in a package file do nothing.

```

390 \def\OptionNotUsed{%
391   \ifx\@currext\@clsextension
392     \xdef\@unusedoptionlist{%
393       \ifx\@unusedoptionlist\@empty\else\@unusedoptionlist,\fi
394       \CurrentOption}%
395   \fi}
396 \onlypreamble\OptionNotUsed

```

(End definition for `\OptionNotUsed`.)

`\default@ds` The default option code. Set by `\@onefilewithoptions` to either `\OptionNotUsed` for classes, or `\@unknownoptionerror` for packages. This may be reset in either case with `\DeclareOption*`.

```

397 \% \let\default@ds\OptionNotUsed

```

(End definition for `\default@ds`.)

```
\ProcessOptions \ProcessOptions calls \ds@option for each known package option, then calls \default@ds for each option on the local options list. Finally resets all the declared options to \relax. The empty option does nothing, this has to be reset on the off chance it's set to \relax if an empty element gets into the \@declaredoptions list.
```

The star form is similar but executes options given in the order specified in the document, not the order they are declared in the file. In the case of packages, global options are executed before local ones.

```
398 \def\ProcessOptions{%
399   \let\ds@\empty
400   \edef\curroptions{\optionlist{\currname.\currext}}%
401   \ifstar\xprocessoptions\processoptions
402   \onlypreamble\ProcessOptions

403 \def\processoptions{%
404   \@for\CurrentOption:=\declaredoptions\do{%
405     \ifx\CurrentOption\empty\else
406       \expandafter\in@\CurrentOption,\currext}%
407       ,\ifx\currext\clsextension\else\classoptionslist,\fi
408       \curroptions,}%
409   \ifin@
410     \useoption
411       \expandafter\let\csname ds@\CurrentOption\endcsname\empty
412     \fi
413   }%
414 \processoptions
415 \onlypreamble\processoptions

416 \def\xprocessoptions{%
417   \ifx\currext\clsextension\else
418     \@for\CurrentOption:=\classoptionslist\do{%
419       \ifx\CurrentOption\empty\else
420         \expandafter\in@\CurrentOption,\currext}%
421         ,\declaredoptions,}%
422       \ifin@
423         \useoption
424           \expandafter\let\csname ds@\CurrentOption\endcsname\empty
425         \fi
426   }%
427 \processoptions
428 \onlypreamble\xprocessoptions
```

The common part of \ProcessOptions and \ProcessOptions*.

```
429 </2ekernel>
430 {*2ekernel | latexrelease}
431 <|latexrelease>\IncludeInRelease{2020/10/01}%
432 <|latexrelease>          {\processoptions{Unused options issue}}%
433 \def\processoptions{%
434   \@for\CurrentOption:=\curroptions\do{%
435     \ifundefined{ds@\CurrentOption}%
436       {\useoption
437        \default@ds}%
438 }
```

There should not be any non-empty definition of \CurrentOption at this point, as all the declared options were executed earlier. This is for compatibility with 2.09 styles which use \def\ds@... directly, and so have options which do not appear in \@declaredoptions.

```

438     \use@option}%

```

Clear all the definitions for option code. First set all the declared options to `\relax`, then reset the ‘default’ and ‘empty’ options. and the list of declared options.

```

439     \@for\CurrentOption:=\@declaredoptions\do{%
440         \expandafter\let\csname ds@\CurrentOption\endcsname\relax}%

```

```

441     \let\CurrentOption\@empty
442     \let\@fileswith@pti@ns\@fileswith@pti@ns
443     \AtEndOfPackage{\expandafter\let
444         \csname unprocessedoptions-\@currname.\@currext\endcsname
445         \relax}%

```

```

446     \onlypreamble\@process@pti@ns
447     {/2ekernel | latexrelease}
448     (latexrelease)\EndIncludeInRelease
449     (latexrelease)\IncludeInRelease{0000/00/00}%
450     (latexrelease)           {\@process@pti@ns}{Unused options issue}%
451     (latexrelease)
452     (latexrelease)\def\@process@pti@ns{%
453     (latexrelease)  \@for\CurrentOption:=\@curroptions\do{%
454     (latexrelease)    \ifundefined{ds@\CurrentOption}%
455     (latexrelease)      {\use@option
456     (latexrelease)        \default@ds}%
457     (latexrelease)      \use@option}%
458     (latexrelease)  \@for\CurrentOption:=\@declaredoptions\do{%
459     (latexrelease)    \expandafter\let\csname ds@\CurrentOption\endcsname\relax}%
460     (latexrelease)    \let\CurrentOption\@empty
461     (latexrelease)    \let\@fileswith@pti@ns\@fileswith@pti@ns
462     (latexrelease)    \AtEndOfPackage{\let\unprocessedoptions\relax}%
463     (latexrelease)\EndIncludeInRelease
464     {*2ekernel}%

```

(End definition for `\ProcessOptions` and `\ProcessOptions*`.)

`\@options` `\@options` is a synonym for `\ProcessOptions*` for upward compatibility with L^AT_EX2.09 style files.

```

465 \def\@options{\ProcessOptions*}
466 \onlypreamble\@options

```

(End definition for `\@options`.)

`\use@option` Execute the code for the current option.

```

467 \def\use@option{%
468     \expandtwoargs\removeelement\CurrentOption
469     \unusedoptionlist\unusedoptionlist
470     \csname ds@\CurrentOption\endcsname}
471 \onlypreamble\use@option

```

(End definition for `\use@option`.)

`\ExecuteOptions` `\ExecuteOptions{<option-list>}` executes the code declared for each option.

```

472 {/2ekernel}
473 (latexrelease)\IncludeInRelease{2017/01/01}%
474 (latexrelease)           {\ExecuteOptions}{Spaces in \ExecuteOptions}%
475 {*2ekernel | latexrelease}
476 \def\ExecuteOptions#1{%

```

Use `\@fortmp` here as it is anyway cleared during `\@for` loop so does not change any existing names.

```
477 \edef\@fortmp{\zap@space#1 \empty}%
478 \def\reserved@a##1\@nil{%
479   \@for\CurrentOption:=\@fortmp\do
480     {\csname ds@\CurrentOption\endcsname}%
481     \edef\CurrentOption{##1}%
482   \expandafter\reserved@a\CurrentOption\@nil}
483 {/2ekernel | latexrelease}
484 {latexrelease}\EndIncludeInRelease
485 {latexrelease}\IncludeInRelease{0000/00/00}%
486 {latexrelease}           {\ExecuteOptions}{Spaces in \ExecuteOptions}%
487 {latexrelease}\def\ExecuteOptions#1{%
488 {latexrelease} \def\reserved@a##1\@nil{%
489 {latexrelease}   \@for\CurrentOption:=#1\do
490 {latexrelease}     {\csname ds@\CurrentOption\endcsname}%
491 {latexrelease}     \edef\CurrentOption{##1}%
492 {latexrelease}   \expandafter\reserved@a\CurrentOption\@nil}
493 {latexrelease}\EndIncludeInRelease
494 {*2ekernel}
495 \onlypreamble\ExecuteOptions
```

(*End definition for \ExecuteOptions.*)

The top-level commands, which just set some parameters then call the internal command, `\@fileswithoptions`.

`\documentclass` The main new-style class declaration.

```
496 \def\documentclass{%
497   \let\documentclass\@twoclasseserror
498   \if@compatibility\else\let\usepackage\RequirePackage\fi
499   \@fileswithoptions\@clsextension}
500 \onlypreamble\documentclass
```

(*End definition for \documentclass.*)

`\documentstyle` 2.09 style class ‘style’ declaration.

```
501 \def\documentstyle{%
502   \makeatletter\input{latex209.def}\makeatother
503   \documentclass}
504 \onlypreamble\documentstyle
```

(*End definition for \documentstyle.*)

`\RequirePackage` Load package if not already loaded.

```
505 \def\RequirePackage{%
506   \@fileswithoptions\@pkgextension}
507 \onlypreamble\RequirePackage
```

(*End definition for \RequirePackage.*)

`\LoadClass` Load class.

```
508 \def\LoadClass{%
509   \ifx\@currext\@pkgextension
510     \@latex@error
```

```

511      {\noexpand\LoadClass in package file}%
512      {You may only use \noexpand\LoadClass in a class file.}%
513  \fi
514  \@fileswithoptions{@clsextension}%
515  @onlypreamble\LoadClass

```

(End definition for \LoadClass.)

\@loadwithoptions Pass the current option list on to a class or package. #1 is \@cls-or-pkgextension, #2 is \RequirePackage or \LoadClass, #3 is the class or package to be loaded.

```

516 \def\@loadwithoptions#1#2#3{%
517   \expandafter\let\csname opt@\#3.\#1\expandafter\endcsname
518     \csname opt@\@currname.\@currext\endcsname
519   #2{\#3}%
520 }@onlypreamble\@loadwithoptions

```

(End definition for \@loadwithoptions.)

\LoadClassWithOptions Load class ‘#1’ with the current option list.

```

521 \def\LoadClassWithOptions{%
522   \@loadwithoptions{@clsextension}\LoadClass}%
523 }@onlypreamble\LoadClassWithOptions

```

(End definition for \LoadClassWithOptions.)

\RequirePackageWithOptions Load package ‘#1’ with the current option list.

```

524 </2ekernel>
525 {*2ekernel | latexrelease}
526 <latexrelease>\IncludeInRelease{2020/10/01}%
527 <latexrelease>          {\RequirePackageWithOptions}{Unused options issue}%
528 \def\RequirePackageWithOptions{%

```

The resetting of the unprocessed options is now done on a par package basis.

```

529  \AtEndOfPackage{\expandafter\let
530    \csname unprocessedoptions-\@currname.\@currext\endcsname
531    \relax}%
532  \@loadwithoptions{@pkgextension}\RequirePackage}%
533  @onlypreamble\RequirePackageWithOptions
534 </2ekernel | latexrelease>
535 <latexrelease>\EndIncludeInRelease
536 <latexrelease>\IncludeInRelease{0000/00/00}%
537 <latexrelease>          {\RequirePackageWithOptions}{Unused options issue}%
538 <latexrelease>
539 <latexrelease>\def\RequirePackageWithOptions{%
540 <latexrelease>  \AtEndOfPackage{\let\unprocessedoptions\relax}%
541 <latexrelease>  \@loadwithoptions{@pkgextension}\RequirePackage}%
542 <latexrelease>\EndIncludeInRelease
543 {*2ekernel}

```

(End definition for \RequirePackageWithOptions.)

`\usepackage` To begin with, `\usepackage` produces an error. This is reset by `\documentclass`.

```
544 \def\usepackage#1{%
545   \@latex@error
546   {\noexpand \usepackage before \string\documentclass}%
547   {\noexpand \usepackage may only appear in the document
548    preamble, i.e.,\MessageBreak
549    between \noexpand\documentclass and
550    \string\begin{document}.}%
551   \@gobble}
552 \onlypreamble\usepackage
```

(*End definition for \usepackage.*)

`\NeedsTeXFormat` Check that the document is running on the correct system.

```
553 \def\NeedsTeXFormat#1{%
554   \def\reserved@a{#1}%
555   \ifx\reserved@a\fmtname
556     \expandafter\@needsformat
557   \else
558     \@latex@error{This file needs format `\'\reserved@a'%
559                   \MessageBreak but this is `\'\fmtname'}%
560     The current input file will not be processed
561     further,\MessageBreak
562     because it was written for some other flavor of
563     TeX.\MessageBreak\@ehd}%
564 \endinput \fi
565 \onlypreamble\NeedsTeXFormat
```

If the file is not meant to be processed by L^AT_EX 2 _{ε} we stop inputting it, but we do not end the run. We just end inputting the current file.

```
566 \def\@needsformat{%
567   \@ifnextchar[%
568     \@needsf@rmat
569   {}}
570 \onlypreamble\@needsformat
571 \def\@needsf@rmat [#1]{%
572   \@ifl@t@r\fmtversion[#1]{}%
573   {\@latex@warning@no@line
574     {You have requested release '#1' of LaTeX,\MessageBreak
575      but only release `\'\fmtversion' is available}}}
576 \onlypreamble\@needsf@rmat
```

(*End definition for \NeedsTeXFormat.*)

`\zap@space` `\zap@space foo<space>` \emptyset removes all spaces from `foo` that are not protected by `{ }` groups.

```
577 \def\zap@space#1 #2{%
578   #1%
579   \ifx#2\empty\else\expandafter\zap@space\fi
580   #2}
```

(*End definition for \zap@space.*)

\@fileswithoptions The common part of \documentclass and \usepackage.

```
581 \def\@fileswithoptions#1{%
582   \@ifnextchar[%]
583     {\@fileswithoptions#1}%
584     {\@fileswithoptions#1[]}}
585 \onlypreamble\@fileswithoptions

586 \def\@fileswithoptions#1[#2]#3{%
587   \@ifnextchar[%]
588     {\@fileswithoptions#1[#2]#3}%
589     {\@fileswithoptions#1[#2]#3[]}}
590 \onlypreamble\@fileswithoptions
```

Then we do some work.

First of all, we define the global variables. Then we look to see if the file has already been loaded. If it has, we check that it was first loaded with at least the current options. If it has not, we add the current options to the package options, set the default version to be 0000/00/00, and load the file if we can find it. Then we check the version number.

Finally, we restore the old file name, reset the default option, and we set the catcode of @.

For classes, we can immediately process the file. For other types, #2 could be a comma separated list, so loop through, processing each one separately.

```
591 </2ekernel>
592 <latexrelease>\IncludeInRelease{2017/01/01}%
593 <latexrelease>      {\@fileswithoptions}{ifx tests in \@fileswithoptions}%
594 (*2ekernel | latexrelease)
595 \def\@fileswithoptions#1[#2]#3[#4]{%
596   \ifx#1\@clsextension
597     \ifx\@classoptionslist\relax
598       \xdef\@classoptionslist{\zap@space#2 \empty}%
599     \def\reserved@a{%
600       \onefilewithoptions#3[#2][#4]#1%
601       \documentclasshook}%
602   \else
603     \def\reserved@a{%
604       \onefilewithoptions#3[#2][#4]#1}%
605   \fi
606 }%else
```

build up a list of calls to \onefilewithoptions (one for each package) without thrashing the parameter stack.

```
607 \def\reserved@b##1,{%
```

If #1 is \onnnil we have reached the end of the list (older version used \nil here but \nil is undefined so \ifx equal to all undefined commands)

```
608   \ifx\@nnnil##1\relax\else
```

If \ifx\@nnnil##1\nil is true then #1 is (presumably) empty (Older code used \relax which is slightly easier to get into #1 by mistake, which would spoil this test.)

```
609   \ifx\@nnnil##1\@nnnil\else
610     \noexpand\onefilewithoptions##1[#2][#4]%
611     \noexpand\@pkgeextension
612   \fi
613   \expandafter\reserved@b
```

```

614      \fi}%
615      \edef\reserved@a{\zap@space#3 \empty}%
616      \edef\reserved@a{\expandafter\reserved@b\reserved@a,\@nil,}%
617  \fi
618  \reserved@a
619 </2ekernel | latexrelease>
620 <latexrelease>\EndIncludeInRelease
621 <latexrelease>\IncludeInRelease{0000/00/00}%
622 <latexrelease>      {\@fileswith@pti@ns}{ifx tests in \@fileswith@pti@ns}%
623 <latexrelease>\def\@fileswith@pti@ns#1[#2]#3[#4]{%
624 <latexrelease>  \ifx#1\@clsextension
625 <latexrelease>    \ifx\@classoptionslist\relax
626 <latexrelease>      \xdef\@classoptionslist{\zap@space#2 \empty}%
627 <latexrelease>      \def\reserved@a{%
628 <latexrelease>        \@onefilewithoptions#3[#2] [#4]#1%
629 <latexrelease>        \@documentclasshook}%
630 <latexrelease>      \else
631 <latexrelease>        \def\reserved@a{%
632 <latexrelease>          \@onefilewithoptions#3[#2] [#4]#1}%
633 <latexrelease>      \fi
634 <latexrelease>    \else
635 <latexrelease>      \def\reserved@b##1{%
636 <latexrelease>        \ifx\@nil##1\relax\else
637 <latexrelease>          \ifx\relax##1\relax\else
638 <latexrelease>            \noexpand\@onefilewithoptions##1[#2] [#4]%
639 <latexrelease>            \noexpand\@pkgextension
640 <latexrelease>          \fi
641 <latexrelease>          \expandafter\reserved@b
642 <latexrelease>        \fi}%
643 <latexrelease>      \edef\reserved@a{\zap@space#3 \empty}%
644 <latexrelease>      \def\reserved@a{%
645 <latexrelease>        \expandafter\reserved@b\reserved@a,\@nil,}%
646 <latexrelease>    \fi
647 <latexrelease>  \reserved@a
648 <latexrelease>\EndIncludeInRelease
649 <*2ekernel>
650 \@onlypreamble\@fileswith@pti@ns

```

This macro is used when loading packages or classes.

Have the main argument as #1, so we only need one \expandafter above.

```

651 </2ekernel>
652 <*2ekernel | latexrelease>
653 <latexrelease>\IncludeInRelease{2020/10/01}%
654 <latexrelease>      {\@onefilewithoptions}{Hooks and unused options issue}%
655 \def\@onefilewithoptions#1[#2] [#3]#4{%

```

We have to sanitise file names, so that something like

```

\usepackage{some/local/path/array}
\usepackage{array}

```

won't load `array.sty` twice. It is remotely possible that those are two different files, but as a matter of principles, we will consider that the base file name uniquely identifies a

package, regardless of where it lives. This assumption already holds for file hooks, for example, which address the hook to a file by its base name only.

We'll use `\@expl@@@filehook@set@curr@file@onNN` to parse the file name and return the `<path>` and `<base+ext>` in separate token lists. Further ahead, most operations use `\@currname` which doesn't have a path attached to it; only few actions prepend `\@currpath` to `\@currname` (namely loading, as we have to respect the given path).

A file substituition isn't followed just yet because at this point we are parsing user input, so the file is still what the user asked for, and not the file actually loaded.

```

656  \@expl@@@filehook@set@curr@file@onNN{#1.#4}\reserved@a\reserved@b
657  \edef\reserved@c{\def\noexpand\reserved@c####1%
658    \detokenize\expandafter{\expanded{. #4}}%
659    \noexpand\@nil{\def\noexpand\reserved@a{####1}}}\reserved@c
660  \expandafter\reserved@c\reserved@a\@nil
661  \@pushfilename
662  \xdef\@currname{\string\makeletter\reserved@a}%
663  \xdef\@currpath{\ifx\reserved@b\@empty\else\reserved@b/\fi}%
664  \global\let\@current#4%

```

The command `\ver@<file>.(<ext>)` is used to signal that a package is already loaded, either because it is in fact loaded, or because it's loading was suppressed. In minimal installations, said package may not exist but still have its loading suppressed with `\ver@<file>.(<ext>)`, so before checking if the file exists we have to check that we do need to load it with `\@ifl@aded`. If we don't, then there's no point in checking for a typo or load-disabling.

```
665  \@ifl@aded\@current\@currname
```

If the package is already loaded, check that there were no option clashes:

```

666  {\@ifoptions\@current{\@currname}{#2}{}}%
667  {\@latex@error
668    {Option clash for \c@cls@pkg\space \@currname}%
669    {The package \@currname\space has already been loaded
670     with options:\MessageBreak
671     \space\space[\@optionlist{\@currname.\@current}]\MessageBreak
672     There has now been an attempt to load it
673     with options\MessageBreak
674     \space\space[#2]\MessageBreak
675     Adding the global options:\MessageBreak
676     \space\space
677     \@optionlist{\@currname.\@current},#2\MessageBreak
678     to your \noexpand\documentclass declaration may fix this.%\MessageBreak
679     Try typing \space <return> \space to proceed.}}%
680  {\@firstofone}%
681  {\@makeatletter

```

The next line seems to be necessary for 2.09 compatibility (the way the code is written there) This seems questionable and should be look at as in 2e it is definitely unnecessary at this point!

```
683  \@reset@ptions
```

First we take the `<name>` and `<ext>` given in the argument and check if the file exists, and issue an error otherwise asking for a correction with `\@missingfileerror`. For checking if the file exists we use `\@currpath` (usually empty) before `\@currname`.

```
684  \IfFileExists{\@currpath\@currname.\@current}{}
```

```
685      {\@missing@onefilewithoptions{#2}}%
```

If `\@currname` is empty (the user replied to the “Enter file name” prompt with `<RETURN>`), so stop here (do `\@popfilename` to pop the item just added above).

This `\@gobble` omits the date check at the end.

```
686      \ifx\@currname\@empty
687          \expandafter\@gobble
688      \else
```

If the file exists, check if it was load-prevented, and otherwise do the bookkeeping with `\@filehook@file@push` then call `\set@curr@file` to set `\@curr@file` (and do any required substitution), then actually load the class/package with `\load@onefile@withoptions`. `\set@curr@file` also needs the file path.

```
689      \@disable@packageload@do{\@currname.\@currext}%
690          {\@expl@@@filehook@file@push@@
691              \set@curr@file{\@currpath\@currname.\@currext}%
692              \@filehook@set@CurrentFile
```

The `\set@curr@file` line above might have replaced the file, so `\@currname` and `\@currext` may no longer hold the actual package being loaded, so in that case we need to update these two token lists (`\@curr@file` holds the file name after replacement, so we parse that).

The requested file is saved in `\@currpkg@reqd` to be used in `\InputIfFileExists` later: if the updated `\@currname` and `\@currext` are used we lose track of the substitution, so `\CurrentFile` and `\CurrentFileUsed` will be (incorrectly) the same.

```
693      \expandafter\@swaptwoargs\expandafter
694          {\expandafter{\@currpkg@reqd}%
695          \%
696          <
```

`\@currpkg@reqd` doesn't take a path because it is used later to assign `\opt@...` and `\ver@....`

```
696      \edef\@currpkg@reqd{\@currname.\@currext}%
697      \ifx\CurrentFile\CurrentFileUsed
698      \else
699          \filename@parse\@curr@file
700          \edef\@currpath{\string@makeletter\filename@area}%
701          \edef\@currname{\string@makeletter\filename@base}%
702          \edef\@currext{\string@makeletter\filename@ext}%
703      \fi
704      \load@onefile@withoptions{#2}%
705      \def\@currpkg@reqd{\@currpkg@reqd}%
706      \%
707      >
```

Now just clean up and exit.

```
707      \@expl@@@filehook@file@pop@@}%
708          \expandafter\@firstofone
709          \fi}%
710      \%
711      \%
712      \%
713      \%
714      \%
```

Except in the case where `\@currname` is empty, the date is checked against the date marked in the package file:

```
710      {\@ifl@ter\@currext{\@currname}{#3}{}}%
711          {\@latex@warning@no@line
712              {You have requested,\on@line,
713                  version\MessageBreak
714                  '#3' of \cls@pkg\space \currname,\MessageBreak}
```

```

715         but only version\MessageBreak
716             '\csname ver@\currname.\currext\endcsname'\MessageBreak
717             is available}}%
718
719     \ifx\currext\clsextension\let\LoadClass@twoloadclasserror\fi}%
720     @popfilename
721     @reset@ptions}
722
723 \let\currpkg\reqd\empty
724 @onlypreamble\onefilewithoptions
    The kernel no longer uses @unprocessedoptions
725 \let@unprocessedoptions@undefined

```

Now the action taken when a file is not found. Path must be included here as it eventually leads to a file lookup.

```

724 \def@missing@onefilewithoptions#1{%
725   @missingfileerror{\currpath\currname}\currext
726   @global\let\currpath@missingfile@area
727   @global\let\currname@missingfile@base
728   @global\let\currext@missingfile@ext}

```

Now the code that actually does the file loading:

```

\load@onefile@withoptions 729 \def\load@onefile@withoptions#1{%
730   \let\CurrentOption\empty
731   @reset@ptions
732
733   \def\reserved@a{%
734     @pass@ptions\currext{#1}{\currname}%
735
736     \expandafter\let
737       \csname opt@\currpkg\reqd\expandafter\endcsname
738       \csname opt@\currname.\currext\endcsname
739     \global\expandafter
740     \let\csname ver@\currname.\currext\endcsname\empty

```

We initialize `\...-h@k` here and only if we load the file so that it remains undefined otherwise.

```

739   \expandafter\let\csname\currname.\currext-h@k\endcsname\empty

```

When the current extension is `@pkgextension` we are loading a package otherwise, if it is `@clsextension`, a class, so depending on that we execute different hooks. If the extension is neither, then it is another type of file without special hooks.

```

740 %-----%
741 \ifx\currext\pkgextension
742   \UseHook{package/before}%
743   \UseHook{package/before/\currname}%
744 \else
745   \ifx\currext\clsextension
746     \UseHook{class/before}%
747     \UseHook{class/before/\currname}%
748   \fi
749 \fi

```

Now actually load the file (at this point we are certain it exists, but use `\InputIfFileExists` so that file hooks are executed). `\@currpath` is needed here too.

```
750  \InputIfFileExists{\@currpath\@currpkg@reqd}{}%
751  {\@latex@error
752  {The \@cls@pkg\space\@currpkg@reqd\space failed to load}\@ehd}%
753 %-----
```

In older versions of the code `\@unprocessedoptions` would generate an error for each specified option in a package unless a `\ProcessOptions` has appeared in the package file.

This has changed in 2020. We now use a separate macro per package to avoid interferences in case of nested packages. The whole code for handling this issue (GitHub 22) was provided by Hironobu Yamashita, thanks for that.

```
754  \expandafter\let\csname unprocessedoptions-\@currname.\@currext\endcsname
755  \@@unprocessedoptions
756  \csname\@currname.\@currext-h@k\endcsname
757  \expandafter\let\csname\@currname.\@currext-h@k\endcsname
758  \undefined
```

Catch the case where the packages has handled the options and redefined `\@unprocessedoptions` to `\relax` (old interface). In that case no error should be produced.

```
759  \ifx\@unprocessedoptions\relax
760  \let\@unprocessedoptions\undefined
```

Otherwise run the per package set of unused options.

```
761  \else
762  \csname unprocessedoptions-\@currname.\@currext\endcsname
763  \fi
```

In either case we drop the macro afterwards as it is no longer needed.

```
764  \expandafter\let
765  \csname unprocessedoptions-\@currname.\@currext\endcsname
766  \undefined
```

And same procedure, James, when we are finished loading, except that the hook order is now reversed.

```
767 %-----
768 \ifx\@currext\@pkgextension
769  \UseHook{package/after/\@currname}%
770  \UseHook{package/after}%
771 \else
772  \ifx\@currext\@clsextension
773  \UseHook{class/after/\@currname}%
774  \UseHook{class/after}%
775 \fi
776 \fi}%
777 %-----
778 \@ifl@aded\@currext\@currname{}{\reserved@a}%

779 </2ekernel | latexrelease>
780 <latexrelease>\EndIncludeInRelease
781 <latexrelease>\IncludeInRelease{0000/00/00}%
782 <latexrelease>      {\@onefilewithoptions}{Hooks and unused options issue}%
783 <latexrelease>
```

Because of the way `\@onfilewithoptions` is changed for rollback handling below we have to define `\load@onfilewithoptions` when rolling back!

```

784 <{latexrelease}>\def\load@onfilewithoptions#1[#2] [#3]#4{%
785 <{latexrelease}>  \@pushfilename
786 <{latexrelease}>  \xdef\@currname{#1}%
787 <{latexrelease}>  \global\let\@currext#4%
788 <{latexrelease}>  \let\CurrentOption\empty
789 <{latexrelease}>  \@reset@ptions
790 <{latexrelease}>  \makeatletter
791 <{latexrelease}>  \def\reserved@a{%
792 <{latexrelease}>    \@ifl@aded\@currext{#1}%
793 <{latexrelease}>    {\@if@ptions\@currext{#1}{#2}{}}%
794 <{latexrelease}>    {\@latex@error
795 <{latexrelease}>      {Option clash for \@cls@pkg\space #1}%
796 <{latexrelease}>      {The package #1 has already been loaded
797 <{latexrelease}>      with options:\MessageBreak
798 <{latexrelease}>      \space\space[\@optionlist{#1.\@currext}]\MessageBreak
799 <{latexrelease}>      There has now been an attempt to load it
800 <{latexrelease}>      with options\MessageBreak
801 <{latexrelease}>      \space\space[#2]\MessageBreak
802 <{latexrelease}>      Adding the global options:\MessageBreak
803 <{latexrelease}>      \space\space
804 <{latexrelease}>      \@optionlist{#1.\@currext},#2\MessageBreak
805 <{latexrelease}>      to your \noexpand\documentclass declaration may fix this.%\MessageBreak
806 <{latexrelease}>      Try typing \space <return> \space to proceed.}}}%
807 <{latexrelease}>  {\@pass@ptions\@currext{#2}{#1}%
808 <{latexrelease}>    \global\expandafter
809 <{latexrelease}>    \let\csname ver@\@currname.\@currext\endcsname\empty
810 <{latexrelease}>    \expandafter\let\csname\@currname.\@currext-h@k\endcsname\empty
811 <{latexrelease}>    \InputIfFileExists
812 <{latexrelease}>    {\@currname.\@currext}%
813 <{latexrelease}>    {}%
814 <{latexrelease}>    {\@missingfileerror\@currname\@currext}%
815 <{latexrelease}>    \let\@unprocessedoptions\@unprocessedoptions
816 <{latexrelease}>    \csname\@currname.\@currext-h@k\endcsname
817 <{latexrelease}>    \expandafter\let\csname\@currname.\@currext-h@k\endcsname
818 <{latexrelease}>    \undefined
819 <{latexrelease}>    \@unprocessedoptions}%
820 <{latexrelease}>  \@ifl@ter\@currext{#1}{#3}{}}%
821 <{latexrelease}>  {\@latex@warning@no@line
822 <{latexrelease}>    {You have requested,\on@line,
823 <{latexrelease}>    version\MessageBreak
824 <{latexrelease}>    '#3' of \@cls@pkg\space #1,\MessageBreak
825 <{latexrelease}>    but only version\MessageBreak
826 <{latexrelease}>    '\csname ver@\#1.\@currext\endcsname'\MessageBreak
827 <{latexrelease}>    is available}}}%
828 <{latexrelease}>  \ifx\@currext\@clsextension\let\LoadClass\@twoloadclasserror\fi
829 <{latexrelease}>  \@popfilename
830 <{latexrelease}>  \@reset@ptions}%
831 <{latexrelease}>  \reserved@a}
832 <{latexrelease}>  \load@onfilewithoptions \@undefined
833 <{latexrelease}>  \let \load@onfile@withoptions \@undefined
834 <{latexrelease}>  \let \load@onfile@withoptions \@undefined
835 <{latexrelease}>  \let \@missing@onfilewithoptions \@undefined

```

```

836  ⟨latexrelease⟩
837  ⟨latexrelease⟩\EndIncludeInRelease
838  ⟨*2ekernel⟩

(End definition for \@@fileswithoptions and others.)

\@@fileswithoptions Save the definition (for error checking).
839  \let\@@fileswith@ptions\@fileswith@ptions
840  \onlypreamble\@@fileswith@ptions

(End definition for \@@fileswith@ptions.)

\@reset@ptions Reset the default option, and clear lists of declared options.
841  \def\@reset@ptions{%
842    \global\ifx\@currext\@clsextension
843      \let\default@ds\OptionNotUsed
844    \else
845      \let\default@ds\@unknownoptionerror
846    \fi
847    \global\let\ds@\emptyset
848    \global\let\@declaredoptions\emptyset
849  \onlypreamble\@reset@ptions

(End definition for \@reset@ptions.)

4.1 Hooks

Allow code to be saved to be executed at specific later times.

Save things in macros, I considered using toks registers, (and \addto@hook from the
NFSS code, that would require stacking the contents in the case of required packages, so
just generate a new macro for each package.

\@begindocumenthook Stuff to appear at the beginning or end of the document.
\@enddocumenthook
850  \ifx\@begindocumenthook\@undefined
851    \let\@begindocumenthook\emptyset
852  \fi
853  \let\@enddocumenthook\emptyset

(End definition for \@begindocumenthook and \@enddocumenthook.)

\AtEndOfPackage The access functions.
\AtEndOfClass
\AtBeginDocument
\AtEndDocument
854  \def\AtEndOfPackage{%
855    \expandafter\g@addto@macro\csname\@currname.\@currext-h@@k\endcsname}
856  \let\AtEndOfClass\AtEndOfPackage
857  \onlypreamble\AtEndOfPackage
858  \onlypreamble\AtEndOfClass

859  ⟨/2ekernel⟩
860  ⟨*2ekernel | latexrelease⟩
861  ⟨latexrelease⟩\IncludeInRelease{2020/10/01}%
862  ⟨latexrelease⟩          {\AtBeginDocument}{Use hook system}%
863  \DeclareRobustCommand\AtBeginDocument{\AddToHook{begindocument}}
864  \DeclareRobustCommand\AtEndDocument {\AddToHook{enddocument}}
865  \% \DeclareRobustCommand\AtEndDocument {\AddToHook{env/document/end}} % alternative impl

```

```

866  {/2ekernel | latexrelease}
867  \latexrelease\EndIncludeInRelease
868  \latexrelease\IncludeInRelease{0000/00/00}%
869  \latexrelease{\AtBeginDocument}{Use hook system}%
870  \latexrelease
871  \latexrelease\DeclareRobustCommand\AtBeginDocument{\g@addto@macro\@begindocumenthook}
872  \latexrelease\DeclareRobustCommand\AtEndDocument{\g@addto@macro\@enddocumenthook}
873  \latexrelease
874  \latexrelease\EndIncludeInRelease
875  {*2ekernel}

876  \onlypreamble\AtBeginDocument

```

(*End definition for \AtEndOfPackage and others.*)

\@cls@pkg The current file type.

```

877  \def\@cls@pkg{%
878    \ifx\@currext\@clsextension
879      document class%
880    \else
881      package%
882    \fi}
883  \onlypreamble\@cls@pkg

```

(*End definition for \@cls@pkg.*)

\@unknownoptionerror Bad option.

```

884  \def\@unknownoptionerror{%
885    \@latex@error
886    {Unknown option ‘\CurrentOption’ for \@cls@pkg\space‘\currname’}%
887    {The option ‘\CurrentOption’ was not declared in
888     \@cls@pkg\space‘\currname’, perhaps you\MessageBreak
889     misspelled its name.
890     Try typing \space <return>
891     \space to proceed.}}
892  \onlypreamble\@unknownoptionerror

```

(*End definition for \@unknownoptionerror.*)

\@@unprocessedoptions Declare an error for each option, unless a \ProcessOptions occurred.

```

893  \def\@@unprocessedoptions{%
894    \ifx\@currext\@pkextension
895      \edef\@curroptions{\@optionlist{\currname.\@currext}}%
896      \@for\CurrentOption:=\@curroptions\do{%
897        \ifx\CurrentOption\@empty\else\@unknownoptionerror\fi}%
898    \fi}
899  \onlypreamble\@unprocessedoptions
900  \onlypreamble\@@unprocessedoptions

```

(*End definition for @@unprocessedoptions.*)

\@badrequireerror \RequirePackage or \LoadClass occurs in the options section.

```

901  \def\@badrequireerror#1[#2]#3[#4]{%
902    \@latex@error
903      {\noexpand\RequirePackage or \noexpand\LoadClass
904       in Options Section}%

```

```

905     {The \@cls@pkg\space ‘\@currname’ is defective.\MessageBreak
906     It attempts to load ‘#3’ in the options section, i.e.,\MessageBreak
907     between \noexpand\DeclareOption and \string\ProcessOptions.}}
908 \onlypreamble\@badrequireerror

```

(End definition for \@badrequireerror.)

\@twoloadclasserror Two \LoadClass in a class.

```

909 \def\@twoloadclasserror{%
910   \@latex@error
911   {Two \noexpand\LoadClass commands}%
912   {You may only use one \noexpand\LoadClass in a class file}%
913 \onlypreamble\@twoloadclasserror

```

(End definition for \@twoloadclasserror.)

\@twoclasseserror Two \documentclass or \documentstyle.

```

914 \def\@twoclasseserror#1{%
915   \@latex@error
916   {Two \noexpand\documentclass or \noexpand\documentstyle commands}%
917   {The document may only declare one class.}\@gobble}
918 \onlypreamble\@twoclasseserror

```

(End definition for \@twoclasseserror.)

4.2 Providing shipment

\two@digits Prefix a number less than 10 with ‘0’.

```
919 \def\two@digits#1{\ifnum#1<10 0\fi\number#1}
```

(End definition for \two@digits.)

\filecontents \endfilecontents This environment implements inline files. The star-form does not write extra comments into the file.

```

920 </2ekernel>
921 {*2ekernel | latexrelease}
922 <| latexrelease>\IncludeInRelease{2020/10/01}%
923 <| latexrelease>           {\filec@ntents}{Define \q@curr@file directly (gh/220)}%
924 %

```

We use @tempswa to mean no preamble writing and reuse @files w to indicate no overwriting:

```

925 \def\filecontents{\@tempswatru@filestrue
926   \@ifnextchar[\filec@ntents@opt\filec@ntents
927 }
928 \namingedef{filecontents*}{\@tempswafalse\@filestrue
929   \@ifnextchar[\filec@ntents@opt\filec@ntents
930 }

```

To handle the optional argument we execute for each option the command \filec@ntents@OPTION if it exist or complain about unknown option.

```

931 \def\filec@ntents@opt[#1]{%
932   \edef\@fortmp{\zap@space#1 \@empty}%
933   \@for\reserved@a:=\@fortmp\do{%
934     \ifcsname filec@ntents@\reserved@a\endcsname

```

```

935      \csname filec@ntents@\reserved@a\endcsname
936      \else
937      \@latex@error{Unknown filecontents option \reserved@a}%
938      {Valid options are force (or overwrite), nosearch, noheader}%
939      \fi}%
940  \filec@ntents
941 }

Option force (or overwrite) changes the overwriting switch
942 \let\filec@ntents@force\@filesfalse
943 \let\filec@ntents@overwrite\@filesfalse % alternative name
and option noheader the preamble switch (which is equivalent to using the star form of
the environment).
944 \let\filec@ntents@noheader\@tempswfalse
Option nosearch only checks the current directory not the whole TeX tree for the exis-
tence of the file to write.
945 \def\filec@ntents@nosearch{%
946   \let\filec@ntents@checkdir\@currdir
947   \def\filec@ntents@where{in current directory}}
By default we search the whole tree:
948 \let\filec@ntents@checkdir\@empty
949 \def\filec@ntents@where{exists on the system}
950 \begingroup%
951 \tempcnta=1
952 \loop
953   \catcode\@tempcnta=12 %
954   \advance\@tempcnta\@ne %
955   \ifnum\@tempcnta<32 %
956   \repeat %
957   \catcode`\*=11 %
958   \catcode`\^M\active%
959   \catcode`\^L\active\let\relax\relax%
960   \catcode`\^I\active%
961 \gdef\filec@ntents#1{%
962   \set@curr@file{\filec@ntents@checkdir#1}%
963   \edef\q@curr@file{"\@curr@file"}%
LuaTeX has more writes (and 18 is safe here).
964 \chardef\reserved@c\ifx\directlua\@undefined 15 \else 127 \fi%
965 \openin\@inputcheck\q@curr@file \space %
966 \ifeof\@inputcheck%
967   \@latex@warning@no@line%
968     {Writing file '\@currdir\@curr@file'}%
969   \ch@ck7\reserved@c\write\relax%
970   \immediate\openout\reserved@c\q@curr@file\relax%
971 \else%
972   \if@files%
973     \@latex@warning@no@line%
974       {File '\@curr@file' already \filec@ntents@where.\MessageBreak%
975         Not generating it from this source}%

```

```

976      \let\write\@gobbletwo%
977      \let\closeout\@gobble%
978 \else%

```

If we are overwriting, we try to make sure that the user is not by mistake overwriting the input file (`\jobname`). Of course, this only works for input files ending in `.tex`. If a different extension is used there is no way to see that we are overwriting ourselves!

```

979      \edef\reserved@a{\detokenize\expandafter{\reserved@a}}%
980      \edef\reserved@a{\detokenize\expandafter{\jobname}}%
981      \edef\reserved@b{\detokenize\expandafter{\jobname}}%
982      \ifx\reserved@a\reserved@b%
983          \@fileswtrue%
984      \else%
985          \edef\reserved@b{\reserved@b\detokenize{.tex}}%
986          \ifx\reserved@a\reserved@b
987              \@fileswtrue%
988          \fi%
989      \fi%

```

We allocate a write channel but we open it only if it is (hopefully) safe. If not opened that means we are going to write on the terminal.

```

990      \ch@ck7\reserved@c\write\relax%
991      \if@filesw% % Foul ... trying to overwrite \jobname!
992          \@latex@error{Trying to overwrite '\jobname.tex'}{You can't %
993              write to the file you are reading from!\MessageBreak%
994              Data is written to screen instead.}%
995      \else%
996          \@latex@warning@no@line%
997              {Writing or overwriting file '\currdir\curr@file'}%
998          \immediate\openout\reserved@c\q\curr@file\relax%
999      \fi%
1000     \fi%
1001 \fi%

```

Closing the `\@inputcheck` is done here to avoid having to do this in each branch.

```

1002 \closein\@inputcheck%
1003 \if@tempswa%
1004     \immediate\write\reserved@c{%
1005         \@percentchar\@percentchar\space%
1006         \expandafter\@gobble\string\LaTeXe file '\curr@file'^^J%
1007         \@percentchar\@percentchar\space generated by the %
1008         '\currenvir' \expandafter\@gobblefour\string\newenvironment^^J%
1009         \@percentchar\@percentchar\space from source '\jobname' on %
1010         \number\year/\two@digits\month/\two@digits\day.^^J%
1011         \@percentchar\@percentchar}%
1012     \fi%
1013 \let\do\@makeother\dospecials%

```

If there are active characters in the upper half (e.g., from `inputenc` there would be confusion so we render everything harmless.

```

1014 \count@ 128\relax%
1015 \loop%
1016     \catcode\count@ 11\relax%
1017     \advance\count@\ @ne%

```

```

1018      \ifnum\count@<\@cclvi%
1019      \repeat%
1020      \edef\E{\@backslashchar end\string{\@currenvir\string}{}%
1021      \edef\reserved@b{%
1022          \def\noexpand\reserved@b{%
1023              #####1\E#####2\E#####3\relax}%
1024      \reserved@b{%
1025          \ifx\relax##3\relax%

```

There was no \end{filecontents}

```

1026      \immediate\write\reserved@c{##1}%
1027      \else%

```

There was a \end{filecontents}, so stop this time.

```

1028      \edef^~M{\noexpand\end{\@currenvir}{}%
1029      \ifx\relax##1\relax%
1030      \else%

```

Text before the \end, write it with a warning.

```

1031      \@latex@warning{Writing text ‘##1’ before %
1032          \string\end{\@currenvir}\MessageBreak as last line of \@curr@file}%
1033      \immediate\write\reserved@c{##1}%
1034      \fi%
1035      \ifx\relax##2\relax%
1036      \else%

```

Text after the \end, ignore it with a warning.

```

1037      \@latex@warning{%
1038          Ignoring text ‘##2’ after \string\end{\@currenvir}{}%
1039          \fi%
1040          \fi%
1041          ^~M}%
1042      \catcode`^~L\active%
1043      \let\L\@undefined%
1044      \def^~L{\expandafter\ifx\csname L\endcsname\relax\fi ^~J^~J}%
1045      \catcode`^~I\active%
1046      \let\I\@undefined%
1047      \def^~I{\expandafter\ifx\csname I\endcsname\relax\fi\space}%
1048      \catcode`^~M\active%
1049      \edef^~M##1^~M{%
1050          \noexpand\reserved@b##1\relax}%
1051      \endgroup%
1052  </2ekernel | latexrelease>
1053  <latexrelease>\EndIncludeInRelease
1054  <latexrelease>\IncludeInRelease[2019/10/01]%
1055  <latexrelease>          {\filec@ntents}{Spaces in file names + optional arg}%
1056  <latexrelease>\def\filecontents{\@tempswatrue\@filesctrue
1057  <latexrelease>  \@ifnextchar[\filec@ntents@opt\filec@ntents
1058  <latexrelease>}%
1059  <latexrelease>\@namedef{filecontents*}{\@tempswafalse\@filesctrue
1060  <latexrelease>  \@ifnextchar[\filec@ntents@opt\filec@ntents
1061  <latexrelease>}%
1062  <latexrelease>\def\filec@ntents@opt[#1]{%
1063  <latexrelease>  \edef\@fortmp{\zap@space#1 \empty}%

```

```

1064 <|latexrelease> \@for\reserved@a:=\@fortmp\do{%
1065 <|latexrelease> \ifcsname filec@ntents@\reserved@a\endcsname
1066 <|latexrelease> \csname filec@ntents@\reserved@a\endcsname
1067 <|latexrelease> \else
1068 <|latexrelease> \@latex@error{Unknown filecontents option \reserved@a}%
1069 <|latexrelease> {Valid options are force (or overwrite), nosearch, noheader}%
1070 <|latexrelease> \fi}%
1071 <|latexrelease> \filec@ntents
1072 <|latexrelease>}%
1073 <|latexrelease>\let\filec@ntents@force\@filesfalse
1074 <|latexrelease>\let\filec@ntents@overwrite\@filesfalse % alternative name
1075 <|latexrelease>\let\filec@ntents@noheader\@tempswfalse
1076 <|latexrelease>\def\filec@ntents@nosearch{%
1077 <|latexrelease> \let\filec@ntents@checkdir\@currdir
1078 <|latexrelease> \def\filec@ntents@where{in current directory}}
1079 <|latexrelease>\let\filec@ntents@checkdir\@empty
1080 <|latexrelease>\def\filec@ntents@where{exists on the system}
1081 <|latexrelease>\begingroup%
1082 <|latexrelease>\@tempcnta=1
1083 <|latexrelease>\loop
1084 <|latexrelease> \catcode\@tempcnta=12 %
1085 <|latexrelease> \advance\@tempcnta\@ne %
1086 <|latexrelease>\ifnum\@tempcnta<32 %
1087 <|latexrelease>\repeat %
1088 <|latexrelease>\catcode`*=11 %
1089 <|latexrelease>\catcode`\~\active%
1090 <|latexrelease>\catcode`\^L\active\let`^L\relax%
1091 <|latexrelease>\catcode`\^I\active%
1092 <|latexrelease>\gdef\filec@ntents#1{%
1093 <|latexrelease> \set@curr@file{\filec@ntents@checkdir#1}%
1094 <|latexrelease> \edef\q@curr@file{\expandafter\quote@name\expandafter{\@curr@file}}%
1095 <|latexrelease> \chardef\reserved@c\ifx\directlua\@undefined 15 \else 127 \fi%
1096 <|latexrelease> \openin\@inputcheck\q@curr@file \space %
1097 <|latexrelease> \ifeof\@inputcheck%
1098 <|latexrelease> \@latex@warning@no@line%
1099 <|latexrelease> {Writing file '\@currdir\@curr@file'}%
1100 <|latexrelease> \ch@ck7\reserved@c\write\relax%
1101 <|latexrelease> \immediate\openout\reserved@c\q@curr@file\relax%
1102 <|latexrelease> \else%
1103 <|latexrelease> \if@files%
1104 <|latexrelease> \@latex@warning@no@line%
1105 <|latexrelease> {File '\@curr@file' already \filec@ntents@where.\MessageBreak%
1106 <|latexrelease> Not generating it from this source}%
1107 <|latexrelease> \let\write@gobbletwo%
1108 <|latexrelease> \let\closeout\gobble%
1109 <|latexrelease> \else%
1110 <|latexrelease> \edef\reserved@a{#1}%
1111 <|latexrelease> \edef\reserved@a{\detokenize\expandafter{\reserved@a}}%
1112 <|latexrelease> \edef\reserved@b{\detokenize\expandafter{\jobname}}%
1113 <|latexrelease> \ifx\reserved@a\reserved@b%
1114 <|latexrelease> \ @filestrue%
1115 <|latexrelease> \else%
1116 <|latexrelease> \edef\reserved@b{\reserved@b\detokenize{.tex}}%
1117 <|latexrelease> \ifx\reserved@a\reserved@b

```

```

1118  ⟨latexrelease⟩          \Qfileswtrue%
1119  ⟨latexrelease⟩          \fi%
1120  ⟨latexrelease⟩          \fi%
1121  ⟨latexrelease⟩          \ch@ck7\reserved@c\write\relax%
1122  ⟨latexrelease⟩          \if@filesw% % Foul ... trying to overwrite \jobname!
1123  ⟨latexrelease⟩          \Qlatex@error{Trying to overwrite ‘\jobname.tex’}{You can’t %
1124  ⟨latexrelease⟩          write to the file you are reading from!\MessageBreak%
1125  ⟨latexrelease⟩          Data is written to screen instead.}%
1126  ⟨latexrelease⟩          \else%
1127  ⟨latexrelease⟩          \Qlatex@warning@no@line%
1128  ⟨latexrelease⟩          {Writing or overwriting file ‘\currdir\curr@file’}%
1129  ⟨latexrelease⟩          \immediate\openout\reserved@c\q@curr@file\relax%
1130  ⟨latexrelease⟩          \fi%
1131  ⟨latexrelease⟩          \fi%
1132  ⟨latexrelease⟩          \fi%
1133  ⟨latexrelease⟩          \closein\Qinputcheck%
1134  ⟨latexrelease⟩          \if@tempswa%
1135  ⟨latexrelease⟩          \immediate\write\reserved@c{%
1136  ⟨latexrelease⟩          \Qpercentchar\Qpercentchar\space%
1137  ⟨latexrelease⟩          \expandafter\Qgobble\string\LaTeXe file ‘\curr@file’^J%
1138  ⟨latexrelease⟩          \Qpercentchar\Qpercentchar\space generated by the %
1139  ⟨latexrelease⟩          ‘\currenvir’ \expandafter\Qgobblefour\string\newenvironment^J%
1140  ⟨latexrelease⟩          \Qpercentchar\Qpercentchar\space from source ‘\jobname’ on %
1141  ⟨latexrelease⟩          \number\year/\two@digits\month/\two@digits\day.^J%
1142  ⟨latexrelease⟩          \Qpercentchar\Qpercentchar}%
1143  ⟨latexrelease⟩          \fi%
1144  ⟨latexrelease⟩          \let\do\Qmakeother\dospecials%
1145  ⟨latexrelease⟩          \count@ 128\relax%
1146  ⟨latexrelease⟩          \loop%
1147  ⟨latexrelease⟩          \catcode\count@ 11\relax%
1148  ⟨latexrelease⟩          \advance\count@ \One%
1149  ⟨latexrelease⟩          \ifnum\count@<\Qcclvi%
1150  ⟨latexrelease⟩          \repeat%
1151  ⟨latexrelease⟩          \edef\E{\Qbackslash\end\string\{\Qcurrenvir\string\}}%
1152  ⟨latexrelease⟩          \edef\reserved@b{%
1153  ⟨latexrelease⟩          \def\noexpand\reserved@b{%
1154  ⟨latexrelease⟩          #####1\E#####2\E#####3\relax}%
1155  ⟨latexrelease⟩          \reserved@b{%
1156  ⟨latexrelease⟩          \ifx\relax##3\relax%
1157  ⟨latexrelease⟩          \immediate\write\reserved@c{##1}%
1158  ⟨latexrelease⟩          \else%
1159  ⟨latexrelease⟩          \edef^M{\noexpand\end\{\Qcurrenvir\}}%
1160  ⟨latexrelease⟩          \ifx\relax##1\relax%
1161  ⟨latexrelease⟩          \else%
1162  ⟨latexrelease⟩          \Qlatex@warning{Writing text ‘##1’ before %
1163  ⟨latexrelease⟩          \string\end\{\Qcurrenvir\}\MessageBreak as last line of \curr@file}%
1164  ⟨latexrelease⟩          \immediate\write\reserved@c{##1}%
1165  ⟨latexrelease⟩          \fi%
1166  ⟨latexrelease⟩          \ifx\relax##2\relax%
1167  ⟨latexrelease⟩          \else%
1168  ⟨latexrelease⟩          \Qlatex@warning{%
1169  ⟨latexrelease⟩          Ignoring text ‘##2’ after \string\end\{\Qcurrenvir\}}%
1170  ⟨latexrelease⟩          \fi%
1171  ⟨latexrelease⟩          \fi%

```

```

1172 〈latexrelease〉      ^~M}%
1173 〈latexrelease〉      \catcode`^~L\active%
1174 〈latexrelease〉      \let\L\@undefined%
1175 〈latexrelease〉      \def^~L{\expandafter\ifx\csname L\endcsname\relax\fi ^~J^~J}%
1176 〈latexrelease〉      \catcode`^~I\active%
1177 〈latexrelease〉      \let\I\@undefined%
1178 〈latexrelease〉      \def^~I{\expandafter\ifx\csname I\endcsname\relax\fi\space}%
1179 〈latexrelease〉      \catcode`^~M\active%
1180 〈latexrelease〉      \edef^~M##1^~M{%
1181 〈latexrelease〉          \noexpand\reserved@b##1\relax}%
1182 〈latexrelease〉\endgroup%
1183 〈latexrelease〉\EndIncludeInRelease
1184 〈latexrelease〉\IncludeInRelease{0000/00/00}%
1185 〈latexrelease〉                  {filec@ntents}{Spaces in file names + optional arg}%
1186 〈latexrelease〉
1187 〈latexrelease〉\let\filec@ntents@opt      \@undefined
1188 〈latexrelease〉\let\filec@ntents@force     \@undefined
1189 〈latexrelease〉\let\filec@ntents@overwrite  \@undefined
1190 〈latexrelease〉\let\filec@ntents@noheader   \@undefined
1191 〈latexrelease〉\let\filec@ntents@nosearch   \@undefined
1192 〈latexrelease〉\let\filec@ntents@checkdir  \@undefined
1193 〈latexrelease〉\let\filec@ntents@where    \@undefined
1194 〈latexrelease〉
1195 〈latexrelease〉\begingroup%
1196 〈latexrelease〉\@tempcnta=1
1197 〈latexrelease〉\loop
1198 〈latexrelease〉  \catcode\@tempcnta=12 %
1199 〈latexrelease〉  \advance\@tempcnta\@ne %
1200 〈latexrelease〉\ifnum\@tempcnta<32        %
1201 〈latexrelease〉\repeat
1202 〈latexrelease〉\catcode`*#=11 %
1203 〈latexrelease〉\catcode`^~M\active%
1204 〈latexrelease〉\catcode`^~L\active\let^~L\relax%
1205 〈latexrelease〉\catcode`^~I\active%
1206 〈latexrelease〉
1207 〈latexrelease〉\gdef\filec@ntents#1{%
1208 〈latexrelease〉  \openin\@inputcheck#1 %
1209 〈latexrelease〉  \ifeof\@inputcheck%
1210 〈latexrelease〉      \@latex@warning@no@line%
1211 〈latexrelease〉      {Writing file `@\currdir#1'}%
1212 〈latexrelease〉  \chardef\reserved@c15 %
1213 〈latexrelease〉  \ch@ck7\reserved@c\write%
1214 〈latexrelease〉  \immediate\openout\reserved@c#1\relax%
1215 〈latexrelease〉  \else%
1216 〈latexrelease〉  \closein\@inputcheck%
1217 〈latexrelease〉  \@latex@warning@no@line%
1218 〈latexrelease〉      {File '#1' already exists on the system.\MessageBreak%
1219 〈latexrelease〉      Not generating it from this source}%
1220 〈latexrelease〉  \let\write@gobbletwo%
1221 〈latexrelease〉  \let\closeout\@gobble%
1222 〈latexrelease〉  \fi%
1223 〈latexrelease〉  \if@tempswa%
1224 〈latexrelease〉  \immediate\write\reserved@c{%
1225 〈latexrelease〉      \percentchar\percentchar\space%

```

```

1226 〈\latexrelease〉      \expandafter\@gobble\string\LaTeXe file '#1'^^J%
1227 〈\latexrelease〉      \@percentchar\@percentchar\space generated by the %
1228 〈\latexrelease〉          '@currenvir' \expandafter\@gobblefour\string\newenvironment^^J%
1229 〈\latexrelease〉      \@percentchar\@percentchar\space from source '\jobname' on %
1230 〈\latexrelease〉          \number\year/\two@digits\month/\two@digits\day.^^J%
1231 〈\latexrelease〉      \@percentchar\@percentchar}%
1232 〈\latexrelease〉      \fi%
1233 〈\latexrelease〉      \let\do\@makeother\dospecials%
1234 〈\latexrelease〉      \count@ 128\relax%
1235 〈\latexrelease〉      \loop%
1236 〈\latexrelease〉          \catcode\count@ 11\relax%
1237 〈\latexrelease〉          \advance\count@ \@ne%
1238 〈\latexrelease〉          \ifnum\count@<\@cclvi%
1239 〈\latexrelease〉          \repeat%
1240 〈\latexrelease〉          \edef\E{\@backslashchar end\string{\@currenvir\string}}%
1241 〈\latexrelease〉          \edef\reserved@b{%
1242 〈\latexrelease〉              \def\noexpand\reserved@b{%
1243 〈\latexrelease〉                  #####1\E#####2\E#####3\relax}%
1244 〈\latexrelease〉          \reserved@b{%
1245 〈\latexrelease〉              \ifx\relax##3\relax%
1246 〈\latexrelease〉                  \immediate\write\reserved@c{##1}%
1247 〈\latexrelease〉              \else%
1248 〈\latexrelease〉                  \edef^~M{\noexpand\end{\@currenvir}}%
1249 〈\latexrelease〉                  \ifx\relax##1\relax%
1250 〈\latexrelease〉                      \else%
1251 〈\latexrelease〉                          \@latex@warning{Writing text '##1' before %
1252 〈\latexrelease〉                              \string\end{\@currenvir}\MessageBreak as last line of #1}%
1253 〈\latexrelease〉                          \immediate\write\reserved@c{##1}%
1254 〈\latexrelease〉                      \fi%
1255 〈\latexrelease〉                  \ifx\relax##2\relax%
1256 〈\latexrelease〉                      \else%
1257 〈\latexrelease〉                          \@latex@warning{%
1258 〈\latexrelease〉                              Ignoring text '##2' after \string\end{\@currenvir}}%
1259 〈\latexrelease〉                      \fi%
1260 〈\latexrelease〉                  \fi%
1261 〈\latexrelease〉                  ^~M}%
1262 〈\latexrelease〉
1263 〈\latexrelease〉      \catcode`\^~L\active%
1264 〈\latexrelease〉      \let\^L\@undefined%
1265 〈\latexrelease〉      \def^~L{\expandafter\ifx\csname L\endcsname\relax\fi ^~J^~J}%
1266 〈\latexrelease〉      \catcode`\^~I\active%
1267 〈\latexrelease〉      \let\^I\@undefined%
1268 〈\latexrelease〉      \def^~I{\expandafter\ifx\csname I\endcsname\relax\fi\space}%
1269 〈\latexrelease〉      \catcode`\^~M\active%
1270 〈\latexrelease〉      \edef^~M##1^~M{%
1271 〈\latexrelease〉          \noexpand\reserved@b##1\^E\relax}%
1272 〈\latexrelease〉      \endgroup%
1273 〈\latexrelease〉      \EndIncludeInRelease
1274 〈*2ekernel〉
1275 \begingroup
1276 \catcode`!=\catcode`\%
1277 \catcode`\#=12
1278 \catcode`\*=11
1279 \gdef\@percentchar{%

```

```

1280 \gdef\endfilecontents{|
1281   \immediate\closeout\reserved@c
1282 \def\T##1##2##3{|
1283   \ifx##1\undefined\else
1284     \@latex@warning@no@line{##2 has been converted to Blank ##3e}|
1285   \fi}|}
1286 \T\L{Form Feed}{Lin}||
1287 \T\I{Tab}{Spac}||
1288 \immediate\write\@unused{}}
1289 \global\let\endfilecontents*\endfilecontents

```

We no longer prevent the code to be used after begin document (no rollback needed for this change).

```

1290 %\@onlypreamble\filecontents
1291 %\@onlypreamble\endfilecontents
1292 %\@onlypreamble\filecontents*
1293 %\@onlypreamble\endfilecontents*
1294 \endgroup
1295 %\@onlypreamble\filecontents
(End definition for \filecontents and \endfilecontents.)

```

5 Package/class rollback mechanism

```

1296 </2ekernel>
1297 (*2ekernel | latexreleasefirst)

```

\pkgcls@debug For testing we have a few extra lines of code that by default do nothing but one can set \pkgcls@debug to \typeout to get extra info. Sometime in the future this will be dropped.

```

1298 (*tracerollback)
1299 %\let\pkgcls@debug\typeout
1300 \let\pkgcls@debug\@gobble
1301 </tracerollback>

```

(End definition for \pkgcls@debug.)

\requestedLaTeXdate The macro (!) \requestedLaTeXdate holds the globally requested rollback date (via `latexrelease`) or zero if no such request was made.

```

1302 \def\requestedLaTeXdate{0}

```

(End definition for \requestedLaTeXdate.)

\pkgcls@targetdate \pkgcls@targetlabel \pkgcls@innerdate If a rollback for a package or class is requested then \pkgcls@targetdate holds the requested date as a number YYYYMMDD (if there was one, otherwise the value of \requestedLaTeXdate) and \pkgcls@targetlabel will be empty. If there was a request for a named version then \pkgcls@targetlabel holds the verion name and \pkgcls@targetdate is set to 1.

\pkgcls@targetdate=0 is used to indicate that there was no rollback request. While loading an old release \pkgcls@targetdate is also reset to zero so that \DeclareRelease declarations are bypassed.

In contrast \pkgcls@innerdate will always hold the requested date (in a macro not a counter) if there was one, otherwise, e.g., if there was no request or a request to a

version name it will contain TeX largest legal number. While loading a file this can be used to provide conditionals that select code based on the request.

```

1303 \ifx\pkgcls@targetdate\@undefined
1304   \newcount\pkgcls@targetdate
1305 \fi
1306 \let\pkgcls@targetlabel\@empty
1307 \def\pkgcls@innerdate{\maxdimen}

```

(End definition for \pkgcls@targetdate, \pkgcls@targetlabel, and \pkgcls@innerdate.)

\pkgcls@candidate When looping through the \DeclareRelease declarations we record if the release is the best candidate we have seen so far. This is recorded in \pkgcls@candidate and we update it whenever we see a better one.

In \pkgcls@releasedate we keep track of the release date of that candidate.

```

1308 \let\pkgcls@candidate\@empty
1309 \let\pkgcls@releasedate\@empty

```

(End definition for \pkgcls@candidate and \pkgcls@releasedate.)

\load@onefilewithoptions the best place to add the rollback code is at the point where \onefilewithoptions is called to load a single class or package.

To make things easy we save the old definition as \load@onefilewithoptions and then provide a new interface.

Important: as this code is also unconditionally placed into latexrelease we can only do this name change once otherwise both macros will contain the same code.

```

1310 \ifx\load@onefilewithoptions\@undefined
1311   \let\load@onefilewithoptions\onefilewithoptions
1312   \def\onefilewithoptions#1[#2] [#3] #4{%

```

First a bit of tracing normally disabled.

```

1313 (*tracerollback)
1314   \pkgcls@debug{--- File loaded request (\noexpand\usepackage or ...) }%
1315   \pkgcls@debug{@spaces 1: #1}%
1316   \pkgcls@debug{@spaces 2: #2}%
1317   \pkgcls@debug{@spaces 3: #3}%
1318   \pkgcls@debug{@spaces 4: #4}%
1319 
```

Two of the arguments are needed later on in error/warning messages so we save them.

```

1320 \def\pkgcls@name{#1}%           % for info message
1321 \def\pkgcls@arg {#3}%           % for info message

```

then we parse the final optional argument to determine if there is a specific rollback request for the current file. This will set \pkgcls@targetdate, \pkgcls@targetlabel and \pkgcls@mindate.

```
1322 \pkgcls@parse@date@arg{#3}%
```

When determining the correct release to load we keep track of candidates in \pkgcls@candidate and initially we don't have any:

```
1323 \let\pkgcls@candidate\@empty
```

If we had a rollback request then #3 may contain data but not necessarily a “minimal date” so instead of passing it on we pass on the content of `\pkgcls@mindate`. We need to pass the value not the command, otherwise nested packages may pick up the wrong information.

```

1324  \begingroup
1325  \edef\reserved@a{%
1326  \endgroup
1327  \unexpanded{\load@onefilewithoptions#1[#2]}%
1328  [\pkccls@mindate]%
1329  \unexpanded{#4}}%
1330  \reserved@a
1331 }
1332 \fi

```

(End definition for `\load@onefilewithoptions` and `\onefilewithoptions`.)

`\pkccls@parse@date@arg` The `\pkccls@parse@date@arg` command parses the second optional argument of `\usepackage`, `\RequirePackage` or `\documentclass` for a rollback request setting the values of `\pkccls@targetdate` and `\pkccls@targetlabel`.

This optional argument has a dual purpose: If it just contains a date string then this means that the package should have at least that date (to ensure that a certain feature is actually available, or a certain bug has been fixed). When the package gets loaded the information in `\Provides...` will then be checked against this request.

But if it starts with an equal sign followed by a date string or followed by a version name then this means that we should roll back to the state of the package at that date or to the version with the requested name.

If there was no optional argument or the optional argument does not start with “=” then the `\pkccls@targetdate` is set to the date of the overall rollback request (via `latexrelease`) or if that was not given it is set to 0. In either case `\pkccls@targetlabel` will be made empty.

If the argument doesn’t start with “=” then it is supposed to be a “minimal date” and we therefore save the value in `\pkccls@mindate`, otherwise this macro is made empty.

So in summary we have:

Input	<code>\pkccls@targetdate</code>	<code>\pkccls@targetlabel</code>	<code>\pkccls@mindate</code>
<code>\langle empty \rangle</code>	<code>\langle global-rollbackdate-as-number \rangle</code>	<code>\langle empty \rangle</code>	<code>\langle empty \rangle</code>
<code>\langle date \rangle</code>	<code>\langle global-rollbackdate-as-number \rangle</code>	<code>\langle empty \rangle</code>	<code>\langle date \rangle</code>
<code>=\langle date \rangle</code>	<code>\langle date-as-number \rangle</code>	<code>\langle empty \rangle</code>	<code>\langle empty \rangle</code>
<code>=\langle version \rangle</code>	1	<code>\langle version \rangle</code>	<code>\langle empty \rangle</code>
<code>\langle other \rangle</code>	<code>\langle global-rollbackdate-as-number \rangle</code>	<code>\langle empty \rangle</code>	<code>\langle other \rangle</code>

where `\langle global-rollbackdate-as-number \rangle` is a date request given via `latexrelease` or if there wasn’t one 0.

```
1333 \def\pkccls@parse@date@arg #1{%
```

If the argument is empty we use the rollback date from `latexrelease` which has the value of zero if there was no rollback request. The label and the minimal date is made empty in that case.

```

1334 \ifx\@nil#1\@nil
1335   \pkccls@targetdate\requestedLaTeXdate\relax
1336   \let\pkccls@targetlabel\@empty
1337   \let\pkccls@mindate\@empty

```

Otherwise we parse the argument further, checking for a = as the first character. We append a = at the end so that there is at least one such character in the argument.

```

1338     \else
1339         \pkgcls@parse@date@arg@#1=\@nil\relax
1340     \fi
1341 }
```

The actual parsing work then happens in \pkgcls@parse@date@arg@:

```
1342 \def\pkgcls@parse@date@arg@#1=#2\@nil{%
```

We set \pkgcls@targetdate depending on the parsing result; the code is expandable so we can do the parsing as part of the assignment.

```
1343 \pkgcls@targetdate
```

If a = was in first position then #1 will be empty. In that case #2 will be the original argument with a = appended.

This can be parsed with \parse@version, the trailing character is simply ignored. This macro returns the parsed date as a number (or zero if it wasn't a date) and accepts both YYYY/MM/DD and YYYY-MM-DD formats.

```

1344 \ifx\@nil#1\@nil
1345     \parse@version0#2//00\@nil\relax
```

Whatever is returned is thus assigned to \pkgcls@targetdate and therefore we can now test its value. If the value is zero we assume that the remaining argument string represents a version and change \pkgcls@targetdate and set \pkgcls@targetlabel to the version name (after stripping off the trailing =).

```

1346 \ifnum \pkgcls@targetdate=\z@
1347     \pkgcls@targetdate\@ne
1348     \def\pkgcls@innerdate{\maxdimen}%
1349     \pkgcls@parse@date@arg@version#2%
1350 \else
1351     \edef\pkgcls@innerdate{\the\pkgcls@targetdate}%
1352 \fi
1353 \let\pkgcls@mindate\@empty
1354 \else
```

If #1 was not empty then there wasn't a = character in first position so we are dealing either with a “minimum date” or with some incorrect data. We assume the former and make the following assignments (the first one finishing the assignment of \pkgcls@targetdate):

```

1355 \requestedLaTeXdate\relax
1356 \let\pkgcls@targetlabel\@empty
1357 \def\pkgcls@innerdate{\maxdimen}%
1358 \def\pkgcls@mindate{\#1}%
```

If the min-date is after the requested rollback date (if there is any, i.e., if it is not zero) then we have a conflict and therefore issue a warning.

```

1359 \ifnum \pkgcls@targetdate > \z@
1360     \ifnum \@parse@version0#1//00\@nil > \pkgcls@targetdate
1361         \@latex@warning@no@line{Suspicious rollback/min-date date given\MessageBreak
1362             A minimal date of #1 has been specified for
1363             \@cls@pkg\MessageBreak '\pkgcls@name'.\MessageBreak
1364             But this is in conflict
1365             with a rollback request to \requestedpatchdate}
1366     \fi
```

```

1367         \fi
1368     \fi
1369 }

```

Strip off the trailing = and assign the version name to `\pkgcls@targetlabel`.

```

1370 \def\pkgcls@parse@date@arg@version#1=%
1371   \def\pkgcls@targetlabel{#1}

```

(End definition for `\pkgcls@parse@date@arg`.)

