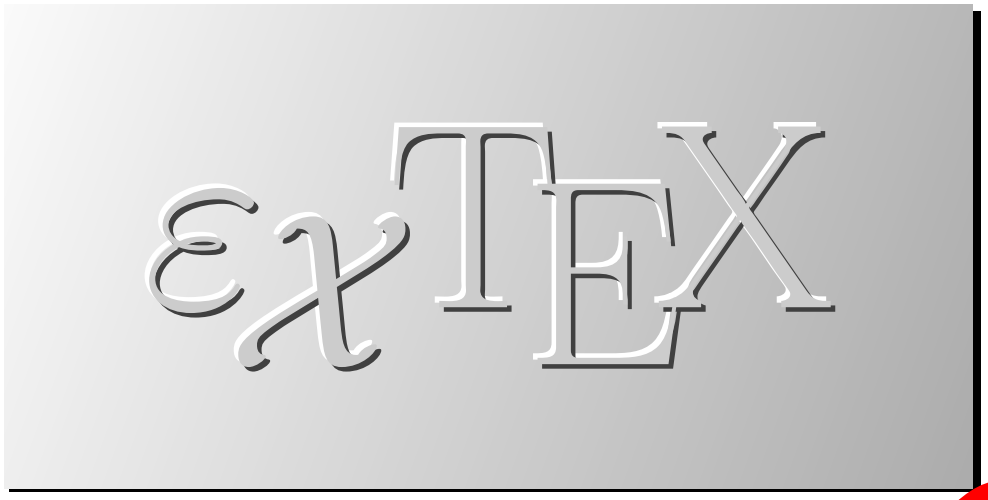

User's Guide

Version 0.0 (Revision 1.12)

Gerd Neugebau

This document describes ε_{χ}TEX. It explains how to get ε_{χ}TEX up and running and which features ε_{χ}TEX offers to you. Since ε_{χ}TEX provides a testbed for experimentation the focus has been put on the default configurations. The intended audience for this document are end users of the typesetting engine who want to use ε_{χ}TEX on the command line or as plug-in replacement of TEX.

Gerd Neugebauer
Im Lerchelsböhl 5
64521 Groß-Gerau (Germany)
gene@gerd-neugebauer.de

Contents

1. Introduction

ε_{χ}TEX aims at providing a high-quality typesetting system. The development of ε_{χ}TEX has been inspired by the experiences with TEX. The focus lies on an open design and a high degree of configurability. Thus ε_{χ}TEX should be a good base for further development.

On the other hand we have to take care not to leave the current user base of TEX behind. pdfTEX has taught us that a migration path from TEX has a positive value in it. In the mean time the majority of TEX users applies in fact pdfTEX.

To provide a backward compatibility of ε_{χ}TEX with TEX one special configuration is provided. Thus backward compatibility is just a matter of configuration.

1.1. This Document

This document is meant to be a reference document. It should contain all information necessary to know. It is not meant to be a tutorial. Thus do not expect tutorial type material in this document.

1.2. Web Site

There is a web site devoted to ε_{χ}TEX. This web site can be reached via the URL

http://www.extex.org

1.3. Mailing Lists

If you are ready to try ε_{χ}TEX you might as well want to join a mailing list to get in contact with the community.

http://www.dante.de/listman/extex

1.4. Reporting Bugs

If you find any bugs in ε_{χ}TEX you can submit them either via a HTML form or via email. You can find the HTML form at

http://www.extex.org/bugs

Emails containing the description can be sent to

extex-bugs@dante.de

Please include in your description

- the source of a *minimal* example showing the problem
- the log file resulting from running this example
- a description why you think that something went wrong and what the expected result would be
- a description of the environment you are using (host architecture, operating system, Java version)

2. Getting Started

In this chapter we describe the steps you can take to get $\varepsilon\chi$TEX up and running. We try to use as few as possible premises. Thus it should be not too hard to get started.

2.1. Prerequisites

2.1.1. Java

You need to have Java 1.4.2 or later installed on your system. You can get Java for a several systems directly from java.sun.com. Download and install it according to the installation instructions for your environment.

To check that you have an appropriate Java on your path you can use the command `java` with the argument `-version`. This can be seen in the following listing:

```
# java -version
java version "1.4.2_06"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.2_06-b03)
Java HotSpot(TM) Client VM (build 1.4.2_06-b03, mixed mode)
#
```

2.1.2. TEXMF

If you want to use more than the pure $\varepsilon\chi$TEX engine, fonts and macros can be inherited from a texmf tree. $\varepsilon\chi$TEX itself does not contain a full texmf tree. It comes just with some rudimentary files necessary for testing. Thus you should have installed a texmf tree, e.g. from a TEXLive installation. This can be found on the Comprehensive TEX Archive Network (CTAN).