- `\DeclareRelease` First argument is the “name” of the release and it can be left empty if one doesn’t like to give a name to the release. The second argument is that from which on this release was available (or should be used in case of minor updates). The final argument is the external file name of this release, by convention this should be `<pkg/cls-name>-<date>.(<extension>)` but this is not enforced and through this argument one can overwrite it.

```

1372 \def\DeclareRelease#1#2#3{%
1373   \ifnum\pkgcls@targetdate>\z@ % some sort of rollback request
1374   (*tracerrollback)
1375     \pkgcls@debug{---\string\DeclareRelease:}%
1376     \pkgcls@debug{@spaces 1: #1}%
1377     \pkgcls@debug{@spaces 2: #2}%
1378     \pkgcls@debug{@spaces 3: #3}%
1379   
```

If the date argument #2 is empty we are dealing with a special release that should be only accessible via its name; a typical use case would be a “beta” release. So if we are currently processing a date request we ignore it and otherwise we check if we can match the name and if so load the corresponding release file.

```

1380   \ifx\@nil#2\@nil
1381     \ifnum\pkgcls@targetdate=\@ne % named request
1382       \def\reserved@a{#1}%
1383       \ifx\pkgcls@targetlabel\reserved@a
1384         \pkgcls@use@this@release{#3}{}%
1385       (*tracerrollback)
1386     \else
1387       \pkgcls@debug{Label doesn't match}%
1388   
```

If the value of `\pkgcls@targetdate` is greater than 1 (or in reality greater than something like 19930101) we are dealing with a rollback request to a specific date.

```

1396   \ifnum\pkgcls@targetdate>\@ne % a real request

```

So we parse the date of this release to check if it is before or after the request date.

```

1397   \ifnum@parse@version#2//00\@nil
1398     >\pkgcls@targetdate

```

If it is after we have to distinguish between two cases: If there was an earlier candidate we use that one because the other is too late, but if there wasn't one (i.e., if current release is the oldest that exists) we use it as the best choice. However in that case something is wrong (as there shouldn't be a rollback to a date where a package used doesn't yet exist). So we make a complained to the user.

```

1399      \ifx\pkgcls@candidate\empty
1400          \pkgcls@rollbackdate@error{#2}%
1401          \pkgcls@use@this@release{#3}{#2}%
1402      \else
1403          \pkgcls@use@this@release\pkgcls@candidate
1404                      \pkgcls@releasedate
1405      \fi
1406  \else

```

Otherwise, if the release date of this version is before the target rollback and we record it as a candidate. But we don't use it yet as there may be another release which is still before the target rollback.

```

1407      \def\pkgcls@candidate{#3}%
1408      \def\pkgcls@releasedate{#2}%
1409  (*tracer rollback)
1410      \pkgcls@debug{New candidate: #3}%
1411  (/tracer rollback)
1412      \fi
1413  \else

```

If we end up in this branch we have a named version request. So we check if `\pkgcls@targetlabel` matches the current name and if yes we use this release immediately, otherwise we do nothing as a later declaration may match it.

```

1414      \def\reserved@a{#1}%
1415      \ifx\pkgcls@targetlabel\reserved@a
1416          \pkgcls@use@this@release{#3}{#2}%
1417  (*tracer rollback)
1418      \else
1419          \pkgcls@debug{Label doesn't match}%
1420  (/tracer rollback)
1421      \fi
1422      \fi
1423      \fi
1424  \fi
1425 }

```

(End definition for `\DeclareRelease`.)

`\pkgcls@use@this@release` If a certain release has been selected (stored in the external file given in #1) we need to input it and afterwards stop reading the current file.

```
1426 \def\pkgcls@use@this@release#1#2{%
```

Before that we record the selection made inside the transcript.

```
1427 \pkgcls@show@selection{#1}{#2}%
```

We then set the `\pkgcls@targetdate` to zero so that any `\DeclareRelease` or `\DeclareCurrentRelease` in the file we now load are bypassed¹⁸ and then we finally load the correct release.

¹⁸The older release may also have such declarations inside if it was a simply copy of the .sty or .cls file current at that date. Removing these declarations would make the file load a tiny bit faster, but this way it works in any case.

After loading that file we need to stop reading the current file so we issue `\endinput`. Note that the `\relax` before that is essential to ensure that the `\endinput` is only happening after the file has been fully processed, otherwise it would act after the first line of the `\@@input`!

```
1428   \pkgcls@targetdate\z@
1429   \@@input #1\relax
1430   \endinput
1431 }
```

(End definition for \pkgcls@use@this@release.)

- \pkgcls@show@selection** This command records what selection was made. As that is needed in two places (and it is rather lengthly) it was placed in a separate command. The first argument is the name of the external file that is being loaded and is only needed for debugging. The second argument is the date that corresponds to this file and it is used as part of the message.

```
1432 \def\pkgcls@show@selection#1#2{%
1433   {*tracerollback}
1434   \pkgcls@debug{Result: use #1}%
1435   (/tracerollback)
1436   \GenericInfo
1437   {\@spaces\@spaces\space}{Rollback for
1438   \@cls@pkg\space'\@currname' requested ->
1439   \ifnum\pkgcls@targetdate>\@ne
1440     date
1441     \ifnum\requestedLaTeXdate=\pkgcls@targetdate
1442       \requestedpatchdate
1443     \else
1444       \expandafter\gobble\pkgcls@arg
1445     \fi.\MessageBreak
1446   Best approximation is
1447   \else
1448     version '\pkgcls@targetlabel'.\MessageBreak
1449     This corresponds to
1450   \fi
1451   \ifx\@nil#2\@nil
1452     a special release%
1453   \else
1454     the release introduced on #2%
1455   \fi
1456   \gobble}%
1457 }
```

(End definition for \pkgcls@show@selection.)

- \pkgcls@rollbackdate@error** This is called if the requested rollback date is earlier than the earliest known release of a package or class.

A similar error is given if global rollback date and min-date on a specific package conflict with each other, but that case is happens only once so it is inlined.

```
1458 \def\pkgcls@rollbackdate@error#1{%
1459   \@latex@error{Suspicious rollback date given}%
1460   {The \@cls@pkg\space'\@currname' has no rollback data}
```

```

1461     before #1 which\MessageBreak
1462     is after your requested rollback date --- so
1463     something may be wrong here.\MessageBreak
1464     Continue and we use the earliest known release.}}

```

(End definition for \pkgcls@rollbackdate@error.)

\DeclareCurrentRelease This declares the date (and possible name) of the current version of a package or class.

```
1465 \def\DeclareCurrentRelease#1#2{%
```

First we test if \pkgcls@targetdate is greater than zero, otherwise this code is bypassed (as there is no rollback request).

```

1466   \ifnum\pkgcls@targetdate>\z@ % some sort of rollback request
1467   (*tracer rollback)
1468     \pkgcls@debug{---DeclareCurrentRelease}%
1469     \pkgcls@debug{ 1: #1}%
1470     \pkgcls@debug{ 2: #2}%
1471   
```

If the value is greater than 1 we have to deal with a date request, so we parse #2 as a date and compare it with \pkgcls@targetdate.

```

1472   \ifnum\pkgcls@targetdate>\@ne % a date request
1473     \ifnum@\parse@version#2//00@nil
1474       >\pkgcls@targetdate

```

If it is greater that means the release date if this file is later than the requested rollback date. Again we have two cases: If there was a previous candidate release we use that one as the current release is too young, but if there wasn't we have to use this release nevertheless as there isn't any alternative.

However this case can only happen if there is a \DeclareCurrentRelease but no declared older releases (so basically the use of the declaration is a bit dubious).

```

1475   \ifx\pkgcls@candidate@\empty
1476     \pkgcls@rollbackdate@error{#2}%
1477   \else
1478     \pkgcls@use@this@release\pkgcls@candidate
1479     \pkgcls@releasedate
1480   \fi

```

Otherwise the current file is the right release, so we record that in the transcript and then carry on.

```

1481   \else
1482     \pkgcls@show@selection{current version}{#2}%
1483   \fi
1484 \else % a label request

```

Otherwise we have a rollback request to a named version so we check if that fits the current name and if not give an error as this was the last possible opportunity.

```

1485   \def\reserved@a{#1}%
1486   \ifx\pkgcls@targetlabel\reserved@a
1487     \pkgcls@show@selection{current version}{#2}%
1488   \else
1489     \@latex@error{Requested version '\pkgcls@targetlabel' for
1490       '@cls@pkg@space' '@currname' is unknown}\@ehc
1491   \fi
1492 \fi

```

```

1493     \fi
1494 }

```

(End definition for `\DeclareCurrentRelease`.)

- `\IfTargetDateBefore` This enables a simple form of conditional code inside a class or package file. If there is a date request and the request date is earlier than the first argument the code in the second argument is processed otherwise the code in the third argument is processed. If there was no date request then we also execute the third argument, i.e., we will get the “latest” version of the file.

Most often the second argument (before-date-code) will be empty.

```

1495 \DeclareRobustCommand\IfTargetDateBefore[1]{%
1496   \ifnum\pkgcls@innerdate <%
1497     \expandafter\@parse@version\expandafter0#1//00\@nil
1498     \typeout{Exclude code introduced on #1}%
1499     \expandafter\@firstoftwo
1500   \else
1501     \typeout{Include code introduced on #1}%
1502     \expandafter\@secondoftwo
1503   \fi
1504 }

```

(End definition for `\IfTargetDateBefore`.)

```
1505 
```

6 After Preamble

Finally we declare a package that allows all the commands declared above to be `\@onlypreamble` to be used after `\begin{document}`.

```

1506 <*afterpreamble>
1507 \NeedsTeXFormat{LaTeX2e}
1508 \ProvidesPackage{pkgindoc}
1509   [2020-08-08 v1.3m Package Interface in Document (DPC)]
1510 \def\reserved@a{\do@classoptionslist\do@filec@ntents\relax}%
1511   \gdef\@preamblecmds{\#1\#3}%
1512 \expandafter\reserved@a\@preamblecmds\relax
1513 
```

File Q

ltfilehook.dtx

Contents

1 Introduction

1.1 Provided hooks

The code offers a number of hooks into which packages (or the user) can add code to support different use cases. Many hooks are offered as pairs (i.e., the second hook is reversed). Also important to know is that these pairs are properly nested with respect to other pairs of hooks.

There are hooks that are executed for all files of a certain type (if they contain code), e.g., for all “include files” or all “packages”, and there are also hooks that are specific to a single file, e.g., do something after the package `foo.sty` has been loaded.

1.2 General hooks for file reading

There are four hooks that are called for each file that is read using document-level commands such as `\input`, `\include`, `\usepackage`, etc. They are not called for files read using internal low-level methods, such as `\@input` or `\openin`.

`file/before`
`file/before/...`
`file/after/...`
`file/after`

These are:

`file/before`, `file/before/⟨file-name⟩` These hooks are executed in that order just before the file is loaded for reading. The code of the first hook is used with every file, while the second is executed only for the file with matching *⟨file-name⟩* allowing you to specify code that only applies to one file.

`file/after/⟨file-name⟩`, `file/after` These hooks are after the file with name *⟨file-name⟩* has been fully consumed. The order is swapped (the specific one comes first) so that the `before` and `after` hooks nest properly, which is important if any of them involve grouping (e.g., contain environments, for example). Furthermore both hooks are reversed hooks to support correct nesting of different packages adding code to both `/before` and `/after` hooks.

So the overall sequence of hook processing for any file read through the user interface commands of L^AT_EX is:

```
\UseHook{⟨file/before⟩}
\UseHook{⟨file/before/⟨file name⟩⟩}
  ⟨file contents⟩
\UseHook{⟨file/after/⟨file name⟩⟩}
\UseHook{⟨file/after⟩}
```

The file hooks only refer to the file by its name and extension, so the *<file name>* should be the file name as it is on the filesystem with extension (if any) and without paths. Different from `\input` and similar commands, the `.tex` extension is not assumed in hook *<file name>*, so `.tex` files must be specified with their extension to be recognized. Files within subfolders should also be addressed by their name and extension only.

Extensionless files also work, and should then be given without extension. Note however that `\TeX` prioritizes `.tex` files, so if two files `foo` and `foo.tex` exist in the search path, only the latter will be seen.

When a file is input, the *<file name>* is available in `\CurrentFile`, which is then used when accessing the `file/before/<file name>` and `file/after/<file name>`.

`\CurrentFile`

The name of the file about to be read (or just finished) is available to the hooks through `\CurrentFile` (there is no `\Expl3` name for it for now). The file is always provided with its extension, i.e., how it appears on your hard drive, but without any specified path to it. For example, `\input{sample}` and `\input{app/sample.tex}` would both have `\CurrentFile` being `sample.tex`.

`\CurrentFilePath`

The path to the current file (complement to `\CurrentFile`) is available in `\CurrentFilePath` if needed. The paths returned in `\CurrentFilePath` are only user paths, given through `\input@path` (or `\Expl3`'s equivalent `\l_file_search_path_seq`) or by directly typing in the path in the `\input` command or equivalent. Files located by `\kpsewhich` get the path added internally by the `\TeX` implementation, so at the macro level it looks as if the file were in the current folder, so the path in `\CurrentFilePath` is empty in these cases (package and class files, mostly).

`\CurrentFileUsed` `\CurrentFilePathUsed`

In normal circumstances these are identical to `\CurrentFile` and `\CurrentFilePath`. They will differ when a file substitution has occurred for `\CurrentFile`. In that case, `\CurrentFileUsed` and `\CurrentFilePathUsed` will hold the actual file name and path loaded by `\TeX`, while `\CurrentFile` and `\CurrentFilePath` will hold the names that were *asked for*. Unless doing very specific work on the file being read, `\CurrentFile` and `\CurrentFilePath` should be enough.

1.3 Hooks for package and class files

Commands to load package and class files (e.g., `\usepackage`, `\RequirePackage`, `\LoadPackageWithOptions`, etc.) offer the hooks from section 1.2 when they are used to load a package or class file, e.g., `file/after/array.sty` would be called after the `array` package got loaded. But as packages and classes form as special group of files, there are some additional hooks available that only apply when a package or class is loaded.

```
package/before
package/after
package/before/...
package/after/...
class/before
class/after
class/before/...
class/after/...
```

These are:

package/before, package/after These hooks are called for each package being loaded.

package/before/⟨name⟩, package/after/⟨name⟩ These hooks are additionally called if the package name is ⟨name⟩ (without extension).

class/before, class/after These hooks are called for each class being loaded.

class/before/⟨name⟩, class/after/⟨name⟩ These hooks are additionally called if the class name is ⟨name⟩ (without extension).

All /after hooks are implemented as reversed hooks.

The overall sequence of execution for \usepackage and friends is therefore:

```
\UseHook{⟨package/before⟩}
\UseHook{⟨package/before/⟨package name⟩⟩}
  \UseHook{⟨file/before⟩}
  \UseHook{⟨file/before/⟨package name⟩.sty⟩}
    ⟨package contents⟩
  \UseHook{⟨file/after/⟨package name⟩.sty⟩}
  \UseHook{⟨file/after⟩}

code from \AtEndOfPackage if used inside the package

\UseHook{⟨package/after/⟨package name⟩⟩}
\UseHook{⟨package/after⟩}
```

and similar for class file loading, except that `package/` is replaced by `class/` and `\AtEndOfPackage` by `\AtEndOfClass`.

If a package or class is not loaded (or it was loaded before the hooks were set) none of the hooks are executed!

1.4 Hooks for \include files

To manage `\include` files, L^AT_EX issues a `\clearpage` before and after loading such a file. Depending on the use case one may want to execute code before or after these `\clearpages` especially for the one that is issued at the end.

Executing code before the final `\clearpage`, means that the code is processed while the last page of the included material is still under construction. Executing code after it means that all floats from inside the include file are placed (which might have added further pages) and the final page has finished.

Because of these different scenarios we offer hooks in three places.¹⁹ None of the hooks are executed when an `\include` file is bypassed because of an `\includeonly` declaration. They are, however, all executed if L^AT_EX makes an attempt to load the `\include` file (even if it doesn't exist and all that happens is "No file ⟨filename⟩.tex").

¹⁹If you want to execute code before the first `\clearpage` there is no need to use a hook—you can write it directly in front of the `\include`.

```
include/before
include/before/...
include/end
include/end/...
include/after
include/after/...
```

These are:

include/before, include/before/⟨name⟩ These hooks are executed (in that order) after the initial `\clearpage` and after `.aux` file is changed to use `⟨name⟩.aux`, but before the `⟨name⟩.tex` file is loaded. In other words they are executed at the very beginning of the first page of the `\include` file.

include/end/⟨name⟩, include/end These hooks are executed (in that order) after L^AT_EX has stopped reading from the `\include` file, but before it has issued a `\clearpage` to output any deferred floats.

include/after/⟨name⟩, include/after These hooks are executed (in that order) after L^AT_EX has issued the `\clearpage` but before it has switched back writing to the main `.aux` file. Thus technically we are still inside the `\include` and if the hooks generate any further typeset material including anything that writes to the `.aux` file, then it would be considered part of the included material and bypassed if it is not loaded because of some `\includeonly` statement.²⁰

1.5 High-level interfaces for L^AT_EX

We do not provide any high-level L^AT_EX commands (like `filehook` or `scrlfile` do) but think that for package writers the commands from for hook management are sufficient.

1.6 Internal interfaces for L^AT_EX

```
\declare@file@substitution  \declare@file@substitution  {⟨file⟩} {⟨replacement-file⟩}
\undeclare@file@substitution \undeclare@file@substitution {⟨file⟩}
```

If `⟨file⟩` is requested for loading replace it with `⟨replacement-file⟩`. `\CurrentFile` remains pointing to `⟨file⟩` but `\CurrentFileUsed` will show the file actually loaded.

The main use case for this declaration is to provide a corrected version of a package that can't be changed (due to its license) but no longer functions because of L^AT_EX kernel changes, for example, or to provide a version that makes use of new kernel functionality while the original package remains available for use with older releases.

The `\undeclare@file@substitution` declaration undoes a substitution made earlier.

Please do not misuse this functionality and replace a file with another unless if really needed and only if the new version is implementing the same functionality as the original one!

²⁰For that reason another `\clearpage` is executed after these hooks which normally does nothing, but starts a new page if further material got added this way.

```
\disable@package@load  \disable@package@load {<package>} {<alternate-code>}
\reenable@package@load \reenable@package@load {<package>}
```

If *<package>* is requested do not load it but instead run *<alternate-code>* which could issue a warning, error or any other code.

The main use case is for classes that want to restrict the set of supported packages or contain code that make the use of some packages impossible. So rather than waiting until the document breaks they can set up informative messages why certain packages are not available.

The function is only implemented for packages not for arbitrary files.

1.7 A sample package for structuring the log output

As an application we provide the package `structuredlog` that adds lines to the `.log` when a file is opened and closed for reading keeping track of nesting level as well. For example, for the current document it adds the lines

```
= (LEVEL 1 START) t1lmr.fd
= (LEVEL 1 STOP) t1lmr.fd
= (LEVEL 1 START) supp-pdf.mkii
= (LEVEL 1 STOP) supp-pdf.mkii
= (LEVEL 1 START) nameref.sty
== (LEVEL 2 START) refcount.sty
== (LEVEL 2 STOP) refcount.sty
== (LEVEL 2 START) gettitlestring.sty
== (LEVEL 2 STOP) gettitlestring.sty
= (LEVEL 1 STOP) nameref.sty
= (LEVEL 1 START) ltfilehook-doc.out
= (LEVEL 1 STOP) ltfilehook-doc.out
= (LEVEL 1 START) ltfilehook-doc.out
= (LEVEL 1 STOP) ltfilehook-doc.out
= (LEVEL 1 START) ltfilehook-doc.hd
= (LEVEL 1 STOP) ltfilehook-doc.hd
= (LEVEL 1 START) ltfilehook.dtx
== (LEVEL 2 START) ot1lmr.fd
== (LEVEL 2 STOP) ot1lmr.fd
== (LEVEL 2 START) omllmm.fd
== (LEVEL 2 STOP) omllmm.fd
== (LEVEL 2 START) omslmsy.fd
== (LEVEL 2 STOP) omslmsy.fd
== (LEVEL 2 START) omxlmex.fd
== (LEVEL 2 STOP) omxlmex.fd
== (LEVEL 2 START) umsa.fd
== (LEVEL 2 STOP) umsa.fd
== (LEVEL 2 START) umsb.fd
== (LEVEL 2 STOP) umsb.fd
== (LEVEL 2 START) ts1lmr.fd
== (LEVEL 2 STOP) ts1lmr.fd
== (LEVEL 2 START) t1lmss.fd
== (LEVEL 2 STOP) t1lmss.fd
= (LEVEL 1 STOP) ltfilehook.dtx
```

Thus if you inspect an issue in the `.log` it is easy to figure out in which file it occurred, simply by searching back for `LEVEL` and if it is a `STOP` then remove 1 from the level value and search further for `LEVEL` with that value which should then be the `START` level of the file you are in.

2 The Implementation

```

1  {*2ekernel}
2  {@@=filehook}
```

2.1 Document and package-level commands

`\CurrentFile`
`\CurrentFilePath`
`\CurrentFileUsed`
`\CurrentFilePathUsed`

User-level macros that hold the current file name and file path. These are used internally as well because the code takes care to protect against a possible redefinition of these macros in the loaded file (it's necessary anyway to make hooks work with nested `\input`). The versions `\...Used` hold the *actual* file name and path that is loaded by L^AT_EX, whereas the other two hold the name as requested. They will differ in case there's a file substitution.

```

3  {/2ekernel}
4  {*2ekernel | latexrelease}
5  {latexrelease}\IncludeInRelease{2020/10/01}%
6  {latexrelease}          {\CurrentFile}{Hook management file}%
7  \ExplSyntaxOn
8  \tl_new:N \CurrentFile
9  \tl_new:N \CurrentFilePath
10 \tl_new:N \CurrentFileUsed
11 \tl_new:N \CurrentFilePathUsed
12 \ExplSyntaxOff
13 {/2ekernel | latexrelease}
14 {latexrelease}\EndIncludeInRelease
15 {latexrelease}\IncludeInRelease{0000/00/00}%
16 {latexrelease}          {\CurrentFile}{Hook management file}%
17 {latexrelease}
18 {latexrelease}\let \CurrentFile      \undefined
19 {latexrelease}\let \CurrentFilePath   \undefined
20 {latexrelease}\let \CurrentFileUsed   \undefined
21 {latexrelease}\let \CurrentFilePathUsed \undefined
22 {latexrelease}
23 {latexrelease}\EndIncludeInRelease
24 {*2ekernel}
```

(End definition for `\CurrentFile` and others. These functions are documented on page 686.)

2.2 `expl3` helpers

```

25 {/2ekernel}
26 {*2ekernel | latexrelease}
27 {latexrelease}\IncludeInRelease{2020/10/01}%
28 {latexrelease}          {\_\_filehook_file_parse_full_name:nN}{File helpers}%
29 \ExplSyntaxOn
```

`__filehook_file_parse_full_name:nN`
`__filehook_full_name:nn`

A utility macro to trigger `expl3`'s file-parsing and lookup, and return a normalized representation of the file name. If the queried file doesn't exist, no normalisation takes place.

The output of `__filehook_file_parse_full_name:nN` is passed on to the #2—a 3-argument macro that takes the $\langle path \rangle$, $\langle base \rangle$, and $\langle ext \rangle$ parts of the file name.

```

30 \cs_new:Npn \__filehook_file_parse_full_name:nN #1
31 {
32     \exp_args:Nf \file_parse_full_name_apply:nN
33     {
34         \exp_args:Nf \__filehook_full_name:nn
35         { \file_full_name:n {#1} } {#1}
36     }
37 }
38 \cs_new:Npn \__filehook_full_name:nn #1 #2
39 {
40     \tl_if_empty:nTF {#1}
41     { \tl_trim_spaces:n {#2} }
42     { \tl_trim_spaces:n {#1} }
43 }
```

(End definition for `__filehook_file_parse_full_name:nN` and `__filehook_full_name:nn`.)

Some actions depend on whether the file extension was explicitly given, and sometimes the extension has to be removed. The macros below use `__filehook_file_parse_full_name:nN` to split up the file name and either check if $\langle ext \rangle$ (#3) is empty, or discard it.

```

44 \cs_new:Npn \__filehook_if_no_extension:nTF #1
45 {
46     \exp_args:Ne \tl_if_empty:nTF
47     { \file_parse_full_name_apply:nN {#1} \use_iii:nnn }
48 }
49 \cs_new_protected:Npn \__filehook_drop_extension:N #1
50 {
51     \tl_gset:Nx #1
52     {
53         \exp_args:NV \__filehook_file_parse_full_name:nN #1
54         \__filehook_drop_extension_aux:nnn
55     }
56 }
57 \cs_new:Npn \__filehook_drop_extension_aux:nnn #1 #2 #3
58 { \tl_if_empty:nF {#1} { #1 / } #2 }
```

(End definition for `__filehook_if_no_extension:nTF` and `__filehook_drop_extension:N`.)

```
\g__filehook_input_file_seq
\l__filehook_internal_tl
\__filehook_file_push:
\__filehook_file_pop:
\__filehook_file_pop_assign:nnnn
```

Yet another stack, to keep track of `\CurrentFile` and `\CurrentFilePath` with nested `\inputs`. At the beginning of `\InputIfFileExists`, the current value of `\CurrentFilePath` and `\CurrentFile` is pushed to `\g__filehook_input_file_seq`, and at the end, it is popped and the value reassigned. Some other places don't use `\InputIfFileExists` directly (`\include`) or need `\CurrentFile` earlier (`\@onefilewithoptions`), so these are manually used elsewhere as well.

```

59 \tl_new:N \l__filehook_internal_tl
60 \seq_new:N \g__filehook_input_file_seq
61 \cs_new_protected:Npn \__filehook_file_push:
62 {
63     \seq_gpush:Nx \g__filehook_input_file_seq
64 }
```

```

65      { \CurrentFilePathUsed } { \CurrentFileUsed }
66      { \CurrentFilePath      } { \CurrentFile      }
67    }
68  }
69 \cs_new_protected:Npn \__filehook_file_pop:
70 {
71   \seq_gpop:NNTF \g__filehook_input_file_seq \l__filehook_internal_tl
72   { \exp_after:wN \__filehook_file_pop_assign:nnnn \l__filehook_internal_tl }
73   {
74     \msg_error:nnn { hooks } { should-not-happen }
75     { Tried~to~pop~from~an~empty~file~name~stack. }
76   }
77 }
78 \cs_new_protected:Npn \__filehook_file_pop_assign:nnnn #1 #2 #3 #4
79 {
80   \tl_set:Nn \CurrentFilePathUsed {#1}
81   \tl_set:Nn \CurrentFileUsed {#2}
82   \tl_set:Nn \CurrentFilePath {#3}
83   \tl_set:Nn \CurrentFile {#4}
84 }
85 \ExplSyntaxOff

(End definition for \g__filehook_input_file_seq and others.)

86 </2ekernel | latexrelease>
87 <| latexrelease>\EndIncludeInRelease

```

When rolling forward the following expl3 functions may not be defined. If we roll back the code does nothing.

```

88 <| latexrelease>\IncludeInRelease{2020/10/01}%
89 <| latexrelease>          {\file_parse_full_name_apply:nN}{Roll forward help}%
90 <| latexrelease>
91 <| latexrelease>\ExplSyntaxOn
92 <| latexrelease>\cs_if_exist:NF\file_parse_full_name_apply:nN
93 <| latexrelease>{
94 <| latexrelease>\cs_new:Npn \file_parse_full_name_apply:nN #1
95 <| latexrelease>  {
96 <| latexrelease>    \exp_args:Ne \__file_parse_full_name_auxi:nN
97 <| latexrelease>    { \__kernel_file_name_sanitize:n {#1} }
98 <| latexrelease>  }
99 <| latexrelease>\cs_new:Npn \__file_parse_full_name_auxi:nN #1
100 <| latexrelease>  {
101 <| latexrelease>    \__file_parse_full_name_area:nw { } #1
102 <| latexrelease>    / \s__file_stop
103 <| latexrelease>  }
104 <| latexrelease>\cs_new:Npn \__file_parse_full_name_area:nw #1 #2 / #3 \s__file_stop
105 <| latexrelease>  {
106 <| latexrelease>    \tl_if_empty:nTF {#3}
107 <| latexrelease>    { \__file_parse_full_name_base:nw { } #2 . \s__file_stop {#1} }
108 <| latexrelease>    { \__file_parse_full_name_area:nw { #1 / #2 } #3 \s__file_stop }
109 <| latexrelease>  }
110 <| latexrelease>\cs_new:Npn \__file_parse_full_name_base:nw #1 #2 . #3 \s__file_stop
111 <| latexrelease>  {
112 <| latexrelease>    \tl_if_empty:nTF {#3}
113 <| latexrelease>    {

```

```

114 <|latexrelease>          \tl_if_empty:nTF {#1}
115 <|latexrelease>          {
116 <|latexrelease>          \tl_if_empty:nTF {#2}
117 <|latexrelease>          { \__file_parse_full_name_tidy:nnnN { } { } }
118 <|latexrelease>          { \__file_parse_full_name_tidy:nnnN { .#2 } { } }
119 <|latexrelease>          }
120 <|latexrelease>          { \__file_parse_full_name_tidy:nnnN {#1} { .#2 } }
121 <|latexrelease>          }
122 <|latexrelease>          { \__file_parse_full_name_base:nw { #1 . #2 } #3 \s__file_stop }
123 <|latexrelease>          }
124 <|latexrelease>\cs_new:Npn \__file_parse_full_name_tidy:nnnN #1 #2 #3 #4
125 <|latexrelease>          {
126 <|latexrelease>          \exp_args:Nee #4
127 <|latexrelease>          {
128 <|latexrelease>          \str_if_eq:nnF {#3} { / } { \use_none:n }
129 <|latexrelease>          #3 \prg_do_nothing:
130 <|latexrelease>          }
131 <|latexrelease>          { \use_none:n #1 \prg_do_nothing: }
132 <|latexrelease>          {#2}
133 <|latexrelease>          }
134 <|latexrelease>          }
135 <|latexrelease>\ExplSyntaxOff
136 <|latexrelease>
137 <|latexrelease>\EndIncludeInRelease
138 <|2ekernel>
139 <@>

```

2.3 Declaring the file-related hooks

All hooks starting with `file/` `include/`, `class/` or `package/` are generic and will be allocated if code is added to them. Thus there is no need to explicitly declare any hook in the code below.

Furthermore, those named `.../after` or `.../end` are automatically declared as reversed hooks if filled with code, so this is also automatically taken care of.

2.4 Patching L^AT_EX's `\InputIfFileExists` command

Most of what we have to do is adding `\UseHook` into several L^AT_EX 2 _{ε} core commands, because of some circular dependencies in the kernel we do this only now and not in `ltfiles`.

```

\InputIfFileExists          \InputIfFileExists loads any file if it is available so we have to add the hooks
@input@file@exists@with@hooks file/before and file/after in the right places. If the file doesn't exist no hooks
\unqu@tefilef@und           should be executed.

```

```

140 </2ekernel>
141 <|latexrelease>\IncludeInRelease{2020/10/01}%
142 <|latexrelease>          {\InputIfFileExists}{Hook management (files)}%
143 <|2ekernel | latexrelease>
144 \let\InputIfFileExists\undefined
145 \DeclareRobustCommand \InputIfFileExists[2]{%
146   \IfFileExists{#1}%
147   {%

```

```

148      \expl@@@filehook@file@push@@
149      \filehook@set@CurrentFile

```

We pre-expand `\@filef@nd` so that in case another file is loaded in the true branch of `\InputIfFileExists`, these don't change their value meanwhile. This isn't a worry with `\CurrentFile...` because they are kept in a stack.

```

150      \expandafter\@swaptwoargs\expandafter
151          {\expandafter\@input@file@exists@with@hooks
152              \expandafter{\@filef@nd}}%
153          {#2}%
154          \expl@@@filehook@file@pop@@
155      }%
156  }
157 \def\@input@file@exists@with@hooks#1{%

```

If the file exists then `\CurrentFile` holds its name. But we can't rely on that still being true after the file has been processed. Thus for using the name in the file hooks we need to preserve the name and then restore it for the `file/after/...` hook.

The hook always refers to the file requested by the user. The hook is *always* loaded for `\CurrentFile` which usually is the same as `\CurrentFileUsed`. In the case of a file replacement, the `\CurrentFileUsed` holds the actual file loaded. In any case the file names are normalized so that the hooks work on the real file name, rather than what the user typed in.

`expl3's \file_full_name:n` normalizes the file name (to factor out differences in the `.tex` extension), and then does a file lookup to take into account a possible path from `\l_file_search_path_seq` and `\input@path`. However only the file name and extension are returned so that file hooks can refer to the file by their name only. The path to the file is returned in `\CurrentFilePath`.

```

158 \edef\reserved@a{%
159     \expl@@@filehook@file@pop@assign@nnnn
160     {\CurrentFilePathUsed}}%
161     {\CurrentFileUsed}}%
162     {\CurrentFilePath}}%
163     {\CurrentFile}}%
164 \expandafter\@swaptwoargs\expandafter{\reserved@a}%

```

Before adding to the file list we need to make all (letter) characters catcode 11, because several packages use constructions like

```

\filename@parse{<filename>}
\ifx\filename@ext\@clsextension
    ...
\fi

```

and that doesn't work if `\filename@ext` is `\detokenized`. Making `\@clsextension` a string doesn't help much because some packages define their own `\<prefix>@someextension` with normal catcodes. This is not entirely correct because packages loaded (somehow) with catcode 12 alphabetic tokens (say, as the result of a `\string` or `\detokenize` command, or from a `\TeX` string like `\jobname`) will have these character tokens incorrectly turned into letter tokens. This however is rare, so we'll go for the all-letters approach (grepping the packages in `\TeX` Live didn't bring up any obvious candidate for breaking with this catcode change).

```

165 {\edef\reserved@a{\unqu@tefilef@nd#1\@nil}%

```

```

166   \Caddtolist{\string\makeletter\reserved@a}%
167   \UseHook{file/before}%

```

The current file name is available in `\CurrentFile` so we use that in the specific hook.

```

168   \UseHook{file/before/\CurrentFile}%
169   \Cinput #1% <- trailing space comes from \Cfilef@und
170 }%

```

And here, `\CurrentFile` is restored (by `\expl@@filehook@file@pop@assign@nnnn`) so we can use it once more.

```

171   \UseHook{file/after/\CurrentFile}%
172   \UseHook{file/after}%
173 \def\unqu@tefilef@und"#1" \nil{#1}
174 \end{InRelease}
175 /*2ekernel | latexrelease)

```

Now define `\InputIfFileExists` to input #1 if it seems to exist. Immediately prior to the input, #2 is executed. If the file #1 does not exist, execute '#3'.

```

176 \end{InRelease}
177 \end{InRelease} {\InputIfFileExists}{Hook management (files)}%
178 \end{InRelease}
179 \end{InRelease} \DeclareRobustCommand \InputIfFileExists[2]{%
180 \IfFileExists{#1}%
181 {%
182 \expandafter\swaptwoargs\expandafter
183 \let\@input@file@exists@with@hooks\undefined
184 \let\@input@file@exists@with@hooks\undefined
185 \let\unqu@tefilef@und\undefined
186 \end{InRelease}
187 \end{InRelease} \end{InRelease}%
188 \end{InRelease} {\InputIfFileExists}{Hook management (files)}%
189 \long\def \InputIfFileExists#1#2{%
190 \IfFileExists{#1}%
191 {#2\addtolist{\#1}\Cinput \Cfilef@und}%
192 \let\@input@file@exists@with@hooks\undefined
193 \let\unqu@tefilef@und\undefined
194 \end{InRelease}
195 /*2ekernel}

```

(End definition for `\InputIfFileExists`, `\@input@file@exists@with@hooks`, and `\unqu@tefilef@und`.)

2.5 Declaring a file substitution

```

196 (@=filehook)
197 /*2ekernel|
198 /*2ekernel | latexrelease)
199 \end{InRelease} \end{InRelease}%
200 \end{InRelease} {\_\_filehook\_subst\_add:nn}{Declaring file substitution}%
201 \ExplSyntaxOn

```

`__filehook_subst_add:nn` declares a file substitution by doing a (global) definition of the form `\def\@file-subst@<file>{<replacement>}`. The file names are properly sanitised, and normalized with the same treatment done for the file hooks. That is, a file replacement is declared by using the file name (and extension, if any) only, and the

file path should not be given. If a file name is empty it is replaced by `.tex` (the empty csname is used to check that).

```

202 \cs_new_protected:Npn \__filehook_subst_add:nn #1 #2
203   {
204     \group_begin:
205       \cs_set:cpx { } { \exp_not:o { \cs:w\cs_end: } }
206       \int_set:Nn \tex_escapechar:D { -1 }
207       \cs_gset:cpx
208         {
209           @file-subst@
210           \__filehook_subst_file_normalize:Nn \use_ii_iii:nnn {#1}
211         }
212         { \__filehook_subst_file_normalize:Nn \__filehook_file_name_compose:nnn {#2} }
213       \group_end:
214     }
215 \cs_new_protected:Npn \__filehook_subst_remove:n #1
216   {
217     \group_begin:
218       \cs_set:cpx { } { \exp_not:o { \cs:w\cs_end: } }
219       \int_set:Nn \tex_escapechar:D { -1 }
220       \cs_undefine:c
221         {
222           @file-subst@
223           \__filehook_subst_file_normalize:Nn \use_ii_iii:nnn {#1}
224         }
225       \group_end:
226     }
227 \cs_new:Npn \__filehook_subst_file_normalize:Nn #1 #2
228   {
229     \exp_after:wN \__filehook_subst_empty_name_chk:NN
230     \cs:w \exp_after:wN \cs_end:
231     \cs:w \__filehook_file_parse_full_name:nN {#2} #1 \cs_end:
232   }
233 \cs_new:Npn \__filehook_subst_empty_name_chk:NN #1 #2
234   { \if_meaning:w #1 #2 .tex \else: \token_to_str:N #2 \fi: }

(End definition for \__filehook_subst_add:nn and others.)

```

`\use_ii_iii:nnn` A variant of `\use_...` to discard the first of three arguments.

Todo: this should move to expl3

```

235 \cs_gset:Npn \use_ii_iii:nnn #1 #2 #3 {#2 #3}
(End definition for \use_ii_iii:nnn.)

236 \ExplSyntaxOff
237 </2ekernel | latexrelease>
238 <latexrelease>\EndIncludeInRelease
239 {*2ekernel}

```

`\declare@file@substitution` For two internals we provide L^AT_EX 2 _{ε} names so that we can use them elsewhere in the kernel (and so that they can be used in packages if really needed, e.g., `scrlfile`).

```

240 </2ekernel>
241 {*2ekernel | latexrelease>

```

```

242 〈\latexrelease〉\IncludeInRelease{2020/10/01}%
243 〈\latexrelease〉           {\declare@file@substitution}{File substitution}%
244 \ExplSyntaxOn
245 \cs_new_eq:NN \declare@file@substitution  \__filehook_subst_add:nN
246 \cs_new_eq:NN \undeclare@file@substitution \__filehook_subst_remove:n
247 \ExplSyntaxOff
248 〈/2ekernel | \latexrelease〉
249 〈\latexrelease〉\EndIncludeInRelease

250 〈\latexrelease〉\IncludeInRelease{0000/00/00}%
251 〈\latexrelease〉           {\declare@file@substitution}{File substitution}%
252 〈\latexrelease〉
253 〈\latexrelease〉\let \declare@file@substitution \@undefined
254 〈\latexrelease〉\let \undeclare@file@substitution \@undefined
255 〈\latexrelease〉
256 〈\latexrelease〉\EndIncludeInRelease
257 〈*2ekernel〉

(End definition for \declare@file@substitution and \undeclare@file@substitution. These functions
are documented on page 688.)
```

258 〈@C=〉
259 \ExplSyntaxOff

2.6 Selecting a file (\set@curr@file)

\set@curr@file
 \@curr@file
\@curr@file@reqd

Now we hook into \set@curr@file to resolve a possible file substitution, and add \Expl@@@filehook@set@curr@file@nNN at the end, after \@curr@file is set.

A file name is built using \expandafter\string\csname<filename>\endcsname to avoid expanding utf8 active characters. The \csname expands the normalisation machinery and the routine to resolve a file substitution, returning a control sequence with the same name as the file.

It happens that when <filename> is empty, the generated control sequence is \csname\endcsname, and doing \string on that results in the file csnameendcsname.tex. To guard against that we \ifx-compare the generated control sequence with the empty csname. To do so, \csname\endcsname has to be defined, otherwise it would be equal to \relax and we would have false positives. Here we define \csname\endcsname to expand to itself to avoid it matching the definition of some other control sequence.

```

260 〈/2ekernel〉
261 〈*2ekernel | \latexrelease〉
262 〈\latexrelease〉\IncludeInRelease{2020/10/01}%
263 〈\latexrelease〉           {\set@curr@file}{Setting current file name}%
264 \def\set@curr@file#1{%
265   \begingroup
266   \escapechar\m@ne
267   \expandafter\def\csname\expandafter\endcsname
268   \expandafter{\csname\endcsname}%
}
```

Two file names are set here: \@curr@file@reqd which is the file requested by the user, and \@curr@file which should be the same, except when we have a file substitution, in which case it holds the actual loaded file. \@curr@file is resolved first, to check if a substitution happens. If it doesn't, \Expl@@@filehook@if@file@replaced@@TF short-cuts and just copies \@curr@file, otherwise the full normalisation procedure is executed.

At this stage the file name is parsed and normalized, but if the input doesn't have an extension, the default .tex is *not* added to \curr@file because for applications other than \input (graphics, for example) the default extension may not be .tex. First check if the input has an extension, then if the input had no extension, call \expl@@@filehook@drop@extension@N. In case of a file substitution, \curr@file will have an extension.

```

269      \expl@@@filehook@if@no@extension@nTF{#1}%
270          {\@tempswatrue}{\@tempswafalse}%
271      \kernel@make@file@csname@\curr@file
272          \expl@@@filehook@resolve@file@subst@w {#1}%
273      \expl@@@filehook@if@file@replaced@CTF
274          {\@kernel@make@file@csname@\curr@file@reqd
275              \expl@@@filehook@normalize@file@name@w{#1}%
276              \if@tempswa \expl@@@filehook@drop@extension@N@\curr@file@reqd \fi}%
277          {\if@tempswa \expl@@@filehook@drop@extension@N@\curr@file \fi
278              \global\let\curr@file@reqd\curr@file}%
279      \expl@@@filehook@clear@replacement@flag@%
280  \endgroup}
281 /*2ekernel | latexrelease)
282 \latexrelease\EndIncludeInRelease

283 \latexrelease\IncludeInRelease[2019/10/01]%
284 \latexrelease           {\set@curr@file}{Setting current file name}%
285 \latexrelease\def\set@curr@file#1{%
286 \latexrelease  \begingroup
287 \latexrelease    \escapechar\m@ne
288 \latexrelease    \xdef@\curr@file{%
289 \latexrelease      \expandafter\expandafter\expandafter\unquote@name
290 \latexrelease      \expandafter\expandafter\expandafter{%
291 \latexrelease      \expandafter\string
292 \latexrelease          \csname@\firstofone#1\empty\endcsname}}%
293 \latexrelease  \endgroup
294 \latexrelease}%
295 \latexrelease\EndIncludeInRelease

296 \latexrelease\IncludeInRelease[0000/00/00]%
297 \latexrelease           {\set@curr@file}{Setting current file name}%
298 \latexrelease\let\set@curr@file@\undefined
299 \latexrelease\EndIncludeInRelease
300 /*2ekernel}

```

(End definition for \set@curr@file, \curr@file, and \curr@file@reqd.)

Todo: This should get internalized using \expl@ names

```

301 /*2ekernel)
302 /*2ekernel | latexrelease)
303 \latexrelease\IncludeInRelease[2020/10/01]%
304 \latexrelease           {\@kernel@make@file@csname}{Make file csname}%

305 \def@\kernel@make@file@csname#1#2#3{%
306     \xdef#1{\expandafter\@set@curr@file@aux
307         \csname\expandafter#2\@firstofone#3\empty\endcsname}}

```

This auxiliary compares \filename with \csname\endcsname to check if the empty .tex file was requested.

```

308 \def\@set@curr@file@aux#1{%
309   \expandafter\ifx\csname\endcsname#1%
310     .tex\else\string#1\fi}

```

Then we call `\@expl@@@filehook@set@curr@file@nNN` once for `\@curr@file` to set `\CurrentFile(Path)Used` and once for `\@curr@file@reqd` to set `\CurrentFile(Path)`. Here too the slower route is only used if a substitution happened, but here `\@expl@@@filehook@if@file@` can't be used because the flag is reset at the `\endgroup` above, so we check if `\@curr@file` and `\@curr@file@reqd` differ. This macro is issued separate from `\set@curr@file` because it changes `\CurrentFile`, and side-effects would quickly get out of control.

```

311 \def\@filehook@set@CurrentFile{%
312   \@expl@@@filehook@set@curr@file@nNN{\@curr@file}%
313   \CurrentFileUsed\CurrentFilePathUsed
314   \ifx\@curr@file@reqd\@curr@file
315     \let\CurrentFile\CurrentFileUsed
316     \let\CurrentFilePath\CurrentFilePathUsed
317   \else
318     \@expl@@@filehook@set@curr@file@nNN{\@curr@file@reqd}%
319     \CurrentFile\CurrentFilePath
320   \fi}
321 {/2ekernel | latexrelease}
322 <latexrelease>\EndIncludeInRelease
323 {*2ekernel}

```

(End definition for `\@filehook@set@CurrentFile`, `\@kernel@make@file@csname`, and `\@set@curr@file@aux`.)

`\@_set_curr_file:nNN` When inputting a file, `\set@curr@file` does a file lookup (in `\input@path` and `\l_file_search_path_seq`) and returns the actual file name (`<base>` plus `<ext>`) in `\CurrentFileUsed`, and in case there's a file substitution, the requested file in `\CurrentFile` (otherwise both are the same). Only the base and extension are returned, regardless of the input (both `path/to/file.tex` and `file.tex` end up as `file.tex` in `\CurrentFile`). The path is returned in `\CurrentFilePath`, in case it's needed.

```

324 {/2ekernel}
325 {*2ekernel | latexrelease}
326 <latexrelease>\IncludeInRelease{2020/10/01}%
327 <latexrelease>      {\@_set_curr_file:nNN}{Set curr file}%
328 \ExplSyntaxOn
329 <@=filehook>
330 \cs_new_protected:Npn \__filehook_set_curr_file:nNN #1
331   {
332     \exp_args:Nf \__filehook_file_parse_full_name:nN {#1}
333     \__filehook_set_curr_file_assign:nnnNN
334   }
335 \cs_new_protected:Npn \__filehook_set_curr_file_assign:nnnNN #1 #2 #3 #4 #5
336   {
337     \str_set:Nn #5 {#1}
338     \str_set:Nn #4 {#2#3}
339   }
340 \ExplSyntaxOff
341 {/2ekernel | latexrelease}
342 <latexrelease>\EndIncludeInRelease
343 {*2ekernel}

```

(End definition for `\@_set_curr_file:nNN` and `\@_set_curr_file_assign:nnnNN`.)

2.7 Replacing a file and detecting loops

```
\_filehook_resolve_file_subst:w
\_\_filehook\_normalize_file_name:w
\_\_filehook_file_name_compose:nnn
344  {/\2ekernel}
345  {*2ekernel | latexrelease}
346  {latexrelease}\IncludeInRelease{2020/10/01}%
347  {latexrelease}           {\_\_filehook_resolve_file_subst:w}{Replace files detect loops}%
348  \ExplSyntaxOn
349  \cs_new:Npn \_\_filehook_resolve_file_subst:w #1 \@nil
350  { \_\_filehook_parse_full_name:nN {#1} \_\_filehook_file_subst_begin:nnn }
351  \cs_new:Npn \_\_filehook_normalize_file_name:w #1 \@nil
352  { \_\_filehook_parse_full_name:nN {#1} \_\_filehook_file_name_compose:nnn }
353  \cs_new:Npn \_\_filehook_file_name_compose:nnn #1 #2 #3
354  { \tl_if_empty:nF {#1} { #1 / } #2#3 }
```

Since the file replacement is done expandably in a `\csname`, use a flag to remember if a substitution happened. We use this in `\set@curr@file` to short-circuit some of it in case no substitution happened (by far the most common case, so it's worth optimising). The flag raised during the file substitution algorithm must be explicitly cleared after the `__filehook_if_file_replaced:TF` conditional is no longer needed, otherwise further uses of `__filehook_if_file_replaced:TF` will wrongly return true.

```
355 \flag_new:n { __filehook_file_replaced }
356 \cs_new:Npn \_\_filehook_if_file_replaced:TF #1 #2
357 { \flag_if_raised:nTF { __filehook_file_replaced } {#1} {#2} }
358 \cs_new_protected:Npn \_\_filehook_clear_replacement_flag:
359 { \flag_clear:n { __filehook_file_replaced } }
```

First off, start by checking if the current file ($\langle name \rangle + \langle ext \rangle$) has a declared substitution. If not, then just put that as the name (including a possible $\langle path \rangle$ in this case): this is the default case with no substitutions, so it's the first to be checked. The auxiliary `__filehook_file_subst_tortoise_hare:nn` sees that there's no replacement for #2#3 and does nothing else.

```
360 \cs_new:Npn \_\_filehook_file_subst_begin:nnn #1 #2 #3
361 {
362     \_\_filehook_file_subst_tortoise_hare:nn { #2#3 } { #2#3 }
363     { \_\_filehook_file_name_compose:nnn {#1} {#2} {#3} }
364 }
365 \ExplSyntaxOff
366 {/\2ekernel | latexrelease}
367 {latexrelease}\EndIncludeInRelease
368 {*2ekernel}
```

2.7.1 The Tortoise and Hare algorithm

If there is a substitution ($\langle true \rangle$ in the first `\cs_if_exist:cTF` below), then first check if there is no substitution down the line: this should be the second most common case, of one file replaced by another. In that case just leave the substitution there and the job is done. If any substitution happens, then the `\flag __filehook_file_replaced` is raised (conditionally, because checking if a flag is raised is much faster than raising it over and over again).

If, however there are more substitutions, then we need to check for a possible loop in the substitutions, which would otherwise put TeX in an infinite loop if just an exhaustive expansion was used.

To detect a loop, the *Tortoise and Hare* algorithm is used. The name of the algorithm is an analogy to Aesop's fable, in which the Hare outruns a Tortoise. The two pointers here are the csnames which contains each file replacement, both of which start at the position zero, which is the file requested. In the inner part of the macro below, `__filehook_file_subst_loop:cc` is called with `\@file-subst@⟨file⟩` and `\@file-subst@＼@file-subst@⟨file⟩`; that is, the substitution of `⟨file⟩` and the substitution of that substitution: the Tortoise walks one step while the Hare walks two.

Within `__filehook_file_subst_loop:NN` the two substitutions are compared, and if they lead to the same file it means that there is a loop in the substitutions. If there's no loop, `__filehook_file_subst_tortoise_hare:nn` is called again with the Tortoise at position 1 and the hare at 2. Again, the substitutions are checked ahead of the Hare pointer to check that it won't run too far; in case there is no loop in the declarations, eventually one of the `\cs_if_exist:cTF` below will go `⟨false⟩` and the algorithm will end; otherwise it will run until the Hare reaches the same spot as the tortoise and a loop is detected.

```

369 </2ekernel>
370 (*2ekernel | latexrelease)
371 ⟨latexrelease⟩\IncludeInRelease{2020/10/01}%
372 ⟨latexrelease⟩          {\__filehook_file_subst_tortoise_hare:nn}{Tortoise and Hare}%
373 \ExplSyntaxOn
374 \cs_new:Npn \__filehook_file_subst_tortoise_hare:nn #1 #2 #3
375 {
376     \cs_if_exist:cTF { @file-subst@ #2 }
377     {
378         \flag_if_raised:nF { __filehook_file_replaced }
379         { \flag_raise:n { __filehook_file_replaced } }
380         \cs_if_exist:cTF { @file-subst@ \use:c { @file-subst@ #2 } }
381         {
382             \__filehook_file_subst_loop:cc
383             { @file-subst@ #1 }
384             { @file-subst@ \use:c { @file-subst@ #2 } }
385         }
386         { \use:c { @file-subst@ #2 } }
387     }
388     { #3 }
389 }

```

This is just an auxiliary to check if a loop was found, and continue the algorithm otherwise. If a loop is found, the .tex file is used as fallback and `__filehook_file_subst_cycle_error:cN` is called to report the error.

```

390 \cs_new:Npn \__filehook_file_subst_loop:NN #1 #2
391 {
392     \token_if_eq_meaning:NNTF #1 #2
393     {
394         .tex
395         \__filehook_file_subst_cycle_error:cN { @file-subst@ #1 } #1
396     }
397     { \__filehook_file_subst_tortoise_hare:nn {#1} {#2} {#2} }
398 }
399 \cs_generate_variant:Nn \__filehook_file_subst_loop:NN { cc }

```

Showing this type of error expandably is tricky, as we have a very limited amount of characters to show and a potentially large list. As a work around, several errors are printed, each showing one step of the loop, until all the error messages combined show the loop.

```

400 \cs_new:Npn \__filehook_file_subst_cycle_error:NN #1 #2
401   {
402     \__kernel_msg_expandable_error:nnff { kernel } { file-cycle }
403     {#1} { \use:c { @file-subst@ #1 } }
404     \token_if_eq_meaning:NNF #1 #2
405     { \__filehook_file_subst_cycle_error:cN { @file-subst@ #1 } #2 }
406   }
407 \cs_generate_variant:Nn \__filehook_file_subst_cycle_error:NN { c }

And the error message:

408 \__kernel_msg_new:nnn { kernel } { file-cycle }
409   { File-loop!~#1~replaced~by~#2... }

(End definition for \__filehook_resolve_file_subst:w and others.)

410 \ExplSyntaxOff
411 </2ekernel | latexrelease>
412 <latexrelease>\EndIncludeInRelease
413 <*2ekernel>
414 <@@=>
```

2.8 Preventing a package from loading

We support the use case of preventing a package from loading but not any other type of files (e.g., classes).

```

\disable@package@load \disable@package@load defines \@pkg-disable@{package} to expand to some code #2
\reenable@package@load instead of loading the package.

415 </2ekernel>
416 <*2ekernel | latexrelease>
417 <latexrelease>\IncludeInRelease{2020/10/01}%
418 <latexrelease>          {\disable@package@load}{Disable packages}%
419 \def\disable@package@load#1#2{%
420   \global\@namedef{@pkg-disable@#1.\@pkextension}{#2}}
421 \def\@disable@packageload@do#1#2{%
422   \@ifundefined{@pkg-disable@#1}{#2}{%
423     {\@nameuse{@pkg-disable@#1}}}
424 \def\reenable@package@load undefines \@pkg-disable@{package} to reallow loading
425 a package.
426 \def\reenable@package@load#1{%
427   \global\expandafter\let
428   \csname @pkg-disable@#1.\@pkextension \endcsname \undefined}
429 </2ekernel | latexrelease>
430 <latexrelease>\EndIncludeInRelease
431 <latexrelease>\IncludeInRelease{0000/00/00}%
432 <latexrelease>          {\disable@package@load}{Disable packages}%
433 <latexrelease>
434 <latexrelease>\let\disable@package@load \undefined
```

```

433 〈\latexrelease〉\let\@disable@packageload@do\@undefined
434 〈\latexrelease〉\let\reenable@package@load \@undefined
435 〈\latexrelease〉\EndIncludeInRelease
436 (*2ekernel)

```

(*End definition for \disable@package@load, \reenable@package@load, and \@disable@packageload@do. These functions are documented on page 689.*)

2.9 High-level interfaces for L^AT_EX

None so far and the general feeling for now is that the hooks are enough. Packages like filehook, etc., may use them to set up their interfaces (samples are given below) but for the now the kernel will not provide any.

2.10 Internal commands needed elsewhere

Here we set up a few horrible (but consistent) L^AT_EX 2 _{ε} names to allow for internal commands to be used outside this module (and in parts that still use L^AT_EX 2 _{ε} syntax). We have to unset the @@ since we want double “at” sign in place of double underscores.

```

437 〈@@=〉
438 〈/2ekernel〉
439 (*2ekernel | latexrelease)
440 〈\latexrelease〉\IncludeInRelease{2020/10/01}%
441 〈\latexrelease〉 {\@expl@@@filehook@if@no@extension@@nTF}{2e tmp interfaces}%
442 \ExplSyntaxOn
443 \cs_new_eq:NN \@expl@@@filehook@if@no@extension@@nTF
444           \__filehook_if_no_extension:nTF
445 \cs_new_eq:NN \@expl@@@filehook@set@curr@file@nNN
446           \__filehook_set_curr_file:nNN
447 \cs_new_eq:NN \@expl@@@filehook@resolve@file@subst@w
448           \__filehook_resolve_file_subst:w
449 \cs_new_eq:NN \@expl@@@filehook@normalize@file@name@w
450           \__filehook_normalize_file_name:w
451 \cs_new_eq:NN \@expl@@@filehook@if@file@replaced@@TF
452           \__filehook_if_file_replaced:TF
453 \cs_new_eq:NN \@expl@@@filehook@clear@replacement@flag@@
454           \__filehook_clear_replacement_flag:
455 \cs_new_eq:NN \@expl@@@filehook@drop@extension@@N
456           \__filehook_drop_extension:N
457 \cs_new_eq:NN \@expl@@@filehook@file@push@@
458           \__filehook_file_push:
459 \cs_new_eq:NN \@expl@@@filehook@file@pop@@
460           \__filehook_file_pop:
461 \cs_new_eq:NN \@expl@@@filehook@file@pop@assign@nnnn
462           \__filehook_file_pop_assign:nnnn
463 \ExplSyntaxOff

```

This one specifically has to be undefined because it is left over in the input stream from `\InputIfFileExists` and executed when `\textrun` is loaded. It cannot be `\let` to `\undefined` otherwise it would error as well, so it is `\let` to `\relax` to be silently ignored when loading `\textrun`.

```

464 </2ekernel | \textrun>
465 <\textrun>\EndIncludeInRelease
466 <\textrun>
467 <\textrun>\IncludeInRelease{0000/00/00}%
468 <\textrun>    {\@expl@@filehook@if@no@extension@nTF}{2e tmp interfaces}%
469 <\textrun>\let\@expl@@filehook@file@pop@@\relax
470 <\textrun>\EndIncludeInRelease
471 <2ekernel>

This ends the kernel code in this file.

472 </2ekernel>
```

3 A sample package for structuring the log output

```

473 <*structuredlog>
474 <@=filehook>
475 \ProvidesExplPackage
476     {structuredlog}{\ltfilehookdate}{\ltfilehookversion}
477     {Structuring the TeX transcript file}

\g_filehook_nesting_level_int
Stores the current package nesting level.

478 \int_new:N \g_filehook_nesting_level_int
Initialise the counter with the number of files in the \currnamestack (the number of items divided by 3) minus one, because this package is skipped when printing to the log.

479 \int_gset:Nn \g_filehook_nesting_level_int
480     { ( \tl_count:N \currnamestack ) / 3 - 1 }

(End definition for \g_filehook_nesting_level_int.)
```

`_filehook_log_file_record:n` This macro is responsible for increasing and decreasing the file nesting level, as well as printing to the log. The argument is either `STOPTART` or `STOP` and the action it takes on the nesting integer depends on that.

```

481 \cs_new_protected:Npn \_filehook_log_file_record:n #1
482     {
483         \str_if_eq:nnT {#1} {START} { \int_gincr:N \g_filehook_nesting_level_int }
484         \iow_term:x
485         {
486             \prg_replicate:nn { \g_filehook_nesting_level_int } { = } ~
487             ( LEVEL ~ \int_use:N \g_filehook_nesting_level_int \c_space_tl #1 ) ~
488             \CurrentFileUsed
```

If there was a file replacement, show that as well:

```

489     \str_if_eq:NNF \CurrentFileUsed \CurrentFile
490         { ~ ( \CurrentFile \c_space_tl requested ) }
491         \iow_newline:
492     }
493     \str_if_eq:nnT {#1} {STOP} { \int_gdecr:N \g_filehook_nesting_level_int }
494 }
```

Now just hook the macro above in the generic `file/before...`

```

495 \AddToHook{file/before}{ \_filehook_log_file_record:n { START } }
...and file/after hooks. We don't want to install the file/after hook immediately, because that would mean it is the first time executed when the package finishes. We therefore put the declaration inside \AddToHookNext so that it gets only installed when we have left this package.
496 \AddToHookNext{file/after}
497   { \AddToHook{file/after}{ \_filehook_log_file_record:n { STOP } } }
(End definition for \_filehook_log_file_record:n.)
498 <@@=
499 </structuredlog>

```

4 Package emulations

4.1 Package `atveryend` emulation

With the new hook management and the hooks in `\enddocument` all of `atveryend` is taken care of. We can make an emulation only here after the substitution functionality is available:

```

500 {*2ekernel}
501 \declare@file@substitution{atveryend.sty}{atveryend-ltx.sty}
502 </2ekernel>

```

Here is the package file we point to:

```

503 <atveryend-ltx>
504 \ProvidesPackage{atveryend-ltx}
505 [2020/08/19 v1.0a
506   Emulation of the original atvery package^^Jwith kernel methods]

```

Here are new definitions for its interfaces now pointing to the hooks in `\enddocument`

```

507 \newcommand\AfterLastShipout {\AddToHook{\enddocument/afterlastpage}}
508 \newcommand\AtVeryEndDocument {\AddToHook{\enddocument/afteraux}}

```

Next one is a bit of a fake, but the result should normally be as expected. If not, one needs to add a rule to sort the code chunks in `enddocument/info`.

```

509 \newcommand\AtEndAfterFileList{\AddToHook{\enddocument/info}}
510 \newcommand\AtVeryVeryEnd {\AddToHook{\enddocument/end}}

```

`\BeforeClearDocument` This one is the only one we don't implement or rather don't have a dedicated hook in the code.

```

511 \ExplSyntaxOn
512 \newcommand\BeforeClearDocument[1]
513   { \AtEndDocument{#1}
514     \atveryend@DEPRECATED{BeforeClearDocument \tl_to_str:n{#1}}
515   }
516 \cs_new:Npn\atveryend@DEPRECATED #1
517   {\iow_term:x{=====~DEPRECATED~USAGE~#1~=====}}
518 \ExplSyntaxOff
(End definition for \BeforeClearDocument.)
519 </atveryend-ltx>

```

File R

ltshipout.dtx

Contents

1 Introduction

The code provides an interface to the `\shipout` primitive of TeX which is called when a finished pages is finally “shipped out” to the target output file, e.g., the `.dvi` or `.pdf` file. A good portion of the code is based on ideas by Heiko Oberdiek implemented in his packages `atbegshi` and `atenddvi` even though the interfaces are somewhat different.²¹

1.1 Overloading the `\shipout` primitive

\shipout

With this implementation TeX’s shipout primitive is no longer available for direct use. Instead `\shipout` is running some (complicated) code that picks up the box to be shipped out regardless of how that is done, i.e., as a constructed `\vbox` or `\hbox` or as a box register.

It then stores it in a named box register. This box can then be manipulated through a set of hooks after which it is shipped out for real.

\ShipoutBox \l_shipout_box

This box register is called `\ShipoutBox` (alternatively available via the L3 name `\l_`-`shipout_box`).

\l_shipout_box_ht_dim \l_shipout_box_dp_dim \l_shipout_box_wd_dim \l_shipout_box_ht_plus_dp_dim

The shipout box dimensions are available in the L3 registers `\l_shipout_box_ht_dim`, etc. (there are no L^AT_EX 2 _{ε} names).²² These variables can be used inside the hook code for `shipout/before`, `shipout/foreground` and `shipout/background` if needed.

²¹Heiko’s interfaces are emulated by the kernel code, if a document requests his packages, so older documents will continue to work.

²²Might need changing, but HO’s version as strings is not really helpful I think).

1.2 Provided hooks

shipout/before
shipout/foreground
shipout/background
shipout/firstpage
shipout/lastpage

The code offers a number of hooks into which packages (or the user) can add code to support different use cases. These are:

shipout/before This hook is executed after the finished page has been stored in `\ShipoutBox / \l_shipout_box`. It can be used to alter that box content or to discard it completely (see `\DiscardShipoutBox` below).

shipout/background This hook adds a picture environment into the background of the page with the $(0,0)$ coordinate in the top-left corner using a `\unitlength` of `1pt`. It should therefore only receive `\put` commands or other commands suitable in a `picture` environment and the vertical coordinate values would normally be negative.

Technically this is implemented by adding a zero-sized `\hbox` as the very first item into the `\ShipoutBox` containing that `picture` environment. Thus the rest of the box content will overprint what ever is typeset by that hook.

shipout/foreground This hook adds a picture environment into the foreground of the page with the $(0,0)$ coordinate in the top-left corner using a `\unitlength` of `1pt`.

Technically this is implemented by adding a zero-sized `\hbox` as the very last item into the `\ShipoutBox` and raising it up so that it still has its $(0,0)$ point in the top-left corner. But being placed after the main box content it will be typeset later and thus overprints it (i.e., is in the foreground).

shipout/firstpage The material from this hook is executed only once at the very beginning of the first output page that is shipped out (i.e., not discarded at the last minute). It should only contain `\special` or similar commands needed to direct post processors handling the `.dvi` or `.pdf` output.²³

shipout/lastpage The corresponding hook to add `\specials` at the very end of the output file. It is only executed on the very last page — or rather on the page that `LATEX` believes is the last one.

It may not be possible for `LATEX` to correctly determine which page is the last one without several reruns. If this happens and the hook is non-empty then `LATEX` will add an extra page to place the material and also request a rerun to get the correct placement sorted out.

As mentioned above the hook `shipout/before` is executed first and can manipulate the prepared shipout box stored in `\ShipoutBox` or set things up for use in `\write` during the actual shipout. The other hooks are added inside `hbox`s to the box being shipped out in the following order:

²³In `LATEX 2<` that was already existing, but implemented using a box register with the name `\@begindvibox`.

<code>shipout/firstpage</code>	only on the first page
<code>shipout/background</code>	
<code><boxed content of \ShipoutBox></code>	
<code>shipout/foreground</code>	
<code>shipout/lastpage</code>	only on the last page

If any of the hooks has no code then that particular no box is added at that point.

In a document that doesn't produce pages, e.g., only makes `\typeouts`, none of the hooks are executed (as there is no `\shipout`) not even the `shipout/lastpage` hook.

`\AtBeginDvi`
`\AtEndDvi`

`\AtBeginDvi` is the existing L^AT_EX 2 _{ε} interface to fill the `shipout/firstpage` hook. This is not really a good name as it is not just supporting `.dvi` but also `.pdf` output or `.dtx`.

`\AtEndDvi` is the counterpart that was not available in the kernel but only through the package `atenddvi`. It fills the `shipout/lastpage` hook.

Todo: better names? Any suggestions?

1.3 Special commands for use inside the hooks

`\DiscardShipoutBox`
`\shipout_discard_box:`

`\AddToHookNext {shipout/before} {...\DiscardShipoutBox...}`

The `\DiscardShipoutBox` declaration (L3 name `\shipout_discard_box:`) requests that on the next shipout the page box is thrown away instead of being shipped to the `.dvi` or `.pdf` file.

Typical applications wouldn't do this unconditionally, but have some processing logic that decides to use or not to use the page.

Note that if this declaration is used directly in the document it may depend on the placement to which page it applies, given that L^AT_EX output routine is called in an asynchronous manner!

Todo: Once we have a new mark mechanism available we can improve on that and make sure that the declaration applies to the page that contains it.

In the `atbegshi` package there are a number of additional commands for use inside the `shipout/before` hook. They should normally not be needed any more as one can instead simply add code to the hooks `shipout/before`, `shipout/background` or `shipout/foreground`.²⁴ If `atbegshi` gets loaded then those commands become available as public functions with their original names as given below.

²⁴If that assumption turns out to be wrong it would be trivial to change them to public functions (right now they are private).

1.4 Information counters

```
\ ReadonlyShipoutCounter  
\g_shipout_READONLY_int
```

This integer holds the number of pages shipped out up to now (including the one to be shipped out when inside the output routine). More precisely, it is incremented only after it is clear that a page will be shipped out, i.e., after the `shipout/before` hook (because that might discard the page)!

Just like with the `page` counter its value is only accurate within the output routine. In the body of the document it may be off by one as the output routine is called asynchronously!

Also important: it *must not* be set, only read. There are no provisions to prevent that but if you do, chaos will be the result. To emphasize this fact it is not provided as a `LATEX` counter but as a `TeX` counter (i.e., a command), so `\Alph{\ReadonlyShipoutCounter}` etc, would not work.

```
totalpages
```

```
\g_shipout_TOTALPAGES_int
```

```
\arabic{totalpages}  
\int_use:N \g_shipout_TOTALPAGES_int % expl3 usage
```

In contrast to `\ReadonlyShipoutCounter`, the `totalpages` counter is a `LATEX` counter and incremented for each shipout attempt including those pages that are discarded for one or the other reason. Again `shipout/before` sees the counter before it is incremented).

Furthermore, while it is incremented for each page, its value is never used by `LATEX`. It can therefore be freely reset or changed by user code, for example, to additionally count a number of pages that are not build by `LATEX` but are added in a later part of the process, e.g., cover pages or picture pages made externally.

Important: as this is a page-related counter its value is only reliable inside the output routine!

```
\PreviousTotalPages
```

```
\thetotalpages/\PreviousTotalPages
```

Command that expands to the number of total pages from the previous run. If there was no previous run or if used in the preamble it expands to 0. Note that this is a command to a counter, so in order to display the number in, say, Roman numerals you have to assign its value to a counter and then use `\Roman` on that counter.

1.5 Debugging shipout code

```
\DebugShipoutsOn  
\DebugShipoutsOff  
\shipout_DEBUG_on:  
\shipout_DEBUG_off:
```

```
\DebugShipoutsOn
```

Turn the debugging of shipout code on or off. This displays changes made to the shipout data structures.

Todo: This needs some rationalizing and may not stay this way.

2 Emulating commands from other packages

The packages in this section are no longer necessary but as they are used in other packages they are emulated when they are loaded via `\usepackage` or `\RequirePackage`.

2.1 Emulating **atbegshi**

<code>\AtBeginShipoutUpperLeft</code>	<code>\AddToHook {shipout/before}</code>
<code>\AtBeginShipoutUpperLeftForeground</code>	<code>{... \AtBeginShipoutUpperLeft{\code} ...}</code>

This adds a `picture` environment into the background of the shipout box expecting `\code` to contain `picture` commands. The same effect can be obtained by simply using kernel features as follows:

```
\AddToHook{shipout/background}{\code}
```

There is one technical difference: if `\AtBeginShipoutUpperLeft` is used several times each invocation is put into its own box inside the shipout box whereas all `\code` going into `shipout/background` ends up all in the same box in the order it is added or sorted based on the rules for the hook chunks.

`\AtBeginShipoutUpperLeftForeground` is similar with the difference that the `picture` environment is placed in the foreground. To model it with the kernel functions use the hook `shipout/foreground` instead.

<code>\AtBeginShipoutAddToBox</code>	<code>\AddToHook {shipout/before} {... \AtBeginShipoutAddToBox{\code} ...}</code>
<code>\AtBeginShipoutAddToBoxForeground</code>	

These work like `\AtBeginShipoutUpperLeft` and `\AtBeginShipoutUpperLeftForeground` with the difference that `\code` is directly placed into an `\hbox` inside the shipout box and not surrounded by a `picture` environment.

To emulate them using `shipout/background` or `shipout/foreground` you may have to wrap `\code` into a `\put` statement but if the code is not doing any typesetting just adding it to the hook should be sufficient.

<code>\AtBeginShipoutBox</code>	This is the name of the shipout box as <code>atbegshi</code> knows it.
---------------------------------	--

<code>\AtBeginShipoutInit</code>	By default <code>atbegshi</code> delayed its action until <code>\begin{document}</code> . This command was forcing it in an earlier place. With the new concept it does nothing.
----------------------------------	--

<code>\AtBeginShipout</code>	<code>\AtBeginShipout{\code} \equiv \AddToHook{shipout/before}{\code}</code>
<code>\AtBeginShipoutNext</code>	<code>\AtBeginShipoutNext{\code} \equiv \AddToHookNext{shipout/before}{\code}</code>

This is equivalent to filling the `shipout/before` hook by either using `\AddToHook` or `\AddToHookNext`, respectively.

<code>\AtBeginShipoutFirst</code>	The <code>atbegshi</code> names for <code>\AtBeginDvi</code> and <code>\DiscardShipoutBox</code> .
<code>\AtBeginShipoutDiscard</code>	

2.2 Emulating **everyshi**

<code>\EveryShipout</code>	<code>\EveryShipout{\code} \equiv \AddToHook{shipout/before}{\code}</code>
----------------------------	--

<code>\AtNextShipout</code>	<code>\AtNextShipout{\code} \equiv \AddToHookNext{shipout/before}{\code}</code>
-----------------------------	---

2.3 Emulating `atenddvi`

The `atenddvi` package implemented only a single command: `\AtEndDvi` and that is now available out of the box.

2.4 Emulating `everypage`

This page takes over the original `\@begindvi` hook and replaces it. It should be all covered by the hooks offered here (details need checking) and thus could simply use the provided hooks rather than defining its own.

3 The Implementation

```
1 <@@=shipout>
```

At the moment the whole module rolls back in one go, but if we make any modifications in later releases this will then need splitting.

```
2 {*ekernel | latexrelease}
3 <latexrelease>\IncludeInRelease{2020/10/01}%
4 <latexrelease>           {\shipout}{Hook mangement (shipout)}%
5 \ExplSyntaxOn
```

3.1 Debugging

`\g__shipout_debug_bool` Holds the current debugging state.

```
6 \bool_new:N \g__shipout_debug_bool
```

(*End definition for \g__shipout_debug_bool.*)

```
\shipout_debug_on: Turns debugging on and off by redefining \__shipout_debug:n.
\shipout_debug_off:
\__shipout_debug:n
\__shipout_debug_gset:
```

7 \cs_new_eq:NN __shipout_debug:n \use_none:n
8 \cs_new_protected:Npn \shipout_debug_on:
9 {
10 \bool_gset_true:N \g__shipout_debug_bool
11 __shipout_debug_gset:
12 }
13 \cs_new_protected:Npn \shipout_debug_off:
14 {
15 \bool_gset_false:N \g__shipout_debug_bool
16 __shipout_debug_gset:
17 }
18 \cs_new_protected:Npn __shipout_debug_gset:
19 {
20 \cs_gset_protected:Npx __shipout_debug:n ##1
21 { \bool_if:NT \g__shipout_debug_bool {##1} }
22 }

(*End definition for \shipout_debug_on: and others. These functions are documented on page 709.*)

`\ShipoutBox` The box filled with the page to be shipped out (both L3 and L^AT_EX 2_& name).
`\l_shipout_box`

```
23 \box_new:N \l_shipout_box
24 \cs_set_eq:NN \ShipoutBox \l_shipout_box
```

(*End definition for \ShipoutBox and \l_shipout_box. These functions are documented on page 706.*)

`__shipout_execute:` This is going to be the code run by `\shipout`. The code follows closely the ideas from `atbegshi`, so not documenting that here for now.

```

25 \cs_set_protected:Npn \__shipout_execute: {
26   \tl_set:Nx \l__shipout_group_level_tl
27   { \int_value:w \tex_currentgrouplevel:D }
28   \tex_afterassignment:D \__shipout_execute_test_level:
29   \tex_setbox:D \l_shipout_box
30 }
```

(End definition for `__shipout_execute:..`)

`\shipout` Overloading the `\shipout` primitive:

```
31 \cs_gset_eq:NN \shipout \__shipout_execute:
```

(End definition for `\shipout`. This function is documented on page 706.)

`\l__shipout_group_level_tl` Helper token list to record the group level at which `__shipout_execute:` is encountered.

```
32 \tl_new:N \l__shipout_group_level_tl
```

(End definition for `\l__shipout_group_level_tl`.)

`__shipout_execute_test_level:` If the group level has changed then we are still constructing `\l_shipout_box` and to continue we need to wait until the current group has finished, hence the `\tex_aftergroup:D`.

```

33 \cs_new:Npn \__shipout_execute_test_level: {
34   \int_compare:nNnT
35   { \l__shipout_group_level_tl < \tex_currentgrouplevel:D }
36   \tex_aftergroup:D
37   \__shipout_execute_cont:
38 }
```

(End definition for `__shipout_execute_test_level:..`)

`__shipout_execute_cont:` When we have reached this point the shipout box has been processed and is available in `\l_shipout_box` and ready for real ship out (perhaps)..

First we quickly check if it is void (can't happen in the standard L^AT_EX output routine but `\shipout` might be called from a package that has some special processing logic). If it is void we aren't shipping anything out and processing ends.²⁵

```

39 \cs_new:Npn \__shipout_execute_cont: {
40   \box_if_empty:NTF \l_shipout_box
41   { \PackageWarning{ltshipout}{Ignoring~void~shipout~box} }
42 }
```

Otherwise we assume that we will ship something and prepare for final adjustments (in particular setting the state of `\protect` while we are running the hook code). We also save the current `\protect` state to restore it later.

```

43   \bool_gset_false:N \g__shipout_discard_bool
44   \cs_set_eq:NN \__shipout_saved_protect: \protect
45   \set@typeset@protect
```

We also store the current shipout box dimension in registers, so that they can be used in the hook code.²⁶

```
46   \__shipout_get_box_size:N \l_shipout_box
```

²⁵In that case we don't reset the deadcycles, that would be up to the OR processing logic to do.

²⁶This is not really necessary as the code could access them via `\box_ht:N`, etc., but it is perhaps convenient.

Then we execute the `shipout/before` hook.

```
47      \hook_use:n {shipout/before}
```

In `\g_shipout_totalpages_int` we count all shipout attempts so we increment that counter already here (the other one is incremented later when we know for sure that we do a `\shipout`).

We increment it after running the above hook so that the values for `\g_shipout_totalpages_int` and `\` are in sync while the hook is executed (in the case that `totalpages` isn't manually altered or through discarding pages that is).

```
48      \int_gincr:N \g_shipout_totalpages_int
```

The above hook might contain code that requests the page to be discarded so we now test for it.

```
49      \bool_if:NTF \g__shipout_discard_bool
50          { \PackageInfo{ltshipout}{Completed~ page~ discarded}
51              \bool_gset_false:N \g__shipout_discard_bool
```

As we are discarding the page box and not shipping anything out, we need to do some house cleaning and reset TeX's deadcycles so that it doesn't complain about too many calls to the OR without any shipout.

```
52      \tex_deadcycles:D \c_zero_int
```

Todo: In atbegshi the box was dropped but is that actually needed? Or the resetting of \protect to its kernel value?

```
53 %
54 %         \group_begin:
55 %             \box_set_eq_drop:NN \l_shipout_box \l_shipout_box
56 %         \group_end:
57 %             \cs_set_eq:NN \protect \exp_not:N
58 }
```

Even if there was no explicit request to discard the box it is possible that the code for the hook `shipout/before` has voided the box (by mistake or deliberately). We therefore test once more but this time make it a warning, because the best practice way is to use the request mechanism.

```
58     { \box_if_empty:NTF \l_shipout_box
59         { \PackageWarning{ltshipout}%
60             { Shipout~ box~ was~ voided~ by~ hook,\MessageBreak
61                 ignoring~ shipout~ box }
62 }
```

Finally, if the box is still non-empty we are nearly ready to ship it out. First we increment the total page counter so that we can later test if we have reached the final page according to our available information.²⁷

```
63     {
64         \int_gincr:N \g_shipout_READONLY_int
65         \_shipout_debug:n {
66             \typeout{Absolute~ page~ == \int_use:N \g_shipout_READONLY_int
67                     \space (target:~ \@abspage@last)}
68     }
```

²⁷Doing that earlier would be wrong because we might end up with the last page counted but discard and then we have no place to add the final objects into the output file.

Then we store the box sizes again (as they may have changed) and then look at the hooks `shipout/foreground` and `shipout/background`. If either or both are non-empty we add a `picture` environment to the box (in the foreground and or in the background) and execute the hook code inside that environment.

```

69          \__shipout_get_box_size:N \l_shipout_box
70          \hook_if_empty:nF {shipout/foreground}
71              { \__shipout_add_foreground_picture:n
72                  { \hook_use:n {shipout/foreground} } }
73          \hook_if_empty:nF {shipout/background}
74              { \__shipout_add_background_picture:n
75                  { \@kernel@before@shipout@background
76                      \hook_use:n {shipout/background} } }

```

We then run `__shipout_execute_firstpage_hook`: that adds the content of the hook `shipout/firstpage` to the start of the first page (if non-empty). It is then redefined to do nothing on later pages.

```
77          \__shipout_execute_firstpage_hook:
```

The we check if we have to add the `shipout/lastpage` hook because we have reached the last page. This test will be false for all but one (and hopefully the correct) page.

```

78          \int_compare:nNnT \cabs@page@last = \g_shipout_READONLY_int
79              { \hook_if_empty:nF {shipout/lastpage}
80                  { \__shipout_debug:n { \typeout{Executing- lastpage- hook-
81                      on- page- \int_use:N \g_shipout_READONLY_int } } }
82                      \__shipout_add_foreground_box:n { \UseHook{shipout/lastpage}
83                          \@kernel@after@shipout@lastpage } }
84                  }
85          \bool_gset_true:N \g__shipout_lastpage_handled_bool
86      }

```

Finally we run the actual `\TeX` primitive for `shipout`. As that will expand delayed `\write` statements inside the page in which protected commands should not expand we first change `\protect` to the appropriate definition for that case.

```

87          \cs_set_eq:NN \protect \exp_not:N
88          \tex_shipout:D \box_use:N \l_shipout_box
89      }
90  }

```

Restore the value of `\protect` in case `\shipout` is called outside of the output routine (where it is automatically restored because of the implicit group).

```

91          \cs_set_eq:NN \protect \__shipout_saved_protect:
92      }
93  }

```

(End definition for `__shipout_execute_cont`.)

`__shipout_saved_protect`: Remeber the current `\protect` state.

```
94 \cs_new_eq:NN \__shipout_saved_protect: \protect
```

(End definition for `__shipout_saved_protect`.)

shipout/before
shipout/foreground
shipout/background
shipout/firstpage
shipout/lastpage

```

98 \hook_new:n{shipout/firstpage}
99 \hook_new:n{shipout/lastpage}

```

(End definition for `shipout/before` and others. These functions are documented on page 707.)

```

\@kernel@after@shipout@lastpage
\@kernel@before@shipout@background
100 \let\@kernel@after@shipout@lastpage\@empty
101 \let\@kernel@before@shipout@background\@empty

```

(End definition for `\@kernel@after@shipout@lastpage` and `\@kernel@before@shipout@background`.)

`_shipout_execute_firstpage_hook:` This command adds any specials into a box and adds that to the very beginning of the first box shipped out. After that we redefine it to do nothing on later pages.

```

102 \cs_new:Npn \_shipout_execute_firstpage_hook: {
```

Adding something to the beginning means adding it to the background as that layer is done first in the output. Of course that is only needed if the hook actually contains anything.

```

103 \hook_if_empty:nF {shipout/firstpage}
104     { \_shipout_add_background_box:n { \UseHook{shipout/firstpage} } }
```

Once we are here we change the definition to do nothing next time and we also change the command used to implement `\AtBeginDvi` to become a warning and not add further material to a hook that is never used again.

```

105 \cs_gset_eq:NN \_shipout_execute_firstpage_hook: \prg_do_nothing:
106 \cs_gset:Npn \_shipout_add_firstpage_material:Nn ##1 ##2 {
107     \@latex@warning{
108         First~ page~ is~ already~ shipped~ out,~ ignoring\MessageBreak
109         \string##1 }
110     }
111 }
```

(End definition for `_shipout_execute_firstpage_hook:..`)

`\g_shipout_lastpage_handled_bool` A boolean to signal if we have already handled the `shipout/lastpage` hook.

```

112 \bool_new:N \g\_shipout_lastpage_handled_bool
```

(End definition for `\g_shipout_lastpage_handled_bool`.)

`_shipout_add_firstpage_material:Nn` This command adds material to the `shipout/firstpage` hook. It is used in `\AtBeginDvi`, etc. The first argument is the command through which it is called. Initially this is ignored but once we are passed the first page it can be used to generate a warning message mentioning the right user command.

```

113 \cs_new:Npn \_shipout_add_firstpage_material:Nn #1#2 {
114     \AddToHook{shipout/firstpage}{#2}
115 }
```

(End definition for `_shipout_add_firstpage_material:Nn`.)

`_shipout_get_box_size:N` Store the box dimensions in dimen registers.

Todo: This could/should perhaps be generalized to set height depth and width given an arbitrary box.

```

116 \cs_new:Npn \__shipout_get_box_size:N #1 {
117   \dim_set:Nn \l_shipout_box_ht_dim { \box_ht:N #1 }
118   \dim_set:Nn \l_shipout_box_dp_dim { \box_dp:N #1 }
119   \dim_set:Nn \l_shipout_box_wd_dim { \box_wd:N #1 }
120   \dim_set:Nn \l_shipout_box_ht_plus_dp_dim { \l_shipout_box_ht_dim +
121                                         \l_shipout_box_dp_dim }
122 }
```

(End definition for `__shipout_get_box_size:N`.)

`\l_shipout_box_ht_dim` And here are the variables set by `__shipout_get_box_size:N`.

```

123 \dim_new:N \l_shipout_box_ht_dim
124 \dim_new:N \l_shipout_box_dp_dim
125 \dim_new:N \l_shipout_box_wd_dim
126 \dim_new:N \l_shipout_box_ht_plus_dp_dim
```

(End definition for `\l_shipout_box_ht_dim` and others. These functions are documented on page 706.)

`\g__shipout_discard_bool` Indicate whether or not the current page box should be discarded

```
127 \bool_new:N \g__shipout_discard_bool
```

(End definition for `\g__shipout_discard_bool`.)

`\l__shipout_tmp_box` We need a box for the background and foreground material and a token register to remember badness settings as we disable them during the buildup below.

```

128 \box_new:N \l__shipout_tmp_box
129 \tl_new:N \l__shipout_saved_badness_tl
```

(End definition for `\l__shipout_tmp_box` and `\l__shipout_saved_badness_tl`.)

`__shipout_add_background_box:n` In standard L^AT_EX the shipout box is always a `\vbox` but here we are allowed for other usage as well, in case some package has its own output routine.

```

130 \cs_new:Npn \__shipout_add_background_box:n #1
131 { \__shipout_get_box_size:N \l_shipout_box
```

But we start testing for a vertical box as that should be the normal case.

```

132 \box_if_vertical:NTF \l_shipout_box
133 {
```

Save current values of `\vfuzz` and `\vbadness` then change them to allow box manipulations without warnings.

```

134 \tl_set:Nx \l__shipout_saved_badness_tl
135 { \vfuzz=\the\vfuzz\relax
136   \vbadness=\the\vbadness\relax }
137 \vfuzz=\c_max_dim
138 \vbadness=\c_max_int
```

Then we reconstruct `\l_shipout_box` ...

```

139 \vbox_set_to_ht:Nnn \l_shipout_box \l_shipout_box_ht_plus_dp_dim
140 {
```

... the material in #1 is placed into a horizontal box with zero dimensions.

```

141 \hbox_set:Nn \l__shipout_tmp_box
142 { \l__shipout_saved_badness_tl #1 }
143 \box_set_wd:Nn \l__shipout_tmp_box \c_zero_dim
144 \box_set_ht:Nn \l__shipout_tmp_box \c_zero_dim
145 \box_set_dp:Nn \l__shipout_tmp_box \c_zero_dim
```

The we typeset that box followed by whatever was in `\l_shipout_box` before (unpacked).

```

146      \skip_zero:N \baselineskip
147      \skip_zero:N \lineskip
148      \skip_zero:N \lineskiplimit
149      \box_use:N \l_shipout_tmp_box
150      \vbox_unpack:N \l_shipout_box

```

The `\kern` ensures that the box has no depth which is afterwards explicitly corrected.

```

151          \kern \c_zero_dim
152      }
153      \box_set_ht:Nn \l_shipout_box \l_shipout_box_ht_dim
154      \box_set_dp:Nn \l_shipout_box \l_shipout_box_dp_dim

```

Todo: The whole boxing maneuver looks a bit like overkill to me, but for the moment I leave.

```

155          \l__shipout_saved_badness_tl
156      }
157      {

```

A horizontal box is handled in a similar way. The last case would be a void box in which case we do nothing hence the missing F branch.

```

158      \box_if_horizontal:NT \l_shipout_box
159      {
160          \tl_set:Nx \l__shipout_saved_badness_tl
161          { \hfuzz=\the\hfuzz\relax
162              \hbadness=\the\hbadness\relax }
163          \hfuzz=\c_max_dim
164          \hbadness=\c_max_int
165          \hbox_set_to_wd:Nnn \l_shipout_box \l_shipout_box_wd_dim
166          {
167              \hbox_set:Nn \l__shipout_tmp_box
168              { \l__shipout_saved_badness_tl #1 }
169              \box_set_wd:Nn \l__shipout_tmp_box \c_zero_dim
170              \box_set_ht:Nn \l__shipout_tmp_box \c_zero_dim
171              \box_set_dp:Nn \l__shipout_tmp_box \c_zero_dim
172              \box_move_up:nn
173                  \l_shipout_box_ht_dim
174                  { \box_use:N \l__shipout_tmp_box }
175                  \hbox_unpack:N \l_shipout_box
176          }
177          \l__shipout_saved_badness_tl
178      }
179  }
180 }

```

(End definition for `_shipout_add_background_box:n`.)

`_shipout_add_foreground_box:n` Foreground boxes are done in the same way, only the order and placement of boxes has to be done differently.

```

181 \cs_new:Npn \_shipout_add_foreground_box:n #1
182 {
183     \box_if_vertical:NTF \l_shipout_box
184     {
185         \tl_set:Nx \l__shipout_saved_badness_tl

```

```

186 { \vfuzz=\the\vfuzz\relax
187   \vbadness=\the\vbadness\relax }
188 \vfuzz=\c_max_dim
189 \vbadness=\c_max_int
190 \vbox_set_to_ht:Nnn \l_shipout_box \l_shipout_box_ht_plus_dp_dim
191 {
192   \hbox_set:Nn \l__shipout_tmp_box
193   { \l__shipout_saved_badness_tl #1 }
194   \box_set_wd:Nn \l__shipout_tmp_box \c_zero_dim
195   \box_set_ht:Nn \l__shipout_tmp_box \c_zero_dim
196   \box_set_dp:Nn \l__shipout_tmp_box \c_zero_dim
197   \skip_zero:N \baselineskip
198   \skip_zero:N \lineskip
199   \skip_zero:N \lineskiplimit
200   \vbox_unpack:N \l_shipout_box
201   \kern -\l_shipout_box_ht_plus_dp_dim
202   \box_use:N \l__shipout_tmp_box
203   \kern \l_shipout_box_ht_plus_dp_dim
204 }
205 \l__shipout_saved_badness_tl
206 \box_set_ht:Nn \l_shipout_box \l_shipout_box_ht_dim
207 \box_set_dp:Nn \l_shipout_box \l_shipout_box_dp_dim
208 }
209 {
210   \box_if_horizontal:NT \l_shipout_box
211   {
212     \tl_set:Nx \l__shipout_saved_badness_tl
213     { \hfuzz=\the\hfuzz\relax
214       \hbadness=\the\hbadness\relax }
215     \hfuzz=\c_max_dim
216     \hbadness=\c_max_int
217     \hbox_set_to_wd:Nnn \l_shipout_box \l_shipout_box_wd_dim
218     {
219       \hbox_unpack:N \l_shipout_box
220       \kern -\box_wd:N \l_shipout_box
221       \hbox_set:Nn \l__shipout_tmp_box
222       { \l__shipout_saved_badness_tl #1 }
223       \box_set_wd:Nn \l__shipout_tmp_box \c_zero_dim
224       \box_set_ht:Nn \l__shipout_tmp_box \c_zero_dim
225       \box_set_dp:Nn \l__shipout_tmp_box \c_zero_dim
226       \box_move_up:nm { \box_ht:N \l_shipout_box }
227       { \box_use:N \l__shipout_tmp_box }
228       \kern \box_wd:N \l_shipout_box
229     }%
230     \l__shipout_saved_badness_tl
231   }
232 }
233 }

(End definition for \__shipout_add_foreground_box:n)

```

`__shipout_init_page_origins:`
`\c__shipout_horigin_tl`
`\c__shipout_vorigin_tl`

Two constants holding the offset of the top-left with respect to the media box.
Setting the constants this way is courtesy of Bruno.

We delay setting the constants to the last possible place as there might be updates in the preamble or even in the `\begin{document}` hook that affects their setup.

```

234 \cs_new:Npn \__shipout_init_page_origins: {
235   \tl_const:Nx \c__shipout_horigin_tl
236   {
237     \cs_if_exist_use:NTF \pdfvariable { horigin }
238     { \cs_if_exist_use:NF \pdfhorigin { 1in } }
239   }
240   \tl_const:Nx \c__shipout_vorigin_tl
241   {
242     \cs_if_exist_use:NTF \pdfvariable { vorigin }
243     { \cs_if_exist_use:NF \pdfvorigin { 1in } }
244   }

```

After the constants have been set there is no need to execute this command again, in fact it would raise an error, so we redefine it to do nothing.

```

245   \cs_gset_eq:NN \__shipout_init_page_origins: \prg_do_nothing:
246 }
```

(End definition for `__shipout_init_page_origins:`, `\c__shipout_horigin_tl`, and `\c__shipout_vorigin_tl`.)

`__shipout_picture_overlay:n` Put the argument into a `picture` environment that doesn't take up any size and uses `1pt` for `\unitlength`.

Todo: Could perhaps be generalized as it might be useful elsewhere. For now it is not.

```

247 \cs_new:Npn \__shipout_picture_overlay:n #1 {
```

The very first time this is executed we have to initialize (and freeze) the origins.

```

248   \__shipout_init_page_origins:
249   \kern -\c__shipout_horigin_tl \scan_stop:
250   \vbox_to_zero:n {
251     \kern -\c__shipout_vorigin_tl \scan_stop:
252     \unitlength 1pt \scan_stop:
```

This mimics a simple zero-sized picture environment. The `\hss` is needed in case there is horizontal material (without using `\put` with a positive width).

```

253   \hbox_set_to_wd:Nnn \l__shipout_tmp_box \c_zero_dim
254   { \ignorespaces #1 \hss }
255   \box_set_ht:Nn \l__shipout_tmp_box \c_zero_dim
256   \box_set_dp:Nn \l__shipout_tmp_box \c_zero_dim
257   \box_use:N \l__shipout_tmp_box
258   \tex_vss:D
259 }
260 }
```

(End definition for `__shipout_picture_overlay:n`.)

`__shipout_add_background_picture:n` Put a `picture` env in the background of the shipout box with its reference point in the top-left corner.

```

261 \cs_new:Npn \__shipout_add_background_picture:n #1 {
262   \__shipout_add_background_box:n { \__shipout_picture_overlay:n {#1} }
263 }
```

(End definition for `__shipout_add_background_picture:n`.)

`__shipout_add_foreground_picture:n`:

Put a `picture` env in the foreground of the shipout box with its reference point in the top-left corner.

```
264 \cs_new:Npn \__shipout_add_foreground_picture:n #1 {  
265     \__shipout_add_foreground_box:n { \__shipout_picture_overlay:n {#1} }  
266 }
```

(End definition for `__shipout_add_foreground_picture:n`.)

`\shipout_discard:`

Request that the next shipout box should be discarded. At the moment this is just setting a boolean, but we may want to augment this behavior that the position of the call is taken into account (in case L^AT_EX looks ahead and is not using the position for on the next page).

```
267 \cs_new_protected:Npn \shipout_discard: {  
268     \bool_gset_true:N \g__shipout_discard_bool  
269 }
```

(End definition for `\shipout_discard:..`)

3.2 Handling the end of job hook

At the moment this is partly solved by using the existing hooks. But rather than putting the code into these hooks it should be moved to the right place directly as we shouldn't prefill hooks with material unless it needs to interact with other code.

`\g_shipout_READONLY_int`
`\ ReadonlyShipoutCounter`

We count every shipout activity that makes a page (but not those that are discarded) in order to know how many pages got produced.

```
270 \int_new:N \g_shipout_READONLY_int
```

For L^AT_EX 2_E it is available as a command (i.e., a T_EX counter only).

```
271 \cs_new_eq:NN \ ReadonlyShipoutCounter \g_shipout_READONLY_int
```

(End definition for `\g_shipout_READONLY_int` and `\ ReadonlyShipoutCounter`. These functions are documented on page 709.)

`\g_shipout_totalpages_int`
`\c@totalpages`

We count every shipout attempt (even those that are discarded) in this counter. It is not used in the code but may get used in user code.

```
272 \int_new:N \g_shipout_totalpages_int
```

For L^AT_EX 2_E this is offered as a L^AT_EX counter so can be easily typeset inside the output routine to display things like "`\thepage/\thetotalpages`", etc.

```
273 \cs_new_eq:NN \c@totalpages \g_shipout_totalpages_int  
274 \cs_new:Npn \thetotalpages { \arabic{totalpages} }
```

(End definition for `\g_shipout_totalpages_int` and `\c@totalpages`. These functions are documented on page 709.)

`\@abspage@last`

In `\@abspage@last` record the number of pages from the last run. This is written to the `.aux` and this way made available to the next run. In case there is no `.aux` file or the statement is missing from it we initialize it with the largest possible number in T_EX. We use this as the default because then we are inserting the `shipout/lastpage` on the last page (or after the last page but not on page 1 for a multipage document).

```
275 \xdef\@abspage@last{\number\maxdimen}
```

(End definition for `\@abspage@last`.)

`\enddocument` Instead of using the hooks `enddocument` and `enddocument/afterlastpage` we add this code to private kernel hooks to be 100% when it is executed and to avoid cluttering the hooks with data that is always there.

Inside `\enddocument` there is a `\clearpage`. Just before that we execute this code here. There is a good chance that we are on the last page. Therefore, if we don't know the value from the last run, we assume that the current page is the right one. So we set `\@abspage@last` and as a result the next shipout will run the `shipout/lastpage` code. Of course, if there are floats that still need a placement this guess will be wrong but then rerunning the document will give us the correct value next time around.

`\@kernel@after@enddocument`

```
276 \g@addto@macro \@kernel@after@enddocument {  
277   \int_compare:nNnT \@abspage@last = \maxdimen  
278 }
```

We use L^AT_EX 2_< coding as `\@abspage@last` is not an L3 name.

```
279   \xdef\@abspage@last{ \int_eval:n {\g_shipout_READONLY_int + 1} }  
280 }  
281 }
```

`\@kernel@after@enddocument@afterlastpage`

Once the `\clearpage` has done its work inside `\enddocument` we know for sure how many pages this document has, so we record that in the `.aux` file for the next run.

```
282 \g@addto@macro \@kernel@after@enddocument@afterlastpage {
```

There is one special case: If no output is produced then there is no point in a) recording the number as 0 will never match the page number of a real page and b) adding an extra page to ran the `shipout/lastpage` is pointless as well (as it would remain forever). So we test for this and run the code only if there have been pages.

```
283   \int_compare:nNnF \g_shipout_READONLY_int = 0  
284 }
```

This ends up in the `.aux` so we use L^AT_EX 2_< names here.

To do: This needs an interface for `\nofiles` in expl3, doesn't at the moment!

```
285 \if@filesw  
286   \iow_now:Nx \@auxout {  
287     \gdef\string\@abspage@last {\int_use:N \g_shipout_READONLY_int}  
288 }
```

But we may have guessed wrongly earlier and we still have to run the `shipout/lastpage` even though there is no page to place it into. If that is the case we make a trivial extra page and put it there. This temporary page will then vanish again on the next run but helps to keep pdf viewers happy.

```
289 \bool_if:NF \g__shipout_lastpage_handled_bool  
290 {
```

However, making this extra page in case the hook is actually empty would be forcing a rerun without any reason, so we check that condition and also check if `\@kernel@after@shipout@lastpage` contains any code. If both are empty we omit the page generation.

```
291   \bool_lazy_and:nnF  
292   { \hook_if_empty_p:n {shipout/lastpage} }
```

```

293     { \tl_if_empty_p:N \@kernel@after@shipout@lastpage }
294     {
295         \tex_shipout:D\vbox to\textheight
296         {
297             \hbox:n { \UseHook{shipout/lastpage}
298                         \@kernel@after@shipout@lastpage }

```

This extra page could be totally empty except for the hook content, but to help the user understanding why it is there we put some text into it.

```

299             \__shipout_excuse_extra_page:
300             \null
301         }

```

At this point we also signal to L^AT_EX's endgame that a rerun is necessary so that an appropriate message can be shown on the terminal. We do this by simply defining a command used as a flag and tested \enddocument.

```

302             \cs_gset_eq:NN \extra@page@added \relax
303         }
304     }
305 }
306 }

(End definition for \enddocument, \@kernel@after@enddocument, and \@kernel@after@enddocument@afterlastpage.)
```

__shipout_excuse_extra_page: Say mea culpa ...

```

307 \cs_new:Npn \__shipout_excuse_extra_page: {
308     \vfil
309     \begin{center}
310         \bfseries Temporary~ page!
311     \end{center}
312     \LaTeX{} was~ unable~ to~ guess~ the~ total~ number~ of~ pages~
313     correctly.~ ~ As~ there~ was~ some~ unprocessed~ data~ that~
314     should~ have~ been~ added~ to~ the~ final~ page~ this~ extra~
315     page~ has~ been~ added~ to~ receive~ it.
316     \par
317     If~ you~ rerun~ the~ document~ (without~ altering~ it)~ this~
318     surplus~ page~ will~ go~ away,~ because~ \LaTeX{} now~ knows~
319     how~ many~ pages~ to~ expect~ for~ this~ document.
320     \vfil
321 }

(End definition for \__shipout_excuse_extra_page:..)
```

\PreviousTotalPages In the preamble before the aux file was read \PreviousTotalPages is always zero.
`@kernel@before@begindocument`

In the aux file there should be an update for \abs@page@last recording the number of pages from the previous run. If not that macro holds the value of \maxdimen. So we test for it and update \PreviousTotalPages if there was a real value. This should happen just before the begindocument hook is executed so that the value can be used inside that hook.

```

323 \g@addto@macro\@kernel@before@begindocument
324   {\ifnum\abs@page@last<\maxdimen
325     \xdef\PreviousTotalPages{\abs@page@last}\fi}
```

(End definition for \PreviousTotalPages and \@kernel@before@begindocument. These functions are documented on page 709.)

4 Legacy L^AT_EX 2 _{ϵ} interfaces

\DiscardShipoutBox

Request that the next shipout box is to be discarded.

326 \cs_new_eq:NN \DiscardShipoutBox \shipout_discard:

(End definition for \DiscardShipoutBox. This function is documented on page 708.)

\AtBeginDvi

If we roll forward from an earlier kernel \AtBeginDvi is defined so we better not use \cs_new_protected:Npn here.

327 \cs_set_protected:Npn \AtBeginDvi {_shipout_add_firstpage_material:Nn \AtBeginDvi}

(End definition for \AtBeginDvi. This function is documented on page 708.)

\DebugShipoutsOn

\DebugShipoutsOff

328 \cs_new_eq:NN \DebugShipoutsOn \shipout_debug_on:

329 \cs_new_eq:NN \DebugShipoutsOff \shipout_debug_off:

(End definition for \DebugShipoutsOn and \DebugShipoutsOff. These functions are documented on page 709.)

5 Internal commands needed elsewhere

These internal commands use double and triple @ signs so we need to stop getting them translated to the module name.

330 @@@

Some internals needed elsewhere.

331 \cs_set_eq:NN \Expl@@@shipout@add@firstpage@material@@Nn

332 _shipout_add_firstpage_material:Nn

333 \cs_set_eq:NN \Expl@@@shipout@add@background@box@@n

334 _shipout_add_background_box:n

335 \cs_set_eq:NN \Expl@@@shipout@add@foreground@box@@n

336 _shipout_add_foreground_box:n

337 \cs_set_eq:NN \Expl@@@shipout@add@background@picture@@n

338 _shipout_add_background_picture:n

339 \cs_set_eq:NN \Expl@@@shipout@add@foreground@picture@@n

340 _shipout_add_foreground_picture:n

(End definition for \Expl@@@shipout@add@firstpage@material@@Nn and others.)

341 \ExplSyntaxOff

342

343 \EndIncludeInRelease

Rolling back here doesn't undefine the interface commands as they may be used in packages without rollback functionality. So we just make them do nothing which may or may not work depending on the code usage.

344 \EndIncludeInRelease{0000/00/00} %

345 \EndIncludeInRelease{The hook management (shipout)} %

346 \EndIncludeInRelease

If we roll forward then `\tex_shipout:D` may not be defined in which case `\shipout` does have its original definition and so we must not `\let` it to something else which is `\relax!`

```

347 〈\latexrelease〉\ifcsname tex_shipout:D\endcsname
348 〈\latexrelease〉\expandafter\let\expandafter\shipout
349 〈\latexrelease〉                                \csname tex_shipout:D\endcsname
350 〈\latexrelease〉\fi
351 〈\latexrelease〉
352 〈\latexrelease〉\let \ShipoutBox\@undefined
353 〈\latexrelease〉\let \ ReadonlyShipoutCounter \@undefined
354 〈\latexrelease〉\let \c@totalpages \@undefined
355 〈\latexrelease〉\let \thetotalpages \@undefined
356 〈\latexrelease〉
357 〈\latexrelease〉\let \DiscardShipoutBox \@undefined
358 〈\latexrelease〉\let \DebugShipoutsOn \@undefined
359 〈\latexrelease〉\let \DebugShipoutsOff \@undefined
360 〈\latexrelease〉
361 〈\latexrelease〉\DeclareRobustCommand \AtBeginDvi [1]{%
362 〈\latexrelease〉  \global \setbox \@begindvibox
363 〈\latexrelease〉    \vbox{\unvbox \@begindvibox #1}%
364 〈\latexrelease〉}
365 〈\latexrelease〉
366 〈\latexrelease〉\let \AtBeginShipout \@undefined
367 〈\latexrelease〉\let \AtBeginShipoutNext \@undefined
368 〈\latexrelease〉
369 〈\latexrelease〉\let \AtBeginShipoutFirst \@undefined
370 〈\latexrelease〉
371 〈\latexrelease〉\let \ShipoutBoxHeight \@undefined
372 〈\latexrelease〉\let \ShipoutBoxDepth \@undefined
373 〈\latexrelease〉\let \ShipoutBoxWidth \@undefined
374 〈\latexrelease〉
375 〈\latexrelease〉\let \AtBeginShipoutDiscard \@undefined
376 〈\latexrelease〉
377 〈\latexrelease〉\let \AtBeginShipoutAddToBox \@undefined
378 〈\latexrelease〉\let \AtBeginShipoutAddToBoxForeground \@undefined
379 〈\latexrelease〉\let \AtBeginShipoutUpperLeft \@undefined
380 〈\latexrelease〉\let \AtBeginShipoutUpperLeftForeground \@undefined
381 〈\latexrelease〉

```

We do not undo a substitution when rolling back. As the file support gets undone the underlying data is no longer used (and sufficiently obscure that should not interfere with existing commands) and properly removing it would mean we need to make the `\unclare@...` and its support macros available in all earlier kernel releases which is pointless (and actually worse).

```

382 %\undeclare@file@substitution{everyshi.sty}
383 〈\latexrelease〉
384 〈\latexrelease〉\let \AtEndDvi \@undefined

```

We do not reenable a disabled package load when rolling back. As the file support gets undone the underlying data is no longer checked (and sufficiently obscure that it should not interfere with existing commands) and properly removing it would mean we need to make the `\reenable@package@load` command available in all earlier kernel releases which is pointless (and actually worse).

```

385 \%reenable@package@load{atenddvi}
386 ⟨latexrelease⟩
387 ⟨latexrelease⟩\EndIncludeInRelease
388 ⟨*2ekernel⟩

```

6 Package emulation for compatibility

6.1 Package **atenddvi** emulation

\AtEndDvi This package has only one public command to simulating it is easy and actually sensible to provide as part of the kernel.

```

389 ⟨/2ekernel⟩
390 ⟨*2ekernel | latexrelease⟩
391 ⟨latexrelease⟩\IncludeInRelease{2020/10/01}%
392 ⟨latexrelease⟩          {\AtEndDvi}{atenddvi emulation}%
393 \ExplSyntaxOn
394 \cs_new_protected:Npn \AtEndDvi {\AddToHook{shipout/lastpage}}
395 \ExplSyntaxOff

```

As the package is integrate we prevent loading (no need to roll that back):

```

396 \disable@package@load{atenddvi}
397 {\PackageWarning{atenddvi}
398     {Functionality of this package is already\MessageBreak
399      provided by LaTeX.\MessageBreak\MessageBreak
400      It is there no longer necessary to load it\MessageBreak
401      and you can safely remove it.\MessageBreak
402      Found on}}}
403 ⟨/2ekernel | latexrelease⟩
404 ⟨latexrelease⟩\EndIncludeInRelease
405 ⟨latexrelease⟩\IncludeInRelease{0000/00/00}%
406 ⟨latexrelease⟩          {\AtEndDvi}{atenddvi emulation}%
407 ⟨latexrelease⟩\let \AtEndDvi \c@undefined
408 ⟨latexrelease⟩\EndIncludeInRelease
409 ⟨*2ekernel⟩

```

(*End definition for \AtEndDvi. This function is documented on page 708.*)

```
410 ⟨/2ekernel⟩
```

6.2 Package **atbegshi** emulation

```

411 ⟨*atbegshi-ltx⟩
412 \ProvidesPackage{atbegshi-ltx}
413 [2020/08/17 v1.0a
414     Emulation of the original atbegshi package^^Jwith kernel methods]

```

\AtBeginShipoutBox

```
415 \let \AtBeginShipoutBox \ShipoutBox
```

(*End definition for \AtBeginShipoutBox. This function is documented on page 710.*)

\AtBeginShipoutInit Compatibility only, we aren't delaying ...

```
416 \let \AtBeginShipoutInit \c@empty
```

(End definition for `\AtBeginShipoutInit`. This function is documented on page 710.)

`\AtBeginShipout` Filling hooks

```
417 \protected \def \AtBeginShipout { \AddToHook{shipout/before} }
418 \protected \def \AtBeginShipoutNext { \AddToHookNext{shipout/before} }
```

(End definition for `\AtBeginShipout` and `\AtBeginShipoutNext`. These functions are documented on page 710.)

`\AtBeginShipoutFirst` Slightly more complex as we need to know the name of the command under which the `shipout/firstpage` hook is filled.

```
419 \protected \def \AtBeginShipoutFirst
420   {\Expl@@@shipout@add@firstpage@material@@n \AtBeginShipoutFirst}
```

(End definition for `\AtBeginShipoutFirst`. This function is documented on page 710.)

`\AtBeginShipoutDiscard` Just a different name.

```
421 \let \AtBeginShipoutDiscard \DiscardShipoutBox
```

(End definition for `\AtBeginShipoutDiscard`. This function is documented on page 710.)

`\AtBeginShipoutAddToBox` We don't expose them.

```
422 \let \AtBeginShipoutAddToBox
```

```
423   {\Expl@@@shipout@add@background@box@@n}
```

```
424 \let \AtBeginShipoutAddToBoxForeground
```

```
425   {\Expl@@@shipout@add@foreground@box@@n}
```

```
426 \let \AtBeginShipoutUpperLeft
```

```
427   {\Expl@@@shipout@add@background@picture@@n}
```

```
428 \let \AtBeginShipoutUpperLeftForeground
```

```
429   {\Expl@@@shipout@add@foreground@picture@@n}
```

(End definition for `\AtBeginShipoutAddToBox` and others. These functions are documented on page 710.)

`\ShipoutBoxHeight` This is somewhat different from the original in `atbegshi` where `\ShipoutBoxHeight` etc. only holds the `\the\ht<box>` value. This may have some implications in some use cases and if that is a problem then it might need changing.

```
430 \ExplSyntaxOn
```

```
431 \cs_new:Npn \ShipoutBoxHeight { \dim_use:N \l_shipout_box_ht_dim }
```

```
432 \cs_new:Npn \ShipoutBoxDepth { \dim_use:N \l_shipout_box_dp_dim }
```

```
433 \cs_new:Npn \ShipoutBoxWidth { \dim_use:N \l_shipout_box_wd_dim }
```

```
434 \ExplSyntaxOff
```

(End definition for `\ShipoutBoxHeight`, `\ShipoutBoxWidth`, and `\ShipoutBoxDepth`.)

```
435 
```

If the package is requested we substitute the one above:

```
436 {*2ekernel}
```

```
437 \declare@file@substitution{atbegshi.sty}{atbegshi-ltx.sty}
```

```
438 
```

6.3 Package **everyshi** emulation

```
439  (*everyshi-ltx)
440  \ProvidesPackage{everyshi-ltx}
441  [2020/08/17 v1.0a
442  Emulation of the original everyshi package^^Jwith kernel methods]
\EveryShipout This package has only two public commands so simulating it is easy:
\AtNextShipout
443  \protected \def \EveryShipout {\AddToHook{shipout/before}}
444  \protected \def \AtNextShipout {\AddToHookNext{shipout/before}}
```

(End definition for \EveryShipout and \AtNextShipout. These functions are documented on page 710.)

```
445 % This is one difference between \pkg{everyshi} and the kernel
446 % implementation, the latter does not directly use box 255.
447 %
448 % For usage by ordinary users this makes no difference but of a
449 % package use complicated code together with \pkg{everyshi} and
450 % directly manipulates box 255 then this package needs updating.
451 % In most cases the updates are simple because the kernel offers
452 % hooks that makes such complicated code unnecessary.
453 %
454 % We therefore add a little file into the adjusted package
455 % \begin{macrocode}
456 %%
457 %% In normal circumstances the above emulation is sufficient and in
458 %% all known packages (we know of) that use everyshi it either works or
459 %% the packages have been adjusted.
460 %%
461 %% Code that directly manipulates box 255, however, might fail.
462 %% If that is the case look at the shipout hooks offered now as
463 %% they are normally sufficient to avoid such manipulations (or
464 %% replace box 255 with \ShipoutBox in the code.
465 %%
466 
```

If the package is requested we substitute the one above:

```
467  {*2ekernel}
468  \declare@file@substitution{everyshi.sty}{everyshi-ltx.sty}
469  
```

Rather important :-)

```
470  <@@=
```

File S

ltoutput.dtx

1 Output Routine

1.1 Floats

The ‘2ekernel’ code ensures that a `\usepackage{autoout1}` is essentially ignored if a ‘full’ format is being used that has the autoload file mode already in the format.

```
1 <defx>\begingroup
2 <defx>\makeatletter
3 <defx>\nfss@catcodes
4 <2ekernel>\expandafter\let\csname ver@autoout1.sty\endcsname\fmtversion
```

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

```
5 {*2ekernel}
6 \message{output,}
*****
*          OUTPUT
*****
*****
```

PAGE LAYOUT PARAMETERS

```
\topmargin      : Extra space added to top of page.
@twoside       : boolean. T if two-sided printing
\oddsidemargin : IF @twoside = T
                  THEN extra space added to left of odd-numbered
                  pages.
                  ELSE extra space added to left of all pages.
\evensidemargin : IF @twoside = T
                  THEN extra space added to left of even-numbered
                  pages.
\headheight    : height of head
\headsep       : separation between head and text
\footskip      : distance separation between baseline of last
                  line of text and baseline of foot.
                  Note difference between \footSKIP and \headSEP.
\textheight    : height of text on page, excluding head and foot
\textwidth     : width of printing on page
\columnsep     : IF @twocolumn = T
                  THEN width of space between columns
\columnseprule : IF @twocolumn = T
                  THEN width of rule between columns (0 if none).
\columnwidth   : IF @twocolumn = T
                  THEN (\textwidth - \columnsep)/2
                  ELSE \textwidth
                  It is set by the \twocolumn and
                  \onecolumn commands.
```

- \@textbottom : Command executed at bottom of vbox holding text of page (including figures). The \raggedbottom command almost \let's this to \vfil (actually sets it to \vskip \z@ plus.0001fil). Should have depth 0pt.
- \@texttop : Command executed at top of vbox holding text of page (including figures). Used by letter style; can also be used to produce centered pages. Let to \relax by \raggedbottom and \flushbottom.

Page layout must initialize \@colht and \@colroom to \textheight.

PAGE STYLE PARAMETERS:

- \floatsep : Space left between floats.
 \textfloatsep : Space between last top float or first bottom float and the text.
 \topfigrule : Command to place rule (or whatever) between floats at top of page and text. Executed in inner vertical mode right before the \textfloatsep skip separating the floats from the text. Must occupy zero vertical space. (See \footnoterule.)
 \botfigrule : Same as \topfigrule, but put after the \textfloatsep skip separating text from the floats at bottom of page.
 \intextsep : Space left on top and bottom of an in-text float.
 \dblfloatsep : Space between double-column floats.
 \dbltextfloatsep : Space between top double-column floats and text.
 \dblfigrule : Similar to \topfigrule, but for double-column floats.
 \@fptop : Glue to go at top of float column – must be 0pt + stretch
 \@fpsep : Glue to go between floats in a float column.
 \@fpbot : Glue to go at bottom of float column – must be 0pt + stretch
 \@dblfpsep, \@dblfpbot : Analogous for double-column float page in two-column format.

FOOTNOTES: As in PLAIN, footnotes use \insert\footins.

PAGE LAYOUT SWITCHES AND MACROS

- @twocolumn : Boolean. T if two columns per page globally.

PAGE STYLE MACROS AND SWITCHES

```

\@oddhead      : IF @twoside = T
                  THEN macro to generate head of odd-numbered
                  pages.
                  ELSE macro to generate head of all pages.
\@evenhead     : IF @twoside = T
                  THEN macro to generate head of even-numbered
                  pages.
\@oddfoot      : IF @twoside = T
                  THEN macro to generate foot of odd-numbered
                  pages.
                  ELSE macro to generate foot of all pages.
\@evenfoot     : IF @twoside = T
                  THEN macro to generate foot of even-numbered
                  pages.
@specialpage   : boolean. T if current page is to have a special
                  format.
\@specialstyle : If its value is foo then
                  IF @specialpage = T
                      THEN the command \ps@foo is executed to
                      temporarily reset the page style parameters
                      before composing the current page.
                      This command should execute only \def's and
                      \edef's, making only local definitions.

```

FLOAT PLACEMENT PARAMETERS

The following parameters are set by the macro `\@floatplacement`.

When `\@floatplacement` is called,

`\@colht` is the height of the page or column being built. I.e.:

- * For single-column page it equals `\textheight`.
- * For double-column page it equals `\textheight - height` of double-column floats on page.

Note that some are set globally and some locally:

```

\@topnum       :=G Maximum number of floats allowed on the top of a
                  column.
\@toproom      :=G Maximum amount of top of column devoted to floats-
                  excluding \textfloatsep separation below the floats
                  and \floatsep separation between them. For
                  two-column output, should be computed as a function
                  of \@colht.
\@botnum, \@botroom
                  : Analogous to above.
\@colnum       :=G Maximum number of floats allowed in a column,
                  including in-text floats.
\@textmin      :=L Minimum amount of text (excluding footnotes) that
                  must appear on a text page.
                  %% 27 Sep 85 : made local to
                  %% \@addtocurcol and \@addtonextcol
                  It is now also used locally in processing double
                  floats.

```

`\@fpmin` :=L Minimum height of floats in a float column.

The macro `\dblfloatplacement` sets the following parameters.

`\@dbltopnum` :=G Maximum number of double-column floats allowed at the top of a two-column page.

`\@dbltoproom` :=G Maximum height of double-column floats allowed at top of two-column page.

`\@fpmin` :=L Minimum height of floats in a float column.

It should also perform the following local assignments where necessary – i.e., where the new value differs from the old one:

`\@fptop` :=L `\@dblftop`

`\@fpsep` :=L `\@dblfpsep`

`\@fpbot` :=L `\@dblfpbot`

OUTPUT ROUTINE VARIABLES

`\@colht` : The total height of the current column. In single column style, it equals `\textheight`. In two-column style, it is `\textheight` minus the height of the double-column floats on the current page. MUST BE INITIALIZED TO `\textheight`.

`\@colroom` : The height available in the current column for text and footnotes. It equals `\@colht` minus the height of all floats committed to the top and bottom of the current column.

`\@textfloatsheight` : The total height of in-text floats on the current page.

`\footins` : Footnote insertion number.

`\@maxdepth` : Saved value of TeX's `\maxdepth`. Must be set when any routine sets `\maxdepth`.

CALLING THE OUTPUT ROUTINE

The output routine is called either by TeX's normal page-breaking mechanism, or by a macro putting a penalty < or = -10000 in the output list. In the latter case, the penalty indicates why the output routine was called, using the following code.

penalty	reason
-10000	<code>\pagebreak</code> <code>\newpage</code>
-10001	<code>\clearpage</code> (<code>\penalty -10000 \vbox{}</code>) <code>\penalty -10001</code>)
-10002	float insertion, called from horizontal mode
-10003	float insertion, called from vertical mode.
-10004	float insertion.

Note: A float or marginpar puts the following sequence in the output list:

- (i) a penalty of -10004,
- (ii) a null \vbox
- (iii) a penalty of -10002 or -10003.

This solves two special problems:

1. If the float comes right after a \newpage or \clearpage, then the first penalty is ignored, but the second one invokes the output routine.
2. If there is a split footnote on the page, the second 'page' puts out the rest of the footnote.

THE OUTPUT ROUTINE

FUNCTIONS USED IN THE OUTPUT ROUTINE:

\@outputpage : Produces an output page with the contents of box \@outputbox as the text part.

Also sets \@colht :=G \textheight.

The page style is determined as follows.

IF @thispagestyle = true
THEN use \thispagestyle style
ELSE use ordinary page style.

\@tryfcolumn\FLIST : Tries to form a float column composed of floats from \FLIST (if nonempty) with the following parameters:

\@colht : height of box
\@fpmmin : minimum height of floats in the box
\@fpsep : interfloat space
\@ftpsep : glue at top of box
\@fpbot : glue at bottom of box.

If it succeeds, then it does the following:

* \@outputbox :=L the composed float box.
* @fcollmade :=G true
* \FLIST :=G \FLIST - floats put in box
* \@freelist :=G \@freelist + floats put in box

If it fails, then:

* @fcollmade :=G false

NOTE: BIT MUST BE A SINGLE TOKEN!

\@makefcolumn \FLIST : Same as \@tryfcolumn except that it fails to make a float column only if \FLIST is empty. Otherwise, it makes a float column containing at least the first box in \FLIST, disregarding \@fpmmin.

\@startcolumn :

Calls \@tryfcolumn\@deferlist. If \@tryfcolumn returns with (globally set) @fcollmade = false, then:

* Globally sets \@toplist and \@botlist to floats

from `\@deferlist` to go at top and bottom of column, deleting them from `\@deferlist`. It does this using `\@colht` as the total height, the page style parameters `\@floatsep` and `\@textfloatsep`, and the float placement parameters `\@topnum`, `\@toproom`, `\@botnum`, `\@botroom`, `\@colnum` and `\textfraction`.

- * Globally sets `\@colroom` to `\@colht` minus the height of the added floats.

`\@startdblcolumn` :

Calls `\@tryfcolumn\@dbldeferlist{8}`. If `\@tryfcolumn` returns with (globally set) `@fcolmade = false`, then:

- * Globally sets `\@dbltopl` to floats from `\@dbldeferlist` to go at top and bottom of column, deleting them from `\@dbldeferlist`. It does this using `\textheight` as the total height, and the parameters `\@dblfloatsep`, etc.
- * Globally sets `\@colht` to `\textheight` minus the height of the added floats.

`\@combinefloats` : Combines the text from box

`\@outputbox` with the floats from `\@topl` and `\@botl`, putting the new box in `\@outputbox`. It uses `\floatsep` and `\textfloatsep` for the appropriate separations. It puts the elements of `\TOPLIST` and `\BOTLIST` onto `\@freelist`, and makes those lists null.

`\@makecol` : Makes the contents of `\box255` plus the accumulated footnotes, plus the floats in `\@topl` and `\@botl`, into a single column of height `\@colht` (unless the page height has been locally changed), which it puts into box `\@outputbox`. It puts boxes in `\@midlist` back onto `\@freelist` and restores `\maxdepth`.

`\@opcol` : Outputs a column whose text is in box `\@outputbox`

If `@twocolumn = false`, then it calls `\@outputpage`, sets `\@colht :=G \textheight`, and calls `\@floatplacement`.

If `@twocolumn = true`, then:

If `@firstcolumn = true`, then it puts box `\@outputbox` into `\@leftcolumn` and sets `@firstcolumn :=G false`.

If `@firstcolumn = false`, then it puts out the current two-column page, any possible two-column float pages, and determines `\@dbltopl` for the next page.

USER COMMANDS THAT CALL OR AFFECT THE OUTPUT ROUTINE

```

\newpage == BEGIN \par\vfil\penalty -10000 END

\clearpage == BEGIN \newpage
    \write -1{}% Part of hack to make sure no
    \vbox{}% \write's get lost.
    \penalty -10001
END

\cleardoublepage == BEGIN \clearpage
    if @twoside = true and c@page is even
        then \hbox{} \newpage fi
    END

```

\twocolumn[BOX] : starts a new page, changing to twocolumn setting and puts BOX in a parbox of width \textwidth across the top. Useful for full-width titles for double-column pages.

SURPRISE: The stretch from \dbltextfloatsep will be inserted between the BOX and the top of the two columns.

FLOAT-HANDLING MECHANISMS

The float environment obtains an insertion number B from the \freelist (see below for a description of list manipulation), puts the float into box B and sets \count B to a FLOAT SPECIFIER. For a normal (not double-column) float, it then causes a page break in one of the following two ways:

- In outer hmode: \vadjust{\penalty -10002}
- In vmode : \penalty -10003.

For a double-column float, it puts B onto the \dbldeferlist.

The float specifier has two components:

- * A PLACEMENT SPECIFICATION, describing where the float may be placed.
- * A TYPE, which is a power of two—e.g., figures might be type 1 floats, tables type 2 floats, programs type 4 floats, etc.

The float specifier is encoded as follows, where bit 0 is the least significant bit.

Bit	Meaning
0	1 iff the float may go where it appears in the text.
1	1 iff the float may go on the top of a page.
2	1 iff the float may go on the bottom of a page.
3	1 iff the float may go on a float page.
4	1 unless the PLACEMENT includes a !
5	1 iff a type 1 float

6 1 iff a type 2 float
etc.

A negative float specifier is used to indicate a marginal note.

MACROS AND DATA STRUCTURES FOR PROCESSING FLOATS

A FLOAT LIST consisting of the floats in boxes `\boxa` ... `\boxN` has the form:

`\@elt \boxa ... \@elt \boxN`

where `\boxI` is defined by

`\newinsert\boxI`

Normally, `\@elt` is `\let` to `\relax`. A test can be performed on the entire float list by locally `\def`'ing `\@elt` appropriately and executing the list.

This is a lot more efficient than looping through the list.

The following macros are used for manipulating float lists.

```
\@next \CS \LIST {\NONEMPTY}{\EMPTY} ==  %% NOTE: ASSUME \@elt
= \relax
    BEGIN assume that \LIST == \@elt \B1 ... \@elt \Bn
        if n = 0
            then EMPTY
            else \CS   :=L \B1
                  \LIST :=G \@elt \B2 ... \@elt \Bn
                  NONEMPTY
        fi
    END
```

`\@bitor\NUM\LIST` : Globally sets switch `@test` to the disjunction for all I of bit $\log_2 \NUM$ of the float specifiers of all the floats in `\LIST`.
I.e., `@test` is set to true iff there is at least one float in `\LIST` having bit $\log_2 \NUM$ of its float specifier equal to 1.

Note: $\log_2 [(\count I)/32]$ is the bit number corresponding to the type of float I. To see if there is any float in `\LIST` having the same type as float I, you run `\@bitor` with

`\NUM = [(\count I)/32] * 32.`

```
\@bitor\NUM\LIST ==
BEGIN
    @test :=G false
    { \@elt \CTR ==  if \NUM <> 0 then
        if \count\CTR / \NUM is odd
            then @test := true      fi fi
```

```

    \LIST
}
END

```

\@cons\LIST\NUM : Globally sets \LIST := \LIST * \@elt \NUM

```

\@cons\LIST\NUM ==
BEGIN { \@elt == \relax
        \LIST :=G \LIST \@elt \NUM
}

```

BOX LISTS FOR FLOAT-PLACEMENT ALGORITHMS

\@freelist	: List of empty boxes for placing new floats.
\@toplist	: List of floats to go at top of current column.
\@midlist	: List of floats in middle of current column.
\@botlist	: List of floats to go at bottom of current column.
\@deferlist	: List of floats to go after current column.
\@dbltoplist	: List of double-col. floats to go at top of current page.
\@dbldeferlist	: List of double-column floats to go on subsequent pages.

FLOAT-PLACEMENT ALGORITHMS

\@addtobot : Tries to put insert \@currbox on \@botlist.

Called only when:

- * \ht BOX < \@colroom
- * type of \@currbox not on \@deferlist
- * \@colnum > 0
- * @insert = false

If it succeeds, then:

- * sets @insert true
- * decrements \@botroom by \ht BOX
- * decrements \@botnum and \@colnum by 1
- * decrements \@colroom by \ht BOX + either \floatsep or \textfloatsep, as appropriate.
- * sets \maxdepth to 0pt

\@addtotoporbot : Tries to put insert \@currbox on \@toplist or \@botlist.

Called only under same conditions as \@addtobot.

If it succeeds, then:

- * sets @insert true
- * decrements \@toproom or \@botroom by \ht BOX
- * decrements \@colnum and either \@topnum or \@botnum by 1
- * decrements \@colroom by \ht BOX + \floatsep

or `\textfloatsep`, as appropriate.

`\@addtocurcol` : Tries to add `\@currbox` to current column, setting
 `@insert` true if it succeeds, false otherwise.
 It will add `\@currbox` to top only if bit 0 of
 `\count\@currbox` is 0, and to the bottom only if
 bit 0 = 0 or an earlier float of the same type is
 put on the bottom.
 If the float is put in the text, then
 `\penalty\interlinepenalty` is put
 right after the float, before the following `\vskip`,
 and `\outputpenalty :=L 0`.

`\@addtonextcol` : Tries to add `\@currbox` to the next column, setting
 `@insert` true if it succeeds, false otherwise.

`\@addtobdblcol` : Tries to add `\@currbox` to the next double-column page,
 adding it to `\@dbltoplist` if it succeeds and
 `\@dbldefeolist` if it fails.

```
\@addmarginpar ==
BEGIN
if \@currlist nonempty
  then remove \@marbox from \@currlist
      add \@marbox and \@currbox to \@freelist
      %% NOTE: \@currbox = left box
  else LaTeX error: ? %% shouldn't happen
fi
\@tempcnta := 1      %% 1 = right, -1 = left
if @twocolumn = true
  then if @firstcolumn = true
      then \@tempcnta := -1
    fi
  else if @mparswitch = true
    then if count0 odd
      else \@tempcnta := -1
    fi
  fi
  if @reversemargin = true
    then \@tempcnta := -\@tempcnta
  fi
fi
if \@tempcnta < 0 then \box\@marbox :=G \box\@currbox
fi
\@tempdima :=L maximum(\@mparbottom - \@pageht
                     + ht of \@marbox, 0)
if \@tempdima > 0 then LaTeX warning: 'marginpar moved' fi
\@mparbottom :=G \@pageht + \@tempdima + depth of \@marbox
                  + \marginpush
```

```

\@tempdima :=L \@tempdima - ht of \@marbox
\box\@marbox :=G \box\@currbox
    \vbox { \vskip \@tempdima
        \box\@marbox
    }
height of \@marbox :=G depth of \@marbox :=G 0
\kern -\@pagedp
\nointerlineskip
\hbox{ if @tempcpta > 0 then \hskip \columnwidth
        \hskip \marginparsep
    else \hskip -\marginparsep
        \hskip -\marginparwidth
    fi
    \box\@marbox \hss
}
\nobreak
\nointerlineskip
\hbox{\vrule height 0 width 0 depth \@pagedp}
END

```

FLOATS AND MARGINPARS ADD A LOT OF DEAD CYCLES.

End of historical L^AT_EX 2.09 comments.

```

7 \maxdeadcycles = 100
8 \let\@elt\relax
9 \def\@next#1#2#3#4{\ifx#2\empty #4\else
10   \expandafter\@next #2\@#1#2#3\fi}
11 \def\@xnext \@elt #1#2\@#3#4{\def#3{#1}\gdef#4{#2}}
12 \def\@testfalse{\global\let\if@test\iffalse}
13 \def\@testtrue {\global\let\if@test\iftrue}
14 \qquad\@testfalse
15 \def\@bitor#1#2{\@testfalse {\let\@elt\@xbitor
16   \@tempcpta #1\relax #2}}

```

RmS 91/11/22: Added test for \count#1 = 0. Suggested by Chris Rowley.

```

17 \def\@xbitor #1{\@tempcntb \count#1
18   \ifnum \@tempcpta =\z@
19   \else
20     \divide\@tempcntb\@tempcpta
21     \ifodd\@tempcntb \@testtrue\fi
22   \fi}

```

DEFINITION OF FLOAT BOXES:

```

23 </2ekernel>
24 <latexrelease>\IncludeInRelease{2015/10/01}%
25 <latexrelease> {\bx@ZZ}{Extended float list}%
26 <2ekernel | latexrelease>
27 \let\@elt\newinsert
28 <2ekernel>
29 \def\@freelist{%

```

```

30  \@elt\bx@A\@elt\bx@B\@elt\bx@C\@elt\bx@D\@elt\bx@E
31  \@elt\bx@F\@elt\bx@G\@elt\bx@H\@elt\bx@I\@elt\bx@J
32  \@elt\bx@K\@elt\bx@L\@elt\bx@M\@elt\bx@N
33  \@elt\bx@O\@elt\bx@P\@elt\bx@Q\@elt\bx@R}
34  \@freelist
35  </2ekernel>
36  \ifx\numexpr\@undefined\else
37  \def\reserved@a{%
38    \@elt\bx@S\@elt\bx@T\@elt\bx@U\@elt\bx@V
39    \@elt\bx@W\@elt\bx@X\@elt\bx@Y\@elt\bx@Z
40    \@elt\bx@AA\@elt\bx@BB\@elt\bx@CC\@elt\bx@DD\@elt\bx@EE
41    \@elt\bx@FF\@elt\bx@GG\@elt\bx@HH\@elt\bx@II\@elt\bx@JJ
42    \@elt\bx@KK\@elt\bx@LL\@elt\bx@MM\@elt\bx@NN
43    \@elt\bx@OO\@elt\bx@PP\@elt\bx@QQ\@elt\bx@RR
44    \@elt\bx@SS\@elt\bx@TT\@elt\bx@UU\@elt\bx@VV
45    \@elt\bx@WW\@elt\bx@XX\@elt\bx@YY\@elt\bx@ZZ}
46  \reserved@a
47  \def\@elt{\noexpand\@elt\noexpand}
48  \edef\@freelist{\@freelist\reserved@a}
49  \fi
50  \let\reserved@a\relax
51  \let\@elt\relax
52  </2ekernel | latexrelease>
53  <latexrelease>\EndIncludeInRelease
54  <latexrelease>\IncludeInRelease{0000/00/00}%
55  <latexrelease>          {\bx@ZZ}{Extended float list}%
56  <latexrelease>\def\@freelist{%
57  <latexrelease>  \@elt\bx@A\@elt\bx@B\@elt\bx@C\@elt\bx@D\@elt\bx@E
58  <latexrelease>  \@elt\bx@F\@elt\bx@G\@elt\bx@H\@elt\bx@I\@elt\bx@J
59  <latexrelease>  \@elt\bx@K\@elt\bx@L\@elt\bx@M\@elt\bx@N
60  <latexrelease>  \@elt\bx@O\@elt\bx@P\@elt\bx@Q\@elt\bx@R}
61  <latexrelease>  \insc@unt=234
62  <latexrelease>\EndIncludeInRelease
63  <*2ekernel>

64  \gdef\@toplist{}
65  \gdef\@botlist{}
66  \gdef\@midlist{}
67  \gdef\@currlist{}
68  \gdef\@deferlist{}
69  \gdef\@dbltoplist{}

```

The new algorithm stores page wide floats together with column floats in a single `\@deferlist` list. We keep `\@dbldeferlist` initialised as empty so that packages that are testing for deferred floats can use the same code for old or new float handling.

```

70  \gdef\@dbldeferlist{}
    PAGE LAYOUT PARAMETERS
71  \newdimen\topmargin
72  \newdimen\oddsidemargin
73  \newdimen\evensidemargin
74  \let\@themargin=\oddsidemargin
75  \newdimen\headheight
76  \newdimen\headsep
77  \newdimen\footskip

```

```

78 \newdimen\textheight
79 \newdimen\textwidth
80 \newdimen\columnwidth
81 \newdimen\columnsep
82 \newdimen\columnseprule
83 \newdimen\marginparwidth
84 \newdimen\marginparsep
85 \newdimen\marginparpush

```

\AtBeginDvi We use a box register in which to put stuff that must appear before anything else in the `.dvi` file.

The stuff in the box should not add any typeset material to the page when it is unboxed.

This interface is no longer used. Instead a new one is inside `ltshipout.dtx`. We only keep the box in case some old code refers to it directly (or we do some rollback).

```

86 \newbox\@begindvibox
87 %\DeclareRobustCommand \AtBeginDvi [1]{%
88 %  \global \setbox \@begindvibox
89 %    \vbox{\unvbox \@begindvibox #1}%
90 %}

```

(End definition for `\AtBeginDvi` and `\@begindvibox`. These functions are documented on page 708.)

\@maxdepth This is not the right place to set this; it needs to be set in a class/style file when `\maxdepth` is set.

Also, many settings to `\maxdepth` should be to `\@maxdepth`, probably?

```

91 \newdimen\@maxdepth
92 \@maxdepth = \maxdepth

```

(End definition for `\@maxdepth`.)

\paperheight New `\paper...` registers.

```

93 \newdimen\paperheight
94 \newdimen\paperwidth

```

(End definition for `\paperheight` and `\paperwidth`.)