There is no need to install the texmf tree in a special place. You have to tell $\varepsilon\chi$TEX anyhow where it can be found. It is even possible to work with several texmf trees.

One requirement for the texmf trees is that they have a file database (`ls-R`). $\varepsilon\chi$TEX can be configured to work without it, but then $\varepsilon\chi$TEX is deadly slow. Thus you do not really want to try this alternative.

2.2. Getting ε_{χ}TEX

2.2.1. Getting the Installer

The simplest way to get ε_{χ}TEX up and running is to use the ε_{χ}TEX installer. This installer is distributed as one file `ExTeX-setup.jar`. You can download it from

http://www.extex.org/download/

To be completed.

2.2.2. Getting the Sources

The sources of ε_{χ}TEX are stored in a CVS repository. To access this repository you need access to the internet and CVS installed in some way.

The coordinates of the repository are:

Connection type:	`pserver`
User:	`anonymous`
Host:	`cvs.extex.berlios.de`
Location:	`/cvsroot/extex`
Module:	`ExTeX`

We assume here that you have access to CVS on the command line. This can be either a shell on a Unix-like system or something like cygwin on Windows. We also assume that you have direct connection to the internet.

First we create a directory where the sources are stored:

```
# mkdir ExTeX
```

Next we change the current directory to this base directory:

```
# cd ExTeX
```

Now we log into the CVS repository. This login uses an anonymous account. This enables us to download the sources but not to commit any changes. The committing is restricted to members of the ε_{χ}TEX team.

```
# cvs -d:pserver:anonymous@cvs.extex.berlios.de/cvsroot/extex login
```

Finally we can check out the sources:

```
# cvs -d:pserver:anonymous@cvs.extex.berlios.de/cvsroot/extex co ExTeX
```

This command shows a lot of output. At the end the current directory is filled with a lot of files and directories.

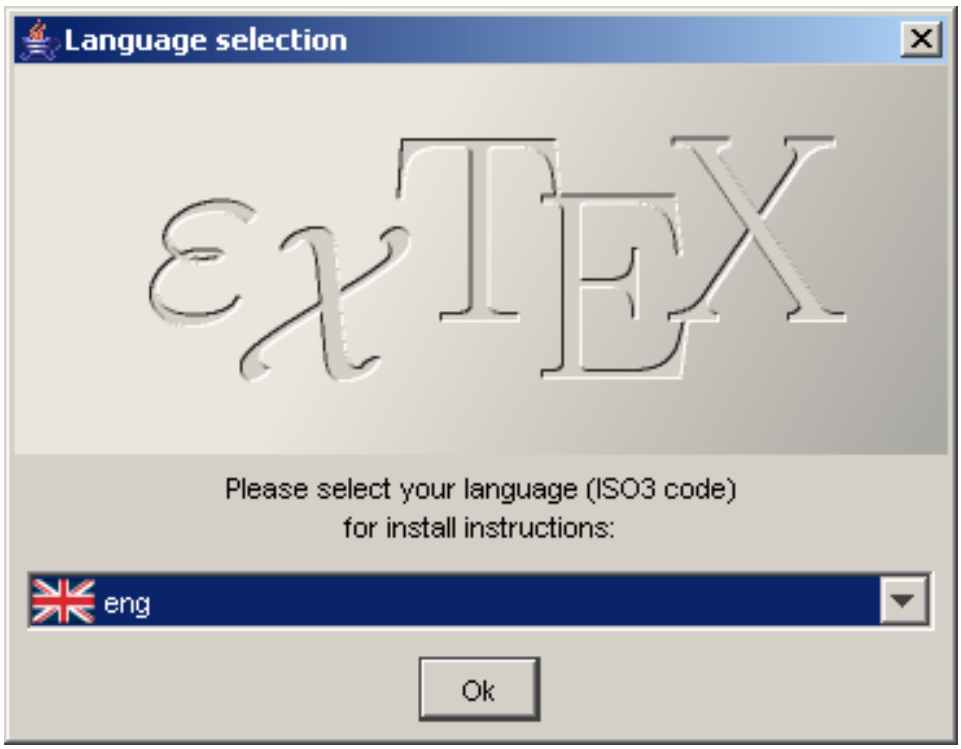

Figure 2.1.: The Language Selection in the Installer

2.3. Installing εχTEX

There are several ways to install εχTEX. Some of them are described in this section.

2.3.1. Installing εχTEX with the Installer

The easiest installation of εχTEX works with the εχTEX installer. This installer is named `ExTeX-setup.jar`. You can start the installer with the following command line:

```
# java -jar ExTeX-setup.jar
```

On Windows with a properly installed Java you can also start the installer by double-clicking `ExTeX-setup.jar` in the Explorer.

The installer provides a graphical user interface with a wizard guiding you through the installation process. The first dialog is shown in figure 2.1. As you can see you can select one of several languages for the installation process. Currently the languages English and German are supported. There might be some more at the time you are performing the installation.

Note that the internationalization covers the installer only. εχTEX can be run under different language environments as well. This is controlled by a setting at run-time. Currently only an English language binding for εχTEX is provided.

Finally you have to make sure that the executables `extex` or `extex.bat` is on your path for executables.

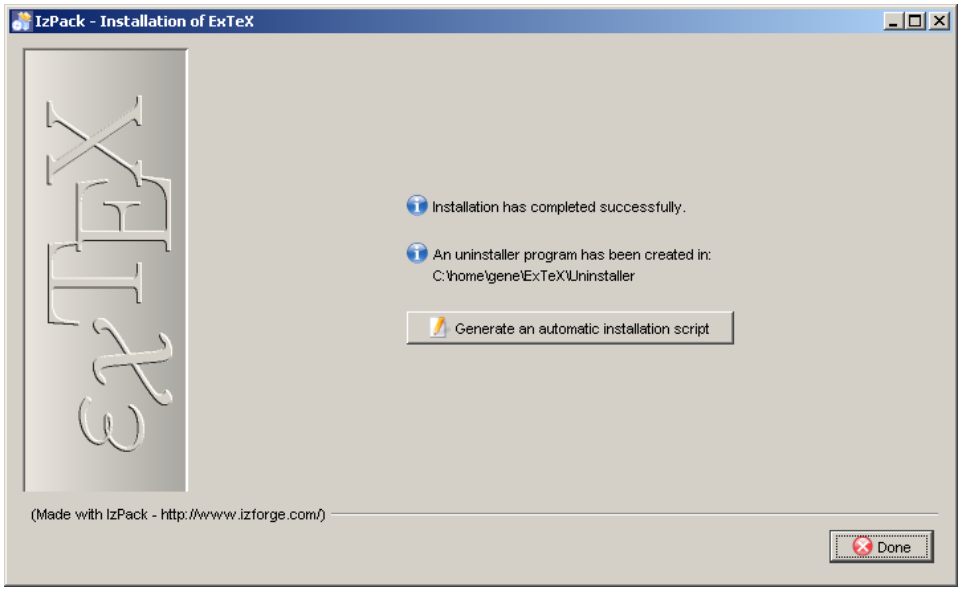

Figure 2.2.: Generating a Auto-Configuration for the Installer

2.3.2. Replaying an Installation

Sometimes it is desirable to perform an installation on several similar machines. This means that the answers to the questions in the installer are the same. This process can be automated.

In figure 2.2 you can see the last screen of the installer. Here you have the possibility to select the button "Generate an automatic installation script". This produces an XML file which can be passed to the installer to avoid the dialogs.

Suppose you have named the file `replay.xml` in the file selector which pops up when the button has been pressed. Then you can replay the installation with the following command invocation:

```
# java -jar ExTeX-setup.jar replay.xml
```

This supposes that the two files `ExTeX-setup.jar` and `replay.xml` are in the current directory.

Finally you have to make sure that the executables `extex` or `extex.bat` is on your path for executables.

2.3.3. Creating the $\varepsilon\chi$TEX Installer

You can create the installer of $\varepsilon\chi$TEX from the sources. All you need for this step is contained in the source distribution. Suppose you are in the base directory of the distribution. Then the following command creates the installer:

```
# build installer
```

As a result the file `ExTeX-setup.jar` is created in the directory `target`. This file is a self-contained installer. You can immediately start the installer with the following command line:

```
# java -jar target/ExTeX-setup.jar
```

In addition the installer file can be moved to any other place – even other machines – and run the installation there (see also section 2.3.1).

2.3.4. Installing εχTEX from the Sources on the Command Line

To install you can use the build script provided in the εχTEX base directory.

```
# build -Dinstall.dir=/usr/local/share/ExTeX install
```

Additionally you have to copy the file `.extex` from the base directory of the εχTEX to your home directory and adapted to your installation. Most probably the value of the property `extex.texinputs` needs adaptation to point to your texmf trees.

Finally you have to make sure that the executables `extex` or

`extex.bat` is on your path for executables.

Now you can forget the source directory. It is not needed any more unless you are debugging or developing εχTEX extensions.

2.4. Configuring εχTEX

The behaviour of εχTEX can be influenced via command line arguments and configuration files. Most of the times the start-up files will be enough for the casual user.

2.4.1. Start-up Files

Whenever εχTEX starts it looks for start-up files named `.extex`. This file is sought in the user's home directory in the current directory. The settings in the current directory overwrite the settings from the user's home directory. Those in turn overwrite the built-in settings.

εχTEX user properties files contain setting of properties. This is done in a line-based way. Lines containing only white space characters are ignored. If the first character is a hash sign (`#`) then the line is treated as a comment and ignored.