\if@insert Local switches first:

```

95 \newif \if@insert

```

\if@fcolmade These should definitely be global:

```

96 \newif \if@fcolmade
97 \newif \if@specialpage \@specialpagefalse

```

\if@firstcolumn These should be global but are not always set globally in other files.

```

98 \newif \if@firstcolumn \@firstcolumntrue
99 \newif \if@twocolumn \@twocolumnfalse

```

Not sure about these: two questions. Should things which must apply to a whole document be local or global (they probably should be ‘preamble only’ commands)? Are these three such things?

```

100 \newif \if@twoside \@twosidefalse
101 \newif \if@reversemargin \@reversemarginfalse
102 \newif \if@mparswitch \@mparswitchfalse

```

This counter has been imported from ‘multicol’.

```
103 \newcount \col@number  
104 \col@number \cne
```

(End definition for `\if@insert` and others.)

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

INTERNAL REGISTERS

```
105 \newcount\@topnum  
106 \newdimen\@toproom  
107 \newcount\@dbltopnum  
108 \newdimen\@dbltoproom  
109 \newcount\@botnum  
110 \newdimen\@botroom  
111 \newcount\@colnum  
112 \newdimen\@textmin  
113 \newdimen\@fpmin  
114 \newdimen\@colht  
115 \newdimen\@colroom  
116 \newdimen\@pageht  
117 \newdimen\@pagedp  
118 \newdimen\@mparbottom \cne \z@  
119 \newcount\@currtype  
120 \newbox\@outputbox  
121 \newbox\@leftcolumn  
122 \newbox\@holdpg  
  
123 \def\@thehead{\@oddhead} % initialization  
124 \def\@thefoot{\@oddfoot}
```

End of historical L^AT_EX 2.09 comments.

- \clearpage The tests at the beginning are an experimental attempt to avoid a completely empty page after a `\twocolumn[...]`. This prevents the text from the argument vanishing into a float box, never to be seen again. We hope that it does not produce wrong formatting in other cases.

```
125 \def\clearpage{  
126   \ifvmode  
127     \ifnum \@dbltopnum =\cne  
128       \ifdim \pagetotal <\topskip  
129         \hbox{}%  
130       \fi  
131     \fi  
132   \fi  
133   \newpage  
134   \write\m@ne{}%  
135   \vbox{}%  
136   \penalty -\OMi  
137 }
```

(End definition for `\clearpage`.)

```

\cleardoublepage
138 \def\cleardoublepage{\clearpage\if@twoside \ifodd\c@page\else
139     \hbox{}\newpage\if@twocolumn\hbox{}\newpage\fi\fi\fi}
140 
```

(End definition for `\cleardoublepage`.)

```

\onecolumn
141 {*2ekernel | ftrace}
142 \def\onecolumn{%
143     \clearpage
144     \global\columnwidth\textwidth
145     \global\hsize\columnwidth
146     \global\linewidth\columnwidth
147     \global\@twocolumnfalse
148     \col@number \@ne
149     \@floatplacement}

```

(End definition for `\onecolumn`.)

`\newpage` The two checks at the beginning ensure that an item label or run-in section title immediately before a `\newpage` get printed on the correct page, the one before the page break.

All three tests are largely to make error processing more robust; that is why they all reset the flags explicitly, even when it would appear that this would be done by a `\leavevmode`.

```

150 
```

`{/2ekernel | ftrace}`
`{\@latexrelease}\IncludeInRelease{2017/04/15}%
152 {\@latexrelease} {\newpage}{Check depth of page}%
153 {*2ekernel | \@latexrelease | ftrace}
154 \def \newpage {%
155 \if@noskipsec
156 \ifx \@nodocument\relax
157 \leavevmode
158 \global \@noskipsecfalse
159 \fi
160 \fi
161 \if@inlabel
162 \leavevmode
163 \global \@inlabelfalse
164 \fi
165 \if@nobreak \@nobreakfalse \everypar{} \fi
166 \par`

The `\vfil` at the end of the macro before the break penalty will normally result in the page being run short, even with `\flushbottom` in effect (in contrast to the behavior of `\pagebreak`). However, if there is some explicit stretch on the page, say, a `\vfill`, it has the undesired side-effect, that the last line will not align at its baseline if it contains characters going below the baseline, as the value of `\prevdepth` is no longer taken into account by TeX. So we back up by that amount (or by `\maxdepth` if it is really huge), to mimic the normal behavior without the `\newpage`.

```

167 \ifdim\prevdepth>\z@
168     \vskip -%
169     \ifdim\prevdepth>\maxdepth

```

```

170          \maxdepth
171          \else
172          \prevdepth
173          \fi
174          \fi
175          \vfil
176          \penalty -\@M}
177  </2ekernel | latexrelease | fltrace>
178  <|latexrelease|>\EndIncludeInRelease
179  <|latexrelease|>\IncludeInRelease{0000/00/00}%
180  <|latexrelease|>          {\newpage}{Check depth of page}%
181  <|latexrelease|>\def \newpage {%
182  <|latexrelease|>  \if@noskipsec
183  <|latexrelease|>    \ifx \nодокумент\relax
184  <|latexrelease|>      \leavevmode
185  <|latexrelease|>      \global \nокомпенсацияfalse
186  <|latexrelease|>    \fi
187  <|latexrelease|>  \fi
188  <|latexrelease|>  \if@inlabel
189  <|latexrelease|>    \leavevmode
190  <|latexrelease|>    \global \инлайнfalse
191  <|latexrelease|>  \fi
192  <|latexrelease|>  \if@nobreak \nobreakfalse \everypar{} \fi
193  <|latexrelease|>  \par
194  <|latexrelease|>  \vfil
195  <|latexrelease|>  \penalty -\@M}
196  <|latexrelease|>\EndIncludeInRelease
197  <*2ekernel | fltrace>

```

(*End definition for \newpage.*)

\@emptycol It may be better to use an invisible rule rather than an empty box here.

```
198 \def \@emptycol {\vbox{} \penalty -\@M}
```

(*End definition for \emptycol.*)

\twocolumn There are several bug fixes to the two-column stuff here.

```

199 \def \twocolumn {%
200   \clearpage
201   \global \columnwidth \textwidth
202   \global \advance \columnwidth -\columnsep
203   \global \divide \columnwidth \tw@
204   \global \hsize \columnwidth
205   \global \linewidth \columnwidth
206   \global \twocolumntrue
207   \global \firstcolumntrue
208   \col@number \tw@

```

There is no reason to put a \@dblfloatplacement here since \@topnewpage ignores these settings. The \@floatplacement is needed in case this comes after some changes.

```

209   \@ifnextchar [\@topnewpage \@floatplacement
210 }
```

Note that here, getting a box from the freelist can assume success since this comes just after a `\clearpage`.

```

211 \long\def \@topnewpage [#1]{%
212   \@nodocument
213   \@next\@currbox\@freelist{}{}%
214   \global \setbox\@currbox
215     \color@vbox
216       \normalcolor
217       \vbox {%
218         \hsize\textwidth
219         \parboxrestore
220         \col@number \@ne
221         #1%
222         \vskip -\dbltextfloatsep
223       }%
224     \color@endbox

```

Added size test and warning message; perhaps we should use an error message.

```

225   \ifdim \ht\@currbox>\textheight
226     \ht\@currbox \textheight
227   \fi

```

This next line is not essential but it is more robust to make this value non-zero, in case of weird errors.

This next bit is what is needed from `\@addtobblcol`, plus some extra checks for error trapping.

```

228   \global \count\@currbox \tw@
229   \tempdima -\ht\@currbox
230   \advance \tempdima -\dbltextfloatsep
231   \global \advance \colht \tempdima
232   \ifx \dbltoplist \empty
233   \else
234     \@latexerr{Float(s) lost}\@ehb
235     \let \dbltoplist \empty
236   \fi
237   \cons \dbltoplist \@currbox

```

This setting of `\@dbltopnum` is used only to change the typesetting in `\@combinedblfloats`.

```

238   \global \@dbltopnum \m@ne
239   {*trace}
240     \f@trace{dbltopnum set to -1 (= \the \@dbltopnum) (topnewpage)}%
241   /trace)

```

At points such as this we need to check that there is still a minimal amount of room left on the page; this uses an arbitrary small value at present; but note that this value is larger than that used when checking that page is too full of normal floats.

If there is little room left we just force a page-break, OK? This involves producing two empty columns. The second empty column may be produced by `\output`, in which case an extra, misleading, warning will be generated, OK? (This happens only when there is too little room left on the page for any float.) Otherwise (i.e. if the size is such that it is allowed as a normal float) the extra `\@emptycol` will be invoked in the second column by the conditional code guarded by the `\if@firstcolumn` test.

I now think that the cut-off point here should be $3\baselineskip$, but we make it a bit less so that 3 lines of text will be allowed, OK?

Since this happens only when there is nothing on the page but the ‘top-box’, the empty box should not cause any problem other than some overfull box messages, which is not entirely misleading.

Here we need two page-ends since both columns need to be empty.

```

242  \ifdim \@colht<2.5\baselineskip
243    \@latex@warning@no@line {Optional argument of \noexpand\twocolumn
244      too tall on page \thepage}%
245    \emptycol
246    \if@firstcolumn
247    \else
248      \emptycol
249    \fi
250  \else
251    \global \vsize \@colht
252    \global \@colroom \@colht
253    \@floatplacement
254  \fi
255 }
```

(End definition for `\twocolumn` and `\@topnewpage`.)

`\output` This needs some small adjustments. We cannot guarantee that the float mechanism will interact correctly with this stuff, but that mechanism does not always work properly with footnotes already.

RmS 91/09/29:

added reset of `\par` to the output routine. This avoids problems when the output routine is called within a list where `\par` may be a no-op.

```

256 \output {%
257   \let \par \@@par
258   \ifnum \outputpenalty<-\@M
259     \specialoutput
260   \else
261     \makecol
262     \opcol
```

Moved to `\opcol`: `\@floatplacement`.

```
263   \startcolumn
```

This loop could be replaced by an `\expandafter` tail recursion in `\startcolumn`.

```

264   \whilesw \if@fcolmade \fi
265   {%
266   (*trace)
267     \f@trace{PAGE: float \if@twocolumn column \else page \fi
268       completed}%
269   (/trace)
270     \opcol\startcolumn}%
271   \fi
272   \ifnum \outputpenalty>-\@Miv
```

At points such as this we need to check that there is still a minimal amount of room left on the page; this uses an arbitrary small value at present. If there is little room left we just force a page-break, OK?

This bit is essential only if a float has just been processed so maybe it should be moved; but this is the natural place at which to set the vsize and a test would need to be done anyway. A check has been added to ensure that there really has been a change in the value of `\@colroom`.

Since this happens only when there is nothing on the page but floats, the empty box should not cause any problem other than some overfull box messages, which is not entirely misleading.

The twocolumn case does not need any extra code here since this is the `\output` itself; in the second column there will still not be enough room left so `\@emptycol` will be executed again when the OR is called by the-page builder when it gets to the penalty inserted by the first execution. (The page-builder is never invoked whilst the OR is being executed since it builds a inner vlist; thus any conditional code for the two-column case within `\output` may not get executed with the correct value of `\if@firstcolumn`.

```

273   \ifdim \@colroom<1.5\baselineskip
274     \ifdim \@colroom<\textheight
275       \@latex@warning@no@line {Text page \thepage\space
276         contains only floats}%
277       \@emptycol
278     %
279     \if@twocolumn
280     \else
281     \else
282     \emptycol
283     \fi
284     \else
285       \global \vsize \@colroom
286     \fi
287     \else
288       \global \vsize \@colroom
289     \fi
290   \else
291     \global \vsize \maxdimen
292   \fi
293 }
```

Historical L^AT_EX 2.09 comments (not necessarily accurate any more):

CHANGES TO `\@specialoutput`:

* `\penalty\z@` changed to `\penalty\interlinepenalty` so `\samepage` works properly with figure and table environments.

(Changed 23 Oct 86)

* Definition of `\@specialoutput` changed 26 Feb 88 so `\@pageht` and `\@pagedp` aren't changed for a marginal note.

(Change suggested by Chris Rowley.)

End of historical L^AT_EX 2.09 comments.

```

294 \gdef\@specialoutput{%
295   \ifnum \outputpenalty>-\@Mii
296     \@doclearpage
```

```

297     \else
298         \ifnum \outputpenalty<-\@Mii
299             \ifnum \outputpenalty<-\@MM \deadcycles \z@ \fi
300             \global \setbox\@holdpg \vbox {\unvbox\@cclv}%
301         \else

```

Note that `\boxmaxdepth` should not be set here since we wish to record the natural depth of the `holdpg` box.

This is changed so as to not lose anything, such as writes and marks, which may get into box 255 and should be returned to the list. This should only happen when the first penalty in the mechanism is discarded and therefore `\@holdpg` should always be void in this case. This can happen because a penalty is discarded whenever there is no box on the list.

It was just: `\setbox\@tempboxa \box \@cclv`.

The last box which is removed is the box put there by the double-penalty mechanism. The `\unskip` then removes the `\topskip` which is put there since the box is the first on the page.

```

302     \global \setbox\@holdpg \vbox{%
303         \unvbox\@holdpg
304         \unvbox\@cclv

```

We must now remove the box added by the float mechanism and the `\topskip` glue therefore added above it by TeX.

```

305     \setbox\@tempboxa \lastbox
306     \unskip
307     }%

```

These two are needed as separate dimensions only by `\@addmarginpar`; for other purposes we put the whole size into `\@pageht` (see below).

```

308     \@pagedp \dp\@holdpg
309     \@pageht \ht\@holdpg
310     \unvbox \@holdpg
311     \next\currbox\@currlist{%
312         \ifnum \count\currbox>\z@

```

Putting the whole size into `\@pageht` (see above).

```

313     \advance \@pageht \@pagedp
314     \ifvoid\footins \else
315         \advance \@pageht \ht\footins
316         \advance \@pageht \skip\footins
317         \advance \@pageht \dp\footins
318     \fi
319     \ifvbox \@kludgeins

```

We want to make the adjustment due to this insert only if the non-star form is used. The *-form will probably not work with floats, but maybe it still could make some adjustment here even so?

```

320         \ifdim \wd\@kludgeins=\z@
321             \advance \@pageht \ht\@kludgeins
322         (*trace)
323             \f@trace {Extra size added: \the \ht\@kludgeins}%
324         (/trace)
325             \fi
326             \fi

```

This version puts the inserts back just before the additional material; it could be moved earlier, before unboxing the page-so-far. Neither is guaranteed not to put things on the wrong page. This version is similar to the original version.

```

327          \@reinserts
328          \@addtocurcol
329      \else
330          \@reinserts
331          \@addmarginpar
332      \fi
333  }\@latexbug

```

A 2e change: use `\addpenalty` instead of `\penalty` here. Some penalty is needed to create a potential break-point immediately after the reinserts (or the marginal). Otherwise there can be no possibility to break here and this can cause the reinserts or the marginal to appear on the next page (which is often incorrect). However, if the nobreak flag is true, a `\nobreak` must be correct.

```

334 \ifnum \outputpenalty<\z@
335   \if@nobreak
336     \nobreak
337   \else
338     \addpenalty \interlinepenalty
339   \fi
340   \fi
341   \fi
342 \fi
343 }
344 </2ekernel | fltrace>

```

(End definition for `\output` and `\@specialoutput`.)

`\@testwrongwidth` Test if the float box has the wrong width when trying to place it into some area. (Actually the test is for a conventional depth setting rather than for the width of the float. For that reason the box depth was explicitly tailored when the float was created).

```

345 <latexrelease>\IncludeInRelease{2015/01/01}%
346 <latexrelease>      {\@testwrongwidth}{float order in 2-column}%
347 <*2ekernel | latexrelease | fltrace>

348 \def\@testwrongwidth #1{%
349   \ifdim\dp#1=\f@depth
350   {*trace}
351     \f1@trace{\string#1
352       \ifdim\f@depth=\z@ single \else double \fi
353       column float -- ok}%
354   {*}trace}
355   \else
356     \global\@testtrue
357   {*}trace}
358   \f1@trace{\string#1
359     \ifdim\f@depth=\z@ double \else single \fi
360     column float -- wrong}%
361 {*}trace}
362   \fi}%

```

Normally looking for single column floats, which have zero depth.
`\let\f@depth\z@`

```

364  {/2ekernel | latexrelease | fltrace}
365  \end{IncludeInRelease}
366  \IncludeInRelease{0000/00/00}%
367  \let\@testwrongwidth\@undefined
368  \let\f@depth\@undefined
369  \end{IncludeInRelease}
370

```

(End definition for `\@testwrongwidth` and `\f@depth`.)

\@doclearpage

This is a very much an emergency action, just dumping everything: footnotes first then floats. A more sophisticated version is needed; but even more urgent is a bug-free version (see, for example, pr/3528).

Also, it puts any left-over non-boxes (writes, specials, etc.) back after any float pages created: this is a very bad bug since, for example, a kludge insert will be in quite the wrong place and, worse, be irremovable and uncancelable.

All the remaining changes are replacing the double column defer list or inserting the extra test `\@testwrongwidth{\box}` at suitable places. That is at places where a box is taken off the deferlist.

```

371  \IncludeInRelease{2015/01/01}{\@doclearpage}%
372  \def \@doclearpage {%
373    {*2ekernel | latexrelease}
374    \ifvoid\footins
375      \ifvbox\@kludgeins
376        \setbox\@tempboxa \box\@kludgeins%
377      \else
378        (*trace)
379        \f@trace {kludgeins box made void}%
380      \else
381        \fi
382        \setbox\@tempboxa\vsplit\@cclv to\z@\unvbox\@tempboxa
383        \setbox\@tempboxa\box\@cclv
384        \xdef\@deferlist{\@toplist\@botlist\@deferlist}%
385        \global \let \@toplist \empty
386        \global \let \@botlist \empty
387        \global \@colroom \@colht
388        \ifx \currlist\empty
389        \else
390          \@latexerr{Float(s) lost}\@ehb
391          \global \let \currlist \empty
392        \fi
393        \@makefcolumn\@deferlist
394        \@whilesw\if@fcolmade \fi\@opcol\@makefcolumn\@deferlist}%
395        \if@twocolumn
396          \if@firstcolumn
397            \xdef\@deferlist{\@dbltoplist\@deferlist}%
398            \global \let \@dbltoplist \empty
399            \global \@colht \textheight
400            \begingroup
401              \@dblfloatcheck

```

```

402          \@makefcolumn\@deferlist
403          \@whilesw\if@fcolmade \fi{\@outputpage
404                                  \@makefcolumn\@deferlist}%
405          \endgroup
406          \else
407              \vbox{}\clearpage
408          \fi
409      \fi

```

the next line is needed to avoid losing floats in certain circumstances a single call to the original \doclearpage will now no longer output all floats.

```

410          \ifx\@deferlist\empty \else\clearpage \fi
411          \else
412              \setbox\@cclv\vbox{\box\@cclv\vfil}%
413              \@makecol\@opcol
414                  \clearpage
415          \fi
416      }%
417  </2ekernel | latexrelease>
418  <latexrelease>\EndIncludeInRelease
419  <latexrelease>\IncludeInRelease{0000/00/00}{\@doclearpage}%
420  <latexrelease>                                {float order in 2-column}%
421  <latexrelease>\def \@doclearpage {%
422  <latexrelease>      \ifvoid\footins

```

We empty any left over kludge insert box here; this is a temporary fix. It should perhaps be applied to one page of cleared floats, but who cares? The whole of this stuff needs completely redoing for many such reasons.

```

423 <latexrelease>      \ifvbox\@kludgeins
424 <latexrelease>          {\setbox \@tempboxa \box \@kludgeins}%
425 <*trace>
426 <latexrelease>          \f@ttrace {kludgeins box made void}%
427 </trace>
428 <latexrelease>          \fi
429 <latexrelease>          \setbox\@tempboxa\vsplit\@cclv to\z@\unvbox\@tempboxa
430 <latexrelease>          \setbox\@tempboxa\box\@cclv
431 <latexrelease>          \xdef\@deferlist{\@toplist\@botlist\@deferlist}%
432 <latexrelease>          \global \let \@toplist \empty
433 <latexrelease>          \global \let \@botlist \empty
434 <latexrelease>          \global \@colroom \colht
435 <latexrelease>          \ifx \@currlist\empty
436 <latexrelease>          \else
437 <latexrelease>              \@latexerr{Float(s) lost}\@ehb
438 <latexrelease>          \global \let \@currlist \empty
439 <latexrelease>          \fi
440 <latexrelease>          \@makefcolumn\@deferlist
441 <latexrelease>          \@whilesw\if@fcolmade \fi
442 <latexrelease>              {\@opcol\@makefcolumn\@deferlist}%
443 <latexrelease>          \if@twocolumn
444 <latexrelease>              \if@firstcolumn
445 <latexrelease>                  \xdef\@dbldeferlist{\@dbltoplist\@dbldeferlist}%

```

```

446 <|latexrelease>          \global \let \@dbltoplist \empty
447 <|latexrelease>          \global \@colht \textheight
448 <|latexrelease>          \begingroup
449 <|latexrelease>          \@dblfloatplacement
450 <|latexrelease>          \@makefcolumn\@dbldeflist
451 <|latexrelease>          \@whilesw\if@fcolmade \fi
452 <|latexrelease>          {\@outputpage\@makefcolumn\@dbldeflist}%
453 <|latexrelease>          \endgroup
454 <|latexrelease>          \else
455 <|latexrelease>          \vbox{}\clearpage
456 <|latexrelease>          \fi
457 <|latexrelease>          \fi
458 <|latexrelease>          \else
459 <|latexrelease>          \setbox\@cclv\vbox{\box\@cclv\vfil}%
460 <|latexrelease>          \@makecol\@opcol
461 <|latexrelease>          \clearpage
462 <|latexrelease>          \fi
463 <|latexrelease>  }%
464 <|latexrelease>\EndIncludeInRelease

```

(End definition for \@doclearpage.)

\@opcol Several changes in detail here.

```

465 {*2ekernel | fltrace}
466 \def \@opcol {%
467   \if@twocolumn
468     \@outputdblcol
469   \else
470     \@outputpage
471   (*trace)
472     \fl@trace{PAGE: one column (float? see above) page completed}%
473   
```

Not needed since it comes after \@outputpage:

```

474 %   \global\@colht\textheight
475   \fi

```

These do not need to be done every time \@opcol is used: they should be grouped together since they all need to be done at the end of the non-special output routine, or at the end of a clearpage one.

```

476   \global \z@\global \z@textfloatsheight \z@
477   \@floatplacement
478 }
479 
```

(End definition for \@opcol.)

\@makecol We must rewrite this macro to allow for variations in page-makeup required by changes in page-length.

This uses a different macro if a special-length column is being produced.

```

480 {*2ekernel}
481 \gdef \@makecol {%
482   \ifvoid\footins
483     \setbox\@outputbox \box\@cclv
484   \else
485     \setbox\@outputbox \vbox {%

```

This `\boxmaxdepth` setting is to ensure that deep footnotes do not overwrite the footer (on account of the negative skip added later): it should use `\@maxdepth` otherwise the change is pointless when there are footnotes.

But see also its use when combining floats.

```

486      \boxmaxdepth \@maxdepth
487  %      \tempdima\dp\@cclv
488  %      \unvbox \cclv
489  %      \vskip-\tempdima
490      \vskip \skip\footins
491      \color@begingroup
492          \normalcolor
493          \footnoterule
494          \unvbox \footins
495          \color@endgroup
496      }%
497  \fi

```

The h floats have now been finally committed to this page so we can reset their list. The top and bottom floats are then added to the page.

```

498  \let\@elt\relax
499  \xdef\@freelist{\@freelist\@midlist}%
500
501  \global \let \midlist \empty
      \combinefloats

```

The variations start here in case `\enlargethispage` has been used.

```

502  \ifvbox\kludgeins
503      \makespecialcolbox
504  \else

```

This extra reboxing is only needed to add the `\@texttop` and `\@textbottom` but this could be done earlier, when the floats are added.

The `\boxmaxdepth` resetting here will have no effect unless `\@textbottom` ends with a box or rule. So is this (or possibly `\@maxdepth`) the correct value?

The `\vskip -\dimen0` ensures that the visible depth of the box does not affect the placement of anything on the page. Thus very deep pages will overprint the footer; but these should have been prevented by suitable settings of the maxdepths at appropriate times.

If `\@textbottom` ends with a box or rule of non-zero depth then this skip adjustment should be done again after it.

I think that the final boxing of the main text page could have a common ending which may make it simpler to see what is going on.

This needs further investigation, especially in the ‘special case’.

Also, the `\boxmaxdepth` setting here affects what happens within `\@texttop` and `\@textbottom`, should it? Is it needed at all?

RmS 91/10/22: Replaced `\dimen128` by `\dimen0`.

```

505      \setbox\outputbox \vbox to\colht {%
506  %      \boxmaxdepth \maxdepth           ???
507      \texttop
508      \dimen0 \dp\outputbox
509      \unvbox \outputbox

```

```

510      \vskip -\dimen@%
511      \textbottom
512  }%
513  \fi
514  \global \maxdepth \maxdepth
515 }

```

(End definition for `\@makecol`.)

- `\@reinserts` This is the code which reinserts the inserts. It puts them all in one place; this can make some of them come out on the wrong page. It has been put into a separate macro to expedite experimentation.

```

516 \gdef \@reinserts{%
517   \ifvoid\footins\else\insert\footins{\unvbox\footins}\fi
518   \ifvbox\@kludgeins\insert\@kludgeins
519     {\unvbox\@kludgeins}\fi
520 }
521 </2ekernel>

```

(End definition for `\@reinserts`.)

- `\@makespecialcolbox` This implements certain variations in page-makeup.

```

522 <*2ekernel | ftrace>
523 \gdef \@makespecialcolbox {%
524 <*trace>
525   \ftrace{Kludgeins ht \the\ht\@kludgeins\space
526           dp \the\dp\@kludgeins\space
527           wd \the\wd\@kludgeins}%
528 </trace>

```

First we find the natural height of the column.

See above for discussion of what is happening here.

This needs further investigation, especially in this ‘special case’.

```

529 \setbox\@outputbox \vbox {%
530   \texttop
531   \dimen@ \dp\@outputbox
532   \unvbox\@outputbox
533   \vskip-\dimen@
534 }%
535 \tempdima \colht
536 \ifdim \wd\@kludgeins>\z@

```

Note that in this case (the `*-`version), the height of the `\@kludgeins` box is not used since its value is somewhat arbitrary: it need only be big enough to ensure that the page-break is not taken prematurely.

Here we calculate how much vertical space needs to be added in order to enable the column to fit into a box of size `\@colht` using the best information we have about the amount of shrink available (another thing which is known internally about a box, but cannot be accessed at the TeX level!).

This needs TeX3 otherwise `\pageshrink` is zero anyway; it may not be exactly the figure we wish as it is the total available from the all the material collected before the page-break decision is made. It will, we think, always be an overestimate of the actual shrink in the box; therefore this should always force the shortest possible column with the possibility of an overfull box.

This should work for both flush- and ragged-bottom setting since it makes the contents no smaller than the size (`\@colht`) of the box into which they are put.

Their should perhaps be an upper limit, of `0pt?`, on the extra space added to force shrinking.

See above for a discussion of the `\boxmaxdepth` setting here.

```

537     \advance \tempdima -\ht\outputbox
538     \advance \tempdima \pagemshrink
539 (*trace)
540     \f@trace {Natural ht of col: \the \ht\outputbox}%
541     \f@trace {\string \colht: \the \colht}%
542     \f@trace {Pagemshrink added: \the \pagemshrink}%
543     \f@trace {Hence, space added: \the \tempdima}%
544 (/trace)
545     \setbox\outputbox \vbox to \colht {%
546     \boxmaxdepth \maxdepth
547     \unvbox\outputbox
548     \vskip \tempdima
549     \textbottom
550   }%

```

For the unstarred version, the final size of the page is precisely specified. Therefore, at least for the flush-bottom case, we need to ensure that, visually, it has this size exactly.

Thus we calculate this size and set the material in a box of this size, which is then put into a box of size `\@colht` with `\vss` at the bottom.

```

551 \else
552   \advance \tempdima -\ht\kludgeins
553 (*trace)
554   \f@trace {Natural ht of col: \the \ht\outputbox}%
555   \f@trace {\string \colht: \the \colht}%
556   \f@trace {Extra size added: -\the \ht \kludgeins}%
557   \f@trace {Hence, height of inner box: \the \tempdima}%
558   \f@trace {Max? pagemshrink available: \the \pagemshrink}%
559 (/trace)

```

This type of final packaging could be done always; this may simplify all of this page-makeup.

It is not necessary to set `\boxmaxdepth` here since the `\outputbox` ends with glue.

```

560   \setbox\outputbox \vbox to \colht {%
561     \vbox to \tempdima {%
562       \unvbox\outputbox
563       \textbottom}%
564     \vss}%
565 \fi

```

Finally we need to explicitly make the insert box void.

```

566   {\setbox\tempboxa \box \kludgeins}%
567 (*trace)
568   \f@trace {kludgeins box made void}%
569 (/trace)
570 }
571 (/2ekernel | ftrace)

```

(End definition for `\makespecialcolbox`.)

\@texttop These do nothing as a default.

\@textbottom

```

572  {*2ekernel}
573  \let \@texttop \relax
574  \let \@textbottom \relax

```

(End definition for \@texttop and \@textbottom.)

\@resetactivechars RmS 93/09/06: added hook to protect against certain active characters in the output routine. Default checks are for active space and end-of-line.

```

575  \def\@activechar@info #1{%
576    \@latex@info@no@line {Active #1 character found while
577                           output routine is active
578                           \MessageBreak
579                           This may be a bug in a package file
580                           you are using}%
581 }

```

Do not put any spaces in this next bit!

```

582  \begingroup
583  \obeylines\obeyspaces%
584  \catcode`\'\active%
585  \gdef\@resetactivechars{%
586  \def^~M{\@activechar@info{EOL}\space}%
587  \def {\@activechar@info{space}\space}%
588  \let'\active@math@prime}%
589  \endgroup

```

(End definition for \@resetactivechars and \@activechar@info.)

\@outputpage \@shipoutsetup \@writesetup

The \color@hbox hooks here are used to avoid putting just a colour special into an otherwise empty box (in a header or footer). These boxes are often set to be completely empty and so adding a special produces a very underfull box message.

There has been extensive tidying up of the old code here; including the removal of a level of grouping.

The setting of \protect immediately before the \shipout is needed so that protected commands within \writes are handled correctly.

Within shipout's vbox it is reset to its default value, \relax.

Resetting it to its default value after the shipout has been completed (and the contents of the writes have been expanded) must be done by use of \aftergroup. This is because it must have the value \relax before macros coming from other uses of \aftergroup within this box are expanded.

Putting this into the \aftergroup token list does not affect the definition used in expanding the \writes because the aftergroup token list is only constructed when popping the save-stack, it is not expanded until after the shipout is completed.

Question: should things from an \aftergroup within the shipped out box be executed in the environment set up for the writes, or after it finishes?

A lot of this code has been in-lined to prevent mis-use of internal commands as hooks.

```

590  {/2ekernel}
591  \IfFileExists{./texlive/2017/texmf-dist/tex/latex/base/ltoutpu.tcx}{%
592  \IncludeInRelease{2017/04/15}{%
593  \IfFileExists{./texlive/2017/texmf-dist/tex/latex/base/ltoutpu.tcx}{%
594  \def\@outputpage{%

```

The `\endgroup` is put in by `\aftergroup`.

595 `\begingroup`

Now all the set-up stuff has been in-lined for Frank.

First the stuff for the writes.

From here ... was in the command `\@writesetup`.

596 `\let \protect \noexpand`

RmS 93/08/19: Redefined accents to allow changes in font encoding; but exactly why was this needed?

Reset `\language` to the value current at `\begin{document}`. In particular this ensures that a pagebreak in `\verb+im` does not prevent hyphenation in the page head.

597 `\language\document@default\language`

The `\catcode`\\ = 10` was removed as it was considered useless (presumably because nothing gets tokenised during shipout).

This was put in as some error produced active spaces in a mark, I think.

Why was the hyphen reset?

598 `\@resetactivechars`

If a page break happens between the start of a list and its first item the `@newlist` will be true and this will mess up any list that is used in the header or footer of the page. So we have to reset that flag.

599 `\global\let\@if@newlist\if@newlist`

600 `\global@\newlistfalse`

This next hook replaces the following:

```
\let\-\@dischyp  
\let'\@acci\let`\@acci\let\=\@acciii  
\let\\@\normalcr  
\let\par\@@par %% 15 Sep 87 (this was once inside the box)
```

and it does more than they did; in particular it sets:

```
\parindent\z@  
\parskip\z@skip  
\everypar{}%  
\leftskip\z@skip  
\rightskip\z@skip  
\parfillskip\@flushglue  
\lineskip\normallineskip  
\baselineskip\normalbaselineskip  
\sloppy
```

601 `\@parboxrestore`

... to here was in the command `\@writesetup`.

602 `\shipout \vbox{%`

603 `\set@typeset@protect`

604 `\aftergroup \endgroup`

Correct? or just restore by ending the group?

605 `\aftergroup \set@typeset@protect`

This first bit has been moved inside the shipped out box.

Now the setup inside the shipped out box; this should contain all the stuff that could only affect typesetting; other stuff may need to be reset for the writes also.

From here ... was in the command \@shipoutsetup.

```
606  \if@specialpage
607    \global\@specialpagefalse\@nameuse{ps@\@specialstyle}%
608  \fi
609  \if@twoside
610    \ifodd\count\z@ \let\@thehead\@oddhead \let\@thefoot\@oddfoot
611      \let\@themargin\oddsidemargin
612    \else \let\@thehead\@evenhead
613      \let\@thefoot\@evenfoot \let\@themargin\evensidemargin
614    \fi
615  \fi
```

The rest was always inside the box.

RmS 91/08/15: added this line:

```
616  \reset@font
```

RmS 93/08/06 Added \lineskiplimit=0pt to guard against it being nonzero: e.g. by \offinterlineskip being in effect.

There are probably lots of other things that may need resetting.

```
617  \normalsize
```

Reset the space factors.

```
618  \normalsfcodes
```

Reset these here (previously reset separately for head and foot)

```
619  \let\label\@gobble
620  \let\index\@gobble
621  \let\glossary\@gobble
622  \baselineskip\z@skip \lineskip\z@skip \lineskiplimit\z@
```

... to here was in the command \@shipoutsetup.

```
623  \@begindvi
624  \vskip \topmargin
625  \moveoveright\@themargin \vbox {%
626    \setbox\@tempboxa \vbox to\headheight{%
627      \vfil
628      \color@hbox
629        \normalcolor
630        \hb@xt@\textwidth{\@thehead}%
631      \color@endbox
632    }%
633    \dp\@tempboxa \z@
634    \box\@tempboxa
635    \vskip \headsep
636    \box\@outputbox
637    \baselineskip \footskip
638    \color@hbox
639      \normalcolor
640      \hb@xt@\textwidth{\@thefoot}%
641    \color@endbox
642  }
```

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```
632
633  \dp\@tempboxa \z@
634  \box\@tempboxa
635  \vskip \headsep
636  \box\@outputbox
637  \baselineskip \footskip
638  \color@hbox
639    \normalcolor
640    \hb@xt@\textwidth{\@thefoot}%
641  \color@endbox
```

```

642      }%
643      }%
\endgroup now inserted by \aftergroup
    Restore \if@newlist
644 \global\let\if@newlist\@@if@newlist
645 \global \colht \textheight
646 \stepcounter{page}%

```

It is now clear that this does something useful, thanks to Piet van Oostrum. It is needed because a float page is made without using TeX's page-builder; thus the output routine is never called so the marks are not updated.

```

647 \let\firstmark\botmark
648 }
649 </2ekernel | latexrelease>
650 <latexrelease>\EndIncludeInRelease
651 <latexrelease>\IncludeInRelease{0000/00/00}%
652 <latexrelease> {\@outputpage}{Reset language for hyphenation}%
653 <latexrelease>\def\@outputpage{%
654 <latexrelease>\begingroup
655 <latexrelease> \let \protect \noexpand
656 <latexrelease> \resetactivechars
657 <latexrelease> \global\let\@@if@newlist\if@newlist
658 <latexrelease> \global\@newlistfalse
659 <latexrelease> \parboxrestore
660 <latexrelease> \shipout \vbox{%
661 <latexrelease> \set@typeset@protect
662 <latexrelease> \aftergroup \endgroup
663 <latexrelease> \aftergroup \set@typeset@protect
664 <latexrelease> \if@specialpage
665 <latexrelease> \global\@specialpagefalse\@nameuse{ps@\@specialstyle}%
666 <latexrelease> \fi
667 <latexrelease> \if@twoside
668 <latexrelease> \ifodd\count\z@%
669 <latexrelease> \let\@thehead\@oddhead \let\@tfoot\@oddfoot
670 <latexrelease> \let\@themargin\oddsidemargin
671 <latexrelease> \else \let\@thehead\@evenhead
672 <latexrelease> \let\@tfoot\@evenfoot \let\@themargin\evensidemargin
673 <latexrelease> \fi
674 <latexrelease> \fi
675 <latexrelease> \reset@font
676 <latexrelease> \normalsize
677 <latexrelease> \normalsfcodes
678 <latexrelease> \let\label\@gobble
679 <latexrelease> \let\index\@gobble
680 <latexrelease> \let\glossary\@gobble
681 <latexrelease> \baselineskip\z@skip \lineskip\z@skip \lineskiplimit\z@
682 <latexrelease> \begindvi
683 <latexrelease> \vskip \topmargin
684 <latexrelease> \overright\@themargin \vbox {%
685 <latexrelease> \setbox\tempboxa \vbox to\headheight{%
686 <latexrelease> \vfil
687 <latexrelease> \color@hbox
688 <latexrelease> \normalcolor

```

```

689 〈latexrelease〉      \hb@xt@{\textwidth}{\thehead}%
690 〈latexrelease〉      \color@endbox
691 〈latexrelease〉      }%
692 〈latexrelease〉      \dp@\tempboxa \z@
693 〈latexrelease〉      \box@\tempboxa
694 〈latexrelease〉      \vskip \headsep
695 〈latexrelease〉      \box@\outputbox
696 〈latexrelease〉      \baselineskip \footskip
697 〈latexrelease〉      \color@hbox
698 〈latexrelease〉      \normalcolor
699 〈latexrelease〉      \hb@xt@{\textwidth}{\thefoot}%
700 〈latexrelease〉      \color@endbox
701 〈latexrelease〉      }%
702 〈latexrelease〉      }%
703 〈latexrelease〉      \global\let\if@newlist\@if@newlist
704 〈latexrelease〉      \global \colht \textheight
705 〈latexrelease〉      \stepcounter{page}%
706 〈latexrelease〉      \let\firstmark\botmark
707 〈latexrelease〉}
708 〈latexrelease〉\EndIncludeInRelease
709 {*2ekernel}

```

(End definition for `\@outputpage`, `\@shipoutsetup`, and `\@writesetup`.)

- `\@begindvi` This unboxes stuff that must appear before anything else in the .dvi file, then returns that box register to the free list and cancels itself.

The stuff in the box should not add any typeset material to the page.

```

710 \def \@begindvi{%
711   \unvbox \@begindvibox
712   \global\let \@begindvi \empty
713 }

```

(End definition for `\@begindvi`.)

- `\@combinefloats` The `\boxmaxdepth` setting here was not made local to a box so was dangerous. It is needed only within the box made by `\@cflt` (and not normally even there), so it has been moved there; this also agrees with the original pseudocode.

```

714 \def \@combinefloats{%
715 %   \boxmaxdepth \maxdepth
716   \ifx \@toplist\empty \else \@cflt \fi
717   \ifx \@botlist\empty \else \@cflb \fi
718 }

719 \def \@cflt{%
720   \let \@elt \@comflelt
721   \setbox\@tempboxa \vbox{}%
722   \@toplist
723   \setbox\@outputbox \vbox{%
724     \boxmaxdepth \maxdepth
725     \unvbox\@tempboxa
726     \vskip -\floatsep
727     \topfigrule
728     \vskip \textfloatsep
729     \unvbox\@outputbox

```

```

730          }%
731      \let\@elt\relax
732      \xdef\@freelist{\@freelist\@toplist}%
733      \global\let\@toplist\@empty
734  }

735 \def \@cflb {%
736     \let\@elt\@comflelt
737     \setbox\@tempboxa \vbox{}%
738     \@botlist
739     \setbox\@outputbox \vbox{%
740         \unvbox\@outputbox
741         \vskip \textfloatsep
742         \botfigrule
743         \unvbox\@tempboxa
744         \vskip -\floatsep
745     }%
746     \let\@elt\relax
747     \xdef\@freelist{\@freelist\@botlist}%
748     \global \let \@botlist\@empty
749 }

```

(End definition for `\@combinefloats`, `\@cflt`, and `\@cflb`.)

```

\@comflelt
\@comdblfllelt 750 \def\@comflelt#1{\setbox\@tempboxa
751     \vbox{\unvbox\@tempboxa\box #1\vskip\floatsep}}
\@combinedblfloats 752 \def\@comdblfllelt#1{\setbox\@tempboxa
753     \vbox{\unvbox\@tempboxa\box #1\vskip\dblfloatsep}%
754 \def \@combinedblfloats{%
755     \ifx \@dbltoplist \@empty
756     \else
757         \setbox\@tempboxa \vbox{}%
758         \let \@elt \@comdblfllelt
759         \@dbltoplist
760         \let \@elt \relax
761         \xdef \@freelist {\@freelist\@dbltoplist}%
762         \global\let \@dbltoplist \@empty
763         \setbox\@outputbox \vbox to\textheight

```

The setting of `\boxmaxdepth` here has no effect since the `\@outputbox` should already have depth zero. Even so, it would have no effect on the layout of the page.

```

764     {\% \boxmaxdepth \maxdepth %% probably not needed, CAR
765     \unvbox\@tempboxa\vskip-\dblfloatsep

```

Here we need different typesetting if the top float comes from `\@topnewpage`.

```

766     \ifnum \@dbltopnum>\m@ne
767         \dblfigrule
768     \fi
769     \vskip \dbltextfloatsep

```

If pdf links are present in the galley and those links get broken across pages they have to end up being on the same level of boxing (even if not actually in the same structure) due to some engine restrictions in pdfTeX and LuaTeX. We therefore unbox `\@outputbox`

here (which only contains a single `\hbox`) so that this case has the same boxing level as a normal twocolumn page without top floats.

```

770      \unvbox\@outputbox
771      }%
772      \fi
773  }
774  </2ekernel>

```

(End definition for `\@comfleft`, `\@comdblleft`, and `\@combinedblfloats`.)

`\@startcolumn` `\@startdblcolumn` We could combine (most of) these two into `\@startcol <list>`. Note that `\@xstartcol` was only used once (i.e. in `\@startcolumn`); it has therefore been removed. This is not quite as efficient but it now has the same structure as `\@startdblcolumn`.

The empty-list test has been moved to `\@tryfcolumn`.

```

775  /*2ekernel | fltrace)
776  \def \@startcolumn {%
777    \global \@colroom \@colht
778    \@tryfcolumn \@deferlist
779    \if@fcolmade
780    (*trace)
781      \fl@trace{PAGE: float \if@twocolumn column \else page \fi
782                  completed}%
783  }/trace)
784  \else
785    \begingroup
786      \let \reserved@b \@deferlist
787      \global \let \@deferlist \@empty
788      \let \@elt \cscoelt
789      \reserved@b
790    \endgroup
791  \fi
792 }

```

This one does not need to set `\@colht`.

```

793  </2ekernel | fltrace>
794  <|latexrelease | fltrace>\IncludeInRelease{2015/01/01}%
795  <|latexrelease | fltrace>  {\@startdblcolumn}{float order in 2-column}%
796  /*2ekernel | latexrelease | fltrace)
797  \def \@startdblcolumn {%
798    \@tryfcolumn \@deferlist
799    \if@fcolmade
800    <fltrace>   \fl@trace{PAGE: double float page completed}%
801    \else
802      \begingroup
803        \let \reserved@b \@deferlist
804        \global \let \@deferlist \@empty
805        \let \@elt \csdblcoelt
806        \reserved@b
807      \endgroup
808    \fi
809  }%
810  </2ekernel | latexrelease | fltrace>
811  <|latexrelease | fltrace>\EndIncludeInRelease

```

```

812 〈latexrelease | fltrace〉\IncludeInRelease{0000/00/00}%
813 〈latexrelease | fltrace〉  {\@startdblcolumn}{float order in 2-column}%
814 〈latexrelease | fltrace〉\def \@startdblcolumn {%

```

Not needed since this always comes after \@outputpage:

```

815 〈latexrelease | fltrace〉% \global \colht \textheight
816 〈latexrelease | fltrace〉  \@tryfc \dbldeferlist
817 〈latexrelease | fltrace〉  \if@fcolmade
818 〈*trace〉
819 〈latexrelease | fltrace〉      \fl@trace{PAGE: double float page completed}%
820 〈/trace〉
821 〈latexrelease | fltrace〉  \else
822 〈latexrelease | fltrace〉      \begingroup
823 〈latexrelease | fltrace〉      \let \reserved@b \dbldeferlist
824 〈latexrelease | fltrace〉      \global \let \dbldeferlist \empty
825 〈latexrelease | fltrace〉      \let \elt \sdblcolelt
826 〈latexrelease | fltrace〉      \reserved@b
827 〈latexrelease | fltrace〉      \endgroup
828 〈latexrelease | fltrace〉  \fi
829 〈latexrelease | fltrace〉}%
830 〈latexrelease | fltrace〉\EndIncludeInRelease
831 〈*2ekernel | fltrace〉

```

(End definition for \@startcolumn and \@startdblcolumn.)

\@tryfc Now tests if its list is empty before any further exertion.

```

832 \def \@tryfc #1{%
833   \global \fcolmadefalse
834   \ifx #1\empty
835   \else
836 〈*trace〉
837   \fl@trace{PAGE: try float \if@twocolumn column/page\else page\fi
838             ---\string #1}%
839   \fl@trace{---- \string #1: #1}%
840 〈/trace〉
841   \xdef\trylist{#1}%
842   \global \let \failedlist \empty
843   \begingroup
844     \let \elt \tryfc \trylist
845   \endgroup
846   \if@fcolmade
847     \vtryfc #1%
848   \fi
849   \fi
850 }
851 〈/2ekernel | fltrace〉

```

(End definition for \@tryfc.)

```
852 〈*2ekernel〉
```

\@scolelt

```
853 \def \@scolelt#1{\def \currbox{#1}\addtonextcol}
```

(End definition for \@scolelt.)

```
\@sdblcolelt
854 \def\@sdblcolelt#1{\def\@currbox{#1}\@addtoblcol}
(End definition for \@sdblcolelt.)
```

```
\@vtryfc
855 \def\@vtryfc #1{%
856   \global\setbox\@outputbox\vbox{}%
857   \let\@elt\@wtryfc
858   \@flsucceed
859   \global\setbox\@outputbox \vbox to\@colht{%
860     \vskip \@fptop
861     \vskip -\@fpsep
862     \unvbox \@outputbox
863     \vskip \@fpbot}%
864   \let\@elt\relax
865   \xdef #1{\@failedlist\@flfail}%
866   \xdef\@freelist{\@freelist\@flsucceed}}
```

(End definition for \@vtryfc.)

```
\@wtryfc
867 \def\@wtryfc #1{%
868   \global\setbox\@outputbox\vbox{%
869     \unvbox\@outputbox
870     \vskip\@fpsep
871     \box #1}}
```

(End definition for \@wtryfc.)

```
\@xtryfc
872 </2ekernel>
873 <|latexrelease|\IncludeInRelease{2015/01/01}{\@xtryfc}%
874 <|latexrelease>                                {float order in 2-column}%
875 <*2ekernel | latexrelease>
876 \def\@xtryfc #1{%
877   \next\reserved@a\@trylist{}{}%
878   \currtype \count #1%
879   \divide\currtype\@xxxii
880   \multiply\currtype\@xxxii
881   \bitor \currtype \@failedlist
882   \testfp #1%
883   \testwidth #1%
884   \ifdim \ht #1>\@colht
885     \testtrue
886   \fi
887   \if@test
888     \cons\@failedlist #1%
889   \else
890     \xtryfc #1%
891   \fi}%
892 </2ekernel | latexrelease>
```

```

893 〈\latexrelease〉\EndIncludeInRelease
894 〈\latexrelease〉\IncludeInRelease{0000/00/00}{\@xtryfc}%
895 〈\latexrelease〉                                     {float order in 2-column}%
896 〈\latexrelease〉\def\@xtryfc #1{%
897 〈\latexrelease〉  \cnext\reserved@a\@trylist{}{}%
898 〈\latexrelease〉  \currtype \count #1%
899 〈\latexrelease〉  \divide\currtype\@xxxii
900 〈\latexrelease〉  \multiply\currtype\@xxxii
901 〈\latexrelease〉  \bitor \currtype \@failedlist
902 〈\latexrelease〉  \@testfp #1%
903 〈\latexrelease〉  \ifdim \ht #1>\@colht
904 〈\latexrelease〉    \@testtrue
905 〈\latexrelease〉  \fi
906 〈\latexrelease〉  \if@test
907 〈\latexrelease〉    \cons\@failedlist #1%
908 〈\latexrelease〉  \else
909 〈\latexrelease〉    \@ytryfc #1%
910 〈\latexrelease〉  \fi}%
911 〈\latexrelease〉\EndIncludeInRelease
912 {*2ekernel}

```

(End definition for \@xtryfc.)

```
\@ytryfc
913 \def\@ytryfc #1{%
914  \begingroup
915   \gdef\@flsucceed{\@elt #1}%
916   \global\let\@flfail\empty
917   \tempdima\ht #1%
918   \let\@elt\@ztryfc
919   \@trylist
920   \ifdim \tempdima >\fpmin
921     \global\fcolmadetrue
922   \else
923     \cons\@failedlist #1%
924   \fi
925   \endgroup
926   \if\fcolmade
927     \let\@elt\@gobble
928   \fi}

```

(End definition for \@ytryfc.)

```
\@ztryfc
929 〈/2ekernel〉
930 〈\latexrelease〉\IncludeInRelease{2015/01/01}{\@ztryfc}%
931 〈\latexrelease〉                                     {float order in 2-column}%
932 {*2ekernel | \latexrelease}
933 \def\@ztryfc #1{%
934   \tempcnta\count #1%
935   \divide\tempcnta\@xxxii
936   \multiply\tempcnta\@xxxii
937   \bitor \tempcnta {\@failedlist \@flfail}%
938   \testfp #1%

```

```

not in fixfloats?

939  \@test{wrongwidth}{#1%}
940  \tempdimb\tempdima
941  \advance\tempdimb\ht #1%
942  \advance\tempdimb\fpsep
943  \ifdim \tempdimb >\colht
944    \test{true}
945  \fi
946  \if@test
947    \cons{\flfail}{#1%}
948  \else
949    \cons{\flsucceed}{#1%}
950  \tempdima\tempdimb
951  \fi}%
952 {/2ekernel | latexrelease}
953 \EndIncludeInRelease
954 \IncludeInRelease{0000/00/00}{\ztryfc}%
955 \EndIncludeInRelease
956 \def{\ztryfc}{#1}{%
957   \tempcpta \count{#1}
958   \divide{\tempcpta}{\xxxii}
959   \multiply{\tempcpta}{\xxxii}
960   \bitor{\tempcpta}{\@failedlist}{\flfail}%
961   \test{fp}{#1}
962   \tempdimb\tempdima
963   \advance\tempdimb\ht{#1}
964   \advance\tempdimb\fpsep
965   \ifdim \tempdimb >\colht
966     \test{true}
967   \fi
968   \if@test
969     \cons{\flfail}{#1%}
970   \else
971     \cons{\flsucceed}{#1%}
972   \tempdima\tempdimb
973   \fi}%
974 \EndIncludeInRelease

```

(End definition for \ztryfc.)

The major changes for float suppression and the changes to the float mechanism to make it conform to the documentation are in these next macros.

\@addtobot Lots of changes.

```

975 {/2ekernel | ftrace}
976 \def{\addtobot}{%
977   {*trace}
978   \ftrace{***Start addtobot}%
979   {/trace}
980   \getfpsbit{4}\relax
981   {*trace}
982   \ftrace{fpstype \ifodd \tempcpta OK \else not \fi bot:
983           \the \fpstype}%
984   {/trace}

```

```

985   \ifodd \@tempcnta
986     \@flsetnum \@botnum
987     \ifnum \@botnum>\z@
988       \atempswafalse
989       \@flcheckspace \@botroom \@botlist
990     \if@tempswa

```

This next line means that this page is produced with box 255 having depth zero, rather than the normal maxdepth: is this needed, useful?

```

991           \global \maxdepth \z@
992           \@flupdates \@botnum \@botroom \@botlist
993   (*trace)
994     \@fl@trace{colroom (after-bot) = \the \@colroom}%
995     \@fl@trace{colnum (after-bot) = \the \@colnum}%
996     \@fl@trace{botnum (after-bot) = \the \@botnum}%
997     \@fl@trace{***Success: bot}%
998   (/trace)
999     \@inserttrue
1000   \fi
1001   (*trace)
1002     \else
1003       \@fl@trace{Fail: botnum = \the \@botnum:
1004                     fpstype \the \@fpstype=ORD?}%
1005       \ifnum \@fpstype<\sixt@n
1006         \@fl@trace{ERROR: !b float not successful (addtobot)}%
1007       \fi
1008   (/trace)
1009   \fi
1010   \fi
1011 }

```

(End definition for \@addtobot.)

\@addtotoporbot Lots of changes.

```

1012 \def \@addtotoporbot {%
1013   (*trace)
1014     \@fl@trace{***Start addtotoporbot}%
1015   (/trace)
1016     \@getfpsbit \tw@
1017   (*trace)
1018     \@fl@trace{fpstype \ifodd \@tempcnta OK \else not \fi top:
1019                           \the \@fpstype}%
1020   (/trace)
1021     \ifodd \@tempcnta
1022       \@flsetnum \@topnum
1023       \ifnum \@topnum>\z@
1024         \atempswafalse
1025         \@flcheckspace \@toproom \@toplist
1026       \if@tempswa
1027         \@bitor\@currtype{\@midlist\@botlist}%
1028   (*trace)
1029     \@fl@trace{(mid+bot)list: \@midlist, \@botlist:
1030                           (addtotoporbot-before)}%
1031   (/trace)

```

```

1032           \if@test
1033   {*trace}
1034     \fl@trace{type already on list: mid or bot---sent to addtobot}%
1035   
```

`1036 \else
1037 \@flupdates \@topnum \@toproom \@topl
1038 {*trace}
1039 \fl@trace{colroom (after-top) = \the \@colroom}%
1040 \fl@trace{colnum (after-top) = \the \@colnum}%
1041 \fl@trace{topnum (after-top) = \the \@topnum}%
1042 \fl@trace{***Success: top}%
1043`
`1044 \@inserttrue
1045 \fi
1046 \fi
1047 {*trace}
1048 \else
1049 \fl@trace{Fail: topnum = \the \@topnum: fpstype
1050 \the \@fpstype=ORD?}%
1051 \ifnum \@fpstype<\sixt@n
1052 \fl@trace{ERROR: !t float not successful (addtotoporbot)}%
1053 \fi
1054`
`1055 \fi
1056 \fi
1057 \if@insert
1058 \else
1059 {*trace}
1060 \fl@trace{sent to addtobot (addtotoporbot)}%
1061`
`1062 \@addtobot
1063 \fi
1064 }
1065`

(End definition for \@addtotoporbot.)

\@addtocurcol Lots of changes.

```

1066 <| latexrelease | filtrace | flafter> \IncludeInRelease{2015/01/01}%
1067 <| latexrelease | filtrace | flafter> {\@addtocurcol}{float order in 2-column}%
1068 {*2ekernel | latexrelease | filtrace | flafter}
1069 \def \@addtocurcol {%
1070   {*trace}
1071     \fl@trace{***Start addtocurcol}%
1072   

1073     \@insertfalse
1074     \@setfloattypecounts
1075     \ifnum \@fpstype=8
1076   {*trace}
1077     \fl@trace{fpstype !p only (addtocurcol): \the \@fpstype = 8?}%
1078   

1079     \else
1080       \ifnum \@fpstype=24
1081   {*trace}

```

```

1082      \fl@trace{fpstype p only (addtocurcol): \the \fpstype = 24?}%
1083  
```

```
</trace>
```

```
\else
```

```
\@fsettextmin
```

This is a new adjustment which is quite a major change in functionality; but it implements the documentation. Note that \reqcolroom will include the whole of the page-so-far, and hence includes \textfloatsheight of floats, so before comparing it with \textmin, we add this to \textmin also.

```

1086  (*trace)
1087      \fl@trace{textfloatsheight (before) = \the \textfloatsheight}%
1088  
```

```
</trace>
```

```
\advance \textmin \textfloatsheight
```

```
1089
```

```
\reqcolroom \pageht
```

```
1090
```

This line must be removed since \specialoutput changed.

```

1091 %           \advance \reqcolroom \pagedp
1092 (*trace)
1093     \fl@trace{textmin + textfloatsheight: \the \textmin}%
1094     \fl@trace{page-so-far: \the \reqcolroom}%
1095 
```

```
</trace>
```

```
\ifdim \textmin > \reqcolroom
```

```
\reqcolroom \textmin
```

```
(*trace)
```

```
\fl@trace{ORD? textmin being used}%
```

```
</trace>
```

```
\fi
```

```
\advance \reqcolroom \ht\currbox
```

```
(*trace)
```

```
\fl@trace{float size = \the \ht \currbox (addtocurcol)}%
```

```
\fl@trace{colroom = \the \colroom (addtocurcol)}%
```

```
\fl@trace{reqcolroom = \the \reqcolroom (addtocurcol)}%
```

```
</trace>
```

```
\ifdim \colroom > \reqcolroom
```

```
\@fsetnum \colnum
```

```
1110
```

```
\ifnum \colnum > \z@
```

```
1111
```

```
\@bitor \currtype \deferlist
```

We need to defer the float also if its width doesn't fit.

```

1112          \testwrongwidth\currbox
1113  
```

```
(*trace)
```

```
\fl@trace{deferlist: \deferlist: (addtocurcol-before)}%
```

```
</trace>
```

```
\if@test
```

```
(*trace)
```

```
\fl@trace{type already on list: defer (addtocurcol)}%
```

```
</trace>
```

```
\else
```

```
\@bitor \currtype \botlist
```

```
(*trace)
```

```
\fl@trace{botlist: \botlist: (addtocurcol-before)}%
```

```
</trace>
```

```
\if@test
```

```
(*trace)
```

```

1127          \fl@trace{type already on list: bot---sent to addtobot}%
1128  </trace>
1129          \addtobot
1130  \else
1131  (*trace)
1132          \fl@trace{fpstype \ifodd \tempcnta OK \else not \fi
1133          here: \the \fpstype}%
1134  </trace>
1135          \ifodd \count\currbox
1136          \advance \reqcolroom \intextsep
1137          \ifdim \colroom>\reqcolroom
1138          \global \advance \colnum \mone
1139          \global \advance \textfloatsheight \ht\currbox

```

This may sometimes give an overestimate.

```

1140          \global \advance \textfloatsheight 2\intextsep
1141          \cons \midlist \currbox
1142  (*trace)
1143          \fl@trace{***Success: here}%
1144          \fl@trace{textfloatsheight (after-here) =
1145          \the \textfloatsheight}%
1146          \fl@trace{colnum (after-here) = \the \colnum}%
1147  </trace>

```

CHANGE TO \addtocurcol:
 $\penalty\z@$ changed to $\penalty\interlinepenalty$ so \samepage works properly with figure and table environments. (Changed 23 Oct 86)

There is also an $\addpenalty\interlinepenalty$ above.

Since in 2e \samepage is no longer supported, these could be removed.

Although it is best to use \advspace in case two h floats come together, this makes other spacing more difficult to adjust; whereas if a user specifies two h floats together then they can more easily get the spacing correct by ad hoc commands.

It is necessary to adjust for the addition of \parskip here in case the float is added between paragraphs (i.e. when in vertical mode).

If the nobreak switch is true we need to reset it and clear \everypar since the float may not reset the flag and cannot reset the \everypar globally.

Typesetting starts here (we are in vertical mode).

```

1148          \if@nobreak
1149          \nobreak
1150          \nobreakfalse
1151          \everypar{}%
1152  \else
1153          \addpenalty \interlinepenalty
1154  \fi
1155          \vskip \intextsep
1156          \box\currbox
1157          \penalty\interlinepenalty
1158          \vskip\intextsep
1159          \ifnum\outputpenalty <-@\Mi \vskip -\parskip\fi

```

Typesetting ends here.

```

1160          \outputpenalty \z@
1161          \inserttrue
1162  (*trace)

```

```

1163           \else
1164             \fl@trace{Fail---no room at 2nd test of colroom
1165               (addtocorcol \string\intextsep)}%
1166   
```

`</trace>`

```

1167           \fi
1168   
```

`\fi`

```

1169   
```

`\if@insert`

```

1170           \else

```

Next set of docstrip guards are a bit weird, essentially `\@addtotoporbot` ends up inside the kernel and the `fltrace` package and `\@addtobot` shows up in the `flafter` package. Guess that could have been done a bit more obvious :-)

```

1171  {*2ekernel | fltrace | latexrelease}
1172  {*trace}
1173   
```

`</trace>`

```

1174           \fl@trace{not here: sent to addtotoporbot}%
1175   
```

`\@addtotoporbot`

```

1176  
```

`/2ekernel | fltrace | latexrelease`

```

1177  {*}!2ekernel&!fltrace&!latexrelease}
1178  
```

`*trace`

```

1179           \fl@trace{not here: sent to addtobot}%
1180  
```

`</trace>`

```

1181           \@addtobot
1182  
```

`/!2ekernel&!fltrace&!latexrelease}
1183`
`\fi`

```

1184   
```

`\fi`

```

1185   
```

`\fi`

```

1186  
```

`*trace`

```

1187           \else
1188             \fl@trace{Fail: colnum = \the \colnum:
1189               fpstype \the \fpstype=ORD?}%
1190             \ifnum \fpstype<\sixt@n
1191               \fl@trace{ERROR: BANG float not successful (addtocurcol)}%
1192             \fi
1193  
```

`</trace>`

```

1194           \fi
1195  
```

`*trace`

```

1196           \else
1197             \fl@trace{Fail---no room: fl box ht: \the \ht \currbox
1198               (addtocurcol)}%
1199  
```

`</trace>`

```

1200           \fi
1201           \fi
1202           \fi
1203           \if@insert
1204             \else
1205               \resetfps
1206  
```

`*trace`

```

1207             \fl@trace{put on deferlist (addtocurcol)}%
1208  
```

`</trace>`

```

1209             \cons\@deferlist\currbox
1210  
```

`*trace`

```

1211             \fl@trace{deferlist: \@deferlist: (addtocurcol-after)}%
1212  
```

`</trace>`

```

1213     \fi
1214 }%
1215 </2ekernel | latexrelease | fltrace | flafter>
1216 <latexrelease | fltrace | flafter>\EndIncludeInRelease
1217 <latexrelease | fltrace | flafter>\IncludeInRelease{0000/00/00}%
1218 <latexrelease | fltrace | flafter> {\@addtocurcol}{float order in 2-column}%
1219 <latexrelease | fltrace | flafter>\def \@addtocurcol {%
1220 {*trace}
1221 <latexrelease | fltrace | flafter> \fl@trace{***Start addtocurcol}%
1222 </trace>
1223 <latexrelease | fltrace | flafter> \Qinsertfalse
1224 <latexrelease | fltrace | flafter> \Qsetfloattypecounts
1225 <latexrelease | fltrace | flafter> \ifnum \Qfpstype=8
1226 {*trace}
1227 <latexrelease | fltrace | flafter> \fl@trace{fpstype !p only (addtocurcol):
1228 <latexrelease | fltrace | flafter> \the \Qfpstype = 8?}%
1229 </trace>
1230 <latexrelease | fltrace | flafter> \else
1231 <latexrelease | fltrace | flafter> \ifnum \Qfpstype=24
1232 {*trace}
1233 <latexrelease | fltrace | flafter> \fl@trace{fpstype p only (addtocurcol):
1234 <latexrelease | fltrace | flafter> \the \Qfpstype = 24?}%
1235 </trace>
1236 <latexrelease | fltrace | flafter> \else
1237 <latexrelease | fltrace | flafter> \Qflsettextmin

```

This is a new adjustment which is quite a major change in functionality; but it implements the documentation. Note that \reqcolroom will include the whole of the page-so-far, and hence includes \textfloatsheight of floats, so before comparing it with \textmin, we add this to \textmin also.

```

1238 {*trace}
1239 <latexrelease | fltrace | flafter> \fl@trace{textfloatsheight (before) =
1240 <latexrelease | fltrace | flafter> \the \textfloatsheight}%
1241 </trace>
1242 <latexrelease | fltrace | flafter> \advance \textmin \textfloatsheight
1243 <latexrelease | fltrace | flafter> \reqcolroom \pageht

```

This line must be removed since \specialoutput changed.

```

1244 \% \advance \reqcolroom \pagedp
1245 {*trace}
1246 <latexrelease | fltrace | flafter> \fl@trace{textmin + textfloatsheight:
1247 <latexrelease | fltrace | flafter> \the \textmin}%
1248 <latexrelease | fltrace | flafter> \fl@trace{page-so-far: \the \reqcolroom}%
1249 <latexrelease | fltrace | flafter>
1250 </trace>
1251 <latexrelease | fltrace | flafter>
1252 <latexrelease | fltrace | flafter>
1253 {*trace}
1254 <latexrelease | fltrace | flafter> \ifdim \textmin>\reqcolroom
1255 </trace> \reqcolroom \textmin
1256 <latexrelease | fltrace | flafter> \fl@trace{ORD? textmin being used}%
1257 <latexrelease | fltrace | flafter> \fi
1258 {*trace}
1259 <latexrelease | fltrace | flafter> \advance \reqcolroom \ht\currbox
1260 <latexrelease | fltrace | flafter> \fl@trace{float size =
\the \ht \currbox (addtocurcol)}%

```

```

1261 <{latexrelease | fltrace | flafter}>
1262 <{latexrelease | fltrace | flafter}>
1263 <{latexrelease | fltrace | flafter}>
1264 <{latexrelease | fltrace | flafter}>
1265 </trace>
1266 <{latexrelease | fltrace | flafter}>
1267 <{latexrelease | fltrace | flafter}>
1268 <{latexrelease | fltrace | flafter}>
1269 <{latexrelease | fltrace | flafter}>
1270 <{*trace}>
1271 <{latexrelease | fltrace | flafter}>
1272 <{latexrelease | fltrace | flafter}>
1273 </trace>
1274 <{latexrelease | fltrace | flafter}>
1275 <{*trace}>
1276 <{latexrelease | fltrace | flafter}>
1277 <{latexrelease | fltrace | flafter}>
1278 </trace>
1279 <{latexrelease | fltrace | flafter}>
1280 <{latexrelease | fltrace | flafter}>
1281 <{*trace}>
1282 <{latexrelease | fltrace | flafter}>
1283 <{latexrelease | fltrace | flafter}>
1284 </trace>
1285 <{latexrelease | fltrace | flafter}>
1286 <{*trace}>
1287 <{latexrelease | fltrace | flafter}>
1288 <{latexrelease | fltrace | flafter}>
1289 </trace>
1290 <{latexrelease | fltrace | flafter}>
1291 <{latexrelease | fltrace | flafter}>
1292 <{*trace}>
1293 <{latexrelease | fltrace | flafter}>
1294 <{latexrelease | fltrace | flafter}>
1295 <{latexrelease | fltrace | flafter}>
1296 </trace>
1297 <{latexrelease | fltrace | flafter}>
1298 <{latexrelease | fltrace | flafter}>
1299 <{latexrelease | fltrace | flafter}>
1300 <{latexrelease | fltrace | flafter}>
1301 <{latexrelease | fltrace | flafter}>
1302 <{latexrelease | fltrace | flafter}>
1303 <{latexrelease | fltrace | flafter}>
1304 <{latexrelease | fltrace | flafter}>
1305 <{latexrelease | fltrace | flafter}>
1306 <{*trace}>
1307 <{latexrelease | fltrace | flafter}>
1308 <{latexrelease | fltrace | flafter}>
1309 <{latexrelease | fltrace | flafter}>
1310 <{latexrelease | fltrace | flafter}>
1311 <{latexrelease | fltrace | flafter}>
1312 <{latexrelease | fltrace | flafter}>
1313 </trace>

This may sometimes give an overestimate.

1303 <{latexrelease | fltrace | flafter}>
1304 <{latexrelease | fltrace | flafter}>
1305 <{latexrelease | fltrace | flafter}>
1306 <{*trace}>
1307 <{latexrelease | fltrace | flafter}>
1308 <{latexrelease | fltrace | flafter}>
1309 <{latexrelease | fltrace | flafter}>
1310 <{latexrelease | fltrace | flafter}>
1311 <{latexrelease | fltrace | flafter}>
1312 <{latexrelease | fltrace | flafter}>
1313 </trace>

\fl@trace{colroom =
              \the \colroom (addtocurcol)}%
\fl@trace{reqcolroom =
              \the \reqcolroom (addtocurcol)}%
\ifdim \colroom>\reqcolroom
  \f@setnum \colnum
  \ifnum \colnum>\z@
    \b@itor\currtype\deferlist
  \fi
\else
  \b@itor\currtype\botlist
\fi
\if@test
  \fl@trace{type already on list:
            defer (addtocurcol)}%
\else
  \b@itor\currtype\botlist
\fi
\if@test
  \fl@trace{type already on list:
            bot---sent to addtobot}%
\else
  \addtobot
\fi
\ifodd \tempcnta OK \else not \fi
here: \the \fpstype}%
\ifodd \count\currbox
  \advance \reqcolroom \intextsep
  \ifdim \colroom>\reqcolroom
    \global \advance \colnum \ne
    \global \advance
      \textfloatsheight\ht\currbox
  \fi
\global \advance
  \textfloatsheight 2\intextsep
  \cons \midlist \currbox
\fl@trace{***Success: here}%
\fl@trace{textfloatsheight
          (after-here) =
          \the \textfloatsheight}%
\fl@trace{colnum (after-here) =
          \the \colnum}%

```

CHANGE TO \addtocurcol:
\penalty\z@ changed to \penalty\interlinepenalty so \samepage works properly with figure and table environments. (Changed 23 Oct 86)

There is also an \addpenalty\interlinepenalty above.

Since in 2e \samepage is no longer supported, these could be removed.

Although it is best to use \addvspace in case two h floats come together, this makes other spacing more difficult to adjust; whereas if a user specifies two h floats together then they can more easily get the spacing correct by ad hoc commands.

It is necessary to adjust for the addition of \parskip here in case the float is added between paragraphs (i.e. when in vertical mode).

If the nobreak switch is true we need to reset it and clear \everypar since the float may not reset the flag and cannot reset the \everypar globally.

Typesetting starts here (we are in vertical mode).

```

1314 <(latexrelease | fltrace | flafter>           \if@nobreak
1315 <(latexrelease | fltrace | flafter>           \nobreak
1316 <(latexrelease | fltrace | flafter>           \nobreakfalse
1317 <(latexrelease | fltrace | flafter>           \everypar{}%
1318 <(latexrelease | fltrace | flafter>           \else
1319 <(latexrelease | fltrace | flafter>           \addpenalty\interlinepenalty
1320 <(latexrelease | fltrace | flafter>           \fi
1321 <(latexrelease | fltrace | flafter>           \vskip \intextsep
1322 <(latexrelease | fltrace | flafter>           \box@\currbox
1323 <(latexrelease | fltrace | flafter>           \penalty\interlinepenalty
1324 <(latexrelease | fltrace | flafter>           \vskip\intextsep
1325 <(latexrelease | fltrace | flafter>           \ifnum\outputpenalty
1326 <(latexrelease | fltrace | flafter>           <- \OMii \vskip
1327 <(latexrelease | fltrace | flafter>           -\parskip\fi

```

Typesetting ends here.

```

1328 <(latexrelease | fltrace | flafter>           \outputpenalty \z@
1329 <(latexrelease | fltrace | flafter>           \@inserttrue
1330 <*trace>
1331 <(latexrelease | fltrace | flafter>           \else
1332 <(latexrelease | fltrace | flafter>           \fl@trace{Fail---no room at 2nd test of colroom
1333 <(latexrelease | fltrace | flafter>           (addtocorcol \string\intextsep)}%
1334 </trace>
1335 <(latexrelease | fltrace | flafter>           \fi
1336 <(latexrelease | fltrace | flafter>           \fi
1337 <(latexrelease | fltrace | flafter>           \if@insert
1338 <(latexrelease | fltrace | flafter>           \else

```

Next set of docstrip guards are a bit weird, essentially \addtotoporbot ends up inside the kernel and the fltrace package and \addtotoporbot shows up in the flafter package. Guess that could have been done a bit more obvious :-)

```

1339 <*2ekernel | fltrace>
1340 <*trace>
1341 <(latexrelease | fltrace | flafter>           \fl@trace{not here: sent to addtotoporbot}%
1342 </trace>
1343 <(latexrelease | fltrace | flafter>           \addtotoporbot
1344 </2ekernel | fltrace>
1345 <!*2ekernel&!autoload&!fltrace>
1346 <*trace>
1347 <(latexrelease | fltrace | flafter>           \fl@trace{not here: sent to addtobot}%

```

```

1348  </trace>
1349  <|latexrelease | fltrace | flafter>           \@addtobot
1350  <|!2ekernel&!autoload&!fltrace>
1351  <|latexrelease | fltrace | flafter>           \fi
1352  <|latexrelease | fltrace | flafter>           \fi
1353  <|latexrelease | fltrace | flafter>           \fi
1354  <|*trace>
1355  <|latexrelease | fltrace | flafter>           \else
1356  <|latexrelease | fltrace | flafter>           \fl@trace{Fail: colnum = \the \@colnum:
1357  <|latexrelease | fltrace | flafter>           fpstype \the \@fpstype=ORD?}%
1358  <|latexrelease | fltrace | flafter>           \ifnum \@fpstype<\sixt@on
1359  <|latexrelease | fltrace | flafter>           \fl@trace{ERROR: BANG float not successful
1360  <|latexrelease | fltrace | flafter>           (addtocurcol)}%
1361  <|latexrelease | fltrace | flafter>           \fi
1362  </trace>
1363  <|latexrelease | fltrace | flafter>           \fi
1364  <|*trace>
1365  <|latexrelease | fltrace | flafter>           \else
1366  <|latexrelease | fltrace | flafter>           \fl@trace{Fail---no room: fl box ht:
1367  <|latexrelease | fltrace | flafter>           \the \ht \currbox (addtocurcol)}%
1368  </trace>
1369  <|latexrelease | fltrace | flafter>           \fi
1370  <|latexrelease | fltrace | flafter>           \fi
1371  <|latexrelease | fltrace | flafter>           \fi
1372  <|latexrelease | fltrace | flafter>           \if@insert
1373  <|latexrelease | fltrace | flafter>           \else
1374  <|latexrelease | fltrace | flafter>           \resethfps
1375  <|*trace>
1376  <|latexrelease | fltrace | flafter>           \fl@trace{put on deferlist (addtocurcol)}%
1377  </trace>
1378  <|latexrelease | fltrace | flafter>           \@cons\@deferlist\currbox
1379  <|*trace>
1380  <|latexrelease | fltrace | flafter>           \fl@trace{deferlist: \@deferlist:
1381  <|latexrelease | fltrace | flafter>           (addtocurcol-after)}%
1382  </trace>
1383  <|latexrelease | fltrace | flafter>           \fi
1384  <|latexrelease | fltrace | flafter>           }%
1385  <|latexrelease | fltrace | flafter>\EndIncludeInRelease

```

(End definition for \@addtocurcol.)

\@addtonextcol Lots of changes.

```

1386  <|latexrelease | fltrace>\IncludeInRelease{2015/01/01}
1387  <|latexrelease | fltrace>  {\@addtonextcol}{float order in 2-column}%
1388  <|*2ekernel | latexrelease | fltrace>
1389  \def\@addtonextcol{%
1390    \begingroup
1391    <|*trace>
1392    \fl@trace{***Start addtonextcol}%
1393  </trace>
1394    \insertfalse
1395    \setfloattypecounts
1396    \ifnum \@fpstype=8
1397    <|*trace>

```

```

1398      \f1@trace{fpstype not curcol: \the \@fpstype = 8?}%
1399  
```

`1400 \else
1401 \ifnum \@fpstype=24
1402`
`1403 \f1@trace{fpstype not curcol: \the \@fpstype = 24?}%
1404`
`1405 \else
1406 \o@f1settextmin
1407`
`1408 \f1@trace{text-so-far: Opt (top of col)}%
1409`
`1410 \o@reqcolroom \ht\@currbox
1411`
`1412 \f1@trace{float size: \the \o@reqcolroom (addtonextcol)}%
1413`
`1414 \advance \o@reqcolroom \o@textmin
1415`
`1416 \f1@trace{colroom = \the \o@colroom (addtonextcol)}%
1417 \f1@trace{reqcolroom = \the \o@reqcolroom (addtonextcol)}%
1418`
`1419 \ifdim \o@colroom>\o@reqcolroom
1420 \o@f1setnum \o@colnum
1421 \ifnum\o@colnum>\z@
1422 \o@bito\o@currtype\o@deferlist
1423`
`1424 \f1@trace{deferlist: \o@deferlist: (addtonextcol-before)}%
1425`
`1426 \o@testwidth\o@currbox
1427`
`1428 \if@test
1429 \f1@trace{type already on list: defer (addtonextcol)}%
1430`
`1431 \else
1432`
`1433 \f1@trace{sent to addtotoporbot (addtonextcol)}%
1434`
`1435 \o@addtotoporbot
1436 \fi
1437 \fi
1438`
`1439 \else
1440 \f1@trace{Fail---no room: fl box ht: \the \ht \o@currbox
1441 (addtonextcol)}%
1442`
`1443 \fi
1444 \fi
1445 \fi
1446 \if@insert
1447 \else
1448`
`1449 \f1@trace{put back on deferlist (addtonextcol)}%
1450`

```

1451      \@cons\@deferlist\@currbox
1452  <*trace>
1453      \fl@trace{deferlist: \@deferlist: (addtonextcol-after)}%
1454  </trace>
1455  \fi
1456  <*trace>
1457      \fl@trace{End of addtonextcol -- locally counts:}%
1458      \fl@trace{col: \the\@colnum. top: \the \@topnum. bot: \the \@botnum.}%
1459  </trace>
1460  \endgroup
1461  <*trace>
1462  \fl@trace{End of addtonextcol -- globally counts:}%
1463  \fl@trace{col: \the\@colnum. top: \the \@topnum. bot: \the \@botnum.}%
1464  </trace>
1465 }%
1466 </2ekernel | latexrelease | fltrace>
1467 <latexrelease | fltrace>\EndIncludeInRelease
1468 <latexrelease | fltrace>\IncludeInRelease{0000/00/00}%
1469 <latexrelease | fltrace> {\@addtonextcol}{float order in 2-column}%
1470 <latexrelease | fltrace>\def\@addtonextcol{%
1471 <latexrelease | fltrace> \begingroup
1472 <*trace>
1473 <latexrelease | fltrace> \fl@trace{***Start addtonextcol}%
1474 </trace>
1475 <latexrelease | fltrace> \@insertfalse
1476 <latexrelease | fltrace> \@setfloattypecounts
1477 <latexrelease | fltrace> \ifnum \fpstype=8
1478 <*trace>
1479 <latexrelease | fltrace> \fl@trace{fpstype not curcol:
1480 <latexrelease | fltrace> \the \fpstype = 8?}%
1481 </trace>
1482 <latexrelease | fltrace> \else
1483 <latexrelease | fltrace> \ifnum \fpstype=24
1484 <*trace>
1485 <latexrelease | fltrace> \fl@trace{fpstype not curcol:
1486 <latexrelease | fltrace> \the \fpstype = 24?}%
1487 </trace>
1488 <latexrelease | fltrace> \else
1489 <latexrelease | fltrace> \fsettextmin
1490 <*trace>
1491 <latexrelease | fltrace> \fl@trace{text-so-far: Opt (top of col)}%
1492 </trace>
1493 <latexrelease | fltrace> \reqcolroom \ht\currbox
1494 <*trace>
1495 <latexrelease | fltrace> \fl@trace{float size:
1496 <latexrelease | fltrace> \the \reqcolroom (addtonextcol)}%
1497 <latexrelease | fltrace>
1498 </trace>
1499 <latexrelease | fltrace> \advance \reqcolroom \textmin
1500 <*trace>
1501 <latexrelease | fltrace> \fl@trace{colroom =
1502 <latexrelease | fltrace> \the \colroom (addtonextcol)}%
1503 <latexrelease | fltrace> \fl@trace{reqcolroom =
1504 <latexrelease | fltrace> \the \reqcolroom (addtonextcol)}%

```

```

1505  </trace>
1506  <|latexrelease | fltrace>      \ifdim \@colroom>\@reqcolroom
1507  <|latexrelease | fltrace>      \@flsetnum \@colnum
1508  <|latexrelease | fltrace>      \ifnum\@colnum>\z@
1509  <|latexrelease | fltrace>      \@bitor\@currtype\@deferlist
1510  <*trace>                      \fl@trace{deferlist: \@deferlist:
1511  <|latexrelease | fltrace>      (addtonextcol-before)}%
1512  <|latexrelease | fltrace>
1513  </trace>
1514  <|latexrelease | fltrace>
1515  <*trace>
1516  <|latexrelease | fltrace>
1517  <|latexrelease | fltrace>
1518  </trace>
1519  <|latexrelease | fltrace>
1520  <*trace>
1521  <|latexrelease | fltrace>
1522  <|latexrelease | fltrace>
1523  </trace>
1524  <|latexrelease | fltrace>
1525  <|latexrelease | fltrace>
1526  <|latexrelease | fltrace>
1527  <*trace>
1528  <|latexrelease | fltrace>
1529  <|latexrelease | fltrace>
1530  <|latexrelease | fltrace>
1531  </trace>
1532  <|latexrelease | fltrace>
1533  <|latexrelease | fltrace>
1534  <|latexrelease | fltrace>
1535  <|latexrelease | fltrace>
1536  <|latexrelease | fltrace>
1537  <*trace>
1538  <|latexrelease | fltrace>
1539  <|latexrelease | fltrace>
1540  </trace>
1541  <|latexrelease | fltrace>
1542  <*trace>
1543  <|latexrelease | fltrace>
1544  <|latexrelease | fltrace>
1545  </trace>
1546  <|latexrelease | fltrace> \fi
1547  <*trace>
1548  <|latexrelease | fltrace> \fl@trace{End of addtonextcol --
1549  <|latexrelease | fltrace>          locally counts:}%
1550  <|latexrelease | fltrace> \fl@trace{col: \the \@colnum.
1551  <|latexrelease | fltrace>          top: \the \@topnum. bot: \the \@botnum.}%
1552  </trace>
1553  <|latexrelease | fltrace> \endgroup
1554  <*trace>
1555  <|latexrelease | fltrace> \fl@trace{End of addtonextcol --
1556  <|latexrelease | fltrace>          globally counts:}%
1557  <|latexrelease | fltrace> \fl@trace{col: \the \@colnum.
1558  <|latexrelease | fltrace>          top: \the \@topnum. bot: \the \@botnum.}%

```

```

1559  </trace>
1560  <|latexrelease | fltrace>}%
1561  <|latexrelease | fltrace>\EndIncludeInRelease

(End definition for \@addtonextcol.)
```

\@addtobdblcol Lots of changes.

```

1562  <|latexrelease | fltrace>\IncludeInRelease{2015/01/01}%
1563  <|latexrelease | fltrace>  {\@addtobdblcol}{float order in 2-column}%
1564  <*2ekernel | latexrelease | fltrace>
1565  \def\@addtobdblcol{%
1566    \begingroup
1567    (*trace)
1568    \fl@trace{***Start addtobdblcol}%
1569  </trace>
1570  \atinsertfalse
1571  \setfloattypecounts
1572  \getfpsbit \tw@
1573  (*trace)
1574  \fl@trace{fpstype \ifodd \tempcnta OK \else not \fi dbltop:
1575                                \the \fpstype}%
1576  </trace>
1577  \ifodd\tempcnta
1578    \flsetnum \dbltopnum
1579    \ifnum \dbltopnum>\z@
1580      \tempswafalse
1581      \ifdim \dbltoproom>\ht\currbox
1582        \tempswatrue
1583  (*trace)
1584    \fl@trace{Space OK: \dbltoproom =
1585                \the \dbltoproom > \the \ht \currbox
1586                (\dbltoproom)}%
1587  </trace>
1588  \else
1589  (*trace)
1590  \fl@trace{fpstype: \the \fpstype (addtobdblcol)}%
1591  </trace>
1592  \ifnum \fpstype<\sixt@n
1593  (*trace)
1594    \fl@trace{BANG float ignoring \dbltoproom}%
1595    \fl@trace{\spaces \dbltoproom = \the \dbltoproom.
1596                Ht float: \the \ht \currbox-BANG}%
1597  </trace>
```

Need to check that there is room on the page, using the local value of \textmin to make the necessary adjustment to \dbltoproom.

```

1598  \advance \dbltoproom \textmin
1599  (*trace)
1600    \fl@trace{Local value of texmin: \the\textmin}%
1601    \fl@trace{\spaces space on page = \the \dbltoproom.
1602                Ht float: \the \ht \currbox-BANG}%
1603  </trace>
1604    \ifdim \dbltoproom>\ht\currbox
1605      \tempswatrue
```

```

1606  {*trace}
1607      \fl@trace{Space OK BANG: space on page =
1608          \the \dbltoproom > \the \ht \currbox}%
1609  \else
1610      \fl@trace{fpstype: \the \fpstype}%
1611      \fl@trace{Fail---no room dbltoproom-BANG?:}%
1612      \fl@trace{\spaces space on page = \the \dbltoproom.
1613          Ht float: \the \ht \currbox}%
1614  {/trace}
1615      \fi
1616      \advance \dbltoproom -\textmin
1617  {*trace}
1618  \else
1619      \fl@trace{fpstype: \the \fpstype}%
1620      \fl@trace{Fail---no room dbltoproom-ORD?:}%
1621      \fl@trace{\spaces \dbltoproom = \the \dbltoproom.
1622          Ht float: \the \ht \currbox}%
1623  {/trace}
1624      \fi
1625      \fi
1626      \if@tempswa
1627          \bitor \currtype \deferlist
1628  {*trace}
1629      \fl@trace{(dbl)deferlist: \deferlist: (before)}%
1630  {/trace}
not in fixfloats?
1631          \testwrongwidth\currbox
1632          \if@test
1633  {*trace}
1634      \fl@trace{type already on list: (dbl)defer}%
1635  {/trace}
1636  \else
1637      \tempdima -\ht\currbox
1638      \advance\tempdima
1639      -\ifx \dbltoplist\empty \dbltextfloatsep \else
1640          \dblfloatsep \fi
1641      \global \advance \dbltoproom \tempdima
1642      \global \advance \colht \tempdima
1643      \global \advance \dbltopnum \m@ne
1644      \cons \dbltoplist \currbox
1645  {*trace}
1646      \fl@trace{dbltopnum (after) = \the \dbltopnum}%
1647      \fl@trace{***Success: dbltop}%
1648  {/trace}
1649          \inserttrue
1650          \fi
1651          \fi
1652  {*trace}
1653  \else
1654      \fl@trace{Fail: dbltopnum = \the \dbltopnum: fpstype
1655          \the \fpstype=ORD?}%
1656      \ifnum \fpstype<\sixteen
1657          \fl@trace{ERROR: !t float not successful (addtoblcol)}%

```

```

1658          \fi
1659  </trace>
1660          \fi
1661          \fi
1662          \if@insert
1663          \else
1664  {*trace}
1665          \fl@trace{put on deferlist}%
1666 </trace>
1667          \@cons\@deferlist\@currbox
1668 {*trace}
1669          \fl@trace{(dbl)deferlist: \@deferlist: (after)}%
1670 </trace>
1671          \fi
1672 {*trace}
1673          \fl@trace{End of addtobtblcol -- locally count:}%
1674          \fl@trace{ dbltop: \the \dbltopnum.}%
1675 </trace>
1676          \endgroup
1677 {*trace}
1678          \fl@trace{End of addtobtblcol -- globally count:}%
1679          \fl@trace{dbltop: \the \dbltopnum.}%
1680 </trace>
1681 }%
1682 </2ekernel | latexrelease | fltrace>
1683 <latexrelease | fltrace>\EndIncludeInRelease
1684 <latexrelease | fltrace>\IncludeInRelease[0000/00/00]%
1685 <latexrelease | fltrace> {\@addtobtblcol}{float order in 2-column}%
1686 <latexrelease | fltrace>\def\@addtobtblcol{%
1687 <latexrelease | fltrace> \begingroup
1688 {*trace}
1689 <latexrelease | fltrace> \fl@trace{***Start addtobtblcol}%
1690 </trace>
1691 <latexrelease | fltrace> \insertfalse
1692 <latexrelease | fltrace> \setfloattypecounts
1693 <latexrelease | fltrace> \getfpsbit \tw@
1694 {*trace}
1695 <latexrelease | fltrace> \fl@trace{fpstype \ifodd \tempcnta OK
1696 <latexrelease | fltrace> \else not \fi dbltop: \the \fpstype}%
1697 </trace>
1698 <latexrelease | fltrace> \ifodd\tempcnta
1699 <latexrelease | fltrace> \flsetnum \dbltopnum
1700 <latexrelease | fltrace> \ifnum \dbltopnum>z@
1701 <latexrelease | fltrace> \tempswafalse
1702 <latexrelease | fltrace> \ifdim \dbltoproom>\ht\currbox
1703 <latexrelease | fltrace> \tempswatrue
1704 {*trace}
1705 <latexrelease | fltrace> \fl@trace{Space OK: \dbltoproom =
1706 <latexrelease | fltrace> \the \dbltoproom > \the \ht \currbox
1707 <latexrelease | fltrace> (dbltoproom)}%
1708 </trace>
1709 <latexrelease | fltrace> \else
1710 {*trace}
1711 <latexrelease | fltrace> \fl@trace{fpstype: \the \fpstype (addtobtblcol)}%

```

```

1712  </trace>
1713  <latexrelease | fltrace>           \ifnum \@fpstype<\sixt@n
1714  <*trace>
1715  <latexrelease | fltrace>           \fl@trace{BANG float ignoring \@dbltoproom}%
1716  <latexrelease | fltrace>           \fl@trace{\@spaces \@dbltoproom =
1717  <latexrelease | fltrace>           \the \@dbltoproom.
1718  <latexrelease | fltrace>           Ht float: \the \ht \currbox-BANG}%
1719  </trace>

```

Need to check that there is room on the page, using the local value of \textmin to make the necessary adjustment to \@dbltoproom.

```

1720  <latexrelease | fltrace>           \advance \@dbltoproom \textmin
1721  <*trace>
1722  <latexrelease | fltrace>           \fl@trace{Local value of texmin: \the\textmin}%
1723  <latexrelease | fltrace>           \fl@trace{\@spaces space on page =
1724  <latexrelease | fltrace>           \the \@dbltoproom.
1725  <latexrelease | fltrace>           Ht float: \the \ht \currbox-BANG}%
1726  </trace>
1727  <latexrelease | fltrace>
1728  <latexrelease | fltrace>
1729  <*trace>
1730  <latexrelease | fltrace>
1731  <latexrelease | fltrace>
1732  <latexrelease | fltrace>
1733  <latexrelease | fltrace>
1734  <latexrelease | fltrace>
1735  <latexrelease | fltrace>
1736  <latexrelease | fltrace>
1737  <latexrelease | fltrace>
1738  </trace>
1739  <latexrelease | fltrace>
1740  <latexrelease | fltrace>
1741  <*trace>
1742  <latexrelease | fltrace>
1743  <latexrelease | fltrace>
1744  <latexrelease | fltrace>
1745  <latexrelease | fltrace>
1746  <latexrelease | fltrace>
1747  <latexrelease | fltrace>
1748  </trace>
1749  <latexrelease | fltrace>
1750  <latexrelease | fltrace>
1751  <latexrelease | fltrace>
1752  <latexrelease | fltrace>
1753  <*trace>
1754  <latexrelease | fltrace>
1755  <latexrelease | fltrace>
1756  </trace>
1757  <latexrelease | fltrace>
1758  <*trace>
1759  <latexrelease | fltrace>
1760  </trace>
1761  <latexrelease | fltrace>
1762  <latexrelease | fltrace>

```

```

\ifdim \@dbltoproom>\ht\currbox
\@tempswatrue
\fl@trace{Space OK BANG: space on page =
\the\@dbltoproom > \the\ht\currbox}%
\else
\fl@trace{fpstype: \the \@fpstype}%
\fl@trace{Fail---no room dbltoproom-BANG?:}%
\fl@trace{\@spaces space on page =
\the \@dbltoproom.
Ht float: \the \ht \currbox}%
\fi
\advance \@dbltoproom -\textmin
\else
\fl@trace{fpstype: \the \@fpstype}%
\fl@trace{Fail---no room dbltoproom-ORD?:}%
\fl@trace{\@spaces \@dbltoproom =
\the \@dbltoproom.
Ht float: \the \ht \currbox}%
\fi
\@if@tempswa
\@bitor \currtype \@dbldeferlist
\fl@trace{dbldeferlist:
@dbldeferlist: (before)}%
\@if@test
\fl@trace{type already on list: dbldefer}%
\else
\@tempdima -\ht\currbox

```

```

1763  ⟨latexrelease | fltrace⟩          \advance\@tempdima
1764  ⟨latexrelease | fltrace⟩          -\ifx \@dbltoplist\@empty
1765  ⟨latexrelease | fltrace⟩          \dbltextfloatsep
1766  ⟨latexrelease | fltrace⟩          \else \dblfloatsep \fi
1767  ⟨latexrelease | fltrace⟩          \global \advance \@dbltoproom \@tempdima
1768  ⟨latexrelease | fltrace⟩          \global \advance \@colht \@tempdima
1769  ⟨latexrelease | fltrace⟩          \global \advance \@dbltopnum \m@ne
1770  ⟨latexrelease | fltrace⟩          \@cons \@dbltoplist \currbox
1771  ⟨*trace⟩
1772  ⟨latexrelease | fltrace⟩          \fl@trace{dbltopnum (after) =
1773  ⟨latexrelease | fltrace⟩          \the \@dbltopnum}%
1774  ⟨latexrelease | fltrace⟩          \fl@trace{***Success: dbltop}%
1775  ⟨/trace⟩
1776  ⟨latexrelease | fltrace⟩          \@inserttrue
1777  ⟨latexrelease | fltrace⟩          \fi
1778  ⟨latexrelease | fltrace⟩          \fi
1779  ⟨*trace⟩
1780  ⟨latexrelease | fltrace⟩          \else
1781  ⟨latexrelease | fltrace⟩          \fl@trace{Fail: dbltopnum = \the \@dbltopnum:
1782  ⟨latexrelease | fltrace⟩          fpstype \the \@fpstype=ORD?}%
1783  ⟨latexrelease | fltrace⟩          \ifnum \@fpstype<\sixt@n
1784  ⟨latexrelease | fltrace⟩          \fl@trace{ERROR: !t float not successful
1785  ⟨latexrelease | fltrace⟩          (addtodblcol)}%
1786  ⟨latexrelease | fltrace⟩          \fi
1787  ⟨/trace⟩
1788  ⟨latexrelease | fltrace⟩          \fi
1789  ⟨latexrelease | fltrace⟩          \fi
1790  ⟨latexrelease | fltrace⟩          \if@insert
1791  ⟨latexrelease | fltrace⟩          \else
1792  ⟨*trace⟩
1793  ⟨latexrelease | fltrace⟩          \fl@trace{put on dbldeferlist}%
1794  ⟨/trace⟩
1795  ⟨latexrelease | fltrace⟩          \@cons\@dbldeferlist\currbox
1796  ⟨*trace⟩
1797  ⟨latexrelease | fltrace⟩          \fl@trace{dbldeferlist: \@dbldeferlist: (after)}%
1798  ⟨/trace⟩
1799  ⟨latexrelease | fltrace⟩          \fi
1800  ⟨*trace⟩
1801  ⟨latexrelease | fltrace⟩          \fl@trace{End of addtodbcol -- locally count:}%
1802  ⟨latexrelease | fltrace⟩          \fl@trace{ dbltop: \the \@dbltopnum.}%
1803  ⟨/trace⟩
1804  ⟨latexrelease | fltrace⟩          \endgroup
1805  ⟨*trace⟩
1806  ⟨latexrelease | fltrace⟩          \fl@trace{End of addtodbcol -- globally count:}%
1807  ⟨latexrelease | fltrace⟩          \fl@trace{dbltop: \the \@dbltopnum.}%
1808  ⟨/trace⟩
1809  ⟨latexrelease | fltrace⟩}%
1810  ⟨latexrelease | fltrace⟩\EndIncludeInRelease

(End definition for \@addtodbcol.)

```

\@addmarginpar

```

1811  ⟨*2ekernel⟩
1812  \def\@addmarginpar{\@next\@marbox\@currlist{\@cons\@freelist\@marbox

```

```

1813     \@cons\@freelist\@currbox}\@latexbug\@tempcnta\@ne
1814     \if@twocolumn
1815         \if@firstcolumn \@tempcnta\m@ne \fi
1816     \else
1817         \if@mparswitch
1818             \ifodd\c@page \else\@tempcnta\m@ne \fi
1819         \fi
1820         \if@reversemargin \@tempcnta -\@tempcnta \fi
1821     \fi
1822     \ifnum\@tempcnta <\z@ \global\setbox\@marbox\box\@currbox \fi
1823     \global\@tempdima\@mparbottom
1824     \advance\@tempdima -\@pageht
1825     \advance\@tempdima\ht\@marbox
1826     \ifdim\@tempdima >\z@
1827         \@latex@warning@no@line {Marginpar on page \thepage\space moved}%
1828     \else
1829         \global\@tempdima\z@
1830     \fi
1831     \global\@mparbottom\@pageht
1832     \global\advance\@mparbottom\@tempdima
1833     \global\advance\@mparbottom\dp\@marbox
1834     \global\advance\@mparbottom\marginparpush
1835     \advance\@tempdima -\ht\@marbox

```

Putting box movement inside the ‘marbox’:

```

1836     \global\setbox\@marbox
1837         \vbox {\vskip\@tempdima
1838             \box\@marbox}%
1839     \global\ht\@marbox\z@
1840     \global\dp\@marbox\z@

```

Sticking (rather than gluing:-) the ‘marbox’ to the line above, changed vskip to kern:

```

1841     \kern -\@pagedp
1842     \nointerlineskip
1843     \hb@xt@\columnwidth
1844         {\ifnum\@tempcnta >\z@
1845             \hskip\columnwidth \hskip\marginparsep
1846         \else
1847             \hskip -\marginparsep \hskip -\marginparwidth
1848         \fi
1849         \box\@marbox\hss}%

```

For this reason the following code can vanish:

```

\nobreak          %% No longer needed.  CAR92/12
\vskip -\@tempdima %% No longer needed.  CAR92/12
1850   \nointerlineskip
1851   \hbox{\vrule\height\z@ \width\z@ \depth\@pagedp}}

```

(End definition for \@addmarginpar.)

1.1.1 Kludgeins

This part of the file is part of the implementation of the following two new commands for L^AT_EX2e.

```
\enlargethispage{<dim>}
```

Adds `<dim>` to the height of the current column only. On the printed page the bottom of this column is extended downwards by exactly `<dim>` without having any effect on the placement of the footer; this may result in an overprinting.

```
\enlargethispage*{<dim>}
```

Similar to `\enlargethispage` but it tries to squeeze the column to be printed in as small a space as possible, ie it uses any shrinkability in the column. If the column was not explicitly broken (e.g. with `\pagebreak`) this may result in an overfull box message but except for this it will come out as expected (if you know what to expect).

The star form of this command is dedicated to Leslie Lamport, the other we need for ourselves (FMi, CAR).

These commands may well have unwanted effects if used soon before a `\clearpage`: please give them clear of such places.

`\@kludgeins` The insert which makes TeX do a lot of the necessary work. All we need to put into it is the amount by which the pagegoal should be changed.

```
1852 \newinsert \@kludgeins  
1853 \global\dimen\@kludgeins \maxdimen  
1854 \global\count\@kludgeins 1000
```

(End definition for `\@kludgeins`.)

`\enlargethispage` The user command.

```
1855 \gdef \enlargethispage {  
1856     \@ifstar  
1857         {}%  
1858     {  
1859         \f@trace{Enlarging page height * }%  
1860     }/  
1861         \enlargepage{\hbox{\kern\p@}}}%  
1862     {}%  
1863     {  
1864         \f@trace{Enlarging page height exactly---}}%  
1865     }/  
1866         \enlargepage\empty%  
1867 }
```

(End definition for `\enlargethispage` and `\enlargethispage*`.)

`\@enlargepage` This actually inserts the insert, after checking for extreme values of the change.

```
1868 \gdef\@enlargepage#1#2{  
1869     {  
1870         \f@trace{@spaces@spaces by #2}}%  
1871     }/  
1872         \tempskipa#2\relax  
1873         \ifdim \tempskipa>.5\maxdimen  
1874             \o@texerr{Suggested space extra space height space  
1875                 (\the\tempskipa) space dangerously space  
1876                 large}\@eha  
1877     \else  
1878         \ifdim \vsize<.5\maxdimen
```

```

1879  {*trace}
1880      \fl@trace {Kludgeins added--pagegoal before: \the\pagegoal}%
1881  
```

```

1882      \@bsphack
1883          \insert\@kludgeins{\#1\vskip-\@tempskipa}%
1884      \@esphack

```

This next bit is for tracing only:

```

1885  {*trace}
1886      \ifvmode \par
1887          \fl@trace {Kludgeins added--pagegoal after: \the \pagegoal}%
1888      \fi
1889  
```

```

1890      \else
1891          \@latexerr{Page\space height\space already\space
1892                      too\space large}\@eha
1893      \fi
1894  
```

```

1895 }
1896 
```

(End definition for \enlargepage.)

1.1.2 Float control

This part implements controllable floats and other changes to the float mechanism.

It provides, at the document level, the following command for inclusion in L^AT_EX2e.

\suppressfloats

This suppresses all further floats on the current page.

With an optional argument it suppresses only floats only in certain positions on the current page.

[**t**] suppresses only floats at the top of the page [**b**] suppresses only floats at the bottom of the page

It also enables the use of an extra specifier, !, in the location optional argument of a float. If this is present then, just for this particular float, whenever it is processed by the float mechanism the followinhg are ignored:

- all restrictions on the number of floats which can appear;
- all explicit restrictions on the amount of space which should (not) be occupied by floats and/or text.

The mechanism will still attempt to ensure that pages are not overfull.

These specifiers override, for the single float, the suppression commands described above.

In its current form, it also supplies a reasonably exhaustive, and somewhat baroque, means of tracing some aspects of the float mechanism.

More tracing.

\f@trace Set-up tracing for floats independent of other tracing as it produces mega-output. Default is no tracing.

```

\f@tracefloatoff
\tracefloats
\f@traceval
\f@tracefloatvals
\f@tracemessage
1897  {*ftrace}
1898  \def \f@tracemessage #1{\let\@elt\empty\typeout{LaTeXe: #1}}
1899  \def \tracefloats{\let \f@trace \f@tracemessage}
1900  \def \tracefloatoff {\let \f@trace \gobble}
1901  \tracefloatoff
1902  \def \f@traceval #1{\f@trace{\string #1 = \the #1}}
1903  \IncludeInRelease{2015/01/01}{\tracefloatvals}%
1904          {trace float vals}%
1905  \def \tracefloatvals{%

```

As \@dblfloatplacement sets \f@depth it needs to be run inside a group, otherwise the float placement will test for the wrong value.²⁸

```

1906  \begingroup
1907  \@dblfloatplacement
1908  \@floatplacement
1909  \f@trace{***Float placement parameters:}%
1910  \f@traceval\@colnum
1911  \f@traceval\@colroom
1912  \f@traceval\@topnum
1913  \f@traceval\@toproom
1914  \f@traceval\@botnum
1915  \f@traceval\@botroom
1916  \f@traceval\@fpmin
1917  \f@trace{\string\textrraction = \textfraction}%
1918  \f@traceval\@dbltopnum
1919  \f@traceval\@dbltoproom
1920  \f@trace{\string\textrraction = \textfraction}%
1921  \f@trace{toplist: \@toplist}%
1922  \f@trace{botlist: \@botlist}%
1923  \f@trace{midlist: \@midlist}%
1924  \f@trace{deferlist: \@deferlist}%
1925  \f@trace{dbltoplist: \@dbltoplist}%
1926  %FMi \f@trace{dbldeferlist: \@dbldeferlist}%
1927  \endgroup
1928 }
1929 \EndIncludeInRelease
1930 \IncludeInRelease{0000/00/00}{\tracefloatvals}%
1931          {trace float vals}%
1932 \def \tracefloatvals{%
1933  \begingroup
1934  \@dblfloatplacement
1935  \@floatplacement
1936  \f@trace{***Float placement parameters:}%
1937  \f@traceval\@colnum
1938  \f@traceval\@colroom
1939  \f@traceval\@topnum
1940  \f@traceval\@toproom
1941  \f@traceval\@botnum
1942  \f@traceval\@botroom
1943  \f@traceval\@fpmin

```

²⁸This is a somewhat questionable design.

```

1944 \f@trace{\string\textration = \textfraction}%
1945 \f@traceval@\dbltopnum
1946 \f@traceval@\dbltoproom
1947 \f@trace{\string\textration = \textfraction}%
1948 \f@trace{toplist: \@toplist}%
1949 \f@trace{botlist: \@botlist}%
1950 \f@trace{midlist: \@midlist}%
1951 \f@trace{deferlist: \@deferlist}%
1952 \f@trace{dbltoplist: \@dbltoplist}%
1953 % next line only in old releases
1954 \f@trace{dbldeferlist: \@dbldeferlist}%
1955 \endgroup
1956 }
1957 \EndIncludeInRelease

```

We need to make sure that `fltrace` comes before `flafter` to make the tracing work.

```

1958 \ifpackageloaded{flafter}
1959 { \PackageWarningNoLine
1960     {fltrace}{Load 'fltrace' before 'flafter'\MessageBreak
1961         Attempting to recover by reloading 'flafter'}%

```

Hide the fact that `flafter` was already loaded and then request it anew.

```

1962 \expandafter\let\csname ver@flafter.sty\endcsname\relax
1963 \def\reserved@a#1{%
1964     \expandafter\let\csname\string#1+flafter+IIR\endcsname\relax}%
1965 \reserved@a\@addtocurcol
1966 \reserved@a\@addtonextcol
1967 \RequirePackage{flafter}{}%
1968 
```

As the code for `flafter` will contain tracing calls so that it works in conjunction with `fltrace` we need to provide a dummy definition for `\f@trace` in that package.

```

1969 {*flafter}
1970 \providecommand\f@trace[1]{}
1971 
```

(End definition for `\f@trace` and others.)

`\suppressfloats` Float suppression commands: these set the relevant counter globally to zero. Thus they
`\@flstop` are overridden for a particular float by an ! specifier.

```

1972 {*2ekernel}
1973 \def \suppressfloats {%
1974     \ifnextchar [%
1975         \flstop
1976         {\global \colnum \z@}%
1977 }

```

Maybe this should be a loop over #1?

```

1978 \def \flstop [#1]{%
1979     \if t#1%
1980         \global \topnum \z@
1981     \fi
1982     \if b#1%
1983         \global \botnum \z@
1984     \fi
1985 }

```

(End definition for `\suppressfloats` and `\@flstop`.)

Manipulation of float placement and type; both their strings and the corresponding count registers.

`\@fpstype` First a new count register to go with `\currtype`.

`\@reqcolroom` Then a new skip register, for information needed to remove the `\maxsep` conservatism: it is possible that this could use a temporary register.

`\@textfloatsheight` Finally a dimension register to hold the total height of in-text floats on the current page. This is needed to implement a major change in the functionality of `\addtocurcol` which is, nevertheless, a bug fix. It is not local and therefore cannot be a temporary register.

```
1986 \newcount \@fpstype  
1987 \newdimen \@reqcolroom  
1988 \newdimen \@textfloatsheight  
1989 {/2ekernel}
```

(End definition for `\@fpstype`, `\@reqcolroom`, and `\@textfloatsheight`.)

`\@fpsadddefault` Adds the default placement to what is already there.

Should not need to change this, but could do it as follows:

```
def \@fpsadddefault {%
```

```
  \@temptokena \expandafter\expandafter\expandafter  
    {\csname fps@\@capttype \endcsname} %  
  \edef \reserved@a {\the\@temptokena} %  
  \onelevel@sanitize \reserved@a  
  \edef \@fps {\@fps\reserved@a} %
```



```
1990 {*2ekernel | fltrace}  
1991 \def \@fpsadddefault {%
```

```
1992 {*trace}  
1993   \fl@trace{fps changed from: \@fps} %  
1994 {/trace}  
1995   \edef \@fps {\@fps\csname fps@\@capttype \endcsname} %  
1996   \@latex@warning {%
```

```
1997     No positions in optional float specifier.\MessageBreak  
1998     Default added (so using '\@fps')} %  
1999 }
```

(End definition for `\@fpsadddefault`.)

`\@setfloattypecounts` Sets counters `\@fpstype` and `\currtype`.

BANG == bit4 of `\count\@currbox` = 0.

```
2000 \def \@setfloattypecounts {%
```

```
  \@currtype \count\@currbox  
  \@fpstype \count\@currbox  
  \divide\currtype\@xxxii \multiply\currtype\@xxxii  
  \advance \@fpstype -\currtype  
  {*trace}  
  \fl@trace{(mod 32) fpstype: \the \@fpstype} %  
  \fl@trace{(mult of 32) currtype: \the \@currtype} %  
  % Tracing only: but some should be changed into real errors/warnings?
```

```

2009  \ifnum \@fpstype<\sixt@n
2010    \ifnum \@fpstype=\z@
2011      \f@trace{ERROR: no PLACEMENT, fpstype = \the \@fpstype = 0?}%
2012    \fi
2013    \ifnum \@fpstype=\@ne
2014      \f@trace{WARNING: only h, fpstype = \the \@fpstype = 1?}%
2015    \fi
2016    \f@trace{BANG float}%
2017  \else
2018    \ifnum \@fpstype=\sixt@n
2019      \f@trace{ERROR: no PLACEMENT, fpstype = \the \@fpstype = 16?}%
2020    \fi
2021    \ifnum \@fpstype=17
2022      \f@trace{WARNING: only h, fpstype = \the \@fpstype = 17?}%
2023    \fi
2024    \f@trace{ORD float}%
2025  \fi
2026 
```

(End definition for `\@setfloattypecounts.`)

Macros for getting, testing and setting bits of the fps.

`\@getfpsbit` Sets `\@tempcnta` to required bit of `\count\@currbox`.

```

2029  {*2ekernel}
2030  \def \@getfpsbit {%
2031    \@boxfpsbit \@currbox
2032  }

```

(End definition for `\@getfpsbit.`)

`\@boxfpsbit` Used above.

```

2033  \def \@boxfpsbit #1#2{%
2034    \@tempcnta \count#1%
2035    \divide \@tempcnta #2\relax
2036  }

```

(End definition for `\@boxfpsbit.`)

`\@testfp` New definition of the float page test.

```

2037  \def \@testfp #1{%
2038    \@boxfpsbit #18\relax % Really '#1 8' for human readers!
2039    \ifodd \@tempcnta
2040    \else
2041      \@testtrue
2042    \fi
2043  }

```

(End definition for `\@testfp.`)

\@setfpsbit Sets required bit of \@tempcnta (to 1).

```
2044 \def \@setfpsbit #1{%
2045   \@tempcntb \@tempcnta
2046   \divide \@tempcntb #1\relax
2047   \ifodd \@tempcntb
2048     \else
2049       \advance \@tempcnta #1\relax
2050   \fi
2051 }
2052 </2ekernel>
```

(End definition for \@setfpsbit.)

\@resethfps Globally adds t as a possible location for an h or !h only placement: this must be done using the count.

Although it will leave \@fpstype set to 17 even if it was originally 1, this does not matter since it is the last thing in \@addtocurcol.

```
2053 <*2ekernel | ftrace>
2054 \def \@resethfps {%
2055   \let\reserved@a\empty
2056   \ifnum \@fpstype=\@ne
2057     \def \reserved@a {!}%
2058     \@fpstype 17
2059   \fi
2060   \ifnum \@fpstype=17
2061     \global \advance \count\@currbox \tw@
2062     \@latex@warning@no@line {%
2063       '\reserved@a h' float specifier changed to '\reserved@a ht'}%
2064   <*trace>
2065   \f@trace{%
2066     't' added to '\reserved@a h'- new Count: \the \count\@currbox}%
2067   </trace>
2068   \fi
2069 }
```

(End definition for \@resethfps.)

Special stuff for BANG floats.

\@flsetnum Ignores any zero float counter value in case BANG.

It uses a local assignment to the normally global counter: a bit naughty, perhaps?

These assignments are safe so long as the counter involved is only consulted once (i.e. only for the ‘bang float’) with the changed value. This is the case within \@addtocurcol because it is used only once within a call of the output routine (which forms a group).

For \@addtonextcol this is achieved by putting a group around its code; this is needed because it is called (by \@startcolumn) for each float which was on the deferlist. Almost identical considerations pertain to \@addtobblcol. There may be more efficient ways to handle this, but the group seems to be the simplest.

```
2070 \def \@flsetnum #1{%
2071   <*trace>
2072   \f@trace{fpstype: \the \fpstype (flsetnum \string#1)}%
2073   </trace>
2074   \ifnum \@fpstype<\sixt@n
```

```

2075      \ifnum #1=\z@
2076  {*trace}
2077      \f@trace{BANG float resetting \string#1 to 1}%
2078  {/trace}
2079      #1\@ne
2080      \fi
2081      \fi
2082  {*trace}
2083      \f@trace{\#1 (before) = \the #1}%
2084  {/trace}
2085 }

```

(End definition for \@flsetnum.)

\@flsettextmin This ignores \textfraction space restriction in case BANG.

```

2086 \def \@flsettextmin {%
2087  {*trace}
2088      \f@trace{fpstype: \the \@fpstype (flsettextmin)}%
2089  {/trace}
2090      \ifnum \@fpstype<\sixt@n
2091  {*trace}
2092      \f@trace{BANG ignoring textmin}%
2093  {/trace}
2094      \@textmin \z@
2095  \else
2096      \@textmin \textfraction\@colht
2097  {*trace}
2098      \f@trace{ORD textmin = \the \@textmin}%
2099  {/trace}
2100      \fi
2101 }

```

(End definition for \@flsettextmin.)

\@flcheckspace This ignores space restriction in case BANG; this is still slightly conservative since it does not allow for the fact that, if there is no text in the column then \textfloatsep is not needed. Sets @tempswa true if there is room for \currbox.

```

2102 \def \@flcheckspace #1#2{%
2103     \advance \reqcolroom
2104     \ifx #2\empty \textfloatsep \else \floatsep \fi
2105  {*trace}
2106     \f@trace{colroom = \the \@colroom
2107                 (flcheckspace \string#1 \string#2)}%
2108     \f@trace{reqcolroom = \the \@reqcolroom
2109                 (flcheckspace \string#1 \string#2)}%
2110  {/trace}
2111     \ifdim \@colroom>\reqcolroom
2112     \ifdim #1>\ht\currbox
2113         \tempswatru
2114  {*trace}
2115      \f@trace{Space OK: #1 = \the #1 > \the \ht \currbox
2116                  (flcheckspace \string#1 \string#2)}%
2117  {/trace}
2118     \else

```

```

2119  {*trace}
2120      \fl@trace{fpstype: \the \@fpstype
2121                      (flcheckspace \string#1 \string#2)}%
2122  
```

 $\langle /trace \rangle$

```

2123  \ifnum \@fpstype<\sixt@n
2124  
```

 $\langle *trace \rangle$

```

2125      \fl@trace{BANG float ignoring #1
2126                      (flcheckspace \string#1 \string#2):}%
2127      \fl@trace{\@spaces #1 = \the #1. Ht float: \the \ht \currbox
2128                      BANG}%
2129  
```

 $\langle /trace \rangle$

```

2130      \@tempswattrue
2131  
```

 $\langle *trace \rangle$

```

2132      \else
2133          \fl@trace{Fail---no room (flcheckspace \string#1 \string#2)
2134                      (fpstype \the \@fpstype=ORD?):}%
2135          \fl@trace{\@spaces #1 = \the #1. Ht float: \the \ht \currbox
2136                      ORD?}%
2137  
```

 $\langle /trace \rangle$

```

2138      \fi
2139      \fi
2140  
```

 $\langle *trace \rangle$

```

2141      \else
2142          \fl@trace{Fail---no room at 2nd test of colroom
2143                      (flcheckspace \string#1 \string#2)}%
2144  
```

 $\langle /trace \rangle$

```

2145      \fi
2146  }
2147  
 $\langle /2ekernel | fltrace \rangle$ 

(End definition for \@flcheckspace.)

```

\@flupdates This updates everything when a float is placed.

```

2148  {*2ekernel}
2149  \def \@flupdates #1#2#3{%
2150      \global \advance #1\m@ne
2151      \global \advance \@colnum \m@ne
2152      \@tempdima -\ht\currbox
2153      \advance \@tempdima
2154          -\ifx #3\empty \textfloatsep \else \floatsep \fi
2155      \global \advance #2\@tempdima
2156      \global \advance \@colroom \@tempdima
2157      \@cons #3\currbox
2158  }
2159  
 $\langle /2ekernel \rangle$ 

(End definition for \@flupdates.)

```

Interesting facts about float mechanisms past and present, together with a summary of various features, some unresolved:

1. The value `\textfraction` does not affect the processing of doublecol floats: this seems sensible, but should be documented.
2. `\twocolumn` floatplacement was wrong: dbl not needed, ord needed.

3. `\@floatplacement` was not called after `\@startdblcol` or `\@topnewpage`. This has been changed; it is clearly a bug fix.
4. The use `\@topnewpage` when `\dblfigrule` is non-trivial produced a rule in the wrong place. This has been fixed by not using `\dblfigrule` when processing the ‘float’ from `\@topnewpage`.
5. If the specifier was just `h` and the float could not be put here, it went on the deferlist and stayed there until a clearpage. It now gets changed to a ‘`th`’: this is only an error-recovery action, putting just `h` or `!h` should be deprecated.
6. `\@dblmaxsep` was ‘the maximum of `\dblfloatsep` and `\dbltextfloatsep`’. But it was never used! Now gone completely, like `\@maxsep`.
7. After an `h` float is put on a page, it was counted as text when applying the `\textfraction` test; this is possibly too big a change although it is a bug fix?
8. Two consecutive `h` floats are separated by twice `\intextsep`: this could be changed to one by use of `\addvspace`, OK? Note that it would also mean that less space is put in if an `h` float immediately follows other spaces. This is also possibly too big a change, at least for compatibility mode? Or it may be simply wrong! It has not been changed.
9. Now `\@addtocurcol` checks first for just `p` `fps`. I think that this is an increase in efficiency, but maybe the coding should be made even more efficient.
10. `\@tryfcolumn` now tests if the list is empty first, otherwise lots of wasted time! Thus this test has been removed from `\@startcolumn`. As Frank pointed out, this makes `\@startcolumn` less efficient. But it is now the same as `\@startdblcolumn`: I can see no reason why they should be different, but which is best?
11. Why is `\@colroom` set in `\@doclearpage`?
12. Footnotes. Check what `\clearpage` does when footnotes are left over. Footnotes are not put on float pages and, also, `\@addtonextcol` ignores the existence of held-over footnotes in deciding what floats can go on the page. Not changed.
13. `\clearpage` can still lose non-boxes, at least when floats are involved. It also moves some to the ‘wrong page’, but this may be a coding problem.
14. The `!` option makes it necessary to check in `\output` that there is enough room left on the page after adding a float. (This would have been necessary anyway if anyone set `\@textmin` too close to zero! A similar danger existed also if the text in a `\twocolumn[text]` entity gets too large.) The current implementation of this also makes the normal case a little less efficient, OK? Not enough room means, at present, less than `\baselineskip`, with a warning: is this OK? Should it be made generic (another parameter)?
15. There are four possibilities for supporting this:

`\twocolumn[\maketitle more text]`

One is to change `\maketitle` slightly to allow this. Another is to change `\@topnewpage` so that more than one `\twocolumn[]` command is allowed; in this case `\maketitle\twocolumn[more text]` will work. The former is more robust

from the user's viewpoint, but makes the code for `\maketitle` rather ad hoc (maybe it is already?). Another is to misuse the global `twocolumn` flag locally within `\@topnewpage`. Yet another is to move the column count register from the `multicol` package into the kernel. This has been done.

16. Where should the reinserts be put to maximise the probability that footnotes come out on the correct page? Or should we go for as much compatibility as possible (but see next item)?
17. Should we continue to support (as much as possible) `\samepage`? Some of its intended functionality is now advertised as being provided by `\enlargethispage`. Use of either is likely to result in wrongly placed footnotes, marginals, etc. Which should have priority: obeying the pagination instructions, or correct placement of notes/marginalia?
18. Is the adjustment of space to cause shrinking in the kludge-* case correct? Should it be limited to 0pt?
19. Is the setting of `\boxmaxdepth` in `makecol` and friends needed? It only has any effect if `\@textbottom` ends with a box or rule, in which case the vskip to allow for its depth should also be added. If it is kept, it should probably be the last thing in the box. It has now been removed.
It would perhaps be better to document that `\@textbottom` and `\@texttop` must have natural height 0pt.
20. I cannot see why the vskip adjustment for the depth is needed if `boxmaxdepth` is used to ensure that there is never a too deep box.
21. The value of `\boxmaxdepth` should be explicitly set whenever necessary: it is too risky to assume that it has any particular value. Care is needed in deciding what to set it to.
It is interesting to note that the value of `\boxmaxdepth` is unique in being read before the local settings for the box group are reset; all other parameter settings which affect the box construction use their values outside the box group.
22. Should `\@maxdepth` store the setting of `\maxdepth` from `lplain`? Or should we provide a proper interface to class files for setting these?

An analysis of various other macros.

`\@opcol` should do `\@floatplacement`, but where? Right at the end, since it always occurs at the start of a column.

```
\def\@opcol{%
% Why is this done first?
\global \c@mparbottom \z@
\if@twocolumn
  \c@outputdblcol
\else
  \c@outputpage
% This is not needed since it is done at the end of
% |\c@outputpage|:
  \global \c@colht \textheight
\fi}
```

Only tracing has been added to these.

```
2160 <{latexrelease | fltrace}>\IncludeInRelease{2017/01/01}%
2161 <{latexrelease | fltrace}> {\@makefcolumn}{negative height floats}%
2162 <{*2ekernel | fltrace | latexrelease}%
2163 \def\@makefcolumn #1{%
2164   \begingroup
2165     \c@fpmin -\maxdimen
2166     \let \c@testfp \c@gobble
2167     \c@tryfcolumn #1%
2168   \endgroup
2169   {*trace}
2170   \if@fcolmade
2171     \fl@trace{PAGE: in \string\clearpage
2172               \if@twocolumn ---twocolumn\fi---}%
2173     \fl@trace{----- float column/page completed from \string#1}%
2174   \fi
2175   </trace>
2176 }
2177 <{latexrelease | fltrace}>\EndIncludeInRelease
2178 <{latexrelease | fltrace}>\IncludeInRelease{0000/00/00}%
2179 <{latexrelease | fltrace}> {\@makefcolumn}{negative height floats}%
2180 <{latexrelease | fltrace}>\def\@makefcolumn #1{%
2181   <{latexrelease | fltrace}> \begingroup
2182     \c@fpmin \z@
2183     \let \c@testfp \c@gobble
2184     \c@tryfcolumn #1%
2185   <{latexrelease | fltrace}> \endgroup
2186   {*trace}
2187   <{latexrelease | fltrace}> \if@fcolmade
2188   <{latexrelease | fltrace}>   \fl@trace{PAGE: in \string\clearpage
2189   <{latexrelease | fltrace}>               \if@twocolumn ---twocolumn\fi---}%
2190   <{latexrelease | fltrace}>   \fl@trace{----- float column/page completed
2191   <{latexrelease | fltrace}>               from \string#1}%
2192   <{latexrelease | fltrace}> \fi
2193   </trace>
2194   <{latexrelease | fltrace}>
2195   <{latexrelease | fltrace}>\EndIncludeInRelease
2196   <{/2ekernel | fltrace | latexrelease}>
```

This will line up the last baselines in the two columns provided they are constructed in the normal way: i.e. ending in a skip of minus the original depth, with `\c@textbottom` adding nothing.

Thus again it is essential for `\c@textbottom` to have depth 0pt.

```
2197 <{latexrelease | fltrace}>\IncludeInRelease{2015/01/01}%
2198 <{latexrelease | fltrace}> {\@outputdblcol}{2 column marks}%
2199 <{*2ekernel | fltrace | latexrelease}%

```

This is just a change to the single command `\c@outputdblcol` so that it saves mark information for the first column and restores it in the second column.

```
2200 \def\@outputdblcol{%
2201   \if@firstcolumn
2202     \global\@firstcolumnfalse

```

Save the left column

```
2203 \global\setbox\@leftcolumn\copy\@outputbox
2204 <ftrace> \f1@trace{PAGE: first column boxed}%
```

Remember the marks from the first column

```
2205 \splitmaxdepth\maxdimen
2206 \vbadness\maxdimen
```

In case of `\enlargeithispage` we will have infinite negative glue at the bottom of the page (coming from `\vss`) and that will earn us an error message if we `\vsplit` to get at the marks. So we need to remove the last glue (if any) at the end of `\@outputbox` as we are only interested in marks that change doesn't matter.

```
2207 \setbox\@outputbox\vbox{\unvbox\@outputbox\unskip}%
2208 \setbox\@outputbox\vsplit\@outputbox to\maxdimen
```

One minor difference from the current `fixmarks` package, pass the marks through a token register to stop any # tokens causing an error in a `\def`.

```
2209 \toks@\expandafter{\topmark}%
2210 \xdef\@firstcoltopmark{\the\toks@}%
2211 \toks@\expandafter{\splitfirstmark}%
2212 \xdef\@firstcolfirstmark{\the\toks@}%
```

This test does not work if truly empty marks have been inserted, but L^AT_EX marks should always have (at least) two brace groups. (Except before the first mark is used, when the marks are empty, but that is OK here.)

```
2213 \ifx\@firstcolfirstmark\empty
2214   \global\let\@setmarks\relax
2215 \else
2216   \gdef\@setmarks{%
2217     \let\firstmark\@firstcolfirstmark
2218     \let\topmark\@firstcoltopmark}%
2219 \fi
2220 End of change
2221 \else
2222   \global\@firstcolumntrue
2223   \setbox\@outputbox\vbox{%
2224     \hb@xt@{\textwidth}{%
2225       \hb@xt@{\columnwidth}{\box\@leftcolumn \hss}}%
2226     \hfil
2227   }%
2228   \hb@xt@{\columnwidth}{\box\@outputbox \hss}}%
2229 <ftrace> \f1@trace{PAGE: second column also boxed}%
2230 \@combinedblfloats
```

The color of the `\vrule` should be `\normalcolor` as to not inherit the color from the column.

```
2226 {\normalcolor\vrule \@width\columnseprule}%
2227 \hfil
2228 \hb@xt@{\columnwidth}{\box\@outputbox \hss}}}%
2229 <ftrace> \f1@trace{PAGE: second column also boxed}%
2230 \@combinedblfloats
```

Override current first and top with those of first column if necessary

```
2231 \@setmarks
2232 End of change
2233 \@outputpage
2234 <ftrace> \f1@trace{PAGE: two column page completed}%
2235 \begingroup
```

```

2235      \@dblfloatplacement
2236      \@startdblcolumn
2237      \@whilesw\if@fcolmade \fi{\@outputpage
2238 〈fltrace〉      \fl@trace{PAGE: double float page completed}%
2239      \@startdblcolumn}%
2240      \endgroup
2241  \fi}%
2242 〈latexrelease | fltrace〉\EndIncludeInRelease
2243 〈latexrelease | fltrace〉\IncludeInRelease{0000/00/00}%
2244 〈latexrelease | fltrace〉 {\@outputdblcol}{2 column marks}%
2245 〈latexrelease | fltrace〉\def\@outputdblcol{%
2246 〈latexrelease | fltrace〉 \if@firstcolumn
2247 〈latexrelease | fltrace〉 \global \@firstcolumnfalse
2248 〈latexrelease | fltrace〉 \global \setbox\@leftcolumn \box\@outputbox
2249 〈*trace〉
2250 〈latexrelease | fltrace〉 \fl@trace{PAGE: first column boxed}%
2251 〈/trace〉
2252 〈latexrelease | fltrace〉 \else
2253 〈latexrelease | fltrace〉 \global \@firstcolumntrue
2254 〈latexrelease | fltrace〉 \setbox\@outputbox \vbox {%
2255 〈latexrelease | fltrace〉 \hb@xt@\textwidth {%
2256 〈latexrelease | fltrace〉 \hb@xt@\columnwidth {%
2257 〈latexrelease | fltrace〉 \box\@leftcolumn \hss}%
2258 〈latexrelease | fltrace〉 \hfil
2259 〈latexrelease | fltrace〉 \normalcolor\vrule
2260 〈latexrelease | fltrace〉 \columneprule}%
2261 〈latexrelease | fltrace〉 \hfil
2262 〈latexrelease | fltrace〉 \hb@xt@\columnwidth {%
2263 〈latexrelease | fltrace〉 \box\@outputbox \hss}%
2264 〈latexrelease | fltrace〉 }%
2265 〈latexrelease | fltrace〉 }%
2266 〈*trace〉
2267 〈latexrelease | fltrace〉 \fl@trace{PAGE: second column also boxed}%
2268 〈/trace〉
2269 〈latexrelease | fltrace〉 \@combinedblfloats
2270 〈latexrelease | fltrace〉 \@outputpage
2271 〈*trace〉
2272 〈latexrelease | fltrace〉 \fl@trace{PAGE: two column page completed}%
2273 〈/trace〉
2274 〈latexrelease | fltrace〉 \begingroup
2275 〈latexrelease | fltrace〉 \@dblfloatplacement
2276 〈latexrelease | fltrace〉 \@startdblcolumn

```

This loop could be replaced by an `\expandafter` tail recursion in `\@startdblcolumn`.

```

2277 〈latexrelease | fltrace〉 \@whilesw\if@fcolmade \fi
2278 〈latexrelease | fltrace〉 {\@outputpage
2279 〈*trace〉
2280 〈latexrelease | fltrace〉 \fl@trace{PAGE: double float page completed}%
2281 〈/trace〉
2282 〈latexrelease | fltrace〉 \@startdblcolumn}%
2283 〈latexrelease | fltrace〉 \endgroup
2284 〈latexrelease | fltrace〉 \fi
2285 〈latexrelease | fltrace〉}%

```

```
2286 〈\latexrelease | \fltrace〉\EndIncludeInRelease  
2287 〈/2ekernel | \fltrace | \latexrelease〉
```

1.1.3 Float placement parameters

The main purpose of this section is to ensure that all the float-placement parameters which need to be set in a class file or package have been declared. It also describes their use and sets values for them which are reasonable for typical documents using US letter or A4 sized paper.

Limits for the placement of floating objects

- \c@topnumber** This counter holds the maximum number of floats that can appear at the top of a text page or column.
- ```
2288 〈*2ekernel〉
2289 \newcount\c@topnumber
2290 \setcounter{topnumber}{2}
```
- (*End definition for \c@topnumber.*)
- \topfraction** This macro holds the maximum proportion (as a decimal number) of a text page or column that can be occupied by floats at the top.
- ```
2291 \newcommand\topfraction{.7}
```
- (*End definition for \topfraction.*)
- \c@bottomnumber** This counter holds the maximum number of floats that can appear at the bottom of a text page or column.
- ```
2292 \newcount\c@bottomnumber
2293 \setcounter{bottomnumber}{1}
```
- (*End definition for \c@bottomnumber.*)
- \bottomfraction** This macro holds the maximum proportion (as a decimal number) of a text page or column that can be occupied by floats at the bottom.
- ```
2294 \newcommand\bottomfraction{.3}
```
- (*End definition for \bottomfraction.*)
- \c@totalnumber** This counter holds the maximum number of floats that can appear on any text page or column.
- ```
2295 \newcount\c@totalnumber
2296 \setcounter{totalnumber}{3}
```
- (*End definition for \c@totalnumber.*)
- \textfraction** This macro holds the minimum proportion (as a decimal number) of a text page or column that must be occupied by text.
- ```
2297 \newcommand\textfraction{.2}
```
- (*End definition for \textfraction.*)
- \floatpagefraction** This macro holds the minimum proportion (as a decimal number) of a page or column that must be occupied by floating objects before a ‘float page’ is produced.
- ```
2298 \newcommand\floatpagefraction{.5}
```

(End definition for `\floatpagefraction`.)

- `\cdbltopnumber` This counter holds the maximum number of double-column floats that can appear on the top of a two-column text page.

2299 `\newcount\cdbltopnumber`  
2300 `\setcounter{dbltopnumber}{2}`

(End definition for `\cdbltopnumber`.)

- `\dbltopfraction` This macro holds the maximum proportion (as a decimal number) of a two-column text page that can be occupied by double-column floats at the top.

2301 `\newcommand{\dbltopfraction}{.7}`

(End definition for `\dbltopfraction`.)

- `\dblfloatautopagefraction` This macro holds the minimum proportion (as a decimal number) of a page that must be occupied by double-column floating objects before a ‘double-column float page’ is produced.

2302 `\newcommand{\dblfloatautopagefraction}{.5}`

(End definition for `\dblfloatautopagefraction`.)

### Floats on a text page

- `\floatsep` `\textfloatsep` `\intextsep` When a floating object is placed on a page with text, these parameters control the separation between the float and the other objects on the page. These parameters are used for both one-column mode and single-column floats in two-column mode. They are all rubber lengths.

`\floatsep` is the space between adjacent floats that are placed at the top or bottom of the text page or column.

`\textfloatsep` is the space between the main text and floats at the top or bottom of the page or column.

`\intextsep` is the space between in-text floats and the text.

2303 `\newskip\floatsep`  
2304 `\newskip\textfloatsep`  
2305 `\newskip\intextsep`  
2306 `\setlength{\floatsep}{12\p@ \oplus 2\p@ \ominus 2\p@}`  
2307 `\setlength{\textfloatsep}{20\p@ \oplus 2\p@ \ominus 4\p@}`  
2308 `\setlength{\intextsep}{12\p@ \oplus 2\p@ \ominus 2\p@}`

(End definition for `\floatsep`, `\textfloatsep`, and `\intextsep`.)

- `\dblfloatsep` `\dbltextfloatsep` When double-column floats (floating objects that span the whole `\textwidth`) are placed at the top of a text page in two-column mode, the separation between the float and the text is controlled by `\dblfloatsep` and `\dbltextfloatsep`. They are rubber lengths.

`\dblfloatsep` is the space between adjacent double-column floats placed at the top of the text page.

`\dbltextfloatsep` is the space between the main text and double-column floats at the top of the page.

2309 `\newskip\dblfloatsep`  
2310 `\newskip\dbltextfloatsep`  
2311 `\setlength{\dblfloatsep}{12\p@ \oplus 2\p@ \ominus 2\p@}`  
2312 `\setlength{\dbltextfloatsep}{20\p@ \oplus 2\p@ \ominus 4\p@}`

(End definition for `\dblfloatsep` and `\dbltextfloatsep`.)

### Floats on their own page or column

- \@fptop When floating objects are placed on a separate page or column, called a ‘float page’, the layout of the page is controlled by these parameters, which are rubber lengths.  
\@fpsep  
\@fpbot At the top of the page \@fptop is inserted; typically this supplies some stretchable whitespace. At the bottom of the page \@fpbot is inserted. Between adjacent floats \@fpsep is inserted.

These parameters are used for all floating objects on a ‘float page’ in one-column mode, and for single-column floats in two-column mode.

Note that at least one of the two parameters \@fptop and \@fpbot should contain a **plus** ...fil so as to fill the remaining empty space.

```
2313 \newskip\@fptop
2314 \newskip\@fpsep
2315 \newskip\@fpbot
2316 \setlength\@fptop{0\p@ \cplus 1fil}
2317 \setlength\@fpsep{8\p@ \cplus 2fil}
2318 \setlength\@fpbot{0\p@ \cplus 1fil}
```

(End definition for \@fptop, \@fpsep, and \@fpbot.)

- \@dblftop Double-column ‘float pages’ in two-column mode use similar parameters.  
\@dblfpsep  
\@dblfpbot  
2319 \newskip\@dblftop
2320 \newskip\@dblfpsep
2321 \newskip\@dblfpbot
2322 \setlength\@dblftop{0\p@ \cplus 1fil}
2323 \setlength\@dblfpsep{8\p@ \cplus 2fil}
2324 \setlength\@dblfpbot{0\p@ \cplus 1fil}

(End definition for \@dblftop, \@dblfpsep, and \@dblfpbot.)

- \topfigrule The macros can be used to put in rules between floats and text; whatever they insert  
\botfigrule should be vertical mode material which takes up zero space.  
\dblfigrule  
2325 \let\topfigrule=\relax
2326 \let\botfigrule=\relax
2327 \let\dblfigrule=\relax
2328 {/2ekernel}

(End definition for \topfigrule, \botfigrule, and \dblfigrule.)

## File T

### lthyphen.dtx

This file contains the code for loading hyphenation patterns into L<sup>A</sup>T<sub>E</sub>X. Most of this will end up in a file called `hyphen.ltx`. If you wish to customize your L<sup>A</sup>T<sub>E</sub>X system in respect of hyphenation patterns, write a file `hyphen.cfg`. If this file exists, it will be loaded instead of `hyphen.ltx`. See the comments below for additional information.

To produce the printed version of this file the following code is used. It can be extracted with the `DOCSTRIP` program, or one can run this file directly through L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub> .

```
1 <*driver>
2 \documentclass{ltxdoc}
3 \begin{document}
4 \DocInput{lthyphen.dtx}
5 \end{document}
6 </driver>
```

The default file `hyphen.ltx` loads hyphenation patterns for US english. If you want to load additional or other hyphenation patterns, you should create a file `hyphen.cfg`. This is best done by starting from `hyphen.ltx`.

For backward compatibility, the default file, `hyphen.ltx`, first tries to load the file `hyphen.tex`. If this file exists, an information message is issued and the appropriate defaults for T<sub>E</sub>X's internal parameters are set: `\language` is initialized to 0, and `\lefthyphenmin` and `\righthyphenmin` to 2 and 3, respectively, to disallow x- or -xx breaks.

```
7 <*default>
8 \InputIfFileExists{hyphen.tex}%
9 {\message{Loading hyphenation patterns for US english.}%
10 \language=0
11 \lefthyphenmin=2 \righthyphenmin=3 }%
```

Otherwise, since we cannot do anything without any hyphenation patterns, an error message is printed and the IniT<sub>E</sub>X run is terminated by invoking `\@@end` (which is the L<sup>A</sup>T<sub>E</sub>X 2 <sub>$\varepsilon$</sub>  name for T<sub>E</sub>X's `\end` primitive).

```
12 {\errhelp{The configuration for hyphenation is incorrectly
13 installed.^^J%
14 If you don't understand this error message you need
15 to seek^Jexpert advice.}%
16 \errmessage{OOPS! I can't find any hyphenation patterns for
17 US english.^^J \space Think of getting some or the
18 latex2e setup will never succeed}\@@end}
19 </default>
```

The following example describes the possible contents of a file `hyphen.cfg` that will load both US English and German hyphenation patterns, making the former the default. It sets `\language` to 0 for the US patterns and to 1 for the German patterns. Then `\language` is set to 0 to make this the default and the default values of `\lefthyphenmin` and `\righthyphenmin` are set.

```
language=0
input hyphen % (or \input ushyphen1 if the file has been renamed)
language=1
input ghyp31
```

```
language=0
lefthyphenmin=2
righthyphenmin=3
endinput
```

Another possibility is to use the package **babel**, by Johannes Braams. That package is distributed with a suitable **hyphen.cfg** file.

# File U

## ltfinal.dtx

### 1 Final settings

This section contains the final settings for L<sup>A</sup>T<sub>E</sub>X. It initialises some debugging and typesetting parameters, sets the default \catcodes and uc/lc codes, and inputs the hyphenation file.

#### 1.1 Debugging

By default, L<sup>A</sup>T<sub>E</sub>X shows statistics:

```
1 <*2ekernel>
2 \tracingstats1
```

#### 1.2 Typesetting parameters

\@lowpenalty These are penalties used internally.  
\@medpenalty  
\@highpenalty

```
3 \newcount\@lowpenalty
4 \newcount\@medpenalty
5 \newcount\@highpenalty
```

(End definition for \@lowpenalty, \@medpenalty, and \@highpenalty.)

\newmarks Allocate extended marks types if etex is active. Placed here at the end of the format to increase compatibility with count allocations in earlier releases.

```
6 </2ekernel>
7 <*2ekernel | latexrelease>
8 <latexrelease>\IncludeInRelease{2015/01/01}%
9 <latexrelease> {\newmarks}{Extended Allocation}%
10 \ifx\marks\@undefined\else
11 \def\newmarks{%
12 \e@alloc\marks \e@alloc@chardef{\count256}\m@ne\@alloc@top}
13 \fi
14 </2ekernel | latexrelease>
15 <latexrelease>\EndIncludeInRelease
16 <latexrelease>\IncludeInRelease{0000/00/00}%
17 <latexrelease> {\newmarks}{Extended Allocation}%
18 <latexrelease>\let\newmarks\@undefined
19 <latexrelease>\EndIncludeInRelease
20 <*2ekernel>
```

(End definition for \newmarks.)

\newXeTeXintercharclass Allocate \XeTeXintercharclass types if xetex is active. previously defined in `xetex.ini`.  
\xe@alloc@intercharclass  
\e@alloc@intercharclass@top

```
21 </2ekernel>
22 <*2ekernel | latexrelease>
23 <latexrelease>\IncludeInRelease{2015/01/01}%
24 <latexrelease> {\newXeTeXintercharclass}{Extended Allocation}%
```

Classes allocated 1 to 4094 (or 254 on older xetex) (In earlier XeLaTeX versions 1, 2 and 3 were pre-set for CJK).

```
25 \ifx\XeTeXcharclass\@undefined
26 \else
27 \ifdim\the\XeTeXversion\XeTeXrevision\p@>0.99993\p@
28 \chardef\@alloc@intercharclass@top=4095
29 \else
30 \chardef\@alloc@intercharclass@top=255
31 \fi
32 \def\newXeTeXintercharclass{%
33 \e@alloc\XeTeXcharclass
34 \chardef\xe@alloc@intercharclass\m@ne\@alloc@intercharclass@top}
35 \fi
36 </2ekernel | latexrelease>
37 <latexrelease>\EndIncludeInRelease
38 <latexrelease>\IncludeInRelease{0000/00/00}%
39 <latexrelease> {\newXeTeXintercharclass}{Extended Allocation}%
40 <latexrelease> \ifx\XeTeXcharclass\@undefined
41 <latexrelease> \else
42 <latexrelease> \def\xe@alloc@#1#2#3#4#5{\global\advance#1\@ne
43 <latexrelease> \xe@ch@ck#1#4#2%
44 <latexrelease> \allocationnumber#1%
45 <latexrelease> \global#3#5\allocationnumber
46 <latexrelease> \wlog{\string#5=\string#2\the\allocationnumber}}
47 <latexrelease> \def\xe@ch@ck#1#2#3{%
48 <latexrelease> \ifnum#1<#2\else
49 <latexrelease> \errmessage{No room for a new #3}%
50 <latexrelease> \fi}
51 <latexrelease> \def\newXeTeXintercharclass{%
52 <latexrelease> \xe@alloc@\xe@alloc@intercharclass
53 <latexrelease> \XeTeXcharclass\chardef\@cclv}
54 <latexrelease> \fi
55 <latexrelease>\EndIncludeInRelease
56 <2ekernel | latexrelease>
57 <latexrelease>\IncludeInRelease{2016/02/01}%
58 <latexrelease> {\xe@alloc@intercharclass}{Start of XeTeX class allocator}%
59 \ifx\XeTeXcharclass\@undefined
60 \else
61 \countdef\xe@alloc@intercharclass=257
62 \xe@alloc@intercharclass=\z@
63 \fi
64 </2ekernel | latexrelease>
65 <latexrelease>\EndIncludeInRelease
66 <latexrelease>\IncludeInRelease{2015/01/01}%
67 <latexrelease> {\xe@alloc@intercharclass}{Start of XeTeX class allocator}%
68 <latexrelease> \ifx\XeTeXcharclass\@undefined
69 <latexrelease> \else
70 <latexrelease> \xe@alloc@intercharclass=\thr@@
71 <latexrelease> \fi
72 <latexrelease>\EndIncludeInRelease
73 <latexrelease>\IncludeInRelease{0000/00/00}%
74 <latexrelease> {\xe@alloc@intercharclass}{Start of XeTeX class allocator}%
75 <latexrelease> \ifx\XeTeXcharclass\@undefined
```

```

76 <{latexrelease} \else
77 <{latexrelease} \newcount\xe@alloc@intercharclass
78 <{latexrelease} \xe@alloc@intercharclass=\thr@@
79 <{latexrelease} \fi
80 <{latexrelease}\EndIncludeInRelease
81 {*2ekernel}

```

(End definition for `\newXeTeXintercharclass`, `\xe@alloc@intercharclass`, and `\e@alloc@intercharclass@top`.)

The default values of the picture and `\fbox` parameters:

```

82 \unitlength = 1pt
83 \fboxsep = 3pt
84 \fboxrule = .4pt

```

The saved value of  $\text{\TeX}'s \maxdepth$ :

```

85 \cmaxdepth = \maxdepth

```

`\vsize` initialized because a `\clearpage` with `\vsize < \topskip` causes trouble.  
`\@colroom` and `\@colht` also initialized because `\vsize` may be set to them if a  
`\clearpage` is done before the `\begin{document}`

```

86 \vsize = 1000pt
87 \@colroom = \vsize
88 \@colht = \vsize

```

Initialise `\textheight` `\textwidth` and page style, to avoid internal errors if they are  
not set by the class.

```

89 \textheight=.5\maxdimen
90 \textwidth=\textheight
91 \ps@empty

```

### 1.3 Lccodes for hyphenation

For 7- and 8-bit engines the assumption of T1 encodings is the basis for the hyphenation patterns. That's not the case for the Unicode engines, where the assumption is engine-native working. The common loader system provides access to data from the Unicode Consortium covering not only `\lccode` but also other related data. The `\lccode` part of that at least needs to be loaded before hyphenation is tackled: Xe $\text{\TeX}$  follows the standard  $\text{\TeX}$  route of building patterns into the format. Lua $\text{\TeX}$  doesn't require this data be loaded *here* but it does need to be loaded somewhere. Rather than test for the Unicode engines by name, the approach here is to look for the extended math mode handling both provide: any other engine developed in this area will presumably also provide `\Umathcode`.

```

92 \ifnum 0%
93 \ifx\Umathcode\undefined\else 1\fi
94 \ifx\XeTeXmathcode\undefined\else 1\fi
95 >\z@
96 \message{ Unicode character data,}
97 \input{load-unicode-data}
98 {*}2ekernel}
99 <{latexrelease}\IncludeInRelease{2016/02/01}%
100 <{latexrelease} {\XeTeXintercharclasses}{XeTeX character classes}%
101 <{latexrelease} \ifx\XeTeXinterchartoks\undefined
102 <{latexrelease} \else
103 <{latexrelease} \begingroup

```

```

104 <|latexrelease> \chardef\XeTeXcharclassID = 0 %
105 <|latexrelease> \chardef\XeTeXcharclassOP = 0 %
106 <|latexrelease> \chardef\XeTeXcharclassCL = 0 %
107 <|latexrelease> \chardef\XeTeXcharclassEX = 0 %
108 <|latexrelease> \chardef\XeTeXcharclassIS = 0 %
109 <|latexrelease> \chardef\XeTeXcharclassNS = 0 %
110 <|latexrelease> \chardef\XeTeXcharclassCM = 0 %
111 <|latexrelease> \input{load-unicode-xetex-classes}
112 <|latexrelease> \endgroup
113 <|latexrelease> \global\let\xtxHanGlue\undefined
114 <|latexrelease> \global\let\xtxHanSpace\undefined
115 <|latexrelease> \global\XeTeXinterchartoks 0 1 = {}
116 <|latexrelease> \global\XeTeXinterchartoks 0 2 = {}
117 <|latexrelease> \global\XeTeXinterchartoks 0 3 = {}
118 <|latexrelease> \global\XeTeXinterchartoks 1 0 = {}
119 <|latexrelease> \global\XeTeXinterchartoks 2 0 = {}
120 <|latexrelease> \global\XeTeXinterchartoks 3 0 = {}
121 <|latexrelease> \global\XeTeXinterchartoks 1 1 = {}
122 <|latexrelease> \global\XeTeXinterchartoks 1 2 = {}
123 <|latexrelease> \global\XeTeXinterchartoks 1 3 = {}
124 <|latexrelease> \global\XeTeXinterchartoks 2 1 = {}
125 <|latexrelease> \global\XeTeXinterchartoks 2 2 = {}
126 <|latexrelease> \global\XeTeXinterchartoks 2 3 = {}
127 <|latexrelease> \global\XeTeXinterchartoks 3 1 = {}
128 <|latexrelease> \global\XeTeXinterchartoks 3 2 = {}
129 <|latexrelease> \global\XeTeXinterchartoks 3 3 = {}
130 <|latexrelease> \fi
131 <|latexrelease>\EndIncludeInRelease
132 <|latexrelease>\IncludeInRelease{0000/00/00}%
133 <|latexrelease> {\XeTeXintercharclasses}{XeTeX character classes}%
134 <|latexrelease> \ifx\XeTeXinterchartoks\undefined
135 <|latexrelease> \else
136 <|latexrelease> \input{load-unicode-xetex-classes}
137 <|latexrelease> \gdef\xtxHanGlue{\hskip0pt plus 0.1em\relax}
138 <|latexrelease> \gdef\xtxHanSpace{\hskip0.2em plus 0.2em minus 0.1em\relax}
139 <|latexrelease> \global\XeTeXinterchartoks 0 1 = {\xtxHanSpace}
140 <|latexrelease> \global\XeTeXinterchartoks 0 2 = {\xtxHanSpace}
141 <|latexrelease> \global\XeTeXinterchartoks 0 3 = {\nobreak\xtxHanSpace}
142 <|latexrelease> \global\XeTeXinterchartoks 1 0 = {\xtxHanSpace}
143 <|latexrelease> \global\XeTeXinterchartoks 2 0 = {\nobreak\xtxHanSpace}
144 <|latexrelease> \global\XeTeXinterchartoks 3 0 = {\xtxHanSpace}
145 <|latexrelease> \global\XeTeXinterchartoks 1 1 = {\xtxHanGlue}
146 <|latexrelease> \global\XeTeXinterchartoks 1 2 = {\xtxHanGlue}
147 <|latexrelease> \global\XeTeXinterchartoks 1 3 = {\nobreak\xtxHanGlue}
148 <|latexrelease> \global\XeTeXinterchartoks 2 1 = {\nobreak\xtxHanGlue}
149 <|latexrelease> \global\XeTeXinterchartoks 2 2 = {\nobreak\xtxHanGlue}
150 <|latexrelease> \global\XeTeXinterchartoks 2 3 = {\xtxHanGlue}
151 <|latexrelease> \global\XeTeXinterchartoks 3 1 = {\xtxHanGlue}
152 <|latexrelease> \global\XeTeXinterchartoks 3 2 = {\xtxHanGlue}
153 <|latexrelease> \global\XeTeXinterchartoks 3 3 = {\nobreak\xtxHanGlue}
154 <|latexrelease> \fi
155 <|latexrelease>\EndIncludeInRelease
156 /*2ekernel*/

```

There is one over-ride that makes sense here (see below for the same for 8-bit engines):

setting the lccode for - to itself.

```
157 \lccode`-='- % default hyphen char
```

The alternative is that a “traditional” engine is in use.

```
158 \else
```

We set things up so that hyphenation files can assume that the default (T1) lccodes are in use (at present this also sets up the uccodes). We temporarily define \reserved@a to apply \reserved@c to all the numbers in the range of its arguments.

```
159 \def\reserved@a#1#2{%
160 \@tempcnta#1\relax
161 \@tempcntb#2\relax
162 \reserved@c
163 }
164 \def\reserved@b{%
165 \ifnum\@tempcnta>\@tempcntb\else
166 \reserved@c\@tempcnta
167 \advance\@tempcnta\@ne
168 \expandafter\reserved@b
169 \fi
170 }
```

Depending on the TeX version, we might not be allowed to do this for non-ASCII characters.

```
171 \def\reserved@c#1{%
172 \count@=#1\advance\count@ by -"20
173 \uccode#1=\count@
174 \lccode#1=#1
175 }
176 \reserved@a{\a}{\z}
177 \reserved@a{"A0}{ "BC}
178 \reserved@a{"E0}{ "FF}
```

The upper case characters need their \uccode and \lccode values set, and their \sfcode set to 999.

```
179 \def\reserved@c#1{%
180 \count@=#1\advance\count@ by "20
181 \uccode#1=#1
182 \lccode#1=\count@
183 \sfcode#1=999
184 }
185 \reserved@a{\A}{\Z}
186 \reserved@a{"80}{ "9C}
187 \reserved@a{"CO}{ "DF}
```

Well, it would be nice if that were correct, but unfortunately, the Cork encoding contains some odd slots whose uccode or lccode isn’t quite what you’d expect.

```
188 \uccode`\^Y=\I % dotless i
189 \lccode`\^Y=\^Y % dotless i
190 \uccode`\^Z=\J % dotless j, ae in OT1
191 \lccode`\^Z=\^Z % dotless j, ae in OT1
192 \lccode`\^9d=\i % dotted I
193 \uccode`\^9d=\^9d % dotted I
194 \lccode`\^9e=\^9e % d-bar
195 \uccode`\^9e=\^d0 % d-bar
```

Finally here is one that helps hyphenation in the OT1 encoding.

```
196 \lccode`^`=\`^` % oe in OT1
```

And we also set the \lccode of \- and \textcompwordmark so that they do not prevent hyphenation in the remainder of the word (as suggested by Lars Helström).

```
197 \lccode`-`=\`- % default hyphen char
198 \lccode 127=127 % alternate hyphen char
199 \lccode 23 =23 % textcompwordmark in T1
```

End of the conditional to select either Unicode or T1 encoding defaults.

```
200 \fi
```

At this stage, we can install any last-minute expl3 set-up.

```
201 \@expl@finalise@setup@@
202 \def\@expl@finalise@setup@@{}
```

This is as good a place as any to active a few XeTeX-specific settings

```
203 \ifx\XeTeXuseglyphmetrics\@undefined
204 \else
205 \XeTeXuseglyphmetrics=1 %
206 \XeTeXdashbreakstate=1 %
207 \fi
```

## 1.4 Hyphenation

The following code will be compiled into the format file. It checks for the existence of `hyphen.cfg` in inputs that file if found. Otherwise it inputs `hyphen.ltx`. Note that these are loaded in *before* the \catcodes are set, so local hyphenation files can use 8-bit input.

We try to load the customized hyphenation description file.

```
208 \InputIfFileExists{hyphen.cfg}
209 {\typeout{=====
210 Local configuration file hyphen.cfg used^^J%
211 =====}%
212 \def\@addtolist##1{\xdef\@list{\@list,##1}}%
213 }
214 {\input{hyphen.ltx}}
215 \let\@addtolist\@gobble

\l@nohyphenation

216 \ifx\l@nohyphenation\@undefined
217 \newlanguage\l@nohyphenation
218 \fi
```

(End definition for \l@nohyphenation.)

\document@default@language Default document language. -1 acts as language 0, but used as a flag in \document to see if it has been set in the preamble.

```
219 </2ekernel>
220 <*2ekernel | latexrelease>
221 <latexrelease>\IncludeInRelease{2017/04/15}%
222 <latexrelease> {\document@default@language}{Save language for hyphenation}%
223 \let\document@default@language\m@ne
224 </2ekernel | latexrelease>
225 <latexrelease>\EndIncludeInRelease
```

```

226 \ifdim \font@submax >\z@%
227 \else
228 {\document@default@language}{Save language for hyphenation}%
229 \let\document@default@language\undefined
230 \EndIncludeInRelease
231 {*2ekernel}

(End definition for \document@default@language.)
```

## 1.5 Font loading

Fonts loaded during the formatting process might already have changed the `\font@submax` from `0pt` to something higher. If so, we put out a bold warning.

```

231 \ifdim \font@submax >\z@%
232 \else
233 {\font@warning{Size substitutions with differences\MessageBreak
234 up to \font@submax\space have occurred.\MessageBreak
235 \MessageBreak
236 Please check the transcript file
237 carefully\MessageBreak
238 and redo the format generation if necessary!
239 \gobbletwo}%
240 \errhelp{Only stopped, to give you time to
241 read the above message.}
242 \errmessage{}%
```

We reset the macro. Otherwise every user will get a warning on every job.

```

242 \def\font@submax{0pt}
243 \fi
```

## 1.6 Input encoding

Starting with the 2018 L<sup>A</sup>T<sub>E</sub>X release default the `inputencoding` to UTF-8. Unless the format is being used with luatex, xetex, encTeX or mltex.

This is done in a way largely compatible with older releases: `utf8.def` is input just as if

```
\usepackage[utf8]{inputenc}
```

had been used, however rather than input the whole package a minimal core part just enough to support loading the UTF-8 encoding files is defined here.

If a document re-specifies UTF-8 this is silently ignored.

```

244 {*}2ekernel| latexrelease
245 {*}2ekernel| latexrelease
```

Check that a classic 8-bit tex engine is being used (LaTeX or PDFLaTeX).

```

246 \ifx\Umathcode\undefined\else 1\fi
247 \ifx\mubyte\undefined\else 1\fi
248 \ifx\charsubdef\undefined\else 1\fi
249 =\z@
```

Skip this section in Unicode TeX, or if MLTeX and EncTeX are enabled.

```

248 \ifnum0%
249 \ifx\Umathcode\undefined\else 1\fi
250 \ifx\mubyte\undefined\else 1\fi
251 \ifx\charsubdef\undefined\else 1\fi
252 =\z@
```

```

253 \def\@space{\catcode{10}}
254 \let\@inpcnt\relax
255 \def\IeC{%
256 \ifx\protect\@typeset@protect
257 \expandafter\@firstofone
258 \else
259 \noexpand\IeC
260 \fi
261 }

 Make characters active for UTF-8 input formats

262 \tempcnta=1
263 \loop
264 \catcode\tempcnta=13 %
265 \advance\tempcnta\@ne %
266 \ifnum\tempcnta<32 %
267 \repeat %

268 \catcode0=15 % null
269 \catcode9=10 % tab
270 \catcode10=12 % ctrl J
271 \catcode12=13 % ctrl L
272 \catcode13=5 % newline
273 \tempcnta=128
274 \loop
275 \catcode\tempcnta=13
276 \advance\tempcnta\@ne
277 \ifnum\tempcnta<256
278 \repeat

```

\UseRawInputEncoding Reset 8 bit characters to catcode 12 so the input encoding matches the “Raw” font encoding. Useful for special behaviours, or for compatibility with older L<sup>A</sup>T<sub>E</sub>X formats.

```

279 \def\UseRawInputEncoding{%
280 \let\inputencodingname\undefined % revert
281 \let\DeclareFontEncoding\@DeclareFontEncoding@saved % revert
282 \let\DeclareUnicodeCharacter\undefined % revert
283 \tempcnta=1
284 \loop
285 \catcode\tempcnta=15 %
286 \advance\tempcnta\@ne %
287 \ifnum\tempcnta<32 %
288 \repeat %

289 \catcode0=15 % null
290 \catcode9=10 % tab
291 \catcode10=12 % ctrl J
292 \catcode12=13 % ctrl L
293 \catcode13=5 % newline
294 \tempcnta=128
295 \loop
296 \catcode\tempcnta=12
297 \advance\tempcnta\@ne
298 \ifnum\tempcnta<256
299 \repeat
300 }

```

(End definition for \UseRawInputEncoding.)

```

\DeclareFontEncoding@saved Saved version of \DeclareFontEncoding@ before utf8.def modifies it for use in
\UseRawInputEncoding above.

301 \let\DeclareFontEncoding@saved\DeclareFontEncoding@

(End definition for \DeclareFontEncoding@saved.)

302 \edef\inputencodingname{utf8}%
303 \input{utf8.def}
304 \let\UTFviii@undefined@err@@\UTFviii@undefined@err
305 \let\UTFviii@invalid@err@@\UTFviii@invalid@err
306 \let\UTFviii@two@octets@@\UTFviii@two@octets
307 \let\UTFviii@three@octets@@\UTFviii@three@octets
308 \let\UTFviii@four@octets@@\UTFviii@four@octets
309 {2ekernel}\def\UTFviii@undefined@err#1{\gobble#1}%
310 {2ekernel}\let\UTFviii@invalid@err\string
311 {2ekernel}\let\UTFviii@two@octets\string
312 {2ekernel}\let\UTFviii@three@octets\string
313 {2ekernel}\let\UTFviii@four@octets\string
314 {2ekernel}\everyjob\expandafter{\the\everyjob
315 {2ekernel}\let\UTFviii@undefined@err\UTFviii@undefined@err@@
316 {2ekernel}\let\UTFviii@invalid@err\UTFviii@invalid@err@@
317 {2ekernel}\let\UTFviii@two@octets\UTFviii@two@octets@@
318 {2ekernel}\let\UTFviii@three@octets\UTFviii@three@octets@@
319 {2ekernel}\let\UTFviii@four@octets\UTFviii@four@octets@@
320 {2ekernel}\}
321 \let\@inenc@test\@undefined
322 \let\@saved@space@catcode\@undefined

```

For formats not set up for UTF-8 default, set the C0 controls to catcode 15.

```

323 \else
324 \@tempcnta=0
325 \loop
326 \catcode\@tempcnta=15 %
327 \advance\@tempcnta\@ne %
328 \ifnum\@tempcnta<32 %
329 \repeat %
330 \catcode0=15 % null
331 \catcode9=10 % tab
332 \catcode10=12 % ctrl J
333 \catcode12=13 % ctrl L
334 \catcode13=5 % newline
335 \let\UseRawInputEncoding\relax

```

This ends the skipped code in Unicode engines:

```

336 \fi
337 {/2ekernel | latexrelease}
338 {latexrelease}\EndIncludeInRelease
339 {latexrelease}\IncludeInRelease{0000/00/00}%
340 {latexrelease} {\UTFviii@invalid}{UTF-8 default}%

```

The first block of commands got only introduced in 2019 but we revert all of Unicode support in one go not jump to the intermediate version.

```

341 {latexrelease} \let\UTFviii@two@octets@combine\@undefined
342 {latexrelease} \let\UTFviii@three@octets@combine\@undefined
343 {latexrelease} \let\UTFviii@four@octets@combine\@undefined

```

```

344 <|latexrelease> \let\UTFviii@two@octets@string@\undefined
345 <|latexrelease> \let\UTFviii@three@octets@string@\undefined
346 <|latexrelease> \let\UTFviii@four@octets@string@\undefined
347 <|latexrelease> \let\UTFviii@two@octets@noexpand@\undefined
348 <|latexrelease> \let\UTFviii@three@octets@noexpand@\undefined
349 <|latexrelease> \let\UTFviii@four@octets@noexpand@\undefined

350 <|latexrelease>\@tempcnta=0
351 <|latexrelease>\loop
352 <|latexrelease> \catcode\@tempcnta=15
353 <|latexrelease> \advance\@tempcnta\@ne
354 <|latexrelease>\ifnum\@tempcnta<32
355 <|latexrelease>\repeat %
356 <|latexrelease>\catcode9=10 % tab
357 <|latexrelease>\catcode10=12 % ctrl J
358 <|latexrelease>\catcode12=13 % ctrl L
359 <|latexrelease>\catcode13=5 % newline
360 <|latexrelease>\@tempcnta=128
361 <|latexrelease>\loop
362 <|latexrelease>\catcode\@tempcnta=12
363 <|latexrelease>\advance\@tempcnta\@ne
364 <|latexrelease>\ifnum\@tempcnta<256
365 <|latexrelease>\repeat
366 <|latexrelease>\let\IeC@\undefined
367 <|latexrelease>\def\DeclareFontEncoding@#1#2#3{%
368 <|latexrelease> \expandafter
369 <|latexrelease> \ifx\csname T@#1\endcsname\relax
370 <|latexrelease> \def\cdp@elt{\noexpand\cdp@elt}%
371 <|latexrelease> \xdef\cdp@list{\cdp@list\cdp@elt{#1}}%
372 <|latexrelease> \default@family\{\default@series}%
373 <|latexrelease> \default@shape}%
374 <|latexrelease> \expandafter\let\csname#1-cmd\endcsname\@changed@cmd
375 <|latexrelease> \else
376 <|latexrelease> \font@info{Redeclaring font encoding #1}%
377 <|latexrelease> \fi
378 <|latexrelease> \global\@namedef{T@#1}{#2}%
379 <|latexrelease> \global\@namedef{M@#1}{\default@M#3}%
380 <|latexrelease> \xdef\LastDeclaredEncoding{#1}%
381 <|latexrelease> }
382 <|latexrelease> \let\UseRawInputEncoding@\undefined
383 <|latexrelease> \let\DeclareFontEncoding@saved@\undefined
384 <|latexrelease> \let\inputencodingname@\undefined
385 <|latexrelease>\EndIncludeInRelease

386 {*2ekernel}
387 % \begin{macrocode}
388 %
389 % We temporarily define |\reserved@a| to apply |\reserved@c| to all the
390 % numbers in the range of its arguments.
391 % \begin{macrocode}
392 \def\reserved@a#1#2{%
393 \tempcnta#1\relax
394 \tempcntb#2\relax
395 \reserved@c
396 }

```

```

397 \def\reserved@b{%
398 \ifnum\@tempcnta>\@tempcntb\else
399 \reserved@c\@tempcnta
400 \advance\@tempcnta\@ne
401 \expandafter\reserved@b
402 \fi
403 }

```

Set the special catcodes (although some of these are useless, since an error will have occurred if the catcodes have changed). Note that  $\sim J$  has catcode ‘other’ for use in warning messages.

```

404 \catcode`\ =10
405 \catcode`\#=6
406 \catcode`\$=3
407 \catcode`\%=14
408 \catcode`\&=4
409 \catcode`\|=0
410 \catcode`\~=7
411 \catcode`_=8
412 \catcode`\{|=1
413 \catcode`\}|=2
414 \catcode`\~|=13
415 \catcode`\@|=11
416 \catcode`\^\^I=10
417 \catcode`\^\^J=12
418 \catcode`\^\^L=13
419 \catcode`\^\^M=5

```

Set the ‘other’ catcodes.

```

420 \def\reserved@c{\catcode#1=12\relax}
421 \reserved@c{`!`}
422 \reserved@c{`}
423 \reserved@a{`}{'?`}
424 \reserved@c{`}
425 \reserved@c{`}
426 \reserved@c{`}
427 \reserved@c{`}

```

Set the ‘letter’ catcodes.

```

428 \def\reserved@c{\catcode#1=11\relax}
429 \reserved@a{`A}{`Z}
430 \reserved@a{`a}{`z}

```

All the characters in the range 0–31 and 127–255 are illegal, *except* tab ( $\^\^I$ ), nl ( $\^\^J$ ), ff ( $\^\^L$ ) and cr ( $\^\^M$ ).

## 1.7 Lccodes and uccodes

We now again set up the default (T1) uc/lccodes. The lower case characters need their `\uccode` and `\lccode` values set. Some of this is a repeat of the set-up before loading hyphenation files. Depending on the TeX version, we might not be allowed to do this for non-ASCII characters. For the Unicode engines (XeTeX and LuaTeX) there is no need to do any of this: they use hyphenation data which does not alter any of the set up and so this entire block is skipped.

```

431 \ifnum 0%
432 \ifx\Umathcode\@undefined\else 1\fi
433 \ifx\XeTeXmathcode\@undefined\else 1\fi
434 >\z@
435 \else
436 \def\reserved@c#1{%
437 \count@=#1\advance\count@ by -"20
438 \uccode#1=\count@
439 \lccode#1=#1
440 }
441 \reserved@a{\a}{`\z}
442 \reserved@a{"AO}{`BC}
443 \reserved@a{"EO}{`FF}

```

The upper case characters need their `\uccode` and `\lccode` values set, and their `\sfcode` set to 999.

```

444 \def\reserved@c#1{%
445 \count@=#1\advance\count@ by "20
446 \uccode#1=#1
447 \lccode#1=\count@
448 \sfcode#1=999
449 }
450 \reserved@a{\A}{`\Z}
451 \reserved@a{"80}{`9C}
452 \reserved@a{"C0}{`DF}

```

Well, it would be nice if that were correct, but unfortunately, the Cork encoding contains some odd slots whose uccode or lccode isn't quite what you'd expect.

```

453 \uccode`^Y=\I % dotless i
454 \lccode`^Y=\^Y % dotless i
455 \uccode`^Z=\J % dotless j, ae in OT1
456 \lccode`^Z=\^Z % dotless j, ae in OT1
457 \lccode`^9d=\i % dotted I
458 \uccode`^9d=\^9d % dotted I
459 \lccode`^9e=\^9e % d-bar
460 \uccode`^9e=\^d0 % d-bar

```

Finally here is one that helps hyphenation in the OT1 encoding.

```

461 \lccode`^=[`\^[% oe in OT1
462 \fi % End of reset block for 8-bit engines

```

`\MakeUppercase` And whilst we're doing things with uc/lc tables, here are two commands to upper- and lower-case a string.

`\@uclclist`

*Note* that this implementation is subject to change! At the moment we're not providing any way to extend the list of uc/lc commands, since finding a good interface is difficult. These commands have some nasty features, such as uppercasing mathematics, environment names, labels, etc. A much better long-term solution is to use all-caps fonts, but these aren't generally available.

```

463 \DeclareRobustCommand{\MakeUppercase}[1]{%
464 \def\i{I}\def\j{J}%
465 \def\reserved@a##1##2{\let##1##2\reserved@a}%
466 \expandafter\reserved@a\@uclclist\reserved@b\@gobble}%

```

Tell UTF-8 processing to process chars even though we are in an `\protected@edef`.

```

467 \let\UTF@two@octets@noexpand\@empty
468 \let\UTF@three@octets@noexpand\@empty
469 \let\UTF@four@octets@noexpand\@empty
470 \protected@edef\reserved@a{\uppercase{#1}}%
471 \reserved@a
472 }
473 \DeclareRobustCommand{\MakeLowercase}[1]{{%
474 \def\reserved@a##1##2{\let##2##1\reserved@a}%
475 \expandafter\reserved@a\@uclclist\reserved@b{\reserved@a\@gobble}%
476 \let\UTF@two@octets@noexpand\@empty
477 \let\UTF@three@octets@noexpand\@empty
478 \let\UTF@four@octets@noexpand\@empty
479 \protected@edef\reserved@a{\lowercase{#1}}%
480 \reserved@a
481 }
482 \def@\uclclist{\oe\OE\o\O\ae\AE
483 \dh\DH\dj\DJ\l\L\ng\NG\ss\SS\th\TH}

```

The above code works, but has the nasty side-effect that if you say something like:

```

\markboth{\MakeUppercase\contentsname}
{\MakeUppercase\contentsname}

```

then the uppercasing is only done to the first letter of the contents name, since the mark expands out to:

```

\mark{\protect\MakeUppercase Table of Contents}
{\protect\MakeUppercase Table of Contents}

```

In order to get round this, we redefine `\MakeUppercase` and `\MakeLowercase` to grab their argument and brace it. This is a very low-level hack, and is *not* recommended practice! This is an instance of a general problem that makes it unsafe to grab arguments unbraced, and probably needs a more general solution. For the moment though, this hack will do:

```

484 \protected@edef\MakeUppercase#1{\MakeUppercase{#1}}
485 \protected@edef\MakeLowercase#1{\MakeLowercase{#1}}

```

(End definition for `\MakeUppercase`, `\MakeLowercase`, and `\@uclclist`.)

## 1.8 Applying Patch files

Between major releases, small patches will be distributed in files `ltpatch.ltx` which must be added at this point.

Patch file code removed.

```

486 %\IfFileExists{ltpatch.ltx}
487 % {\typeout{=====
488 % Applying patch file ltpatch.ltx^^J%
489 % =====}
490 % \def\fmtversion@topatch{unknown}
491 % \input{ltpatch.ltx}
492 % \ifx\fmtversion\fmtversion@topatch
493 % \ifx\patch@level\undefined
494 % \typeout{^^J^^J^^J}

```

```

495 %
496 % !!!!!!! !!!!!!! !!!!!!! !!!!!!! !!!!!!! !!!!!!! ^J%
497 % !! Patch file 'ltpatch.ltx' not suitable for this^J%
498 % !! version of LaTeX.^J^J%
499 % !! Please check if initex found an old patch file:^J%
500 % !! --- if so, rename it or delete it, and redo the^J%
501 % !! initex run.^J%
502 % !!!!!!! !!!!!!! !!!!!!! !!!!!!! !!!!!!! ^J}%
503 % \batchmode \@@end

```

The code below adds the ‘patch level’ string to the first `\typeout` in the startup banner.

```

504 % \def\fmtversion@topatch{0}%
505 % \ifx\fmtversion@topatch\patch@level\else
506 % \def\reserved@a{\typeout##1##2\reserved@a{%
507 % \typeout{##1 patch level \patch@level}##2}
508 % \everyjob\expandafter\expandafter\expandafter{%
509 % \expandafter\reserved@a\the\everyjob\reserved@a}
510 % \let\reserved@a\relax
511 % \the\everyjob
512 % \fi
513 % \fi
514 % \else
515 % \typeout{^J^J^J}%
516 % !!!!!!! !!!!!!! !!!!!!! !!!!!!! !!!!!!! ^J%
517 % !! Patch file 'ltpatch.ltx' (for version <\fmtversion@topatch>)^J%
518 % !! is not suitable for version <\fmtversion> of LaTeX.^J^J%
519 % !! Please check if initex found an old patch file:^J%
520 % !! --- if so, rename it or delete it, and redo the^J%
521 % !! initex run.^J%
522 % !!!!!!! !!!!!!! !!!!!!! !!!!!!! !!!!!!! ^J}%
523 % \batchmode \@@end
524 % \fi
525 % \let\fmtversion@topatch\relax
526 % }{}}

```

## 1.9 Freeing Memory

`\reserved@a` And just to make sure nobody relies on those definitions of `\reserved@b` and friends.  
`\reserved@b` These macros are reserved for use in the kernel. *Do not use them as general scratch macros.*

```

527 \let\reserved@a\@filelist
528 \let\reserved@b=\@undefined
529 \let\reserved@c=\@undefined
530 \let\reserved@d=\@undefined
531 \let\reserved@e=\@undefined
532 \let\reserved@f=\@undefined

```

(End definition for `\reserved@a` and `\reserved@b`.)

```

\toks
533 \toks0{}
534 \toks2{}
535 \toks4{}
536 \toks6{}

```

```
537 \toks8{}
```

(End definition for `\toks`.)

`\errhelp` Empty the error help message, which may have some rubbish:

```
538 \errhelp{}
```

(End definition for `\errhelp`.)

## 1.10 Initialise file list

`\@providesfile` Initialise for use in the document. During initex a modified version has been used which leaves debugging information for `latexbug.tex`.

```
539 \def\@providesfile#1[#2]{%
540 \wlog{File: #1 #2}%
541 \expandafter\xdef\csname ver@#1\endcsname{#2}%
542 }
```

(End definition for `\@providesfile`.)

`\@filelist` Reset `\@filelist` so files input while making the format are not listed. The list built up

`\@addtofilelist` so far may take up a lot of memory and so it is moved to `\reserved@a` where it will be overwritten as soon as almost any L<sup>A</sup>T<sub>E</sub>X command is issued in a class file. However the `latexbug.tex` program will be able to access this information and insert it into a bug report.

```
543 \let\@filelist\@gobble
544 \def\@addtofilelist#1{\xdef\@filelist{\@filelist,#1}}%
```

(End definition for `\@filelist` and `\@addtofilelist`.)

## 1.11 Do some temporary work for pre-release

This is a good place to load code that hasn't yet been integrated into the other files ...

## 1.12 Some last minute initializations ...

Load the first aid set of definitions for external packages that await updates.

```
545 \Qinput{latex2e-first-aid-for-external-files.ltx}
```

## 1.13 Dumping the format

Finally we make @ into a letter, ensure the format will be in the ‘normal’ error mode, and dump everything into the format file.

```
546 \makeatother
547 \errorstopmode
548 \dump
549 </2ekernel>
```

# Change History

|                                                                                                                                                                                                                                      |     |                                                         |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------|-----|
| 1985-11-04 ltmath.dtx LaTeX2.09                                                                                                                                                                                                      |     | \mathversion: Test if version defined<br>added. . . . . | 284 |
| General: produce warning message if<br>line extends into margin. Doesn't<br>warn about formula overprinting<br>equation number. . . . .                                                                                              | 496 |                                                         |     |
| 1989-04-10 ltfssbas.dtx v1.0a                                                                                                                                                                                                        |     |                                                         |     |
| General: Starting with version<br>numbers! \ifmmode added in<br>\math@group . . . . .                                                                                                                                                | 273 |                                                         |     |
| 1989-04-10 ltfssbas.dtx v1.0b                                                                                                                                                                                                        |     |                                                         |     |
| General: \preload@sizes added. . . . .                                                                                                                                                                                               | 273 |                                                         |     |
| \wrong@fontshape changed to<br>define substitution font/shape<br>macro. . . . .                                                                                                                                                      | 273 |                                                         |     |
| 1989-04-10 ltfssini.dtx v1.0a                                                                                                                                                                                                        |     |                                                         |     |
| General: Starting with version<br>numbers \newif for \@tempswa<br>added since this switch is unknown<br>at the time when this file is read<br>in. (latex.tex is loaded later.)<br>\math@famname changed to<br>\math@version. . . . . | 373 |                                                         |     |
| 1989-04-14 ltfssbas.dtx v1.0c                                                                                                                                                                                                        |     |                                                         |     |
| General: More documentation added. . . . .                                                                                                                                                                                           | 273 |                                                         |     |
| 1989-04-15 ltfssini.dtx v1.0b                                                                                                                                                                                                        |     |                                                         |     |
| General: \mathfontset renamed to<br>\mathversion. . . . .                                                                                                                                                                            | 373 |                                                         |     |
| 1989-04-19 ltfssbas.dtx v1.0d                                                                                                                                                                                                        |     |                                                         |     |
| General: Even more doc. . . . .                                                                                                                                                                                                      | 273 |                                                         |     |
| 1989-04-21 ltfssbas.dtx v1.0e                                                                                                                                                                                                        |     |                                                         |     |
| General: Documentation is fun!<br>Parameters of<br>\define@mathalphabet changed. . . . .                                                                                                                                             | 273 |                                                         |     |
| 1989-04-21 ltfssini.dtx v1.0c                                                                                                                                                                                                        |     |                                                         |     |
| General: Changed to conform to<br>fam.tex. . . . .                                                                                                                                                                                   | 373 |                                                         |     |
| 1989-04-23 ltfssbas.dtx v1.0f                                                                                                                                                                                                        |     |                                                         |     |
| General: % in \getanddefinefonts<br>added. . . . .                                                                                                                                                                                   | 273 |                                                         |     |
| 1989-04-26 ltfssini.dtx v1.0d                                                                                                                                                                                                        |     |                                                         |     |
| General: \xpt added. . . . .                                                                                                                                                                                                         | 373 |                                                         |     |
| 1989-04-27 ltfssbas.dtx v1.0g                                                                                                                                                                                                        |     |                                                         |     |
| General: Documentation revised. . . . .                                                                                                                                                                                              | 273 |                                                         |     |
| 1989-04-27 ltfssini.dtx v1.0e                                                                                                                                                                                                        |     |                                                         |     |
| General: Definitions of L <sup>A</sup> T <sub>E</sub> X symbols<br>corrected. . . . .                                                                                                                                                | 373 |                                                         |     |
| 1989-04-29 ltfssbas.dtx v1.0h                                                                                                                                                                                                        |     |                                                         |     |
| General: Documented problem with<br>\halign, and \noalign . . . . .                                                                                                                                                                  | 273 |                                                         |     |
|                                                                                                                                                                                                                                      |     | \mathversion: Test if version defined<br>added. . . . . | 284 |
| 1989-04-29 ltfssbas.dtx v1.0i                                                                                                                                                                                                        |     |                                                         |     |
| General: Removed the \halign<br>\noalign correction (wasn't<br>bugfree) . . . . .                                                                                                                                                    | 273 |                                                         |     |
| 1989-04-29 ltfssini.dtx v1.0f                                                                                                                                                                                                        |     |                                                         |     |
| General: Corrections to L <sup>A</sup> T <sub>E</sub> X tabular<br>env. added. . . . .                                                                                                                                               | 373 |                                                         |     |
| 1989-05-01 ltfssbas.dtx v1.0j                                                                                                                                                                                                        |     |                                                         |     |
| General: Default for<br>\baselinestretch added. . . . .                                                                                                                                                                              | 273 |                                                         |     |
| 1989-05-22 ltfssbas.dtx v1.0k                                                                                                                                                                                                        |     |                                                         |     |
| General: Lines longer than 72<br>characters folded. . . . .                                                                                                                                                                          | 273 |                                                         |     |
| 1989-05-22 ltfssini.dtx v1.0g                                                                                                                                                                                                        |     |                                                         |     |
| General: Lines shortened to 72<br>characters . . . . .                                                                                                                                                                               | 373 |                                                         |     |
| 1989-09-14 ltfssbas.dtx v1.0m                                                                                                                                                                                                        |     |                                                         |     |
| General: Global replacement: \group<br>to \mathgroup . . . . .                                                                                                                                                                       | 273 |                                                         |     |
| \mathversion: Corrected typo:<br>\endcsname to \endcsmame. . . . .                                                                                                                                                                   | 284 |                                                         |     |
| 1989-11-07 ltfssini.dtx v1.0i                                                                                                                                                                                                        |     |                                                         |     |
| General: All family, series, and shape<br>names abbreviated. . . . .                                                                                                                                                                 | 373 |                                                         |     |
| 1989-11-08 ltfssbas.dtx v1.0o                                                                                                                                                                                                        |     |                                                         |     |
| General: First parameter of<br>\define@mathalphabet and<br>\define@mathgroup changed from<br>string to control sequence. . . . .                                                                                                     | 273 |                                                         |     |
| 1989-11-14 ltfssbas.dtx v1.0p                                                                                                                                                                                                        |     |                                                         |     |
| \math@version: Math version prefix<br>'mv@' added. . . . .                                                                                                                                                                           | 284 |                                                         |     |
| 1989-11-19 ltfssbas.dtx v1.0q                                                                                                                                                                                                        |     |                                                         |     |
| \define@newfont: Group added. . . . .                                                                                                                                                                                                | 286 |                                                         |     |
| \wrong@fontshape: Instead of calling<br>\family\default@family, etc. we<br>directly set \f@family, etc. . . . .                                                                                                                      | 290 |                                                         |     |
| 1989-11-22 ltfssbas.dtx v1.0r                                                                                                                                                                                                        |     |                                                         |     |
| \math@version: \def → \edef for<br>\math@version. . . . .                                                                                                                                                                            | 284 |                                                         |     |
| 1989-11-25 ltfssbas.dtx v1.0s                                                                                                                                                                                                        |     |                                                         |     |
| General: All \edef\font@name<br>changed to \xdef\font@name.<br>Necessary after introduction of<br>\begingroup/\endgroup in v1.0q. . . . .                                                                                            | 273 |                                                         |     |
| extra// → + in \extra@def. . . . .                                                                                                                                                                                                   | 273 |                                                         |     |

|                                                                                                                                                         |     |                                                                                                                                             |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1989-11-26 ltfssbas.dtx v1.0t<br>\select@group: \bgroup/\egroup<br>changed to<br>\begingroup/\endgroup to avoid<br>empty Ord atom on math list. . . . . | 293 | 1990-01-25 ltfssini.dtx v1.1e<br>\nfss@text: Macro added. . . . .                                                                           | 392 |
| 1989-12-02 ltfssini.dtx v1.1b<br>General: \rmmath renamed to<br>\mathrm . . . . .                                                                       | 373 | 1990-01-27 ltfssbas.dtx v1.2d<br>\DeclarePreloadSizes: Font identifier<br>set to \relax. . . . .                                            | 279 |
| 1989-12-03 ltfssini.dtx v1.1c<br>General: Some internal macros<br>renamed to make them<br>inaccessible. . . . .                                         | 373 | 1990-01-28 ltfssbas.dtx v1.2e<br>\mathgroup: \newfam let to<br>\new@mathgroup. . . . .                                                      | 273 |
| 1989-12-05 ltfssbas.dtx v1.0u<br>\addto@hook: \addto@hook added. . . . .                                                                                | 298 | 1990-01-28 ltfssbas.dtx v1.2f<br>\define@newfont: Added call to<br>\curr@fontshape macro to allow<br>substitution. . . . .                  | 286 |
| 1989-12-05 lfsstrc.dtx v1.0u fam.dtx<br>\every@math@size: Hook \every@size<br>added. . . . .                                                            | 325 | \wrong@fontshape: Warning message<br>slightly changed. . . . .                                                                              | 290 |
| 1989-12-13 lfsstrc.dtx v1.0f<br>\use@mathgroup: \expandafter added<br>before final \fi. . . . .                                                         | 328 | 1990-01-28 ltfssini.dtx v1.2b<br>\em: Call to \nomath added. . . . .                                                                        | 390 |
| 1989-12-16 ltfssbas.dtx v1.1a<br>\select@group: \relax in front<br>added. . . . .                                                                       | 293 | 1990-02-08 ltfssini.dtx v1.1g<br>General: Protected the commands<br>\fam, \series, \shape, \size,<br>\selectfont, and \mathversion. . . . . | 373 |
| Now four arguments. . . . .                                                                                                                             | 293 | 1990-02-16 ltfssbas.dtx v1.2g<br>General: Support for changes of<br>\baselineskip without changing<br>the size. . . . .                     | 273 |
| Redefinition of alphabet now<br>simpler. . . . .                                                                                                        | 293 | \mathversion: \nomath added. . . . .                                                                                                        | 284 |
| Usage of '=' macro added. . . . .                                                                                                                       | 293 | 1990-02-16 lfsstrc.dtx v1.0i<br>\selectfont: Changed \f@size to<br>\lcl@currsize (see fam file). . . . .                                    | 322 |
| 1989-12-16 lfsstrc.dtx v1.1a<br>\selectfont: Changed order of calls. . . . .                                                                            | 322 | 1990-02-18 lfsstrc.dtx v1.0j<br>General: Redefine unprotected version<br>\p@selectfont instead of<br>\selectfont. . . . .                   | 322 |
| \use@mathgroup: Redefinition of<br>alphabet now simpler. . . . .                                                                                        | 328 | 1990-03-14 lfsstrc.dtx v1.0k<br>General: Added code for TeX3. . . . .                                                                       | 318 |
| Usage of '=' macro added. . . . .                                                                                                                       | 328 | \extract@font: Added code for<br>TeX3. . . . .                                                                                              | 321 |
| 1990-01-18 lfsstrc.dtx v1.0h<br>General: \tracingfonts meaning<br>changed. . . . .                                                                      | 318 | \selectfont: Added code for TeX3. . . . .                                                                                                   | 322 |
| 1990-01-20 ltfssbas.dtx v1.2a<br>\math@bgroup: Def. placed in this<br>file. . . . .                                                                     | 295 | 1990-03-30 ltfssbas.dtx v1.2h<br>\math@egroup: Changed to have one<br>arg. . . . .                                                          | 295 |
| \math@egroup: Def. placed in this<br>file. . . . .                                                                                                      | 295 | 1990-03-30 lfsstrc.dtx v1.2h<br>\use@mathgroup: Third argument<br>removed (see \math@egroup). . . . .                                       | 328 |
| \select@group: Def for alph id<br>changed. . . . .                                                                                                      | 293 | 1990-04-01 ltfssbas.dtx v1.2i<br>General: Code added from<br>traceft.dtx. . . . .                                                           | 273 |
| 1990-01-21 ltfssbas.dtx v1.2b<br>\select@group: Code moved to<br>\use@mathgroup. . . . .                                                                | 293 | Support for TeX3. . . . .                                                                                                                   | 273 |
| 1990-01-21 lfsstrc.dtx v1.2b<br>\use@mathgroup: Macro added to<br>allow cleaner interface. . . . .                                                      | 328 | 1990-04-01 lfsstrc.dtx v1.0l<br>General: Part of code moved to<br>fam.dtx. . . . .                                                          | 318 |
| 1990-01-23 ltfssbas.dtx v1.2c<br>General: \no@version@warning<br>renamed to \no@alphabet@error. . . . .                                                 | 273 | \tracingfonts: Check if<br>\tracingfonts already defined. . . . .                                                                           | 319 |
| Macro \no@alphabet@help added . . . . .                                                                                                                 | 273 |                                                                                                                                             |     |
| \no@alphabet@error: Changed to<br>error call . . . . .                                                                                                  | 273 |                                                                                                                                             |     |

|                                                                                                             |     |                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1990-04-01 lfsstrc.dtx v1.0o                                                                                |     | 1991-08-14 ltmath.dtx LaTeX2.09                                                                                                               |
| \tracingfonts: Check if<br>\tracingfonts defined removed<br>again. . . . .                                  | 319 | \cases: (RmS) inserted extra braces<br>around entry for NFSS . . . . .                                                                        |
| 1990-04-02 ltfssini.dtx v1.1i                                                                               |     | 491                                                                                                                                           |
| General: \input of files now handled<br>by docstrip. . . . .                                                | 373 | 1991-08-14 ltpictur.dtx LaTeX2.09                                                                                                             |
| 1990-04-05 lfsstrc.dtx v1.0m                                                                                |     | General: (RmS) inserted extra braces<br>around entry for NFSS . . . . .                                                                       |
| \selectfont: Call \tracingon only if<br>\tracingfonts greater than 3. . . . .                               | 322 | 563                                                                                                                                           |
| 1990-05-05 lfsstrc.dtx v1.0n                                                                                |     | 1991-08-14 lthm.dtx LaTeX2.09                                                                                                                 |
| \selectfont: \tracingon with new<br>syntax. . . . .                                                         | 322 | \endtheorem: Moved \itshape after<br>\item to make it work with NFSS . . . . .                                                                |
| 1990-06-23 ltfssini.dtx v1.1k                                                                               |     | 593                                                                                                                                           |
| \nfss@text: Changed to \mbox. . . . .                                                                       | 393 | 1991-08-26 ltfssini.dtx v1.1n                                                                                                                 |
| 1990-06-24 ltfssbas.dtx v1.2j                                                                               |     | \reset@font: Macro introduced . . . . .                                                                                                       |
| \DeclarePreloadSizes: Missing<br>percent added. . . . .                                                     | 279 | 393                                                                                                                                           |
| 1990-06-24 lfsstrc.dtx v1.0o                                                                                |     | 1991-08-26 ltmiscen.dtx LaTeX2.09                                                                                                             |
| \baselinestretch: Moved to<br>tracefnt.dtx. . . . .                                                         | 325 | \overline: \C@par added . . . . .                                                                                                             |
| \getanddefine@fonts: \Adding<br>tracing code. . . . .                                                       | 329 | 481                                                                                                                                           |
| \Macro moved from fam.dtx. . . . .                                                                          | 329 | 1991-08-26 ltpictur.dtx LaTeX2.09                                                                                                             |
| Adding debug code. . . . .                                                                                  | 329 | \endpicture: (RmS & FMi) extra<br>boxing level around \picbox to<br>guard against unboxing in math<br>mode (proposed by John Hobby) . . . . . |
| \use@mathgroup: Tracing code added. . . . .                                                                 | 328 | 561                                                                                                                                           |
| 1990-06-30 ltfssbas.dtx v1.2l                                                                               |     | 1991-08-26 lplain.dtx LaTeX209                                                                                                                |
| \showhyphens: Macro added. . . . .                                                                          | 296 | \tracingall: Added<br>\errorcontextlines=\maxdimen,<br>suggested by J. Schrod . . . . .                                                       |
| 1990-06-30 lfsstrc.dtx v1.0p                                                                                |     | 31                                                                                                                                            |
| \use@mathgroup: Added \relax after<br>math group number. . . . .                                            | 328 | 1991-09-29 ltboxes.dtx LaTeX2.09                                                                                                              |
| 1990-07-07 lfsstrc.dtx v1.0q                                                                                |     | \cmpfootnotetext: (RmS) added<br>\reset@font . . . . .                                                                                        |
| \getanddefine@fonts: Group number<br>added to tracing. . . . .                                              | 329 | 529                                                                                                                                           |
| \math@egroup: Tracing code added. . . . .                                                                   | 329 | 1991-09-29 ltfloat.dtx LaTeX2.09                                                                                                              |
| \use@mathgroup: Group number<br>added to tracing. . . . .                                                   | 328 | \footnotetext: (RmS) added<br>\reset@font . . . . .                                                                                           |
| 1990-08-27 lfsstrc.dtx 1.0r                                                                                 |     | 626                                                                                                                                           |
| \type@restoreinfo: Some extra<br>tracing info. . . . .                                                      | 324 | 1991-09-29 ltmath.dtx LaTeX2.09                                                                                                               |
| 1990-08-27 lfsstrc.dtx v1.0r                                                                                |     | \eqnnum: RmS: \reset@font added. . . . .                                                                                                      |
| \getanddefine@fonts: Correcting<br>missing name after \tracingon. . . . .                                   | 329 | 496                                                                                                                                           |
| 1991-03-28 ltfssini.dtx v1.1m                                                                               |     | 1991-09-29 ltsect.dtx LaTeX2.09                                                                                                               |
| \copyright: Extra braces added. . . . .                                                                     | 393 | \dottedtocline: (RmS) added<br>\reset@font for page number . . . . .                                                                          |
| 1991-03-30 ltfssini.dtx v1.2g                                                                               |     | 605                                                                                                                                           |
| \newfont: Definition added. . . . .                                                                         | 391 | 1991-10-17 ltcntrl.dtx LaTeX209                                                                                                               |
| \symbol: Definition added. . . . .                                                                          | 392 | \@for: (Rms) \xdef replaced by \def<br>(See FMi's array.doc) . . . . .                                                                        |
| 1991-07-24 ltmiscen.dtx LaTeX2.09                                                                           |     | 165                                                                                                                                           |
| \verbatim: Added<br>\penalty\interlinepenalty to<br>definition of \par so that<br>\samepage works . . . . . | 481 | 1991-10-25 ltbibl.dtx LaTeX2.09                                                                                                               |
|                                                                                                             |     | \citex: added \reset@font,<br>suggested by Bernd Raichle. . . . .                                                                             |
|                                                                                                             |     | 632                                                                                                                                           |
|                                                                                                             |     | 1991-11-01 ltfloat.dtx LaTeX2.09                                                                                                              |
|                                                                                                             |     | \footnote: (RmS) Added<br>\let\protect\noexpand in<br>\footnote, \footnotemark, and<br>\footnotetext, since \xdef is<br>used . . . . .        |
|                                                                                                             |     | 626                                                                                                                                           |
|                                                                                                             |     | 1991-11-04 ltlists.dtx LaTeX2.09                                                                                                              |
|                                                                                                             |     | \makelabel: (RmS) added default<br>definition for \makelabel, to<br>produce an error message. . . . .                                         |
|                                                                                                             |     | 515                                                                                                                                           |
|                                                                                                             |     | 1991-11-04 lplain.dtx RmS                                                                                                                     |
|                                                                                                             |     | General: Removed \itemitem since<br>never needed/useful with L <sup>A</sup> T <sub>E</sub> X. . . . .                                         |
|                                                                                                             |     | 29                                                                                                                                            |

|            |                             |                                                                                                                                      |          |  |  |
|------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------|--|--|
| 1991-11-06 | ltbibl.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@citex:                    | added code to remove a leading blank                                                                                                 | 632      |  |  |
| 1991-11-13 | ltbibl.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@bibitem:                  | Changed counter enumi to enumiv, as it says in the comment above                                                                     | 632      |  |  |
| 1991-11-21 | ltfssini.dtx                | v1.1o                                                                                                                                |          |  |  |
|            | \reset@font:                | Added extra braces for robustness.                                                                                                   | 393      |  |  |
|            |                             | Changed to protected version of macro.                                                                                               | 393      |  |  |
| 1991-11-22 | ltfloat.dtx                 | LaTeX2.09                                                                                                                            |          |  |  |
|            | \footnote:                  | (RmS) Added \let\protect\noexpand in \xfootnote, \xfootnotemark, and \xfootnotetext                                                  | 626      |  |  |
| 1991-11-22 | ltlists.dtx                 | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@item:                     | (RmS) Changed second call to \makelabel to \unhbox\@tempboxa. Avoids problems with side effects in \makelabel and is more efficient. | 515      |  |  |
| 1991-11-27 | ltfssbas.dtx                | v1.3a                                                                                                                                |          |  |  |
|            | General:                    | All \family, \shape etc. renamed to \fontfamily etc.                                                                                 | 273      |  |  |
| 1991-11-27 | ltfssini.dtx                | v1.2a                                                                                                                                |          |  |  |
|            | General:                    | All \family, \shape etc. renamed to \fontfamily etc.                                                                                 | 373      |  |  |
| 1992-01-06 | ltfssini.dtx                | v1.2c                                                                                                                                |          |  |  |
|            | General:                    | added slitex code                                                                                                                    | 373      |  |  |
| 1992-01-10 | ltbibl.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@bibitem:                  | Changed \c@enumiv to \value of \listctr                                                                                              | 632      |  |  |
| 1992-01-10 | ltmath.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | equation:                   | RmS: put \hbox around \eqnnum to typeset the equation number in text mode (as in the eqnarray env.)                                  | 496      |  |  |
| 1992-01-10 | ltithm.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@othm:                     | (RmS) Check for existence of theorem environment                                                                                     | 592      |  |  |
| 1992-01-14 | ltbibl.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@biblabel:                 | removed \hfill                                                                                                                       | 634      |  |  |
| 1992-01-14 | ltsect.dtx                  | 0.0                                                                                                                                  |          |  |  |
|            | \@starttoc:                 | (RmS) added \immediate to \openout as all \write commands are also executed                                                          | 603      |  |  |
|            | \immediate                  |                                                                                                                                      |          |  |  |
| 1992-02-26 | ltbibl.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@bibitem:                  | Added \hfill to restore left-alignment of bibliography labels in alpha style                                                         | 632      |  |  |
| 1992-03-18 | ltdefns.dtx                 | LaTeX209                                                                                                                             |          |  |  |
|            | General:                    | (RMS) changed input channel from 0 to \inputcheck to avoid conflicts with other channels allocated by \newread                       | 72       |  |  |
| 1992-03-18 | ltfloat.dtx                 | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@xmpar:                    | (RmS) added \global\ignorefalse                                                                                                      | 620      |  |  |
|            | \end@float:                 | (RmS) changed \Eshack to \@Eshack                                                                                                    | 615      |  |  |
| 1992-03-18 | ltlists.dtx                 | 0.0                                                                                                                                  |          |  |  |
|            | \trivlist:                  | RmS: added \nmbrlistfalse                                                                                                            | 511      |  |  |
| 1992-03-18 | ltmisce.dtx                 | LaTeX2.09                                                                                                                            |          |  |  |
|            | \begin:                     | Changed \ignoretrue to \ignorefalse (as documented)                                                                                  | 473      |  |  |
| 1992-03-21 | ltfssini.dtx                | v1.2d                                                                                                                                |          |  |  |
|            | General:                    | Renamed \text to \nfss@text to make it internal.                                                                                     | 373      |  |  |
| 1992-05-12 | ltfssbas.dtx                | v1.3c                                                                                                                                |          |  |  |
|            | \extract@alph@from@version: | Macro added.                                                                                                                         | 294      |  |  |
|            | \select@group:              | Added call to \extract@alph@from@version.                                                                                            | 294      |  |  |
| 1992-07-26 | ltfssbas.dtx                | v1.9a                                                                                                                                |          |  |  |
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|            | \DeclareFontShape:          | Introduced \DeclareFontShape                                                                                                         | 274      |  |  |
|            | \define@newfont:            |                                                                                                                                      | 285      |  |  |
|            | \math@fonts:                |                                                                                                                                      | 293      |  |  |
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|            | \split@name:                | Added splitting into \f@encoding                                                                                                     | 285      |  |  |
|            | \wrong@fontshape:           |                                                                                                                                      | 290, 291 |  |  |
| 1992-07-26 | ltfsstrc.dtx                | v2.0b                                                                                                                                |          |  |  |
|            | \s@fct@:                    |                                                                                                                                      | 337      |  |  |
|            | \s@fct@sub:                 | documentation fixes                                                                                                                  | 338      |  |  |
|            | \selectfont:                |                                                                                                                                      | 322      |  |  |
|            | \try@simple@size:           |                                                                                                                                      | 332      |  |  |
|            | \try@size@range:            |                                                                                                                                      | 335      |  |  |
|            | \use@mathgroup:             |                                                                                                                                      | 328      |  |  |
| 1992-08-14 | ltbibl.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@citex:                    | added missing argument braces around \hbox, found by Ed Sznyter                                                                      | 632      |  |  |
| 1992-08-14 | ltboxes.dtx                 | LaTeX209                                                                                                                             |          |  |  |
|            | \endminipage:               | (RmS) replaced \vskip-\lastskip by \unskip (proposed by FMi)                                                                         | 529      |  |  |
| 1992-08-17 | ltbibl.dtx                  | LaTeX2.09                                                                                                                            |          |  |  |
|            | \@citex:                    | simplified code for removing leading blanks in citation key (proposed by Frank Jensen and Kresten Krab Thorup)                       | 632      |  |  |

|                                                                                                                                     |     |                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------|
| 1992-08-19 ltsect.dtx 0.0                                                                                                           |     | 1992-11-26 ltfloat.dtx LaTeX2.09                                                                   |
| \@xsect: (RmS) corrected bug: stretch<br>and shrink in argument to \hskip<br>previously not negated . . . . .                       | 599 | \@footnotetext: (RmS) added<br>protection for \edef . . . . .                                      |
| 1992-08-19 ltthm.dtx LaTeX2.09                                                                                                      |     | 626                                                                                                |
| \@othm: (RmS) Changed error message<br>to complain about undefined<br>counter . . . . .                                             | 592 | \footnote: (RmS) Changed all to<br>‘def‘protect‘noexpand‘protect‘noexpand<br>. . . . .             |
| 1992-08-20 ltfssini.dtx v1.4b                                                                                                       |     | 626                                                                                                |
| \@setsize: Added \currsize. . . . .                                                                                                 | 392 | 1992-12-03 ltfssini.dtx v?                                                                         |
| 1992-08-24 ltdefns.dtx LaTeX209                                                                                                     |     | \hexnumber@: Make it accept<br>counters. . . . .                                                   |
| \@ifnextchar: (Rms) \@ifnextchar<br>didn't work if its first argument<br>was an equal sign. . . . .                                 | 94  | 392                                                                                                |
| 1992-08-24 ltmiscen.dtx LaTeX2.09                                                                                                   |     | 1993-03-08 preload.dtx v2.0b                                                                       |
| \begin: Added code to \begin to<br>remember line number. Used by<br>\@badend to display position of<br>non-matching \begin. . . . . | 473 | General: Added 12pt preloads . . . . .                                                             |
| \verb: Changed \verb and \sverb to<br>work correctly in math mode . . .                                                             | 485 | 417                                                                                                |
| 1992-08-25 ltsect.dtx LaTeX2.09                                                                                                     |     | 1993-03-18 ltfssbas.dtx v2.0c                                                                      |
| \@sect: (FMi) replaced explicit setting<br>of \@svsec by call to<br>\@seccntformat . . . . .                                        | 598 | General: Changed all \tempdima in<br>\tempdimb to avoid killing<br>\numberline . . . . .           |
| 1992-09-18 ltlists.dtx LaTeX2.09                                                                                                    |     | 273                                                                                                |
| \item: (RmS) Added warning if \item<br>is used in math mode . . . . .                                                               | 513 | 1993-03-18 ltfsstrc.dtx v2.1b                                                                      |
| 1992-09-18 ltab.dtx LaTeX2.09                                                                                                       |     | General: Changed all \tempdima in<br>\tempdimb to avoid killing<br>\numberline . . . . .           |
| \@array: Changed \par to \empty to<br>avoid starting new row e.g. after<br>\hline . . . . .                                         | 546 | 318                                                                                                |
| 1992-09-19 ltfsstrc.dtx v2.0c                                                                                                       |     | Changed all \tempdimb in<br>\tempdimx to avoid killing<br>\numberline . . . . .                    |
| \try@simple@size: . . . . .                                                                                                         | 332 | 318                                                                                                |
| 1992-09-21 ltfssini.dtx v1.4d                                                                                                       |     | 1993-03-18 ltfsstrc.dtx v2.1c                                                                      |
| \@not@math@alphabet: Macro defined.                                                                                                 | 391 | \DeclareSizeFunction: Added all<br>args to avoid blanks problems . . .                             |
| 1992-09-22 ltfssbas.dtx v1.91a                                                                                                      |     | 334                                                                                                |
| General: Introduced \tf@size for<br>math size. . . . .                                                                              | 273 | 1993-04-09 lterror.dtx v1.0e                                                                       |
| 1992-09-22 ltfsstrc.dtx v2.1a                                                                                                       |     | \@latexerr: Mention The<br>Companion . . . . .                                                     |
| \getanddefine@fonts: Introduced<br>\tf@size for math size. . . . .                                                                  | 329 | 171                                                                                                |
| 1992-11-13 ltfssini.dtx v?                                                                                                          |     | 1993-04-11 lterror.dtx v1.0f                                                                       |
| \hexnumber@: Made expandable. . . . .                                                                                               | 392 | \@latexerr: Remove setting of<br>errorcontextlines . . . . .                                       |
| 1992-11-23 ltcounds.dtx LaTeX2.09                                                                                                   |     | 171                                                                                                |
| \stepcounter: Replaced {} in<br>\stepcounter by \begingroup<br>\endgroup to avoid adding an<br>empty ord in math mode . . . . .     | 265 | 1993-05-05 lftntcmd.dtx v2.0b                                                                      |
| 1992-11-26 ltboxes.dtx LaTeX2.09                                                                                                    |     | General: Removed all LaTeX related<br>cmds . . . . .                                               |
| \@mpfootnotetext: (RmS) added<br>protection for \edef . . . . .                                                                     | 529 | 420                                                                                                |
|                                                                                                                                     |     | 1993-05-16 ltfssbas.dtx v2.0e                                                                      |
|                                                                                                                                     |     | \showhyphens: Use \reset@font . . .                                                                |
|                                                                                                                                     |     | 296                                                                                                |
|                                                                                                                                     |     | 1993-07-16 ltfsstrc.dtx v2.1h                                                                      |
|                                                                                                                                     |     | General: Changed layout of info<br>messages . . . . .                                              |
|                                                                                                                                     |     | 318                                                                                                |
|                                                                                                                                     |     | 1993-07-17 ltoutenc.dtx 1.0d                                                                       |
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|                                                                                                                                     |     | 221                                                                                                |
|                                                                                                                                     |     | 1993-08-03 ltmiscen.dtx LaTeX2.09                                                                  |
|                                                                                                                                     |     | \enddocument: Changed redefinition of<br>\global to redefinition of<br>\@setckpt. . . . .          |
|                                                                                                                                     |     | 467                                                                                                |
|                                                                                                                                     |     | 1993-08-05 ltpictur.dtx LaTeX2.09                                                                  |
|                                                                                                                                     |     | \circle: (RMS) Added error message<br>if \circle is used in math mode. . . . .                     |
|                                                                                                                                     |     | 583                                                                                                |
|                                                                                                                                     |     | 1993-08-05 ltsect.dtx LaTeX2.09                                                                    |
|                                                                                                                                     |     | \@sect: (RmS) Made sure that<br>\protect works correctly in<br>expansion of \the counter . . . . . |
|                                                                                                                                     |     | 598                                                                                                |

|                                                                                                                                                                      |     |                                                                                                                                              |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1993-08-05 ltspace.dtx LaTeX2e<br>\@hspace: (RmS) Removed<br>superfluous \leavevmode in<br>\@hspace and \@hspacer, as<br>suggested by CAR. . . . .                   | 195 | 1993-11-03 ltmath.dtx LaTeX2e<br>General: RmS: Initialized \everycr to<br>empty . . . . .                                                    | 496 |
| 1993-08-05 lttab.dtx latex2e<br>\tabular*: Replaced<br>\expandafter\def by \@namedef. . . . .                                                                        | 545 | 1993-11-03 ltpictur.dtx LaTeX2.09<br>General: (RmS) changed \halign to<br>\vialign to initialize \tabskip and<br>\everycr . . . . .          | 563 |
| 1993-08-06 ltbibl.dtx LaTeX2.09<br>\@citex: Moved writing to .aux file in<br>loop over citation keys so that<br>leading blanks are removed there<br>as well. . . . . | 632 | 1993-11-11 ltfssini.dtx v2.1a<br>\normalfont: Macro added . . . . .                                                                          | 393 |
| 1993-08-13 ltoutenc.dtx 1.0f<br>General: Protected against active @<br>sign. . . . .                                                                                 | 221 | 1993-11-11 ltfsstrc.dtx v2.2a<br>General: Option concept added for<br>LaTeX2e . . . . .                                                      | 318 |
| 1993-08-13 preload.dtx v2.0c<br>General: Added \relax at end of font<br>names. . . . .                                                                               | 418 | 1993-11-14 ltclass.dtx v0.2a<br>\@currext: Name changed from<br>\@currextension . . . . .                                                    | 644 |
| 1993-08-16 ltoutenc.dtx 1.0g<br>General: Needs space after \string . . . . .                                                                                         | 221 | \@reset@options: macro added . . . . .                                                                                                       | 666 |
| 1993-08-18 ltfsdcl.dtx v2.0e<br>\new@mathversion: Exchanged names<br>of encodings in warning message of<br>\SetSymbolFont. . . . .                                   | 355 | \AtEndDocument: Included extension<br>in the generated macro name for<br>package and class hooks. . . . .                                    | 666 |
| 1993-09-02 ltfsstrc.dtx v2.1i<br>General: Corrected name of sgen size<br>function. . . . .                                                                           | 318 | \documentstyle: Added<br>\RequirePackage<br>\@unuseoptionlist stuff. . . . .                                                                 | 656 |
| 1993-09-03 ltmiscen.dtx LaTeX2.09<br>\verbatim@nolig@list: Replaced<br>\@noligs by extensible list . . . . .                                                         | 485 | \load@onefilewithoptions: Moved<br>resetting of \default@ds, \ds@ and<br>\@declaredoptions here, from the<br>end of \ProcessOptions. . . . . | 660 |
| 1993-09-07 ltmiscen.dtx LaTeX2.09<br>\verb@balance@group: (RmS)<br>Changed definition of \verb so<br>that it detects a missing second<br>delimiter. . . . .          | 484 | \NeedsTeXFormat: made more robust<br>for alternative syntax for other<br>formats. . . . .                                                    | 658 |
| 1993-09-08 ltmiscen.dtx LaTeX2.09<br>\enddocument: Added warning in case<br>of undefined references. . . . .                                                         | 467 | \ProcessOptions*: Optimise 'empty<br>option' code. . . . .                                                                                   | 654 |
| 1993-09-15 ltfsbas.dtx v2.0g<br>\DeclareFontEncoding: Corrected:<br>\default@T to \default@M. . . . .                                                                | 277 | Stop adding the global option list<br>inside class files. . . . .                                                                            | 654 |
| 1993-09-15 ltfsstrc.dtx v2.1j<br>General: Corrected spelling of<br>\noxpand. . . . .                                                                                 | 318 | 1993-11-14 ltdefns.dtx v0.2a<br>\g@addto@macro: Made global . . . . .                                                                        | 99  |
| 1993-09-19 lterror.dtx LaTeX2.09<br>\@invalidchar: (RmS) Error message<br>for invalid input characters. . . . .                                                      | 174 | 1993-11-15 ltclass.dtx v0.2b<br>\documentstyle: Modified to match<br>\ProcessOption*. . . . .                                                | 656 |
| 1993-11-02 ltmath.dtx LaTeX2.09<br>General: RmS: Corrected description<br>of \eqnse1, moved \eqnse1<br>accordingly and removed extra<br>\tabskip assignment. . . . . | 496 | \ProcessOptions*: Star form added. . . . .                                                                                                   | 654 |
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|                                                                                                                                                                      |     | \load@onefilewithoptions: Added<br>trap for two \LoadClass<br>commands. . . . .                                                              | 644 |
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| \documentstyle: Modified               | \@newenv: Macro interface changed . . .   | 77  |
| \RequirePackage stuff. . . . .         | \@xargdef: Macro interface changed . . .  | 74  |
| \ExecuteOptions: Use                   | \@yargd@f: Avoid \@?@? token . . . . .    | 75  |
| \CurrentOption not \reserved@a         | Macro interface changed . . . . .         | 75  |
| \NeedsTeXFormat: \fmtname              | \newcommand: Macro reimplemented          |     |
| \fmtversion not \@... . . . . .        | and extended . . . . .                    | 73  |
| 1993-11-21 ltfiles.dtx LaTeX2e         | \renewcommand: Macro reimplemented        |     |
| \@missingfileerror: Stop infinite      | and extended . . . . .                    | 76  |
| looping on \@er@ext . . . . .          | \renewenvironment: Macro                  |     |
| 1993-11-21 ltmiscen.dtx v0.9a          | reimplemented and extended . . . . .      | 77  |
| \@verbatim: use \verb@font             | \two@digits: Macro added . . . . .        | 70  |
| instead of \tt . . . . .               | 1993-11-23 ltoutput.dtx v0.1a             |     |
| \verb: Use \verb@font instead of       | \paperheight: Register added . . . . .    | 740 |
| \tt . . . . .                          | \paperwidth: Register added . . . . .     | 740 |
| \verb@font: Macro added . . . . .      | 1993-11-23 ltoutput.dtx v0.1c             |     |
| 1993-11-22 ltclass.dtx v0.2f           | \@enlargepage: Command added . . . . .    | 784 |
| \@files@withoptions: Made the          | \@kludgeins: Insert added . . . . .       | 784 |
| default [] not [\@unknownversion]      | \@makecol: Command changed . . . . .      | 751 |
| \@ifl@ter: Added //0 so parsing        | \@specialoutput: Command changed          | 745 |
| never produces a runaway               | \enlarge@this@page*: Commands             |     |
| argument. . . . .                      | added . . . . .                           | 784 |
| General: \@unknownversion removed      | 1993-11-24 lfnntcmd.dtx v2.1a             |     |
| \load@one@file@withoptions: Made the   | \@maybe@ic@: Use \t@st@ic . . . . .       | 425 |
| initial version [] not                 | \t@st@ic: Macro added . . . . .           | 426 |
| [\@unknownversion] . . . . .           | 1993-11-24 ltfssini.dtx v2.1a             |     |
| 1993-11-22 ltdefns.dtx LaTeX2e         | General: Removed \xpt stuff . . . . .     | 393 |
| \@minus: Macro added . . . . .         | 1993-11-24 ltlogos.dtx LaTeX2e            |     |
| \@plus: Macro added . . . . .          | \LaTeX: Macro changed . . . . .           | 197 |
| \CheckCommand: Macro added . . . . .   | 1993-11-28 ltclass.dtx v0.2h              |     |
| \providecommand: Macro added . . . . . | \@twoclasses@error: Macro added . . . . . | 668 |
| 1993-11-22 lterror.dtx LaTeX2e         | General: Assorted commands now in         |     |
| \c@error@context@lines: Macro added    | the kernel removed. . . . .               | 643 |
| 1993-11-22 ltfiles.dtx LaTeX2e         | Directory syntax checing moved to         |     |
| \listfiles: Removed checking for       | dircheck.dtx . . . . .                    | 643 |
| \@unknownversion . . . . .             | Primitive filenames now terminated        |     |
| 1993-11-22 ltlength.dtx LaTeX2e        | by space not \relax. . . . .              | 643 |
| \@setto@dim: Macro added . . . . .     | \endfilecontents: Don't globally          |     |
| \@setto@point: Macro added . . . . .   | allocate a write stream (always use       |     |
| \@setto@depth: Macro added . . . . .   | 15) . . . . .                             | 668 |
| \@setto@height: Macro added . . . . .  | 1993-11-28 ltfiles.dtx LaTeX2e            |     |
| 1993-11-22 ltlogos.dtx LaTeX2e         | \@missingfileerror: Use filename          |     |
| \LaTeXe: Macro added . . . . .         | parser from dircheck . . . . .            | 214 |
| 1993-11-23 ltclass.dtx v0.2g           | 1993-11-29 ltoutput.dtx v1.0b             |     |
| \@use@option: Name changed from        | \@makecol: \@makespecialcolbox            |     |
| \@executeoption . . . . .              | added . . . . .                           | 751 |
| General: Various macros now moved      | \@makespecialcolbox: Command              |     |
| to latex.tex. . . . .                  | added . . . . .                           | 753 |
| Warnings and errors now directly       | 1993-11-29 ltplain.dtx LaTeX2e            |     |
| coded. . . . .                         | General: All accents in decimals;         |     |
| 1993-11-23 ltdefns.dtx LaTeX2e         | suggested by Paul Taylor . . . . .        | 30  |
| \@argdef: Macro added . . . . .        | 1993-11-30 ltoutput.dtx v1.0c             |     |
| \@ifundefined: Redefined to remove a   | \fl@tracemessage: Commands added          | 786 |
| trailing \fi . . . . .                 |                                           |     |

|                                         |     |                                            |     |
|-----------------------------------------|-----|--------------------------------------------|-----|
| 1993-12-01 fontdef.dtx v2.1a            |     | 1993-12-04 ltfiles.dtx v0.9b               |     |
| General: Update for LaTeX2e . . . . .   | 396 | \@iinput: Macro reimplemented . . . . .    | 213 |
| 1993-12-01 ltoutput.dtx v1.0e           |     | \@input: Macro reimplemented . . . . .     | 214 |
| \@reinserts: Command added . . . . .    | 753 | \IfFileExists@: Macro added . . . . .      | 211 |
| 1993-12-03 ltboxes.dtx v0.1a            |     | \input: Macro reimplemented . . . . .      | 213 |
| \@argsbox: macro removed . . . . .      | 531 | 1993-12-05 ltfloat.dtx LaTeX2e             |     |
| \@begin@tempboxa: macro added . . . . . | 520 | \@dblfloatplacement: Command               |     |
| \@end@tempboxa: macro added . . . . .   | 520 | changed . . . . .                          | 617 |
| \@iirsbox: redefined to support         |     | \@xfloat: Command changed . . . . .        | 611 |
| \height . . . . .                       | 531 | 1993-12-05 ltoutput.dtx v1.0f              |     |
| \@imakebox: macro modified . . . . .    | 520 | \@addtobot: Command changed . . . . .      | 765 |
| \@irsbox: redefined to support          |     | \@addtocurcol: Command changed . . . . .   | 767 |
| \height . . . . .                       | 531 | \@addtobdblcol: Command changed . . . . .  | 778 |
| \@isavebox: color support . . . . .     | 523 | \@addtonextcol: Command changed . . . . .  | 774 |
| extra group . . . . .                   | 523 | \@addtotoporbot: Command changed . . . . . | 766 |
| \@isavepicbox: extra group . . . . .    | 523 | \@boxfpsbit: Command added . . . . .       | 789 |
| \@makebox: default changed from x to    |     | \@flcheckspace: Command added . . . . .    | 791 |
| c . . . . .                             | 520 | \@flsetnum: Command added . . . . .        | 790 |
| \@makepicbox: macro modified . . . . .  | 521 | \@flsettextmin: Command added . . . . .    | 791 |
| \@savebox: default c not x . . . . .    | 523 | \@flstop: Commands added . . . . .         | 787 |
| \bm@b: macros added . . . . .           | 520 | \@flupdates: Command added . . . . .       | 792 |
| \endlrbox: macro added . . . . .        | 523 | \@fpsadddefault: Command added . . . . .   | 788 |
| \fbox: extra group . . . . .            | 524 | \@getfpsbit: Command added . . . . .       | 789 |
| \lrbox: color support . . . . .         | 523 | \@opcol: Command changed . . . . .         | 751 |
| macro added . . . . .                   | 523 | Hook added . . . . .                       | 751 |
| \makebox: modified . . . . .            | 519 | \@outputpage: Command changed . . . . .    | 755 |
| \mbox: extra group . . . . .            | 520 | \@resethfps: Command added . . . . .       | 790 |
| \minipage: Redefined to support extra   |     | \@setfloattypecounts: Command              |     |
| optional arguments . . . . .            | 528 | added . . . . .                            | 788 |
| \newsavebox: Pass the whole of arg 1    |     | \@setfpsbit: Command added . . . . .       | 790 |
| to \@ifdefinable . . . . .              | 522 | \@shipoutsetup: Command added . . . . .    | 755 |
| \parbox: Redefined to support extra     |     | \@startcolumn: Command changed . . . . .   | 761 |
| optional arguments . . . . .            | 526 | \@startdblcolumn: Command                  |     |
| \raisebox: redefined to support         |     | changed . . . . .                          | 761 |
| \height . . . . .                       | 531 | \@testfp: Command added . . . . .          | 789 |
| \sbox: color support . . . . .          | 522 | \@textfloatsheight: Commands               |     |
| extra group . . . . .                   | 522 | added . . . . .                            | 788 |
| \set@color: color support . . . . .     | 522 | \@topnewpage: Commands changed . . . . .   | 743 |
| macro added . . . . .                   | 522 | \@tryfcolumn: Command changed . . . . .    | 762 |
| 1993-12-03 ltclass.dtx v0.2i            |     | \@writesetup: \@startpagehook              |     |
| \@cls@pkg: Name changed to avoid        |     | added . . . . .                            | 755 |
| clash with output routine. . . . .      | 667 | \output: Command changed . . . . .         | 745 |
| General: \@onlypreamble: Many           |     | 1993-12-06 ltclass.dtx v0.2k               |     |
| commands declared. . . . .              | 643 | \ExecuteOptions: Preserve                  |     |
| Removed obsolete                        |     | \CurrentOption. . . . .                    | 655 |
| \@documentclass . . . . .               | 643 | 1993-12-06 ltoutput.dtx v1.0f              |     |
| 1993-12-03 lterror.dtx v1.0b            |     | \@specialoutput: Unboxing of 255           |     |
| \@latexerr: Set                         |     | added to rescue writes . . . . .           | 745 |
| \c@errorcontextlines to -1 . . . . .    | 171 | 1993-12-06 ltoutput.dtx v1.0g              |     |
| 1993-12-03 ltfsini.dtx v2.1a            |     | \@topnewpage: \@floatplacement             |     |
| General: update for LaTeX2e . . . . .   | 373 | placement bug fixed . . . . .              | 743 |
| 1993-12-04 ltfilehook.dtx v0.9b         |     | 1993-12-07 ltclass.dtx v0.2l               |     |
| \unqu@tefilef@nd: Macro added . . . . . | 695 | \ProvidesFile: Macro added . . . . .       | 652 |

|                                                                                                     |                                                                                                                                                                                 |          |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1993-12-07 ltclass.dtx v0.2m                                                                        | \fix@penalty: Macro added . . . . .                                                                                                                                             | 426      |
| \load@onefilewithoptions: Reset<br>\CurrentOption . . . . .                                         | \maybe@ic: Macro name changed . . .                                                                                                                                             | 425      |
| 1993-12-07 ltoutenc.dtx 1.1                                                                         | \maybe@ic@: Macro and name<br>changed . . . . .                                                                                                                                 | 425      |
| General: Protected all special<br>characters with \string. . . . .                                  | \sw@slant: Macro changed . . . . .                                                                                                                                              | 426      |
| 1993-12-07 ltoutenc.dtx v1.1                                                                        | \textup: Macros changed . . . . .                                                                                                                                               | 423      |
| General: Made all character numbers<br>decimal. . . . .                                             | 1993-12-11 ltmath.dtx v0.9g                                                                                                                                                     |          |
| Removed a lot of equal signs and<br>the like. . . . .                                               | General: Added a group around the<br>first argument of \frac to prevent<br>changes (for example font changes)<br>from modifying the contents of the<br>second argument. . . . . | 496      |
| 1993-12-08 ltboxes.dtx v0.1b                                                                        | 1993-12-11 ltoutenc.dtx v1.2a                                                                                                                                                   |          |
| \@begin@tempboxa: Extra braces for<br>color support (braces removed<br>from other macros) . . . . . | General: Corrected for t1enc, math. . . . .                                                                                                                                     | 218      |
| \@irsbox: fix typo . . . . .                                                                        | 1993-12-11 ltsect.dtx LaTeX2e                                                                                                                                                   |          |
| \@parboxto: \endgraf added due to<br>extra group in \@begin@tempboxa . . . . .                      | \author: Added default . . . . .                                                                                                                                                | 594      |
| \lrbbox: move \endpfalse out of the<br>inner group . . . . .                                        | \title: Added default . . . . .                                                                                                                                                 | 594      |
| 1993-12-08 lftntcmd.dtx v2.1b                                                                       | 1993-12-11 ltxref.dtx LaTeX2e                                                                                                                                                   |          |
| General: Macros \rm, \bf and \sf<br>moved to classes.dtx . . . . .                                  | \@setref: Macro added . . . . .                                                                                                                                                 | 463      |
| 1993-12-08 ltlists.dtx LaTeX2e                                                                      | \pageref: Macro reimplemented . . . . .                                                                                                                                         | 463      |
| \@item: use \sbox to support colour . . . . .                                                       | \ref: Macro reimplemented . . . . .                                                                                                                                             | 463      |
| 1993-12-08 ltspace.dtx LaTeX2e                                                                      | 1993-12-12 ltoutput.dtx v1.0h                                                                                                                                                   |          |
| \@bsphack: Command reimplemented . . . . .                                                          | \@cflb: boxmaxdepth setting moved<br>defs changed to lets . . . . .                                                                                                             | 759      |
| Command reimplemented; late<br>birthday present for Chris . . . . .                                 | \@cflt: name changed . . . . .                                                                                                                                                  | 759      |
| \@vbsphack: Command added . . . . .                                                                 | \@doclearpage: defs changed to<br>lets . . . . .                                                                                                                                | 750, 751 |
| 1993-12-09 ltboxes.dtx v0.1c                                                                        | \@makecol: defs changed to lets . . . . .                                                                                                                                       | 752      |
| \@irsbox: fix another typo . . . . .                                                                | \@resethfps: Warnings added:<br>minimal . . . . .                                                                                                                               | 790      |
| 1993-12-09 ltclass.dtx v0.2n                                                                        | \@startdblcolumn: defs changed to<br>lets . . . . .                                                                                                                             | 761, 762 |
| \documentstyle: input 209<br>compatibility file. . . . .                                            | \@topnewpage: braces removed . . . . .                                                                                                                                          | 743      |
| 1993-12-09 ltfiles.dtx v0.9e                                                                        | \@tryfcolumn: defs changed to lets . . . . .                                                                                                                                    | 762      |
| \document: Hook added . . . . .                                                                     | \f@tracemessage: Commands<br>changed . . . . .                                                                                                                                  | 786      |
| 1993-12-09 ltmiscen.dtx v0.9e                                                                       | 1993-12-13 ltclass.dtx v0.2o                                                                                                                                                    |          |
| \enddocument: Hook added . . . . .                                                                  | General: Removed setting<br>\errorcontextlines (now in<br>latex.tex) . . . . .                                                                                                  | 643      |
| 1993-12-10 ltoutenc.dtx v1.2                                                                        | \documentstyle: compatibility file<br>now latex209.sty. . . . .                                                                                                                 | 656      |
| General: Added source code for<br>t1enc.sty. . . . .                                                | \usepackage: Fixed error handling . . . . .                                                                                                                                     | 658      |
| 1993-12-11 lftntcmd.dtx v3.0a                                                                       | 1993-12-13 ltdirchk.dtx v0.2a                                                                                                                                                   |          |
| General: Complete reworking of all<br>text commands, using just one<br>creator function . . . . .   | General: on the ‘docstrip’ pass, do not<br>check openin path . . . . .                                                                                                          | 10       |
| italic correction now put in front of<br>penalty before glue . . . . .                              | \IfFileExists: Removed interactive<br>prompting for current directory<br>syntax . . . . .                                                                                       | 10       |
| newcommands replaced by defs . . . . .                                                              | \strip@prefix: modified, name<br>changed from \stripmeaning. . . . .                                                                                                            | 5        |
| newfontswitch command corrected<br>and changed . . . . .                                            | 1993-12-13 ltlists.dtx latex2e                                                                                                                                                  |          |
| \DeclareTextFontCommand: Macro<br>changed . . . . .                                                 | \trivlist: Initialised \@itemlabel . . . . .                                                                                                                                    | 511      |
| \emph: Macro changed . . . . .                                                                      |                                                                                                                                                                                 |          |

|                                        |          |
|----------------------------------------|----------|
| 1993-12-13 ltmiscen.dtx v0.9h          |          |
| \@noligs: Readded \@noligs . . . . .   | 486      |
| \@verbatim: Readded \@noligs . . . . . | 481      |
| Removed optional argument of           |          |
| \item . . . . .                        | 481      |
| center: Removed optional argument      |          |
| of \item . . . . .                     | 478      |
| flushleft: Removed optional            |          |
| argument of \item . . . . .            | 480      |
| flushright: Removed optional           |          |
| argument of \item . . . . .            | 480      |
| 1993-12-13 ltoutenc.dtx v1.2b          |          |
| General: Corrected file name in driver |          |
| code. . . . .                          | 218      |
| 1993-12-13 ltab.dtx latex2e            |          |
| \tabbing: Removed optional argument    |          |
| of \item . . . . .                     | 540      |
| 1993-12-14 ltoutput.dtx v1.0i          |          |
| General: Section added to declare all  |          |
| parameters . . . . .                   | 798      |
| 1993-12-15 ltboxes.dtx v0.1d           |          |
| \@imminipage: Changed default from     |          |
| ‘c’ to ‘s’ . . . . .                   | 528      |
| \@iparbox: Changed default from ‘c’    |          |
| to ‘s’ . . . . .                       | 526      |
| \minipage: Changed default from ‘c’    |          |
| to ‘s’ . . . . .                       | 528      |
| extra space removed. . . . .           | 528      |
| \parbox: Changed default from ‘c’ to   |          |
| ‘s’ . . . . .                          | 526      |
| 1993-12-15 ltclass.dtx v0.2p           |          |
| General: Removed extra ‘s’ from        |          |
| \@@warnings . . . . .                  | 643      |
| 1993-12-16 ltlogos.dtx LaTeXe          |          |
| \LaTeXe: Extended logo by DPC . . .    | 197      |
| 1993-12-16 ltmath.dtx v0.9i            |          |
| \@eqncr: use \refstepcounter           |          |
| instead of shortcut . . . . .          | 498      |
| General: use \refstepcounter instead   |          |
| of shortcut . . . . .                  | 496      |
| 1993-12-16 ltmiscen.dtx v0.9i          |          |
| General: \literal added . . . . .      | 486      |
| 1993-12-16 ltpage.dtx LaTeXe           |          |
| \mark: Init \mark at begin document    | 637      |
| 1993-12-16 ltspace.dtx LaTeXe          |          |
| \bsphack: Corrected optimisation :-)   | 185      |
| 1993-12-16 ltab.dtx latex2e            |          |
| \@xhline: Measure from middle of       |          |
| vertical rules . . . . .               | 555      |
| 1993-12-17 ltclass.dtx v0.2q           |          |
| \@documentclasshook: Macro added       | 643      |
| \@fileswithoptions: Add                |          |
| \@compatibility hook . . . . .         | 659      |
| \documentstyle: Match Alan’s new       |          |
| code. . . . .                          | 656      |
| 1993-12-17 ltoutenc.dtx 1.3            |          |
| General: Added this section . . . . .  | 222      |
| Removed all the hackery for use in     |          |
| \DeclareFontEncoding, and redid        |          |
| everything using                       |          |
| \DeclareTextFoo. . . . .               | 234, 236 |
| Removed the catcode hackery, since     |          |
| the file is only read as a package in  |          |
| the preamble, and removed all the      |          |
| messages on the screen, which just     |          |
| confuse users. Replaced them by        |          |
| the appropriate \ProvidesPackage       |          |
| commands. Added XXXenc. . . . .        | 221      |
| 1993-12-17 ltoutenc.dtx v1.3           |          |
| General: Added                         |          |
| \EncodingSpecificAccent,               |          |
| \EncodingSpecificAccentedLetter        |          |
| and \EncodingSpecificCommand. . . . .  | 218      |
| Made Rokicki’s encoding a proper       |          |
| encoding scheme rather than a          |          |
| variant of OT1. . . . .                | 218      |
| 1993-12-17 ltoutput.dtx v1.0j          |          |
| \@opcol: Hook removed . . . . .        | 751      |
| \@specialoutput: Page room test        |          |
| added . . . . .                        | 746      |
| \@topnewpage: check for vsize too      |          |
| small added . . . . .                  | 743      |
| Page room test added . . . . .         | 745      |
| \@writesetup: —and then removed        | 755      |
| \f@tracemessage: tracefloatvals        |          |
| made a document command . . . . .      | 786      |
| 1993-12-17 ltpage.dtx LaTeXe           |          |
| \mark: Removed init \mark at begin     |          |
| document, since it doesn’t work.       | 637      |
| \rightmark: Stopgap solution to mark   |          |
| \leftmark and \rightmark work          |          |
| without initializing mark until the    |          |
| problem is solved. . . . .             | 637      |
| 1993-12-18 ltoutenc.dtx 1.3b           |          |
| General: Fixed typos with              |          |
| \ProvidesPackage lines. Added          |          |
| the \NeedsTeXFormat line. Added        |          |
| the last argument to                   |          |
| \DeclareEncoding. Moved the use        |          |
| of the encodings to after their        |          |
| declaration. . . . .                   | 221      |
| Replaced the missing last argument     |          |
| to \DeclareFontEncoding. . . . .       | 234, 236 |
| 1993-12-18 ltoutenc.dtx 1.3c           |          |
| General: Rewrote for the new syntax    |          |
| of \EncodingSpecific. . . . .          | 234, 236 |

|                                                                                                                                                                                                   |     |                                                                                                            |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------|----------|
| Split \EncodingSpecificAccent up<br>into \EncodingSpecific and<br>\DeclareAccent. . . . .                                                                                                         | 222 | 1994-01-13 ltmath.dtx v0.9o<br>\@eqncr: correcting 0.9i . . . . .                                          | 498      |
| 1993-12-18 ltoutenc.dtx v1.3a<br>General: Replaced OT3 by XXX . . .                                                                                                                               | 218 | General: correcting 0.9i . . . . .                                                                         | 496      |
| 1993-12-18 ltoutenc.dtx v1.3b<br>General: Corrected typos. . . . .                                                                                                                                | 218 | 1994-01-14 ltdirchk.dtx v0.2d<br>\IfFileExists: Close the texsys.aux                                       |          |
| Replaced the missing last argument<br>to \DeclareFontEncoding. . . . .                                                                                                                            | 218 | output stream . . . . .                                                                                    | 10       |
| 1993-12-18 ltoutenc.dtx v1.3c<br>General: A new syntax, separating<br>accent-definitions from<br>encoding-specific definitions, and<br>allowing encoding-specific<br>\chardef, \let, etc. . . . . | 218 | 1994-01-15 lfiles.dtx v0.9o<br>\document: move \@preamblecmds                                              |          |
| Rewrote for the new syntax of<br>\EncodingSpecific. . . . .                                                                                                                                       | 218 | after document hook . . . . .                                                                              | 202      |
| 1993-12-18 ltoutenc.dtx v1.3d<br>General: Some T1 stuff had drifted<br>into the OT1 file. . . . .                                                                                                 | 218 | 1994-01-17 ltclass.dtx v0.2s<br>\@fileswithoptions: Modify to                                              |          |
| 1993-12-18 ltpage.dtx LaTeXe<br>\sloppy: Added \emergencystretch                                                                                                                                  | 637 | reduce parameter stack usage . . .                                                                         | 659      |
| 1993-12-19 ltclass.dtx v0.2r<br>\endfilecontents: Different message<br>when ignoring a file . . . . .                                                                                             | 668 | General: Added many more<br>\onlypreamble commands . . . . .                                               | 643      |
| 1993-12-19 lftntcmd.dtx v3.0b<br>General: \@pdef command added . . .                                                                                                                              | 420 | Wrapped long lines to column 72 . . .                                                                      | 643      |
| Added by ASAJ. . . . .                                                                                                                                                                            | 428 | \load@onefile@withoptions: Modify                                                                          |          |
| Made \@newfontswitch produce an<br>error if command already exists,<br>and added \@renewfontswitch,<br>ASAJ . . . . .                                                                             | 420 | to reduce parameter stack usage . . .                                                                      | 663      |
| Other tidying . . . . .                                                                                                                                                                           | 420 | 1994-01-17 lfiles.dtx LaTeXe<br>\listfiles: New Version, adds 'tex'<br>if needed, and lines up columns . . | 216      |
| Some more tidying done . . . . .                                                                                                                                                                  | 420 | 1994-01-17 ltfssbas.dtx v2.1a<br>General: New math font setup . . . .                                      | 273      |
| Untidying added, so this is now a<br>TEMPORARY version. . . . .                                                                                                                                   | 420 | \curr@math@size: New math font                                                                             |          |
| Wording changes by CAR. . . . .                                                                                                                                                                   | 428 | setup . . . . .                                                                                            | 285      |
| \DeclareOldFontCommand: Corrected<br>and tidied . . . . .                                                                                                                                         | 427 | \everydisplay: New math font setup . .                                                                     | 284      |
| \DeclareTextFontCommand: Corrected<br>and tidied . . . . .                                                                                                                                        | 422 | \everymath: New math font setup . .                                                                        | 284      |
| 1993-12-19 ltspace.dtx LaTeXe<br>\bsphack: There seem to be problems<br>with selfmade birthday presents .                                                                                         | 186 | \frozen@everydisplay: New math<br>font setup . . . . .                                                     | 285      |
| 1993-12-20 ltdefns.dtx LaTeXe<br>\reargdef: Kept old version of<br>\reargdef, for array.sty . . . . .                                                                                             | 75  | \frozen@everymath: New math font<br>setup . . . . .                                                        | 284, 285 |
| 1993-12-20 lfiles.dtx v0.9m<br>\obsoletefile: Added this<br>command, removed<br>\oldfilewarning . . . . .                                                                                         | 216 | \math@version: New math font setup . .                                                                     | 284      |
| 1994-01-05 fontdef.dtx v2.1d<br>General: Removed nf prefix from file<br>names. . . . .                                                                                                            | 398 | 1994-01-17 lfsstrc.dtx v2.3a<br>General: New math font setup . . . .                                       | 318      |
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|                                                                                                                                                                                                   |     | \input: do not use a different<br>definition for \@input@path . . . .                                      | 214      |
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| \IfFileExists@: New Definition . . . . .                                     | 211 | 1994-01-25 ltdirchk.dtx v0.2i                                                                                |
| \includeonly: Use \@input@ so<br>include files are listed. . . . .           | 206 | General: Protect against looping on<br>\@Cinput and \@Cend. . . . .                                          |
| 1994-01-18 ltfssini.dtx v2.1f                                                |     | 1994-01-25 ltfssbas.dtx v2.1b                                                                                |
| \@not@math@alphabet: Message<br>corrected . . . . .                          | 391 | \math@version: Corrections for math<br>setup . . . . .                                                       |
| 1994-01-18 ltmiscen.dtx v0.9p                                                |     | 1994-01-25 ltmath.dtx LaTeXe                                                                                 |
| \@verbatim: Add<br>\global\@inlabelfalse . . . . .                           | 481 | \bordermatrix: Removed \p@renwd. . . . .                                                                     |
| Only add \penalty if in hmode . . . . .                                      | 481 | 1994-01-26 ltfsstrc.dtx v2.3c                                                                                |
| 1994-01-19 fontdef.dtx v2.1e                                                 |     | \check@mathfonts: Correct trace info<br>placement . . . . .                                                  |
| General: Added missing setting for<br>symbols in bold version. . . . .       | 403 | \restglb@settings: Correct trace info<br>placement . . . . .                                                 |
| 1994-01-19 ltdirchk.dtx v0.2e                                                |     | 1994-01-27 lfntcmd.dtx v3.1a                                                                                 |
| \IfFileExists: name changed from<br>\test . . . . .                          | 9   | \nocorlist: Only ., used as default<br>for cm fonts . . . . .                                                |
| \input@path: No longer check that an<br>empty group is in the path . . . . . | 10  | 1994-01-29 ltclass.dtx v0.2v                                                                                 |
| \strip@prefix: name changed from<br>\strip@meaning, to match NFSS. . . . .   | 5   | \@unprocessedoptions: Macro<br>added. . . . .                                                                |
| 1994-01-19 ltmath.dtx v1.0n classes                                          |     | \load@onefile@withoptions: All<br>options raise error if no<br>\ProcessOptions appears . . . . .             |
| \mathindent: Deferred setting of<br>\mathindent . . . . .                    | 499 | 1994-01-31 ltdefns.dtx v0.2w                                                                                 |
| 1994-01-20 ltdirchk.dtx v0.2f                                                |     | \g@addto@macro: Use toks register to<br>avoid ‘hash’ problems . . . . .                                      |
| General: \copytexsys and the<br>texsys.new file removed . . . . .            | 8   | 1994-01-31 ltfiles.dtx v0.9t                                                                                 |
| Modify all of ltxcheck . . . . .                                             | 13  | \document: set \normalsize or<br>\normalsize if necessary . . . . .                                          |
| \IfFileExists: \copytexsys<br>removed . . . . .                              | 10  | 1994-01-31 lfntcmd.dtx v3.1b                                                                                 |
| 1994-01-21 ltclass.dtx v0.2u                                                 |     | General: \normalsize no longer<br>defined . . . . .                                                          |
| \documentstyle: compatibility file<br>now latex209.def. . . . .              | 656 | 1994-02-01 ltpage.dtx LaTeXe                                                                                 |
| 1994-01-21 ltdirchk.dtx v0.2g                                                |     | \pagestyle: (DPC) Modify to get<br>nicer error message . . . . .                                             |
| General: Improve documentation,<br>reorganise docstrip module . . . . .      | 1   | >thispagestyle: (DPC) Modify to get<br>nicer error message . . . . .                                         |
| \filename@parse: Minor changes, and<br>add Mac version (): . . . . .         | 11  | 1994-02-02 ltclass.dtx v0.2x                                                                                 |
| \today: Name changed from \stamp,<br>to save memory . . . . .                | 9   | \load@onefile@withoptions: Only<br>run the hook and options check if<br>the file was loaded. . . . .         |
| 1994-01-21 ltfloat.dtx LaTeXe                                                |     | 1994-02-03 ltoutput.dtx v1.0k                                                                                |
| \xfloat: Added missing percent<br>characters. . . . .                        | 611 | \makespecialcolbox: correct<br>mistakes in the documentation . . . . .                                       |
| 1994-01-21 ltmiscen.dtx v0.9s                                                |     | 1994-02-07 ltclass.dtx v0.2y                                                                                 |
| \verbatim@font: Removed<br>unnecessary category code<br>hackery. . . . .     | 482 | \files@withoptions: Run<br>\compatibility on the first class<br>to start (not the first to finish) . . . . . |
| 1994-01-24 ltdirchk.dtx v0.2h                                                |     | @ifclasswith: Add extra ,s so ‘two’<br>is not matched with ‘twocolumn’ . . . . .                             |
| \IfFileExists: Stop testing once<br>texsys.aux has been found . . . . .      | 9   | \ProcessOptions*: Add extra ,s so<br>‘two’ is not matched with<br>‘twocolumn’ . . . . .                      |
| 1994-01-24 ltpage.dtx LaTeXe                                                 |     |                                                                                                              |
| \pagestyle: (DPC) Complain if<br>pagestyle is undefined. . . . .             | 635 |                                                                                                              |

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| 1994-02-07 ltfssbas.dtx v2.1c                                                                                                                                              |     | 1994-03-04 ltsect.dtx v1.0a                                |     |
| \DeclareFontEncoding: revert catcode<br>settings earlier .....                                                                                                             | 277 | General: Initial version, split from<br>latex.dtx .....    | 594 |
| \DeclareFontShape@: revert catcode<br>settings earlier .....                                                                                                               | 274 | 1994-03-04 ltab.dtx v1.0a                                  |     |
| 1994-02-08 ltoutput.dtx v1.0k                                                                                                                                              |     | General: Initial version, split from<br>latex.dtx .....    | 533 |
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| boxmaxdepth setting removed ..                                                                                                                                             | 753 | General: Initial version, split from<br>latex.dtx .....    | 34  |
| General: Documentation and tasks<br>tidied. ....                                                                                                                           | 728 | 1994-03-07 ltboxes.dtx v0.1a                               |     |
| 1994-02-10 ltclass.dtx v0.2z                                                                                                                                               |     | \@mpfootnotetext: Extra group for<br>colour .....          | 529 |
| \@documentclasshook: Changed the<br>name from \compatibility to<br>\@documentclasshook, and added<br>the check for whether<br>\@normalsize has been defined.<br>ASAJ. .... | 643 | 1994-03-07 ltboxes.dtx v1.0a                               |     |
| \@fileswithoptions: Renamed<br>\@compatibility to<br>\@documentclasshook. ASAJ. .                                                                                          | 659 | General: Unify format with other<br>Kernel files .....     | 519 |
| 1994-02-10 ltfssbas.dtx v2.1d                                                                                                                                              |     | 1994-03-07 ltdefns.dtx v1.0a                               |     |
| \addto@hook: Made \addto@hook<br>long. ....                                                                                                                                | 298 | \@@italiccorr: Macro added .....                           | 71  |
| 1994-02-10 ltfsccmp.dtx v2.1d                                                                                                                                              |     | 1994-03-07 ltfiles.dtx v1.0a                               |     |
| \scan@@fontshape: scan away stuff<br>after pt .....                                                                                                                        | 342 | General: Initial version, split from<br>latex.dtx .....    | 198 |
| 1994-02-22 ltfssini.dtx v2.1g                                                                                                                                              |     | Long lines wrapped to 72 columns                           | 198 |
| General: Correct error message ..                                                                                                                                          | 394 | 1994-03-07 ltfinal.dtx v0.1a                               |     |
| 1994-02-24 ltfssbas.dtx v2.1e                                                                                                                                              |     | General: Add code from the old<br>dump.dtx .....           | 815 |
| \DeclareFontShape: Separate<br>restoration of catcodes for fd<br>cmds .....                                                                                                | 274 | Initial version, split from latex.dtx                      | 803 |
| \define@newfont: Separate<br>restoration of catcodes for fd<br>cmds .....                                                                                                  | 286 | move code here from lhyphen.dtx                            | 808 |
| \@fss@catcodes: Separate restoration<br>of catcodes for fd cmds .....                                                                                                      | 287 | Remove oldcomments environment                             | 803 |
| 1994-02-25 ltdirchk.dtx v0.2j                                                                                                                                              |     | use \InputIfExists not<br>\IfFileExists .....              | 808 |
| General: Remove need for drv file ..                                                                                                                                       | 1   | 1994-03-07 ltfloat.dtx v1.0a                               |     |
| 1994-03-01 ltdirchk.dtx v0.2k                                                                                                                                              |     | \@endfloatbox: (DPC) Extra group<br>for colour .....       | 616 |
| General: Add unstripped module, so<br>that dircheck.dtx may be used<br>with initex .....                                                                                   | 1   | \@footnotetext: (DPC) Extra group<br>for colour .....      | 626 |
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| 1994-03-02 ltclass.dtx v0.3a                                                                                                                                               |     | 1994-03-07 llength.dtx v1.0a                               |     |
| General: Remove need for driver file                                                                                                                                       | 643 | \@settodim: (DPC) Extra group for<br>colour .....          | 271 |
| 1994-03-03 ltboxes.dtx v0.1f                                                                                                                                               |     | 1994-03-07 ltlists.dtx v1.0a                               |     |
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| \@hangfrom: (DPC) Extra groups for colour                                                                       | 601 | \@tfcr: (DPC) Add \@tfcr so a single group is correctly treated. |
| 1994-03-07 ltab.dtx v1.0a                                                                                       |     | 1994-03-13 ltfilehook.dtx v0.3b                                  |
| General: Long lines wrapped to 72 columns                                                                       | 533 | \unqu@tefilef@und: Use new cmd \@addtofilelist                   |
| 1994-03-08 ltclass.dtx v0.3b                                                                                    |     | 1994-03-13 ltfiles.dtx LaTeX2e                                   |
| General: Modify driver code into ‘new style’                                                                    | 643 | \@addtofilelist: Macro added ...                                 |
| 1994-03-08 ltdirchk.dtx v1.0a                                                                                   |     | \listfiles: Reset \@addtofilelist at begin document              |
| General: Reorganise driver module into ‘new style’                                                              | 1   | 1994-03-13 ltfsbas.dtx v2.1g                                     |
| 1994-03-08 ltpplain.dtx v1.0a                                                                                   |     | General: add 2ekernel module to omit repeated code               |
| General: Remove need for a driver file.                                                                         | 14  | 1994-03-13 ltfssdcl.dtx v2.1c                                    |
| 1994-03-10 ltfsbas.dtx v2.2f                                                                                    |     | General: add 2ekernel module to omit repeated code               |
| \math@egroup: Changed \begingroup\endgroup to \bgroup\egroup                                                    | 295 | 1994-03-14 ltboxes.dtx v1.0b                                     |
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| \DeclareSymbolFontAlphabet@: Added check against use of alphabet switch outside of math mode                    | 371 | \@isavepicbox: Use \color@setgroup                               |
| \SetMathAlphabet@: Changed parameter template in temporary macro to catch check add below.                      | 360 | \color@begingroup: macro added for colour support                |
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| \ProvidesPackage: Add \wlog use \gtempa                                                                         | 650 | 1994-03-14 ltfloat.dtx 1.0c                                      |
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| \reargdef: New defn, in terms of \yargdef                                                                       | 75  | 1994-03-14 ltfloat.dtx v1.0c                                     |
| \yargd@f: Name changed from \XXX@argdef                                                                         | 75  | \@endfloatbox: (DPC) Use \color@endgroup                         |
| 1994-03-12 ltdirchk.dtx v1.0b                                                                                   |     | \@footnotetext: (DPC) Use \color@begingroup, add \endgraf        |
| General: Change name from dircheck.dtx                                                                          | 1   | \@savemarbox: (DPC) Use \color@begingroup                        |
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| 1994-03-12 ltfloat.dtx v1.0b                                                                                    |     | 1994-03-15 ltfiles.dtx LaTeX2e                                   |
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| General: Replaced remaining width, height, depth by L <sup>A</sup> T <sub>E</sub> X macro names to save tokens. | 14  | Removed defs of short-forms and all sizes except \normalize ...  |
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| <code>\@newctr</code> : Use <code>\nocounterr</code> instead<br>of <code>\@nocnterr</code> . . . . .             | 264 | <code>\maybe@ic@</code> : <code>\nocorr</code> etc removed<br>from list of tokens to check, leaving<br>only punctuation characters . . . . . | 425 |
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| 1994-04-17 lterror.dtx v1.0h                                                                                     |     | <code>\enddocument@kernel@warnings</code> :<br>Changed logic for producing<br>warning messages . . . . .                                     | 469 |
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| 1994-04-17 ltthm.dtx v1.0c                                                                                       |     | 1994-04-21 ltboxes.dtx v1.0e                                                                                                                 |     |
| <code>\@othm</code> : Use new std counter error<br>message (FMi) . . . . .                                       | 592 | <code>\@iiminipage</code> : Extra <code>\bgroup</code> for<br>colour . . . . .                                                               | 529 |
| 1994-04-18 ltfinal.dtx v0.1b                                                                                     |     | <code>\@mpfootnotetext</code> : Extra <code>\endgraf</code><br>for colour . . . . .                                                          | 529 |
| General: Initialise <code>\textheight</code> ,<br><code>\textwidth</code> and page style . . . . .               | 805 | <code>\endminipage</code> : Extra <code>\egroup</code> for<br>colour . . . . .                                                               | 529 |
| 1994-04-18 ltfloat.dtx v1.0d                                                                                     |     | 1994-04-21 ltfinal.dtx v0.1c                                                                                                                 |     |
| <code>\@footnotetext</code> : (DPC) Remove<br>Colour support . . . . .                                           | 626 | General: Added comments, set the<br>catcodes of 128–255. . . . .                                                                             | 803 |
| <code>\@savemarbox</code> : (DPC) Remove Colour<br>support . . . . .                                             | 620 | 1994-04-22 ltfssini.dtx v2.1g                                                                                                                |     |
| 1994-04-18 ltfssbas.dtx v2.1i                                                                                    |     | <code>\not@math@alphabet</code> : Message<br>changed again . . . . .                                                                         | 391 |
| General: Macro <code>\no@alphabet@help</code><br>removed again . . . . .                                         | 273 |                                                                                                                                              |     |
| <code>\calculate@math@sizes</code> : Changed<br>message to log only . . . . .                                    | 295 | 1994-04-23 ltfinal.dtx v0.1d                                                                                                                 |     |
| <code>\no@alphabet@error</code> : Use std LaTeX<br>error macro . . . . .                                         | 273 | General: Check that <code>\font@submax</code> is<br>still zero . . . . .                                                                     | 803 |
| 1994-04-18 ltfssdcl.dtx ???                                                                                      |     | 1994-04-24 ltoutput.dtx v1.0m                                                                                                                |     |
| <code>\DeclareMathAlphabet</code> : Pass correct<br>arg (2 not 3) . . . . .                                      | 358 | <code>\resetfps</code> : Number 2 changed to<br><code>\tw@</code> . . . . .                                                                  | 790 |
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|                                                                                                                  |     | Warning message removed as it will<br>be generated later . . . . .                                                                           | 744 |
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| Removed some long lines and other aesthetic changes. . . . .                                                                                                      | <b>728</b>      |                                                                              |            |
| Warning messages changed/corrected. . . . .                                                                                                                       | <b>728</b>      |                                                                              |            |
| 1994-04-24 ltpictur.dtx v0.1b                                                                                                                                     |                 |                                                                              |            |
| General: Removed surplus spaces after <code>\hbox to</code> in several cases . . . . .                                                                            | <b>558</b>      |                                                                              |            |
| 1994-04-25 ltclass.dtx v0.3h                                                                                                                                      |                 |                                                                              |            |
| General: Removed spurious extra 's at the end of error messages . . . . .                                                                                         | <b>643</b>      |                                                                              |            |
| 1994-04-25 ltfloat.dtx v1.0e                                                                                                                                      |                 |                                                                              |            |
| <code>\@largefloatcheck</code> : Changed warning message to give more info . . . . .                                                                              | <b>616</b>      |                                                                              |            |
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| General: Changed warning messages . . . . .                                                                                                                       | <b>607</b>      |                                                                              |            |
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| 1994-04-27 lfsstrc.dtx v2.3e                                                                                                                                      |                 |                                                                              |            |
| General: Corrected item that was forgotten in last change. . . . .                                                                                                | <b>318</b>      |                                                                              |            |
| 1994-04-28 lterror.dtx v1.0j                                                                                                                                      |                 |                                                                              |            |
| <code>\@inmatherr</code> : Macro added . . . . .                                                                                                                  | <b>174</b>      |                                                                              |            |
| 1994-04-28 lterror.dtx v1.1c                                                                                                                                      |                 |                                                                              |            |
| <code>\@inmatherr</code> : Replaced <code>\noexpand</code> with <code>\protect</code> . . . . .                                                                   | <b>174</b>      |                                                                              |            |
| 1994-04-28 ltfssdcl.dtx v2.1e                                                                                                                                     |                 |                                                                              |            |
| General: Removed all <code>\uppercase</code> in hex num parsing macros . . . . .                                                                                  | <b>346</b>      |                                                                              |            |
| 1994-04-28 ltlists.dtx v1.0c                                                                                                                                      |                 |                                                                              |            |
| <code>\item</code> : Replaced <code>\@ltxnomath</code> by <code>\@inmatherr</code> . . . . .                                                                      | <b>513</b>      |                                                                              |            |
| 1994-04-28 ltpictur.dtx v0.1c                                                                                                                                     |                 |                                                                              |            |
| <code>\@multiput</code> : (DPC) Macro added . . . . .                                                                                                             | <b>562</b>      |                                                                              |            |
| General: bezier curves added . . . . .                                                                                                                            | <b>585</b>      |                                                                              |            |
| <code>\@multiput</code> : (DPC) Ignore spaces between )(. . . . .                                                                                                 | <b>561</b>      |                                                                              |            |
| <code>\picture</code> : (DPC) Ignore spaces before ( . . . . .                                                                                                    | <b>560</b>      |                                                                              |            |
| 1994-04-28 ltplain.dtx v1.0g                                                                                                                                      |                 |                                                                              |            |
| General: Turn off overfull box tracing in log . . . . .                                                                                                           | <b>25</b>       |                                                                              |            |
| 1994-04-29 ltclass.dtx v1.0a                                                                                                                                      |                 |                                                                              |            |
| General: Change version number to 1 (no other change) . . . . .                                                                                                   | <b>643</b>      |                                                                              |            |
| 1994-04-29 ltmiscen.dtx v1.0f                                                                                                                                     |                 |                                                                              |            |
| <code>\@verbatim</code> : <code>\leavevmode</code> added . . . . .                                                                                                | <b>481</b>      |                                                                              |            |
| Change to <code>\everypar</code> added . . . . .                                                                                                                  | <b>481</b>      |                                                                              |            |
| 1994-04-29 ltoutenc.dtx 1.4a                                                                                                                                      |                 |                                                                              |            |
| General: Removed <code>\EncodingSpecific</code> . Renamed all the commands. Added <code>\DeclareTextGlyph</code> and <code>\UndeclareTextCommand</code> . . . . . | <b>222</b>      |                                                                              |            |
| 1994-04-30 ltfntcmd.dtx v3.3b                                                                                                                                     |                 |                                                                              |            |
| General: Documentation up-dated and tidied . . . . .                                                                                                              | <b>420</b>      |                                                                              |            |
| Prefix <code>frag@</code> changed to <code>frag</code> in <code>\@protecteddef</code> . . . . .                                                                   | <b>420</b>      |                                                                              |            |
| Title changed . . . . .                                                                                                                                           | <b>420</b>      |                                                                              |            |
| Warning changed to info message in <code>\@protecteddef</code> . . . . .                                                                                          | <b>420</b>      |                                                                              |            |
| 1994-04-30 ltoutput.dtx v1.0n                                                                                                                                     |                 |                                                                              |            |
| <code>\@activechar@info</code> :                                                                                                                                  |                 |                                                                              |            |
| <code>\@activechar@warning</code> changed to <code>\@activechar@info</code> . . . . .                                                                             | <b>755</b>      |                                                                              |            |
| <code>\@combinedblfloats</code> : Removed rule in <code>topnewpage</code> case . . . . .                                                                          | <b>760</b>      |                                                                              |            |
| <code>\@emptycol</code> : Empty column action added: <code>\@emptycol</code> . . . . .                                                                            | <b>743</b>      |                                                                              |            |
| <code>\@fllsetnum</code> : Rogue space removed . . . . .                                                                                                          | <b>790</b>      |                                                                              |            |
| <code>\@specialoutput</code> : Cut-off point changed to <code>2\baselineskip</code> . . . . .                                                                     | <b>746</b>      |                                                                              |            |
| Empty column action added: <code>\@emptycol</code> . . . . .                                                                                                      | <b>746</b>      |                                                                              |            |
| Extra empty column added for twocolumn case . . . . .                                                                                                             | <b>746</b>      |                                                                              |            |
| Extra empty column added for twocolumn case (wrong, see below) . . . . .                                                                                          | <b>746</b>      |                                                                              |            |
| <code>\@topnewpage</code> : Added setting of <code>\col@number</code> . . . . .                                                                                   | <b>743, 744</b> |                                                                              |            |
| Cut-off point changed to <code>3\baselineskip</code> . . . . .                                                                                                    | <b>745</b>      |                                                                              |            |
| Empty column action added: <code>\@emptycol</code> . . . . .                                                                                                      | <b>745</b>      |                                                                              |            |
| Message changed for Frank . . . . .                                                                                                                               | <b>745</b>      |                                                                              |            |
| General: <code>\@activechar@warning</code> changed to an info message. . . . .                                                                                    | <b>728</b>      |                                                                              |            |
| Added <code>\col@number</code> . . . . .                                                                                                                          | <b>728</b>      |                                                                              |            |
| Documentation tidied. . . . .                                                                                                                                     | <b>728</b>      |                                                                              |            |
| Empty column action added. . . . .                                                                                                                                | <b>728</b>      |                                                                              |            |
| Fixed bug from <code>\dblfigrule</code> with <code>\@topnewpage</code> . . . . .                                                                                  | <b>728</b>      |                                                                              |            |
| Full of floats action improved. . . . .                                                                                                                           | <b>728</b>      |                                                                              |            |
| <code>\col@number</code> : Added <code>\col@number</code> . . . . .                                                                                               | <b>740</b>      |                                                                              |            |
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| 1994-05-01 lterror.dtx v1.0k                                                                                                                                      |                 |                                                                              |            |
| <code>\@latexerr</code> : (CAR) Added draft <code>\@latexinfo</code> . . . . .                                                                                    | <b>171</b>      |                                                                              |            |
| 1994-05-01 ltoutenc.dtx 1.4a                                                                                                                                      |                 |                                                                              |            |
| General: Added the <code>\a</code> command. . . . .                                                                                                               | <b>230</b>      |                                                                              |            |
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|                                                                                                                        |          |                                                                                                                                  |     |
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| 1994-05-01 ltoutenc.dtx v1.4a                                                                                          |          | General: Renamed<br>\@DeclareMathDelimiter to<br>\@DeclareMathDelimiter . . . . .                                                | 346 |
| General: Removed Rokicki's<br>encoding. . . . .                                                                        | 218      |                                                                                                                                  |     |
| Renamed the commands, removed<br>the \EncodingSpecific command.<br>Turned all slots into decimal.<br>Added \a. . . . . | 218      | 1994-05-03 ltlists.dtx v1.0d<br>\item: \hskip changed to \kern . . . . .                                                         | 514 |
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| 1994-05-02 ltdefsns.dtx v1.1f                                                                                          |          | 1994-05-03 ltab.dtx v1.0d<br>\endpbox: Use \@finalstrut based<br>on depth of \@arstrutbox . . . . .                              | 556 |
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| \renewenvironment: Removed surplus<br>\space in error . . . . .                                                        | 77       | 1994-05-04 lterror.dtx v1.0m<br>\@badcrerr: Error message removed . . . . .                                                      | 174 |
| 1994-05-02 ltfiles.dtx v1.0f                                                                                           |          | 1994-05-05 ltbibl.dtx v1.0c<br>\citex: Set switch for warning and<br>end of run. . . . .                                         | 632 |
| \@iffilenonpath: \@break@loop<br>renamed to \@break@tfor . . . . .                                                     | 212      | \nocite: Do not write page number in<br>\nocite warning message. . . . .                                                         | 633 |
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| 1994-05-02 ltfinal.dtx v0.1e                                                                                           |          | 1994-05-05 ltfinal.dtx v0.1g<br>General: Added empty errhelp. . . . .                                                            | 803 |
| General: Added setting the 'letter'<br>catcodes. . . . .                                                               | 813      | \errhelp: Set error help empty. . . . .                                                                                          | 817 |
| Added setting the 'other' catcodes. . . . .                                                                            | 813      | 1994-05-05 ltntcmd.dtx v3.3c<br>\@math@egroup: Corrected<br>\fontswitch and added saved<br>versions . . . . .                    | 427 |
| Added setting the special catcodes. . . . .                                                                            | 813      | General: Corrected \fontswitch . . . . .                                                                                         | 420 |
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| 1994-05-02 ltmiscen.dtx v1.0g                                                                                          |          | Removed surplus braces from<br>\ifnextchar constructs . . . . .                                                                  | 533 |
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| \@resethfps: Code shortened . . . . .                                                                                  | 790      | 1994-05-09 ltntcmd.dtx v3.3f<br>General: Replaced all \next by<br>\let@token and undo change<br>3.3e, whatever that was. . . . . | 420 |
| General: Code of \@resethfps<br>shortened. . . . .                                                                     | 728      |                                                                                                                                  |     |
| 1994-05-03 ltbibl.dtx v1.0b                                                                                            |          |                                                                                                                                  |     |
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| 1994-05-03 ltfloat.dtx v1.0f                                                                                           |          |                                                                                                                                  |     |
| General: (CAR) Added<br>\largefloatcheck . . . . .                                                                     | 607      |                                                                                                                                  |     |
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| 1994-05-10 ltdefns.dtx v1.0n                                           | \@changed@cmd and<br>\DeclareProtectedCommand. . . . .                               | 222                                                            |                                                                                                   |
| General: (ASAJ) Added<br>\DeclareProtectedCommand. . . . .             | 70                                                                                   | Renamed the commands again.                                    |                                                                                                   |
| Added \DeclareProtectedCommand                                         | 79                                                                                   | Made the encoding part of the                                  |                                                                                                   |
| Removed braces around<br>\@ifundefined argument. ASAJ.                 | 76                                                                                   | command syntax. Added the                                      |                                                                                                   |
| \makeatother: Added \makeatletter                                      |                                                                                      | \DeclareTextCommand interface.                                 |                                                                                                   |
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| 1994-05-10 lterror.dtx v1.0n                                           | \DeclareProtectedCommand. . . . .                                                    | 218                                                            |                                                                                                   |
| \@latexerr: (ASAJ) Added extra<br>blank lines to \@latexerr. . . . .   | 171                                                                                  | \DeclareTextAccent: Reimplemented                              |                                                                                                   |
| 1994-05-10 ltmiscen.dtx v1.0j                                          | \@sverb: Slight change in error<br>message text. . . . .                             | 483                                                            | using \DeclareTextCommand. . . . .                                                                |
| 1994-05-11 ltboxes.dtx v1.0f                                           | \begin@tempboxa: Use new<br>\color@setgroup concept. . . . .                         | 520                                                            | 224                                                                                               |
| \@iiminipage: Use new<br>\color@setgroup concept. . . . .              | 529                                                                                  | 1994-05-11 ltspace.dtx v1.0o                                   |                                                                                                   |
| \@mpfootnotetext: Use new<br>\color@setgroup concept. . . . .          | 529                                                                                  | \hspace: Use<br>\DeclareRobustCommand. ASAJ. . . . .           |                                                                                                   |
| Use new \normalcolor and<br>\finalstrut. . . . .                       | 529                                                                                  | 1994-05-12 ltboxes.dtx v1.0g                                   |                                                                                                   |
| General: Superfluous braces removed<br>from several commands . . . . . | 519                                                                                  | \finalstrut: macro added . . . . .                             |                                                                                                   |
| \color@setgroup: macro added for<br>colour support . . . . .           | 522                                                                                  | \fbox: New definition, merged with<br>\fframebox . . . . .     |                                                                                                   |
| \endminipage: Use new<br>\color@setgroup concept. . . . .              | 529                                                                                  | 1994-05-12 \framebox: Merged \fbox and<br>\fframebox . . . . . |                                                                                                   |
| 1994-05-11 ltclass.dtx v1.0c                                           | \endfilecontents: Add checks for<br>form feed and tab . . . . .                      | 668                                                            | 1994-05-12 ltdefns.dtx v1.0p                                                                      |
| 1994-05-11 ltdirchk.dtx v1.0e                                          | General: Add \ProvidesFile as used<br>in fd files. . . . .                           | 4                                                              | General: (ASAJ) Fixed a bug with<br>\relax which was using \gobble<br>before defining it. . . . . |
| 1994-05-11 lterror.dtx v1.0o                                           | \@latexerr: (ASAJ) Removed one of<br>the extra blank lines to<br>\@latexerr. . . . . | 171                                                            | 70                                                                                                |
| 1994-05-11 ltlogos.dtx v1.0o                                           | \LaTeXe: Use<br>\DeclareProtectedCommand.<br>ASAJ. . . . .                           | 197                                                            | Fixed a bug with \relax which was<br>using \gobble before defining it. . . . .                    |
| 1994-05-11 ltoutenc.dtx 1.5a                                           | \LaTeXe: Use<br>\DeclareProtectedCommand.<br>ASAJ. . . . .                           | 197                                                            | 1994-05-12 ltfssbas.dtx v2.1j                                                                     |
| General: Made T1 and OT1 generate<br>packages rather than def files.   |                                                                                      | General: New baselinestretch concept                           |                                                                                                   |
| Renamed the ‘package’ module to<br>‘teststy’. . . . .                  | 221                                                                                  | 273                                                            |                                                                                                   |
| 1994-05-11 ltoutenc.dtx v1.5a                                          | Reimplemented<br>\DeclareTextCommand using                                           |                                                                | Replaced hand-protected commands<br>by \DeclareRobustCommand defs                                 |
| General: Reimplemented<br>\DeclareTextCommand using                    |                                                                                      | 273                                                            |                                                                                                   |
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|                                                                        |                                                                                      | \mathversion: Use<br>\DeclareRobustCommand. . . . .            |                                                                                                   |
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|                                                                        |                                                                                      | 1994-05-12 ltfssdcl.dtx v2.1g                                  |                                                                                                   |
|                                                                        |                                                                                      | General: Allow \relax as undefined<br>command . . . . .        |                                                                                                   |
|                                                                        |                                                                                      | 346                                                            |                                                                                                   |
|                                                                        |                                                                                      | Allow \relax’ed cmds to be<br>declared . . . . .               |                                                                                                   |
|                                                                        |                                                                                      | 346                                                            |                                                                                                   |
|                                                                        |                                                                                      | 1994-05-12 ltfssini.dtx v2.1i                                  |                                                                                                   |
|                                                                        |                                                                                      | General: Moved \fontencoding to<br>fam.dtx . . . . .           |                                                                                                   |
|                                                                        |                                                                                      | 373                                                            |                                                                                                   |
|                                                                        |                                                                                      | Moved \fontfamily to fam.dtx . . . . .                         |                                                                                                   |
|                                                                        |                                                                                      | 373                                                            |                                                                                                   |

|                                                                                   |          |                                                                                        |
|-----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------|
| Moved \fontseries to fam.dtx . . . . .                                            | 373      | 1994-05-13 ltfiles.dtx v1.0g                                                           |
| Moved \fontshape to fam.dtx . . . . .                                             | 373      | \document: Added execution of<br>\every@size . . . . .                                 |
| Moved \fontsize to fam.dtx . . . . .                                              | 373      | 201                                                                                    |
| Moved \mathversion to fam.dtx . . . . .                                           | 373      | 1994-05-13 ltfinal.dtx v0.1h                                                           |
| Moved \selectfont to tracefnt.dtx . . . . .                                       | 373      | General: Added package ot1enc, and<br>defined \@acci, \@accii and<br>\@acciii. . . . . |
| 1994-05-12 lfsstrc.dtx v2.3f                                                      |          | 803                                                                                    |
| \selectfont: Use<br>\DeclareRobustCommand . . . . .                               | 322      | 1994-05-13 ltfinal.dtx v1.0h                                                           |
| 1994-05-12 ltoutenc.dtx 1.5a                                                      |          | General: Added output enc stuff . . . . .                                              |
| General: Removed the<br>\SaveAtCatcode and<br>\RestoreAtCatcode commands. . . . . | 234      | 815                                                                                    |
| Rewrote for the new syntax. . . . .                                               | 234, 236 | 1994-05-13 ltfloat.dtx v1.0g                                                           |
| 1994-05-12 ltoutput.dtx v1.0p                                                     |          | \@footnotetext: (DPC) Add new<br>style colour support:<br>\normalcolor . . . . .       |
| \@writesetup: \normalcoloradded . . . . .                                         | 755      | 626                                                                                    |
| General: \normalcoloradded in<br>various places (DPC). . . . .                    | 728      | (DPC) Use \@finalstrut . . . . .                                                       |
| 1994-05-13 ltboxes.dtx v1.0h                                                      |          | 626                                                                                    |
| \@arrayparboxrestore: New accent<br>system, use \let not \def . . . . .           | 527      | \@xfloat: (DPC) Use \normalcolor . . . . .                                             |
| 1994-05-13 ltcnts.dtx v1.0f                                                       |          | 612                                                                                    |
| General: Removed \@ialph . . . . .                                                | 267      | 1994-05-13 lftntcmd.dtx v3.3g                                                          |
| Removed \@ialph . . . . .                                                         | 267      | General: Replaced \@protecteddef by<br>\DeclareRobustCommand . . . . .                 |
| 1994-05-13 ltdefns.dtx v1.0q                                                      |          | 420                                                                                    |
| General: (ASAJ) Renamed<br>\DeclareProtectedCommand to<br>\DeclareRobustCommand.  |          | 1994-05-13 ltfsbas.dtx v2.1k                                                           |
| Removed \@if@short@command. . . . .                                               | 70       | General: Remove File identification<br>‘typeout’ . . . . .                             |
| (ASAJ) Replaces \space by ‘ ’ in<br>\csname. . . . .                              | 70       | 273                                                                                    |
| Renamed<br>\DeclareProtectedCommand to<br>\DeclareRobustCommand.                  |          | 1994-05-13 lfssbas.dtx v2.1l                                                           |
| Removed \@if@short@command.                                                       |          | \DeclareFontEncoding: Init encoding<br>change command . . . . .                        |
| Moved to after the definition of<br>\@gobble. . . . .                             | 79       | 277                                                                                    |
| 1994-05-13 ltdefns.dtx v1.0r                                                      |          | \define@newfont: Use \@input@ for fd<br>files . . . . .                                |
| General: (ASAJ) Added logging<br>message to<br>\DeclareProtectedCommand. . . . .  | 70       | 286                                                                                    |
| Added logging message to<br>\DeclareProtectedCommand. . . . .                     | 79       | 1994-05-13 ltfsdcl.dtx v2.1h                                                           |
| 1994-05-13 ltdefns.dtx v1.0s                                                      |          | General: Removed file identification<br>typeout . . . . .                              |
| General: (ASAJ) Added<br>\@backslashchar. . . . .                                 | 70       | 346                                                                                    |
| (ASAJ) Coded \ifdefinable more<br>efficiently. . . . .                            | 70       | 1994-05-13 ltfsini.dtx v2.1j                                                           |
| Coded more efficiently, thanks to<br>FMi. . . . .                                 | 76       | General: Removed file identification<br>typeout . . . . .                              |
| 1994-05-13 ltfiles.dtx LaTeXe                                                     |          | 373                                                                                    |
| \listfiles: Stop \listfiles being<br>run twice . . . . .                          | 216      | 1994-05-13 lfsstrc.dtx v2.3g                                                           |
|                                                                                   |          | General: Removed typeouts as<br>\ProvidesPackage writes to log. . . . .                |
|                                                                                   |          | 318                                                                                    |
|                                                                                   |          | 1994-05-13 ltoutenc.dtx v1.5b                                                          |
|                                                                                   |          | General: Added \{, \} and \\$. . . . .                                                 |
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|                                                                                   |          | Renamed<br>\DeclareProtectedCommand to<br>\DeclareRobustCommand. . . . .               |
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|                                                                                   |          | Replaces \space by ‘ ’ in \csname. . . . .                                             |
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|                                                                                   |          | 1994-05-13 ltpictur.dtx v0.1d                                                          |
|                                                                                   |          | General: Removed surplus braces from<br>\@if.. constructions . . . . .                 |
|                                                                                   |          | 558                                                                                    |
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|                                                                                   |          | \@contfield: Colour support . . . . .                                                  |
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|                                                                                   |          | 1994-05-14 fontdef.dtx v2.1f                                                           |
|                                                                                   |          | General: Removed .def files. . . . .                                                   |
|                                                                                   |          | 398                                                                                    |
|                                                                                   |          | 1994-05-14 lfssbas.dtx v2.1m                                                           |
|                                                                                   |          | \enc@update: Macro added . . . . .                                                     |
|                                                                                   |          | 282                                                                                    |

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| 1994-05-14 ltfssbas.dtx v2.1n                                                                                                                                                          |          | 1994-05-16 ltfssbas.dtx v2.1p                                                                                                                                     |
| General: Set defaults for all \f@... . . . . .                                                                                                                                         | 283      | \fontsize: Pass \baselinestretch not<br>\f@linespread . . . . .                                                                                                   |
| \DeclareErrorFont: Don't set<br>\f@encoding . . . . .                                                                                                                                  | 290      | \linespread: Remove surplus braces . . . . .                                                                                                                      |
| \DeclareFontEncoding: Log if<br>encoding is redeclared . . . . .                                                                                                                       | 277      | 1994-05-16 ltfssini.dtx v2.1m                                                                                                                                     |
| Only init enc change cmd when new<br>encoding . . . . .                                                                                                                                | 277      | \@acciii: Define saved versions of<br>accents . . . . .                                                                                                           |
| 1994-05-14 ltfssini.dtx v2.1k                                                                                                                                                          |          | 1994-05-16 ltlogos.dtx v1.1a                                                                                                                                      |
| General: Init error font just before<br>checking for fontdef.cfg . . . . .                                                                                                             | 394      | General: (ASAJ) Split from ltinit.dtx. . . . .                                                                                                                    |
| \reset@font: Remove surplus braces . . . . .                                                                                                                                           | 393      | 1994-05-16 ltmath.dtx v1.0k                                                                                                                                       |
| 1994-05-14 ltfssrc.dtx v2.3h                                                                                                                                                           |          | \ensuremath: Use<br>\ DeclareRobustCommand and add<br>extra braces in math mode . . . . .                                                                         |
| \selectfont: Added \enc@update . . . . .                                                                                                                                               | 323      | 1994-05-16 ltoutenc.dtx 1.5h                                                                                                                                      |
| 1994-05-14 ltoutenc.dtx 1.5d                                                                                                                                                           |          | General: \pounds was still using u<br>rather than ui shape. . . . .                                                                                               |
| General: Moved the driver to the top. . . . .                                                                                                                                          | 221      | 1994-05-16 ltoutenc.dtx v1.5f                                                                                                                                     |
| 1994-05-14 ltoutenc.dtx v1.5c                                                                                                                                                          |          | General: enc files now have uc<br>encoding name parts (FMi) . . . . .                                                                                             |
| General: Added the fontenc package . . . . .                                                                                                                                           | 260      | Revert code so that the encoding<br>given is used in<br>\ DeclareTextCommand (FMi) . . . . .                                                                      |
| Added the fontenc package. . . . .                                                                                                                                                     | 218      | 1994-05-16 ltoutenc.dtx v1.5g                                                                                                                                     |
| Fixed a bug which caused an<br>infinite loop if \f@encoding was<br>incorrectly set. . . . .                                                                                            | 218, 222 | General: Made fontenc.sty use the new<br>mixed-case encoding files. . . . .                                                                                       |
| Moved fontsmpl to its own dtx file. . . . .                                                                                                                                            | 218      | Removed the lowercasing of the<br>filename. . . . .                                                                                                               |
| 1994-05-14 ltoutenc.dtx v1.5d                                                                                                                                                          |          | 1994-05-16 ltoutenc.dtx v1.5h                                                                                                                                     |
| General: Rewrote<br>\ DeclareTextCommand to define its<br>argument to use the current<br>encoding by default, rather than<br>the encoding provided to<br>\ DeclareTextCommand. . . . . | 218      | General: Added \NG, \ng, \TH, \th,<br>\VH, \dh, \DJ and \dj. . . . .                                                                                              |
| Tidied up the documentation. . . . .                                                                                                                                                   | 218      | Added \r (ring accent) and \k<br>(ogonek) accents. . . . .                                                                                                        |
| 1994-05-14 ltoutenc.dtx v1.5e                                                                                                                                                          |          | Fixed a bug with \pounds. . . . .                                                                                                                                 |
| General: Replaced \ENC@cmd by<br>\ENC-cmd. . . . .                                                                                                                                     | 218      | Removed \P from the OT1<br>definitions file. . . . .                                                                                                              |
| 1994-05-15 ltfssbas.dtx v2.1o                                                                                                                                                          |          | 1994-05-16 ltoutenc.dtx v1.5i                                                                                                                                     |
| General: encoding cmd changed to<br>enc-cmd . . . . .                                                                                                                                  | 273      | General: Fixed a bug with \d. . . . .                                                                                                                             |
| 1994-05-16 fontdef.dtx v2.1g                                                                                                                                                           |          | 1994-05-16 ltoutput.dtx v1.0q                                                                                                                                     |
| General: Removed<br>\ DeclareFontEncoding for ot1 and<br>t1 and input .def files instead . . . . .                                                                                     | 398      | \@writesetup: Changed setting of<br>accents (FMi): with the new<br>encoding setup they can use \let.<br>It could also use the new internal<br>commands? . . . . . |
| 1994-05-16 ltalloc.dtx v1.1a                                                                                                                                                           |          | General: Changed setting of accents<br>(FMi). . . . .                                                                                                             |
| General: (ASAJ) Split from ltinit.dtx. . . . .                                                                                                                                         | 160      | 1994-05-16 ltpar.dtx v1.1a                                                                                                                                        |
| 1994-05-16 ltcntrl.dtx v1.0a                                                                                                                                                           |          | General: (ASAJ) Split from ltinit.dtx. . . . .                                                                                                                    |
| General: (ASAJ) Split from ltinit.dtx. . . . .                                                                                                                                         | 162      | 1994-05-16 lplain.dtx v1.0h                                                                                                                                       |
| 1994-05-16 ltdefns.dtx v1.1a                                                                                                                                                           |          | General: Comment out encoding<br>specific commands . . . . .                                                                                                      |
| General: (ASAJ) Split from ltinit.dtx. . . . .                                                                                                                                         | 70       | Remove \@acci and friends again . . . . .                                                                                                                         |
| 1994-05-16 lterror.dtx v1.1a                                                                                                                                                           |          | Remove unnecessary def for \item . . . . .                                                                                                                        |
| General: (ASAJ) Completely new<br>error interface. . . . .                                                                                                                             | 166      | \loop: Use Kabelschacht method . . . . .                                                                                                                          |
| (ASAJ) Split from ltinit.dtx. . . . .                                                                                                                                                  | 166      | \m@th: Remove unnecessary space . . . . .                                                                                                                         |
| 1994-05-16 ltfinal.dtx v1.0i                                                                                                                                                           |          |                                                                                                                                                                   |
| General: moved output enc stuff to<br>lffonts . . . . .                                                                                                                                | 815      |                                                                                                                                                                   |

|            |                                                                                                                                          |                                                             |     |
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| 1994-05-16 | ltspace.dtx v1.1a                                                                                                                        | Replaced \defaultencoding with<br>\encodingdefault. . . . . | 218 |
|            | General: (ASAJ) Split from ltinit.dtx.                                                                                                   | 178                                                         |     |
| 1994-05-17 | ltclass.dtx v1.0e                                                                                                                        |                                                             |     |
|            | \useoption: Execute option after<br>removing from list, not before . . .                                                                 | 655                                                         |     |
| 1994-05-17 | ltdefns.dtx 1.1b                                                                                                                         |                                                             |     |
|            | General: (ASAJ) Added the<br>\protect@... commands. . . . .                                                                              | 80                                                          |     |
| 1994-05-17 | ltdefns.dtx v1.1b                                                                                                                        |                                                             |     |
|            | General: (ASAJ) Added definitions for<br>protect. . . . .                                                                                | 70                                                          |     |
|            | (ASAJ) Removed warnings and<br>logging to lterror.dtx. . . . .                                                                           | 70                                                          |     |
|            | Added the discussion of protected<br>commands, defined the values that<br>\protect should have. . . . .                                  | 80                                                          |     |
| 1994-05-17 | ltdefns.dtx v1.1c                                                                                                                        |                                                             |     |
|            | General: (ASAJ) Redid definitions for<br>protect. . . . .                                                                                | 70                                                          |     |
| 1994-05-17 | lterror.dtx v1.1b                                                                                                                        |                                                             |     |
|            | General: (ASAJ) Moved error stuff<br>from ltdefns.dtx. . . . .                                                                           | 166                                                         |     |
| 1994-05-17 | ltfssini.dtx v2.1n                                                                                                                       |                                                             |     |
|            | \copyright: Really add extra braces                                                                                                      | 393                                                         |     |
|            | \nfss@text: Added braces to allow<br>use in subscripts . . . . .                                                                         | 393                                                         |     |
| 1994-05-17 | ltmath.dtx v1.0i                                                                                                                         |                                                             |     |
|            | General: Replaced \let by \gdef, for<br>indirect definition. . . . .                                                                     | 494                                                         |     |
| 1994-05-17 | ltoutenc.dtx v1.5j                                                                                                                       |                                                             |     |
|            | General: Added braces to \pounds so<br>it works as a subscript. . . . .                                                                  | 218                                                         |     |
| 1994-05-18 | ltdefns.dtx 1.1c                                                                                                                         |                                                             |     |
|            | General: (ASAJ) Renamed the<br>commands, and removed one<br>which is no longer needed. . . . .                                           | 80                                                          |     |
| 1994-05-18 | ltdefns.dtx v1.1c                                                                                                                        |                                                             |     |
|            | General: Redid the discussion and<br>definitions, in line with the<br>proposed new setting of \protect<br>in the output routine. . . . . | 80                                                          |     |
| 1994-05-18 | ltfinal.dtx v0.1j                                                                                                                        |                                                             |     |
|            | General: Corrected the lccode for<br>d-bar. . . . .                                                                                      | 803                                                         |     |
| 1994-05-18 | ltlogos.dtx v1.1b                                                                                                                        |                                                             |     |
|            | General: (ASAJ) Added the TeX<br>logo. . . . .                                                                                           | 197                                                         |     |
|            | (ASAJ) Made the LATEX 2 $\varepsilon$ logo use<br>the text font '2' rather than the<br>math font '2'. . . . .                            | 197                                                         |     |
| 1994-05-18 | ltoutenc.dtx v1.5k                                                                                                                       |                                                             |     |
|            | General: Made dotted-i produce 'i'. . .                                                                                                  | 218                                                         |     |
|            | Removed braces from \pounds and<br>\dollar. . . . .                                                                                      | 218                                                         |     |
| 1994-05-19 | ltbibl.dtx v1.1a                                                                                                                         |                                                             |     |
|            | General: Initial version of ltbibl.dtx,<br>split from ltidxbib.dtx . . . . .                                                             | 631                                                         |     |
| 1994-05-19 | ltcounts.dtx v1.1a                                                                                                                       |                                                             |     |
|            | General: Extracted file from ltcntlen.                                                                                                   | 263                                                         |     |
| 1994-05-19 | ltdefns.dtx v1.1d                                                                                                                        |                                                             |     |
|            | General: (RmS) Added definitions for<br>\namedef and \nameuse again. . . . .                                                             | 70                                                          |     |
| 1994-05-19 | ltfinal.dtx v0.1k                                                                                                                        |                                                             |     |
|            | General: Removed \makeat... . . . .                                                                                                      | 803                                                         |     |
| 1994-05-19 | ltidxglo.dtx v1.1a                                                                                                                       |                                                             |     |
|            | General: Initial version of ltidxglo.dtx,<br>split from ltidxbib.dtx . . . . .                                                           | 628                                                         |     |
| 1994-05-19 | ltlength.dtx v1.1a                                                                                                                       |                                                             |     |
|            | General: Extract file ltlength from<br>ltcntlen. . . . .                                                                                 | 271                                                         |     |
| 1994-05-19 | ltpageno.dtx v1.1a                                                                                                                       |                                                             |     |
|            | General: Extract file ltpageno from<br>ltcntlen. . . . .                                                                                 | 460                                                         |     |
| 1994-05-19 | lplain.dtx v0.1k ltfinal                                                                                                                 |                                                             |     |
|            | \showoutput: used \maxdimen not<br>99999 . . . . .                                                                                       | 31                                                          |     |
|            | \showoverfull: used \one not 1 . . . . .                                                                                                 | 31                                                          |     |
| 1994-05-19 | ltxref.dtx v1.1a                                                                                                                         |                                                             |     |
|            | General: Extract file ltxref from<br>ltcntlen. . . . .                                                                                   | 461                                                         |     |
| 1994-05-20 | ltdefns.dtx v1.1e                                                                                                                        |                                                             |     |
|            | General: Changed command name<br>from \checkcommand to<br>\CheckCommand. . . . .                                                         | 70                                                          |     |
|            | \CheckCommand: Changed name from<br>\checkcommand to<br>\CheckCommand. . . . .                                                           | 78                                                          |     |
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|            | (ASAJ) Added missing full stops. . . . .                                                                                                 | 166                                                         |     |
|            | (ASAJ) Fixed a bug with<br>\inmatherr. . . . .                                                                                           | 166                                                         |     |
| 1994-05-20 | ltfinal.dtx v0.1l                                                                                                                        |                                                             |     |
|            | General: Use new font warning<br>commands . . . . .                                                                                      | 809                                                         |     |
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|            | \endfloatbox: Restore outer value of<br>\nobreak switch. . . . .                                                                         | 616                                                         |     |
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|            | General: Use new error commands . . .                                                                                                    | 273                                                         |     |

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| 1994-05-20 ltmiscen.dtx v1.0l                                                                                                     |     | (ASAJ) Replaced<br>\\@generic@message and<br>\\@generic@error by<br>\\GenericError, \\GenericWarning<br>and \\GenericInfo. . . . . | 166 |
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| 1994-05-20 ltmiscen.dtx v1.0m                                                                                                     |     | (ASAJ) Replaces \\string by<br>\\protect in some messages. . . . .                                                                 | 166 |
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| General: Use new error commands .                                                                                                 | 502 | General: Removed def of<br>\\f@warn@break . . . . .                                                                                | 335 |
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| 1994-11-17 lterror.dtx v1.2h<br>General: \tempa to \reserved@a . . . . .                 | 166 | 1994-11-21 ltfloat.dtx v1.1f<br>\endfloatbox: Added reset of<br>minipage flag . . . . .                                | 616      |
| 1994-11-17 ltfiles.dtx v1.0n<br>General: \tempa to \reserved@a . . . . .                 | 198 | Corrected position of<br>\outer@nobreak . . . . .                                                                      | 616      |
| 1994-11-17 ltfinal.dtx v1.0o<br>General: \tempa to \reserved@a . . . . .                 | 803 | \marginparreset: Macro added . . . . .                                                                                 | 620      |
| 1994-11-17 ltfloat.dtx v1.1e<br>General: \tempa to \reserved@a . . . . .                 | 607 | \savemarbox: Added \setminipage<br>etc . . . . .                                                                       | 620      |
| 1994-11-17 lftntcmd.dtx v3.3p<br>General: \tempa to \reserved@a . . . . .                | 420 | Added resetting of size and font . . . . .                                                                             | 620      |
| 1994-11-17 ltfsbas.dtx v2.1w<br>General: \tempa to \reserved@a . . . . .                 | 273 | Changed to \color@vbox . . . . .                                                                                       | 620      |
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| 1994-11-17 ltmath.dtx v1.0o<br>General: \tempa to \reserved@a . . . . .                  | 487 | \setnobreak: Macro added . . . . .                                                                                     | 614      |
| 1994-11-17 ltmiscen.dtx v1.0v<br>General: \tempa to \reserved@a . . . . .                | 466 | \xfloat: Added \setminipage . . . . .                                                                                  | 612      |
| 1994-11-17 ltoutenc.dtx v1.6h<br>General: (DPC) \tempa to<br>\reserved@a . . . . .       | 218 | Added resetting of size and font . . . . .                                                                             | 612      |
| 1994-11-17 ltoutput.dtx v1.1h<br>General: \tempa to \reserved@a . . . . .                | 728 | Changed to \color@vbox so that<br>large floats overflow at the<br>bottom . . . . .                                     | 612      |
| 1994-11-17 ltpictur.dtx v1.0f<br>General: \tempa to \reserved@a . . . . .                | 558 | Missing percents reinserted after 4,<br>8: these are not numbers. . . . .                                              | 611      |
| 1994-11-17 ltsect.dtx v1.0i<br>General: \tempa to \reserved@a . . . . .                  | 594 | Use \setnobreak . . . . .                                                                                              | 612      |
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| 1994-11-18 ltfinal.dtx v1.0n<br>General: re-allow slots 127–255 . . . . .                | 813 | \specialoutput: Added \if@nobreak<br>test . . . . .                                                                    | 748      |
| 1994-11-18 ltfsbas.dtx v2.1x<br>General: (DPC) use \reserved@f not<br>\next . . . . .    | 273 | \topnewpage: Changed to<br>\color@vbox . . . . .                                                                       | 744      |
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| \@newenv: Added test for \endgraf . . . . .                                                                                                                    | 77  |
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| 1994-11-30 ltoutenc.dtx v1.6g                                                                                                                                  |     |
| General: Removed new definitions of<br>\patterns and \hyphenation,<br>since encoding-specific commands<br>now expand in the mouth. . . . .                     | 230 |
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| 1995-09-15 | ltfssini.dtx v3.0e                                                                   |     | 1995-10-16 | ltboxes.dtx v1.0w                                                                                  |
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| General: Added <code>\leavevmode</code> at start<br>of <code>\c</code> , otherwise the output routine<br>might be invoked within the<br>macro. . . . . | 234 | General: Added <code>\textasciicircum</code> ,<br><code>\textasciitilde</code> ,<br><code>\textbackslash</code> , <code>\textbar</code> ,<br><code>\textgreater</code> and <code>\textless</code> . . . . . |
| Changed <code>\char32</code> to <code>\@xxxii</code> (two<br>tokens less). . . . .                                                                     | 235 | Added <code>\textasciicircum</code> ,<br><code>\textasciitilde</code> ,<br><code>\textregistered</code> and<br><code>\texttrademark</code> . . . . .                                                        |
| Replaced octal number 27 by<br>decimal number 23 to protect<br>against the quote character being<br>active. . . . .                                    | 235 | Added <code>\textbackslash</code> and<br><code>\textbar</code> . . . . .                                                                                                                                    |
| Replaced some 0's by <code>\z@</code> (faster).                                                                                                        | 235 | Added <code>\textless</code> and<br><code>\textgreater</code> . . . . .                                                                                                                                     |
| 1995-11-10 ltoutput.dtx v1.1s                                                                                                                          |     | 1995-12-01 ltoutenc.dtx v1.7u                                                                                                                                                                               |
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| 1995-11-14 ltclass.dtx v1.0t                                                                                                                           |     | 1995-12-04 ltspace.dtx v1.2l                                                                                                                                                                                |
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| <code>\LoadClassWithOptions</code> : macro<br>added . . . . .                                                                                          | 657 | General: Ulrik Vieth. added 12pt<br>OMS and OML preloads /1989 .                                                                                                                                            |
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| \ltx@sh@ft: New macro . . . . .       | 30            | bug). . . . .                                                     | 354 |
| \sh@ft: Macro no longer used but left |               | \loggingall: etex tracing if available                            | 31  |
| for compatibility . . . . .           | 30            | 2013-07-07 ltclass.dtx v1.1i                                      |     |
| 2005-11-08 ltoutenc.dtx v1.99h        |               | General: Correctly describe how the                               |     |
| General: Added \ij and \IJ from       |               | date in \@ifpackagelater is used                                  | 642 |
| babel. (pr/3771) . . . . .            | 231, 235, 238 | 2014-04-18 ltoutput.dtx v1.1o                                     |     |
| 2005-11-10 ltmath.dtx v1.1g           |               | General: Handle infinite glue from                                |     |
| \l: (MH) Fixed potential problem in   |               | \enlargethispage (pr/4023) . . . . .                              | 796 |
| \l (pr/3399). . . . .                 | 494           | 2014-04-24 ltoutput.dtx v1.2n                                     |     |
| General: (MH) Minor documentation     |               | \f1@tracemessage: Renamed internal                                |     |
| fixes. . . . .                        | 487           | trace commands; provide as                                        |     |
| 2006-05-18 ltboxes.dtx v1.1g          |               | package . . . . .                                                 | 786 |
| \@parboxto: Ensure \@parboxto holds   |               | 2014-04-27 ltfloat.dtx v1.2b                                      |     |
| the value of \tempdimb not the        |               | \end@dblfloat: Inline the code to                                 |     |
| register itself (pr/3867) . . . . .   | 526           | allow some coexistence with                                       |     |
| 2006-09-13 ltoutput.dtx v1.1m         |               | packages that hook into                                           |     |
| General: Ensure that rule is in       |               | \end@float and do not know                                        |     |
| \normalcolor . . . . .                | 796           | about the algorithm change . . . . .                              | 615 |
| 2007-08-05 ltclass.dtx v1.1h          |               | 2014-06-10 ltfloat.dtx v1.2b                                      |     |
| \@fileswithoptions: Prevent loss of   |               | \end@dblfloat: missing \fi added .                                | 615 |
| brackets PR/3965 . . . . .            | 659           | 2014-12-30 ltfinal.dtx v2.0a                                      |     |
| 2007-08-06 ltcntrl.dtx v1.0h          |               | \newmarks: macro added . . . . .                                  | 803 |
| \@fornoop: Really make defs long .    | 165           | \newXeTeXintercharclass: macro                                    |     |
| 2007-08-31 ltfsdcl.dtx v3.0l          |               | added . . . . .                                                   | 803 |
| \SetSymbolFont@: Font warning         |               | 2014-12-30 ltfloat.dtx v1.2a                                      |     |
| changed to info for encoding          |               | \@textsubscript: Command added                                    |     |
| change (pr/3975) . . . . .            | 356           | (latexrelease) . . . . .                                          | 625 |
| 2009-09-24 ltvers.dtx v1.0l           |               | \textsubscript: Command added                                     |     |
| General: Stop checking for old format | 34            | (latexrelease) . . . . .                                          | 625 |
| 2009-10-20 ltfsdcl.dtx v3.0m          |               | 2014-12-30 ltfsbas.dtx v3.0y                                      |     |
| \in@: More robust thanks to Heiko.    | 346           | \mathgroup: move allocation to                                    |     |
| 2009-10-28 lttextcomp.dtx v1.99k      |               | ltplain. . . . .                                                  | 273 |
| General: Added Latin Modern and       |               | 2014-12-30 ltoutput.dtx v1.2m                                     |     |
| TeX Gyre subsets . . . . .            | 458           | General: Command updated                                          |     |
| 2009-11-04 lttextcomp.dtx v1.99l      |               | (latexrelease) . . . . .                                          | 795 |
| General: Added more Latin Modern      |               |                                                                   |     |
| and TeX Gyre subsets . . . . .        | 458           |                                                                   |     |
| 2009-12-14 ltntcmld.dtx v3.4a         |               |                                                                   |     |
| \ifmaybe@ic: Macro added . . . . .    | 425           |                                                                   |     |
| \maybe@ic@: Use switch \ifmaybe@ic    |               |                                                                   |     |
| instead of \if@tempswa . . . . .      | 425           |                                                                   |     |

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| 2014-12-30 ltplain.dtx v2.0a                                                    |     | 2015-01-11 lccounts.dtx v1.1h                                                      |     |
| \@alloc: macro added .....                                                      | 19  | \TextOrMath: Add command to solve robustness issues (pr/3752) (latexrelease) ..... | 269 |
| \@alloc@chardef: macro added .....                                              | 18  | \@dblfloatplacement: float order in 2-column (latexrelease) .....                  | 617 |
| \@alloc@top: macro added .....                                                  | 18  | \@xfloat: Check for valid option (latexrelease) .....                              | 611 |
| \@ch@ck: macro added .....                                                      | 19  | \end@dblfloat: float order in 2-column (latexrelease) .....                        | 615 |
| \extrafloats: macro added .....                                                 | 20  | \@DeclarMathSizes: Allow arbitrary units (latexrelease) .....                      | 280 |
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| \raisebox: Make Robust (latexrelease) .....                                     | 531 | \@startdblcolumn: float order in 2-column (latexrelease) .....                     | 761 |
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| General: Added \textcommabelow latex/4414 . . . . .           | 233 | 2015-03-10 ltplain.dtx v2.0g                                                                                           |     |
| 2015-02-16 ltoutenc.dtx v1.99n                                |     | \hideoutput: macro added . . . . .                                                                                     | 32  |
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| 2015-02-16 lttextcomp.dtx v1.99m                              |     | General: initialise \dbldeflist again . . . . .                                                                        | 739 |
| General: Added lmmt (Heiko Oberdiek) latex/4415 . . . . .     | 458 | 2015-03-18 ltfssdcl.dtx v3.0q                                                                                          |     |
| 2015-02-19 ltvers.dtx v1.0q                                   |     | \DeclareSymbolFont: Restrict Symbol fonts to 0–15 . . . . .                                                            | 355 |
| \IncludeInRelease: Swap argument order . . . . .              | 35  | \document@select@group: Introduce \mathgroup@top . . . . .                                                             | 351 |
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| \loggingall: Spell commands correctly :-) . . . . .           | 31  | 2015-03-26 ltfinal.dtx v2.0d                                                                                           |     |
| 2015-02-21 ltdefns.dtx v1.4b                                  |     | General: Use renamed unicode-letters.def . . . . .                                                                     | 805 |
| General: Removed autoload support . . . . .                   | 70  | 2015-04-07 ltfssbas.dtx v3.1a                                                                                          |     |
| 2015-02-21 lterror.dtx v1.2o                                  |     | \wrongfontshape: Try loading fd file if family has changed . . . . .                                                   | 291 |
| General: Removed autoload support . . . . .                   | 166 | 2015-04-28 ltfinal.dtx v2.0f                                                                                           |     |
| 2015-02-21 ltfiles.dtx v1.1m                                  |     | \newXeTeXintercharclass: define \alloc@intercharclass for compatibility with older xelatex initialisation . . . . .    | 803 |
| General: Removed autoload support . . . . .                   | 198 | 2015-05-10 ltlists.dtx v1.0t                                                                                           |     |
| 2015-02-21 ltfssbas.dtx v3.0z                                 |     | \doendpe: Explicitly reset \clubpenalty before clearing \everypar; see also pr/0462 and pr/4065 . . . . .              | 512 |
| General: Removed autoload code . . . . .                      | 273 | 2015-06-19 ltfinal.dtx v2.0g                                                                                           |     |
| 2015-02-21 ltfsscmp.dtx v3.0d                                 |     | \alloc@intercharclass@top: Use -1 for first range to get contiguous allocation . . . . .                               | 804 |
| General: Removed autoload code . . . . .                      | 341 | \newmarks: Use -1 for first range to get contiguous allocation . . . . .                                               | 803 |
| 2015-02-21 ltfssdcl.dtx v3.0p                                 |     |                                                                                                                        |     |
| General: Removed autoload code . . . . .                      | 346 |                                                                                                                        |     |
| 2015-02-21 lfsstrc.dtx v3.0k                                  |     |                                                                                                                        |     |
| General: Removed autoload code . . . . .                      | 318 |                                                                                                                        |     |
| 2015-02-21 ltoutenc.dtx v1.99m                                |     |                                                                                                                        |     |
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| \f@depth: macro added(latexrelease) . . . . .                 | 748 |                                                                                                                        |     |
| 2015-02-21 ltpictur.dtx v1.1k                                 |     |                                                                                                                        |     |
| General: Removed autoload code . . . . .                      | 558 |                                                                                                                        |     |
| 2015-02-21 ltplain.dtx v2.0e                                  |     |                                                                                                                        |     |
| General: Removed autoload code . . . . .                      | 14  |                                                                                                                        |     |
| 2015-02-21 lttab.dtx v1.1n                                    |     |                                                                                                                        |     |
| General: Removed autoload code . . . . .                      | 533 |                                                                                                                        |     |

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| 2015-06-19 ltplain.dtx v2.0h                                                                                      |            | <b>create_callback:</b> Function added ..                                                              | <b>60</b>  |
| General: delete spurious old definition<br>of <code>\newtoks</code> .....                                         | <b>23</b>  | <b>provides_module:</b> Function added ..                                                              | <b>50</b>  |
| <code>\e@alloc:</code> extra braces in case<br>arguments not single token .....                                   | <b>19</b>  | <b>luatexbase:</b> Table added .....                                                                   | <b>49</b>  |
| <code>\newlanguage:</code> Use -1 for first range<br>to get contiguous allocation .....                           | <b>17</b>  |                                                                                                        |            |
| 2015-06-23 ltfinal.dtx v2.0h                                                                                      |            | 2015-10-02 ltdirchk.dtx v1.2a                                                                          |            |
| General: set <code>\patch@level</code> in ltvers<br>rather than in ltfinal/ltpatch .....                          | <b>815</b> | General: Allow backing out of<br>unprefixed names .....                                                | <b>3</b>   |
| 2015-06-23 ltvers.dtx v1.0t                                                                                       |            | 2015-10-02 ltluatex.dtx v1.0b                                                                          |            |
| General: set <code>\patch@level</code> in ltvers<br>rather than in ltfinal/ltpatch .....                          | <b>34</b>  | General: Fix backing out of TeX code ..                                                                | <b>48</b>  |
| 2015-08-06 ltplain.dtx v2.0i                                                                                      |            | 2015-10-02 ltluatex.dtx v1.0c                                                                          |            |
| <code>\extrafloats:</code> Add <code>\string</code> in case<br>argument is not an unexpandable<br>primitive ..... | <b>20</b>  | General: Allow backing out of Lua<br>code .....                                                        | <b>48</b>  |
| 2015-08-23 ltdirchk.dtx v1.2                                                                                      |            | 2015-10-02 ltluatex.dtx v1.0e                                                                          |            |
| General: Do not use luatex prefix .....                                                                           | <b>3</b>   | <code>uninstall:</code> Function added .....                                                           | <b>63</b>  |
| 2015-08-23 ltvers.dtx v1.0v                                                                                       |            | 2015-10-03 ltluatex.dtx v1.0f                                                                          |            |
| General: Allow negative patchlevel for<br>pre-release .....                                                       | <b>35</b>  | <code>provides_module:</code> use luatexbase_log ..                                                    | <b>50</b>  |
| 2015-08-30 ltplain.dtx v2.1a                                                                                      |            | 2015-10-27 ltplain.dtx v2.1b                                                                           |            |
| <code>\newinsert:</code> new <code>\newinsert</code><br>implementation .....                                      | <b>22</b>  | <code>\extrafloats:</code> Use global assignment<br>when switching to extended range ..                | <b>20</b>  |
| 2015-09-205 ltoutput.dtx v1.3a                                                                                    |            | 2015-11-07 ltspace.dtx v1.3f                                                                           |            |
| General: extended <code>\@freelist</code> .....                                                                   | <b>738</b> | <code>\@esphack:</code> Only space if there is no<br>space at the end of the hlist<br>latex/4443 ..... | <b>186</b> |
| 2015-09-24 ltluatex.dtx v1.0a                                                                                     |            | 2015-11-14 ltluatex.dtx v1.0g                                                                          |            |
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| <code>\catcodetable@initex:</code> Macro added ..                                                                 | <b>45</b>  | <code>\newlanguage:</code> Only extend allocation<br>of write streams (see luatex list) ..             | <b>17</b>  |
| <code>\catcodetable@latex:</code> Macro added ..                                                                  | <b>45</b>  | 2015-11-27 ltluatex.dtx v1.0h                                                                          |            |
| <code>\catcodetable@string:</code> Macro added ..                                                                 | <b>45</b>  | <code>callback_descriptions:</code> Match test<br>in in-callback latex/4445 .....                      | <b>63</b>  |
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|                      |                                                                                                                                                                                          |                                    |                                                                          |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------|
| \addtocounter        | 263                                                                                                                                                                                      | \arg                               | E26                                                                      |
| \addtocounter        | p6, p18                                                                                                                                                                                  | array (environment)                | H168                                                                     |
| \AddToHook           | 100, 101, 102, 103, 107, 111, 114, 115, 116, 710, 710, 710, g1006, g1125, D37, D38, D285, D286, D287, D288, P863, P864, P865, Q495, Q497, Q507, Q508, Q509, Q510, R114, R394, R417, R443 | \array                             | H168                                                                     |
| \AddToHookNext       | 103, 103, 107, 111, 148, 705, 708, 710, 710, g1008, g1123, Q496, R418, R444                                                                                                              | \arraycolsep                       | E359, E360, E504, E505, H258, H338                                       |
| \addtolength         | 271                                                                                                                                                                                      | \arrayrulewidth                    | H324, H338, H346, H347, H359, H363, H366, H376, H378                     |
| \addtolength         | q16, E494, E496                                                                                                                                                                          | \arraystretch                      | H186, H187, H342                                                         |
| \addtoversion        | u20, u139                                                                                                                                                                                | \Arrowvert                         | x569                                                                     |
| \addvspace           | l233, D318, F124, F171, F172, F176, F224, K50                                                                                                                                            | \arrowvert                         | x567                                                                     |
| \adjdemerits         | b330                                                                                                                                                                                     | \asciispace                        | D448, D450, D453, D456, D457, D476                                       |
| \AE                  | o241, o398, o524, o762, o1102, o1403, U482                                                                                                                                               | \ast                               | x232, x395                                                               |
| \ae                  | o246, o401, o534, o766, o1108, o1404, U482                                                                                                                                               | \asymp                             | x449                                                                     |
| \afterassignment     | 83, b401, b404, f256, f262, f305, o212, o220, r316, E186                                                                                                                                 | \AtBeginDocument                   | 101, 105, 115, 116, 116, 116, 118, 315, n127, n182, s619, N34, N48, P854 |
| \AfterEndEnvironment | 117, D281                                                                                                                                                                                | \atbegindocumenthook               | 202                                                                      |
| \aftergroup          | r91, r330, t156, t222, v114, v121, v129, z64, D492, D507, D522, G129, S604, S605, S662, S663                                                                                             | \AtBeginDvi                        | 116, 708, 710, 715, 715, 723, R327, R361, S86                            |
| \AfterLastShipout    | Q507                                                                                                                                                                                     | \AtBeginEnvironment                | 117, D281                                                                |
| \afterpreamble       | 202                                                                                                                                                                                      | \AtBeginShipout                    | 710, R366, R417                                                          |
| \aleph               | x308                                                                                                                                                                                     | \AtBeginShipoutAddToBox            | 710, R377, R422                                                          |
| \allocationnumber    | b37, b57, b69, b71, b143, b144, b145, b195, b196, b237, b238, b239, b252, b253, b254, b271, b277, b283, b284, b297, b298, b299, d52, d53, d54, d91, d205, H4, H9, U44, U45, U46          | \AtBeginShipoutAddToBoxForeground  | 710, R378, R422                                                          |
| \allowbreak          | b408, f772, f773, f792, f794, E40                                                                                                                                                        | \AtBeginShipoutBox                 | 710, R415                                                                |
| \Alph                | 263                                                                                                                                                                                      | \AtBeginShipoutDiscard             | 710, R375, R421                                                          |
| \Alph                | 709, p106                                                                                                                                                                                | \AtBeginShipoutFirst               | 710, R369, R419                                                          |
| \alph                | 263                                                                                                                                                                                      | \AtBeginShipoutInit                | 710, R416                                                                |
| \alpha               | p105                                                                                                                                                                                     | \AtBeginShipoutNext                | 710, R367, R417                                                          |
| \alpha               | x268                                                                                                                                                                                     | \AtBeginShipoutUpperLeft           | 710, 710, R379, R422                                                     |
| \amalg               | x379                                                                                                                                                                                     | \AtBeginShipoutUpperLeftForeground | 710, 710, R380, R422                                                     |
| \AmSfont             | 309                                                                                                                                                                                      | \AtEndAfterFileList                | Q509                                                                     |
| \and                 | 594                                                                                                                                                                                      | \AtEndDocument                     | 116, 118, 119, D68, P854, Q513                                           |
| \and                 | K14, K27                                                                                                                                                                                 | \AtEndDvi                          | 708, 711, R384, R389                                                     |
| \angle               | x337                                                                                                                                                                                     | \AtEndEnvironment                  | 117, D281                                                                |
| \approx              | x422                                                                                                                                                                                     | \AtEndOfClass                      | 687, E430, P854                                                          |
| \arabic              | 263                                                                                                                                                                                      | \AtEndOfPackage                    | 687, P443, P462, P529, P540, P854                                        |
| \arabic              | 709, p102, J33, R274                                                                                                                                                                     | \AtEndPreamble                     | 118                                                                      |
| \arccos              | E13                                                                                                                                                                                      | \AtNextShipout                     | 710, R443                                                                |
| \arcsin              | E10                                                                                                                                                                                      | \atopwithdelims                    | E57, E58, E59                                                            |
| \arctan              | E16                                                                                                                                                                                      | \attribute                         | 38, d79                                                                  |
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|                      |                                                                                                                                                                                          | \AtVeryEndDocument                 | Q508                                                                     |
|                      |                                                                                                                                                                                          | \AtVeryVeryEnd                     | Q510                                                                     |
|                      |                                                                                                                                                                                          | \author                            | 594                                                                      |
|                      |                                                                                                                                                                                          | \author                            | K8, K24, K32                                                             |

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|                                               |                                                                                                                                                                                    |
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| \bar . . . . .                                | x520                                                                                                                                                                               |
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|                                               | b369, b399, b435, t140, t141,<br>t142, t144, t145, x510, E158, E159,<br>E178, E184, E188, G280, G299,<br>H198, R146, R197, S242, S273,<br>S622, S637, S681, S696, I136, I314, I373 |
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| \BeforeBeginEnvironment . . . . .             |                                                                                                                                                                                    |
|                                               | 117, 117, 117, 117, D281                                                                                                                                                           |
| \BeforeClearDocument . . . . .                | Q511                                                                                                                                                                               |
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| \belowdisplayskip . . . . .                   | b352, E497                                                                                                                                                                         |
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| \bezier . . . . .                             | I682, I683, I805, I806, I821, I823                                                                                                                                                 |
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| \bfseries . . . . .                           | 120, 374, 374,<br>377, 386, w13, w14, w189, w198,<br>w268, w279, w280, w320, w324,<br>w325, z19, C13, J36, J38, N20, R310                                                          |
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| \bfseries/defaults . . . . .                  | w252                                                                                                                                                                               |
| \bgroup . . . . .                             | b383                                                                                                                                                                               |
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| \bibitem . . . . .                            | N3                                                                                                                                                                                 |
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| \bibliographystyle . . . . .                  | N32                                                                                                                                                                                |
| \bibstyle . . . . .                           | N25, N37                                                                                                                                                                           |
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| \biggl . . . . .                              | E47                                                                                                                                                                                |
| \Biggm . . . . .                              | E51                                                                                                                                                                                |
| \biggm . . . . .                              | E48                                                                                                                                                                                |
| \Biggr . . . . .                              | E52                                                                                                                                                                                |
| \biggr . . . . .                              | E49                                                                                                                                                                                |
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| \bigskip . . . . .                            | b420, l400                                                                                                                                                                         |
| \bigskipamount . . . . .                      | b419, l402, l403, L367                                                                                                                                                             |
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| \bigwedge . . . . .                           | x343                                                                                                                                                                               |
| \binoppenalty . . . . .                       | b321                                                                                                                                                                               |
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|                                               | \bool_gset_true:N g10, R10, R85, R268                                                                                                                                              |
|                                               | \bool_if:NTF . . . . .                                                                                                                                                             |
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|                                               | \bool_lazy_and:nnTF g727, g893, R291                                                                                                                                               |
|                                               | \bool_lazy_and_p:nn . . . . .                                                                                                                                                      |
|                                               | g896                                                                                                                                                                               |
|                                               | \bool_lazy_or:nnTF . . . . .                                                                                                                                                       |
|                                               | g298                                                                                                                                                                               |
|                                               | \bool_new:N .. g6, g24, R6, R112, R127                                                                                                                                             |
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|                                               | g717                                                                                                                                                                               |
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| \bordermatrix . . . . .                       | E172                                                                                                                                                                               |
| \bot . . . . .                                | x321                                                                                                                                                                               |
| \botfigrule . . . . .                         | S742, S2325                                                                                                                                                                        |
| \botmark . . . . .                            | O50, S647, S706                                                                                                                                                                    |
| \bottomfraction . . . . .                     | L275, S2294                                                                                                                                                                        |
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|                                               | R118                                                                                                                                                                               |
|                                               | \box_ht:N . . . . .                                                                                                                                                                |
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|                                               | \box_move_up:nn . . . . .                                                                                                                                                          |
|                                               | R172, R226                                                                                                                                                                         |

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     R69, R88, R131, R132, R139, R150,  
     R153, R154, R158, R165, R175,  
     R183, R190, R200, R206, R207,  
     R210, R217, R219, R220, R226, R228  
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| \CYRSH                | o1487                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrsh                | o1487                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRSHCH              | o1487                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrshch              | o1487                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRSHHA              | o1487                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrshha              | o1487                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRT                 | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrt                 | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRTDSC              | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrtdesc             | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRETSE              | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyretse              | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRTSHE              | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrtshe              | o1488                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRU                 | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrus                | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRUSHRT             | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrushrt             | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRV                 | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrv                 | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRW                 | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrw                 | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRY                 | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyry                 | o1489                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRYA                | o1490                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyrya                | o1490                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRYAT               | o1490                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \cyryat               | o1490                              |                                                                                                                                                                                                                                                                                                                                 |       |
| \CYRYHCRS             | o1490                              |                                                                                                                                                                                                                                                                                                                                 |       |
|                       |                                    | D                                                                                                                                                                                                                                                                                                                               |       |
| \d                    |                                    | o235, o395, o479,<br>o759, o1215, o1423, o1424, o1425,<br>o1426, o1429, o1430, o1431, o1432,<br>o1433, o1434, o1435, o1436, o1437,<br>o1438, o1439, o1440, o1441, o1442,<br>o1443, o1444, o1445, o1446, o1447,<br>o1448, o1449, o1450, o1451, o1452,<br>o1453, o1454, o1455, o1456, o1457,<br>o1458, o1459, o1460, o1461, o1462 |       |
| \dag                  |                                    | o312                                                                                                                                                                                                                                                                                                                            |       |
| \dagger               | o312, p131, p137, p145, p146, x375 |                                                                                                                                                                                                                                                                                                                                 |       |
| \dashbox              |                                    | I309, I808, I825                                                                                                                                                                                                                                                                                                                |       |
| \dashv                |                                    | x403                                                                                                                                                                                                                                                                                                                            |       |
| \date                 |                                    | 594                                                                                                                                                                                                                                                                                                                             |       |
| \date                 |                                    | K9, K25                                                                                                                                                                                                                                                                                                                         |       |
| \day                  |                                    | a185, P1010, P1141, P1230                                                                                                                                                                                                                                                                                                       |       |
| \dblfigrule           |                                    | S767, S2325                                                                                                                                                                                                                                                                                                                     |       |
| \dblfloatpagefraction |                                    | L287, L301, S2302                                                                                                                                                                                                                                                                                                               |       |
| \dblfloatsep          |                                    | ... S753, S765, S1640, S1766, S2309                                                                                                                                                                                                                                                                                             |       |
| \dbltextfloatsep      |                                    | S222, S230, S769, S1639, S1765, S2309                                                                                                                                                                                                                                                                                           |       |
| \dbltopfraction       |                                    | L284, L298, S2301                                                                                                                                                                                                                                                                                                               |       |
| \ddag                 |                                    | o313                                                                                                                                                                                                                                                                                                                            |       |
| \ddagger              | o313, p132, p138, p145, p147, x374 |                                                                                                                                                                                                                                                                                                                                 |       |
| \ddot                 |                                    | x518                                                                                                                                                                                                                                                                                                                            |       |
| \ddots                |                                    | x513                                                                                                                                                                                                                                                                                                                            |       |
| \deadcycles           |                                    | ... n335, n368, D31, D98, D150, S299                                                                                                                                                                                                                                                                                            |       |
| debug commands:       |                                    |                                                                                                                                                                                                                                                                                                                                 |       |
|                       | \debug_resume:                     | 123                                                                                                                                                                                                                                                                                                                             |       |
|                       | \debug_suspend:                    | 123                                                                                                                                                                                                                                                                                                                             |       |
|                       | \DebugHooksOff                     | 109, g1097, g1135                                                                                                                                                                                                                                                                                                               |       |
|                       | \DebugHooksOn                      | 109, g1097, g1134                                                                                                                                                                                                                                                                                                               |       |
|                       | \DebugShipoutsOff                  | 709, R328, R359                                                                                                                                                                                                                                                                                                                 |       |
|                       | \DebugShipoutsOn                   | 709, R328, R358                                                                                                                                                                                                                                                                                                                 |       |
|                       | \DeclareCommandCopy                | 86, f460, f461, f463                                                                                                                                                                                                                                                                                                            |       |

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 \DeclareDefaultHookRule 107, g1101, g1138  
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 \DeclareEmphSequence ..... 389, w391, w427, w428, w440  
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**File Key:** a=ltdirchk.dtx, b=lpplain.dtx, c=ltvers.dtx, d=ltluatex.dtx, e=ltexpl.dtx, f=ltdefns.dtx, g=lthooks.dtx, h=ltalloc.dtx, i=ltctrl.dtx, j=lterror.dtx, k=ltpar.dtx, l=ltspaced.dtx, m=ltlogos.dtx, n=ltfiles.dtx, o=ltoutenc.dtx, p=ltcounts.dtx, q=ltlength.dtx, r=ltfssbas.dtx, s=ltfssaxes.dtx, t=ltfssstrc.dtx, u=ltfsscmp.dtx, v=ltfssdcl.dtx, w=ltfssini.dtx, x=fontdef.dtx, y=preload.dtx, z=ltfntcmd.dtx, A=lttextcomp.dtx, B=ltpageno.dtx, C=ltxref.dtx, D=ltmisen.dtx, E=ltmath.dtx, F=ltlists.dtx, G=ltboxes.dtx, H=lttab.dtx, I=ltpicture.dtx, J=ltthm.dtx, K=ltsect.dtx, L=ltfloat.dtx, M=ltidxglo.dtx, N=ltbibl.dtx, O=ltpage.dtx, P=ltclass.dtx, Q=ltfilehook.dtx, R=ltshipout.dtx, S=ltoutput.dtx, T=ltthyphen.dtx, U=ltfinal.dtx

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\exp_args:NNo g560
\exp_args:NNV g534
\exp_args:NNx g366, g481
\exp_args:No g759, g803
\exp_args:NV Q53
\exp_args:Nv g704, g711, g783
\exp_args:Nx g1025, g1067
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**File Key:** a=ltdirname.dtx, b=lpplain.dtx, c=ltvers.dtx, d=ltluatex.dtx, e=ltexpl.dtx, f=ltdefns.dtx, g=lthooks.dtx, h=ltalloc.dtx, i=ltctrl.dtx, j=lterror.dtx, k=ltpar.dtx, l=ltspage.dtx, m=ltlogos.dtx, n=ltfiles.dtx, o=ltoutenc.dtx, p=ltcounts.dtx, q=ltlength.dtx, r=ltfssbas.dtx, s=ltfssaxes.dtx, t=ltfsstrc.dtx, u=ltfsscmp.dtx, v=ltfssdcl.dtx, w=ltfssini.dtx, x=fontdef.dtx, y=preload.dtx, z=ltfntcmd.dtx, A=lttextcomp.dtx, B=ltpageno.dtx, C=ltxref.dtx, D=ltmisen.dtx, E=ltmath.dtx, F=ltlists.dtx, G=ltboxes.dtx, H=lttab.dtx, I=lt pictur.dtx, J=ltthm.dtx, K=ltsect.dtx, L=ltfloat.dtx, M=ltidxglo.dtx, N=ltbibl.dtx, O=ltpage.dtx, P=ltclass.dtx, Q=ltfilehook.dtx, R=ltshipout.dtx, S=ltoutput.dtx, T=lt hyphen.dtx, U=ltfinal.dtx

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     S726, S744, S751, S2104, S2154, S2303  
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     c38, c40, c43, c45, c48, c56, P555, P559  
 \fmtversion ..... c1, c19,  
     c38, c40, c43, c45, c48, c56, c84,  
     d268, j2, o1498, w160, H1, P146,  
     P156, P572, P575, S4, U492, U518, II  
 \fnsymbol ..... 263  
 \fnsymbol ..... p107  
 \font ..... b439, b444, f737,  
     f740, f752, f755, o297, o298, o299,  
     o436, o443, o793, o800, o986, o987,  
     o1034, o1182, r81, r87, r89, t84,  
     w403, w436, w442, w468, y8, y9,  
     y10, z85, A6, A47, A542, A549, D436  
 \fontdimen ..... b439,  
     b444, o297, o298, o299, o436, o443,  
     o793, o800, w403, w436, w442, z85,  
     A6, A47, A542, A549, I126, I129, I679  
 \fontencoding .. 282, d251, d252, d274,  
     d275, o1529, r251, r286, r296, v269,  
     w508, x16, x24, x67, x74, x83, x85, A36  
 \fontfamily 282, 384, r279, w6, w9, w12,  
     w80, w91, w332, w335, w338, w551,  
     x58, x69, x76, x87, A28, A30, A32,  
     A34, A106, A108, A110, A112, A825  
 \fontname ..... o987, r89  
 \fontseries ..... 282,  
     309, 314, 381, 383, 384, r279, s387,  
     s581, w15, w18, w210, w211, w212,  
     w213, w229, w230, w231, w232,  
     w282, w283, w284, w285, w293,  
     w294, w295, w296, w326, w329, w552  
 \fontseriesforce ..... 309, s386, s583  
 \fontshape . 282, 314, o446, o803, r279,  
     s451, s456, s461, s521, s552, s556,  
     s559, s562, s565, s568, s571, s574,  
     s582, w21, w24, w27, w30, w553, A552  
 \fontshapeforce ..... s522, s584  
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     o1220, r79, r306, w491, w554, A125,  
     A584, A842, L385, L392, L413, L420  
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     S375, S422, S482, S490, S494, S517  
 \footnote ..... L428  
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 \footnoterule ..... G341, L370, S493  
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 \footnotesize ..... G353, L438  
 \footnotetext ..... K12, L467  
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 \frac ..... E341  
 \frame ..... G138, G214  
 \framebox ..... 518  
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 \frenchspacing ..... b364, f777, f798,  
     n48, n117, n175, D441, D467, D557  
 \frown ..... x451  
 \fussy ..... O64  
 \futurelet ..... e42,  
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     \gdef\_ ..... E256  
     \ge ..... x417, x419  
     \GenericError ..... j18, j85, j111, j137, t62  
     \GenericInfo ..... c85, c88, c93, e56, j4, j104,  
         j130, j155, t31, t34, t39, t75, P1436  
     \GenericWarning .....  
         .j11, j94, j120, j146, t42, t47, t50, t78

**File Key:** a=ltDIRchk.dtx, b=ltPLAIN.dtx, c=ltVERS.dtx, d=ltLUATEX.dtx, e=ltEXPL.dtx,  
 f=ltDEFNS.dtx, g=ltHOOKS.dtx, h=ltALLOC.dtx, i=ltCTRL.dtx, j=ltERROR.dtx, k=ltPAR.dtx,  
 l=ltSPACE.dtx, m=ltLOGOS.dtx, n=ltFILES.dtx, o=ltOUTENC.dtx, p=ltCOUNTS.dtx,  
 q=ltLENGTH.dtx, r=ltFSSBAS.dtx, s=ltFSSAXES.dtx, t=ltFSSSTRC.dtx, u=ltFSSCMP.dtx,  
 v=ltFSSDCL.dtx, w=ltFSSINI.dtx, x=fontDEF.dtx, y=PRELOAD.dtx, z=ltFNTCMD.dtx,  
 A=ltTEXTCOMP.dtx, B=ltPAGENO.dtx, C=ltXREF.dtx, D=ltMISCEN.dtx, E=ltMATH.dtx,  
 F=ltLISTS.dtx, G=ltBOXES.dtx, H=ltTAB.dtx, I=ltPICTUR.dtx, J=ltTHM.dtx, K=ltSECT.dtx,  
 L=ltFLOAT.dtx, M=ltIDXGLO.dtx, N=ltBIBL.dtx, O=ltPAGE.dtx, P=ltCLASS.dtx,  
 Q=ltFILEHOOK.dtx, R=ltSHIPOUT.dtx, S=ltOUTPUT.dtx, T=ltHYPHEN.dtx, U=ltFINAL.dtx

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 \gg ..... x433  
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     M23, M35, O24, O32, S621, S680  
 \glossaryentry ..... M32  
 \goodbreak ..... b411, f778, f799  
 \grave ..... x517  
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         \group\_end: . g172, Q213, Q225, R55  
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 \guillemetright ..... o538, o768, o1095  
 \guillemotleft ..... o540, o770, o1081  
 \guillemotright ..... o541, o771, o1097  
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     o622, o630, o747, o1212, o1351,  
     o1352, o1379, o1380, A188, A205  
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 \hat ..... x523  
 \hbadness ..... b316, r635, r642,  
     r677, r696, R162, R164, R214, R216  
 \hbar ..... x335  
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         \hbox\_set:Nn . R141, R167, R192, R221  
             \hbox\_set\_to\_wd:Nnn R165, R217, R253  
                 \hbox\_unpack:N ..... R175, R219  
     \headheight ..... S75, S626, S685  
     \headsep ..... S76, S635, S694  
     \heartsuit ..... x333  
     \height ..... o1188, G31, G34  
     \hfil ..... 504  
     \hfuzz ..... b339, r643, O60, O61,  
         O67, O68, R161, R163, R213, R215  
     \hglue ..... b401  
     \hideoutput ..... b499  
     \hideskip ..... b307, b425  
     \hidewidth ..... b425, o327,  
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         o397, o473, o474, o478, o481, o483,  
         o486, o498, o503, o519, o754, o755,  
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         110, 131, g256, g805, g1009  
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         111, 133, g325, g1011  
     \hook\_gset\_rule:nnnn .....  
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     103, 104, 111, 133,  
     g73, g209, g222, g281, g347, g462,  
     g682, g697, g752, g810, g905, g1106  
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 \hook\_new\_reversed:n .....  
     110, g93, g101, g1004  
 \hook\_show:n ... 112, 146, g664, g1095  
 \hook\_use:n .....  
     103, 104, 110, 114, 128, 150, 151,  
     g454, g829, g884, g1093, R47, R72, R76  
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     \g\_\_hook\_??\_code\_prop ..... g372  
     \g\_\_hook\_??\_reversed\_tl ..... g372  
     \g\_\_hook\_<hook>\_labels\_clist ... 125  
     \g\_\_hook\_<name>\_code\_prop ..... 124  
     \g\_\_hook\_<name>\_reversed\_tl ... 124  
     \g\_\_hook\_all\_seq ..... g28, g76, g443  
     \\_\\_hook\_apply\_-rule\_->:nnn ... g639  
     \\_\\_hook\_apply\_-rule\_-<:nnn ... g639  
     \\_\\_hook\_apply\_-rule\_-<:nnn ... g639  
     \\_\\_hook\_apply\_-rule\_->:nnn ... g639  
     \\_\\_hook\_apply\_-rule\_x:nnn ... g639  
     \\_\\_hook\_apply\_label\_pair:nnn ...  
         141, 143, 148, g511, g512, g566  
     \\_\\_hook\_apply\_rule:nnn 143, g576, g582

**File Key:** a=ltdirchk.dtx, b=lpplain.dtx, c=ltvrs.dtx, d=ltluatex.dtx, e=ltexpl.dtx,  
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 l=ltspc.dtx, m=ltlogos.dtx, n=ltfiles.dtx, o=ltoutenc.dtx, p=ltcounts.dtx,  
 q=ltlength.dtx, r=ltfssbas.dtx, s=ltfssaxes.dtx, t=ltfssstrc.dtx, u=ltfsscmp.dtx,  
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 A=lttextcomp.dtx, B=ltpageno.dtx, C=ltxref.dtx, D=ltmisen.dtx, E=ltmath.dtx,  
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 L=ltfloat.dtx, M=ltidxglo.dtx, N=ltbibl.dtx, O=ltpage.dtx, P=ltclass.dtx,  
 Q=ltfilehook.dtx, R=ltshipout.dtx, S=ltoutput.dtx, T=lt hyphen.dtx, U=ltfinal.dtx

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__hook_apply_rule:nnN 143
__hook_apply_rule_->:nnn g617
__hook_apply_rule_<-:nnn g617
__hook_apply_rule_<:nnn g589
__hook_apply_rule_>:nnn g589
__hook_apply_rule_xE:nnn g603
__hook_apply_rule_xW:nnn g603
__hook_clear_next:n g805
__hook_clist_gput:Nn g475, g477, g535, g564
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__hook_curr_name_pop: 156, g1012, g1112
__hook_curr_name_push: 156
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g442, g447, g459, g481, g516, g536,
g591, g598, g605, g613, g619, g630
\g__hook_debug_bool . g6, g10, g15, g21
__hook_debug_gset: g7
__hook_debug_label_data:N g516, g557, g652
__hook_debug_print_rules:n .. g789
__hook_declare:n 130,
153, g78, g84, g229, g245, g382, g809
__hook_end_document_label_-
check: g1012
\g__hook_execute_immediately_-
prop 151, g32, g203, g888
__hook_file_hook_normalize:n ...
132, g263, g310, g865
\l__hook_front_t1 g488, g527, g530,
g533, g535, g536, g537, g550, g551
\c__hook_generics_file_prop ...
132, g303, g322
\c__hook_generics_prop ... g279, g320
\c__hook_generics_reversed_iि_-
prop g282, g322
\c__hook_generics_reversed_iिि_-
prop g285, g322
__hook_gput_code:nnn g199
__hook_gput_next_do:nnn 131, g256, g805
__hook_gput_next_do:Nnn g805
__hook_gput_undeclared_hook:nnn ...
130, g243, g251
__hook_gremove_code:nn g325
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__hook_gset_rule:nnnn g375
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g148, g158, g1012, g1023, g1037,
g1038, g1045, g1055, g1056, g1076
__hook_hook_gput_code_do:nnn ...
..... g108, g199, g246
__hook_if_exist:nTF ...
..... g86, g329, g891, g911
__hook_if_exist_p:n g911
__hook_if_exist_use:n ... 151, g854
__hook_if_file_hook:wTF ...
131, 132, 132, 151, g260, g293, g862
__hook_if_file_hook_p:w g293
__hook_if_label_case:nnnnn ...
..... g432, g509, g767
__hook_if_marked_removal:nnTF ...
..... g206, g364
__hook_if_reversed:nTF ...
..... g473, g698, g735, g737, g917
__hook_if_reversed_p:n g917
__hook_include_legacy_code_-
chunk:n g81, g102, g461
__hook_initialize_all: . g440, g1110
__hook_initialize_hook_code:n ...
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137, 139, 140, g479, g493
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__hook_label_ordered:nn 137
__hook_label_ordered:nnTF ...
..... 136, g395, g401, g407, g424
__hook_label_ordered_p:nn ... g424
__hook_label_pair:nn ...
136, 137, g394, g400, g406,
g410, g412, g415, g416, g648, g649
\l__hook_labels_int ...
142, g488, g496, g500, g532, g553
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```

**File Key:** a=ltirchk.dtx, b=lpplain.dtx, c=ltvers.dtx, d=ltluatex.dtx, e=ltexpl.dtx,
f=ltdefns.dtx, g=lthooks.dtx, h=ltalloc.dtx, i=ltctrl.dtx, j=lterror.dtx, k=ltpar.dtx,
l=ltspage.dtx, m=ltlogos.dtx, n=ltfiles.dtx, o=ltoutenc.dtx, p=ltcounts.dtx,
q=ltlength.dtx, r=ltfssbas.dtx, s=ltfssaxes.dtx, t=ltfssstrc.dtx, u=ltfsscmp.dtx,
v=ltfssdcl.dtx, w=ltfssini.dtx, x=fontdef.dtx, y=preload.dtx, z=ltfntcmd.dtx,
A=lttextcomp.dtx, B=ltpageno.dtx, C=ltxref.dtx, D=ltmisen.dtx, E=ltmath.dtx,
F=ltlists.dtx, G=ltboxes.dtx, H=lttab.dtx, I=lt pictur.dtx, J=ltthm.dtx, K=ltsect.dtx,
L=ltfloat.dtx, M=ltidxglo.dtx, N=ltbibl.dtx, O=ltpage.dtx, P=ltclass.dtx,
Q=ltfilehook.dtx, R=ltshipout.dtx, S=ltoutput.dtx, T=lt hyphen.dtx, U=ltfinal.dtx

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```

**File Key:** a=ltDIRCHK.dtx, b=ltPLAIN.dtx, c=ltVERS.dtx, d=ltLUATEX.dtx, e=ltEXPL.dtx, f=ltDEFNS.dtx, g=ltHOOKS.dtx, h=ltALLOC.dtx, i=ltCNTRL.dtx, j=ltERROR.dtx, k=ltPAR.dtx, l=ltSPACE.dtx, m=ltLOGOS.dtx, n=ltFILES.dtx, o=ltOUTENC.dtx, p=ltCOUNTS.dtx, q=ltLENGTH.dtx, r=ltFSSBAS.dtx, s=ltFSSAXES.dtx, t=ltFSSSTRC.dtx, u=ltFSSCMP.dtx, v=ltFSSDCL.dtx, w=ltFSSINI.dtx, x=fontdef.dtx, y=preload.dtx, z=ltFNTCMD.dtx, A=ltTEXTCOMP.dtx, B=ltPAGENO.dtx, C=ltXREF.dtx, D=ltMISCEN.dtx, E=ltMATH.dtx, F=ltLISTS.dtx, G=ltBOXES.dtx, H=ltTAB.dtx, I=ltPICTUR.dtx, J=ltTHM.dtx, K=ltSECT.dtx, L=ltFLOAT.dtx, M=ltIDXGLO.dtx, N=ltBIBL.dtx, O=ltPAGE.dtx, P=ltCLASS.dtx, Q=ltFILEHOOK.dtx, R=ltSHIPOUT.dtx, S=ltOUTPUT.dtx, T=ltHYPHEN.dtx, U=ltFINAL.dtx

```

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include/end/... 688
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**File Key:** a=ltdirname.dtx, b=lpplain.dtx, c=ltvers.dtx, d=ltluatex.dtx, e=ltexpl.dtx,  
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l=ltspage.dtx, m=ltlogos.dtx, n=ltfiles.dtx, o=ltoutenc.dtx, p=ltcounts.dtx,  
q=ltlength.dtx, r=ltfssbas.dtx, s=ltfssaxes.dtx, t=ltfssstrc.dtx, u=ltfsscmp.dtx,  
v=ltfssdcl.dtx, w=ltfssini.dtx, x=fontdef.dtx, y=preload.dtx, z=ltfntcmd.dtx,  
A=lttextcomp.dtx, B=ltpageno.dtx, C=ltxref.dtx, D=ltmisen.dtx, E=ltmath.dtx,  
F=ltlists.dtx, G=ltboxes.dtx, H=lttab.dtx, I=lt pictur.dtx, J=ltthm.dtx, K=ltsect.dtx,  
L=ltfloat.dtx, M=ltidxglo.dtx, N=ltbibl.dtx, O=ltpage.dtx, P=ltclass.dtx,  
Q=ltfilehook.dtx, R=ltshipout.dtx, S=ltoutput.dtx, T=lt hyphen.dtx, U=ltfinal.dtx

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     691, 693, 693, 694, 704, n477, n500,  
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     r379, w556, w566, w576, A754,  
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**File Key:** a=ltirchk.dtx, b=lpplain.dtx, c=ltvers.dtx, d=ltluatex.dtx, e=ltexpl.dtx, f=ltdefns.dtx, g=lthooks.dtx, h=ltalloc.dtx, i=ltctrl.dtx, j=lterror.dtx, k=ltpar.dtx, l=ltspaced.dtx, m=ltlogos.dtx, n=ltfiles.dtx, o=ltoutenc.dtx, p=ltcounts.dtx, q=ltlength.dtx, r=ltfssbas.dtx, s=ltfssaxes.dtx, t=ltfssstrc.dtx, u=ltfsscmp.dtx, v=ltfssdcl.dtx, w=ltfssini.dtx, x=fontdef.dtx, y=preload.dtx, z=ltfntcmd.dtx, A=lttextcomp.dtx, B=ltpageno.dtx, C=ltxref.dtx, D=ltmisen.dtx, E=ltmath.dtx, F=ltlists.dtx, G=ltboxes.dtx, H=lttab.dtx, I=lt pictur.dtx, J=ltthm.dtx, K=ltsect.dtx, L=ltfloat.dtx, M=ltidxglo.dtx, N=ltbibl.dtx, O=ltpage.dtx, P=ltclass.dtx, Q=ltfilehook.dtx, R=ltshipout.dtx, S=ltoutput.dtx, T=lt hyphen.dtx, U=ltfinal.dtx

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| \int_decr:N . . . . .               | g532                                   |
| \int_eval:n . . . . .               | g540, g593, g600, R279                 |
| \int_gdecr:N . . . . .              | Q493                                   |
| \int_gincr:N . . . . .              | Q483, R48, R64                         |
| \int_gset:Nn . . . . .              | Q479                                   |
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| \int_new:N . . . . .                | g489, Q478, R270, R272                 |
| \int_set:Nn . . . . .               | Q206, Q219                             |
| \int_use:N . . . . .                | 709, 709, Q487, R66, R81, R287         |
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| \__hook~?? . . . . .                | 135, g372                              |
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| \interfootlinepenalty . . . . .     | b360                                   |
| \interfootnotelinepenalty           | b360, l18, L439                        |
| \interlinepenalty . . . . .         | l11, r651, D408, D411, D429,           |
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| \iow_log:n . . . . .                | g666                                   |
| \iow_newline: . . . . .             | Q491                                   |
| \iow_now:Nn . . . . .               | R286                                   |
| \iow_term:n . . . . .               | g221, g448, g450,                      |
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|                                     | F141, F219, H78, J36, J38, N4, N8      |
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| \itemize . . . . .                  | F242                                   |
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 \langle ..... x594  
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     l221, l225, l227, l228, l240, l258,  
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\mathaccent v622, v670, v704, v714
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     I85, I107, I108, I164, I241, I316,  
     I318, I332, I340, I342, I357, I480,  
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     I694, I697, I698, I700, I701, I712,  
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     S798, S803, S804, S1111, S1209,  
     S1269, S1378, S1422, S1451, S1509,  
     S1541, S1627, S1667, S1924, S1951  
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 \@dir .... a160, a163, a165, a167, a168  
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 \@expl@@filehook@if@no@extension@C@NTF .....  
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     P350, Q272, Q447  
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\@firsttrue H262
\@firstcolfirstmark S2212, S2213, S2217
\@firstcoltopmark S2210, S2218
\@firstcolumnfalse S2202, S2247
\@firstcolumntrue n30, n99, n157, S98, S207, S2221, S2253
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\@firstoftwo ... 213, a87, e28, e36, f212, f442, f444, f466, f537, f587, f645, f655, f665, f692, f716, n431, n469, o133, p157, p162, v799, w360, A90, A745, A796, A812, C19, O16, P135, P174, P186, P213, P231, P1499
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\@flfail S865, S916, S937, S947, S960, S969
\@float L26, L32
\@floatboxreset ... L101, L170, L174
\@floatpenalty L3, L53, L55, L58, L122, L124, L127, L191, L194, L199, L201, L212, L216, L221, L223, L237, L241, L311, L313, L317, L321, L355
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\@flsetnum S986, S1022, S1109, S1267, S1420, S1507, S1578, S1699, S2070
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\@flstop S1972
\@flsucceed S858, S866, S915, S949, S971
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\@forced@seriestrue s386
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\@fornoop i15, i23, i29
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   P128, P131, P137, P665, P778, P792  
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   G239, G308, G312, G316, G367,  
   G372, G395, G402, G407, H57,  
   H181, H203, H210, J3, J5, J28,  
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   P587, P926, P929, P1057, P1060,  
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 P478, P482, P488, P492, P636,  
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 I662, I663, I711, I731, I771, I787  
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 L88, L89, L90, L157, L158, L159,  
 S17, S20, S21, S2045, S2046, S2047,  
 U161, U165, U394, U398, I279,  
 I280, I281, I283, I284, I285, I562,  
 I563, I567, I568, I575, I576, I579, I580  
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 r219, r224, E173, E176, E182, G43,  
 G44, G185, G186, G191, G192,  
 G193, G195, G246, G247, G322,  
 G326, G379, G382, G383, G410,  
 G412, G418, G421, H35, H36, H37,  
 H88, H89, H90, H91, H218, H219,  
 K196, K197, K219, K220, K233,  
 L196, L198, L218, L220, L258,  
 L259, L260, S229, S230, S231, S487,  
 S489, S535, S537, S538, S543, S548,  
 S552, S557, S561, S917, S920, S940,  
 S950, S962, S972, S1637, S1638,  
 S1641, S1642, S1762, S1763, S1767,  
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 S2153, S2155, S2156, I210, I211,  
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 I492, I493, I516, I517, I521, I523,  
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 I634, I636, I637, I657, I658, I659  
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 t134, t391, t414, t415, t424, t425,  
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 I365, I482, I484, I485, I510, I513,  
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 I622, I628, I629, I640, I648, I649, I654  
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 F116, F117, F118, F150, F152,  
 F153, F154, F222, F223, F224,  
 K42, K44, K45, K50, K62, K63,  
 K88, K89, K91, K103, K104, K113,  
 K114, S1872, S1873, S1875, S1883  
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 I286, I290, I292, I294, I295, I318, I321  
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 Q270, S988, S1024, S1580, S1701  
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 r663, r666, r669, v316, v371, v435,  
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 S1605, S1703, S1728, S2113, S2130  
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 $\underline{h_{16}},$  D118, D122, D131, D144,  
 D145, O26, O27, O34, O35, O48, O49  
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 $\underline{D_{76}},$   $\underline{D_{104}}$   
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 $\underline{S_{14}},$   $\underline{S_{15}}$   
 $\backslash@testfp \dots \underline{S_{882}},$   
 $\underline{S_{902}},$   $\underline{S_{938}},$   $\underline{S_{961}},$   $\underline{S_{2037}},$  S2166, S2183  
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 $\backslash@testpatch \dots \underline{H_{348}}$   
 $\backslash@testtrue \dots \underline{S_{13}},$   
 $\underline{S_{21}},$   $\underline{S_{356}},$   $\underline{S_{885}},$   $\underline{S_{904}},$   $\underline{S_{944}},$   $\underline{S_{966}},$  S2041  
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 $\backslash@text@composite \dots \underline{o_{76}},$  o1044, o1049  
 $\backslash@text@composite@x \dots \underline{o_{76}}$   
 $\backslash@textbottom \dots \dots \underline{O_{54}},$   
 $\underline{O_{56}},$   $\underline{S_{511}},$   $\underline{S_{549}},$   $\underline{S_{563}},$   $\underline{S_{572}}$   
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 S112, S1089, S1093, S1096, S1097,  
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 S1499, S1598, S1600, S1616, S1720,  
 S1722, S1740, S2094, S2096, S2098  
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 $\backslash@textsuperscript \dots \underline{L_{377}},$  L379,  $\underline{L_{380}}$   
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 G76, H268, L63, L132, I478, I506, I535  
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 P1174, P1177, P1187, P1188,  
 P1189, P1190, P1191, P1192,  
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`\@upordown` . I195, I196, I204, I225, I273  
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\e@alloc@bytecode@count ..... d70, d189, d190, d191, d195, d245  
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\e@alloc@chardef .. b60, b102, b210, b211, d48, d178, d186, d194, d202, U12  
\e@alloc@intercharclass@top ... U21  
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\s@fct@sgen t456
\s@fct@sgenb t461
\s@fct@sub t468
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     v358, v359, v389, v391, v395, v412,  
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     v536, v542, v550, v554, v566, v569,  
     v572, v580, v582, v1003, v1005,  
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