The first appearance of a equal sign (`=`) or the colon (`:`) separates the name of the property from the value. Leading and trailing white space is ignored both for the name and the value of the property.

Some characters have a special meaning. The backslash (\) acts as an escape character. The sequence `\n` is replaced by the newline character. If the last character in a line is a backslash then the line is continued in the next line. To produce a single backslash it has to be doubled.

You can set any property name you like to a legal value. ε_{χ}TEX will not complain about unknown properties but ignore them silently. The following properties are used by ε_{χ}TEX:

`extex.code`
: This parameter contains ε_{χ}TEX code to be executed directly. The execution is performed after any code specified in an input file.

  Example:

```
extex.code = \\relax
```

`extex.config`
: This parameter contains the name of the configuration resource to use. This configuration resource is sought on the class path.

  Example:

```
extex.config = tex.xml
```

`extex.encoding`
: This parameter contains the name of the property for the standard encoding to use.

  Example:

```
extex.encoding = ISO-8859-1
```

`extex.error.handler`
: This parameter contains the logical name of the error handler.

  Example:

```
extex.error.handler = TeX
```

`extex.fonts`
: This parameter contains the property indicating where to find font files. The value is a path similar to `extex.texinputs`.

  Example:

```
extex.fonts = /usr/local/share/fonts
```

`extex.halt.on.error`
: This boolean parameter contains the property indicating whether the processing should stop after the first error. Allowed values are `true` and `false`.

  Example:

```
extex.halt.on.error = false
```

`extex.file`
: This parameter contains the file to read from. It has no default. If this property is not set or set to the empty string then no attempt is made to read a file. Maybe the user is asked to provide one.

  Example:

```
extex.file = abc.tex
```

`extex.fmt`
: This parameter contains the name of the format to read. An empty string denotes that no format should be read. This is the default. In this case ε_{χ}TEX acts with no macros or fonts preloaded.

  Example:

```
extex.fmt = plain
```

`extex.ini`
: If set to `true` then act as iniTEX. This command line option is defined for compatibility to TEX only. In ε_{χ}TEX it has no effect at all. Allowed values are `true` and `false`.

  Example:

```
extex.ini = true
```

`extex.interaction`
: This parameter contains the interaction mode. Possible values are the numbers 0...3 and the symbolic names `batchmode` (0), `nonstopmode` (1), `scrollmode` (2), and `errorstopmode` (3).

  Example:

```
extex.interaction = scrollmode
```

`extex.jobname`
: This parameter contains the name of the job. It is overwritten if a file is given to read from. In this case the basename of the input file is used instead. If no file is read in then the default value `texput` is used.

  Example:

```
extex.jobname = texput
```

`extex.jobname.master`
: This parameter contains the name of the job to be used with high priority.

  Example:

```
extex.jobname.master = texput
```

`extex.lang`
: This parameter contains the name of the locale to be used for the messages. The value is a two letter ISO language code. $\varepsilon\chi$TEX can be internationalized just by providing some files with the translated strings. Currently only the language English (`en`) is supported.

  Example:

```
extex.lang = en
```

`extex.nobanner`
: This parameter contains a boolean indicating that the banner should be suppressed. Allowed values are `true` and `false`.

  Example:

```
extex.nobanner = false
```

`extex.output`
: This parameter contains the output format. This logical name is resolved via the configuration.

  Example:

```
extex.output = pdf
```

`extex.outputdir`
: This parameter contains the directory where output files should be created. The period is interpreted as the current directory. The default is the current directory.

  Example:

```
extex.outputdir = .
```

`extex.outputdir.fallback`
: This parameter contains the property for the fallback if the output directory (`extex.outputdir`) fails to be writable. The period is interpreted as the current directory.

  The default is the current directory. Thus you can reset `extex.outputdir` and if this directory happens not to be writable then the current directory is used to create the log file and output files in.

  Example:

```
extex.outputdir.fallback = .
```

`extex.progname`
: This parameter can be used to overrule the name of the program shown in the banner and the version information.

  Example:

```
extex.progname = iniExTeX
```

`extex.stacktrace.on.internal.error`
: This parameter can be used to force a stack trace on stdout if an internal error is encountered. This is handy for development. Allowed values are `true` and `false`.

  Example:

```
extex.stacktrace.on.internal.error = true
```

`extex.texinputs`
: This parameter contains the additional directories for searching εχTEX input files. The directories are separated by the system-dependant separator. This separator is a colon (`:`) on Unix and the semicolon (`;`) on Windows.

  Example:

```
extex.texinputs = /home/gene/lib/tex
```

`extex.trace.input.files`
: This boolean parameter contains the indicator whether or not to trace the search for input files. Allowed values are `true` and `false`.

  Example:

```
extex.trace.input.files = false
```

`extex.trace.font.files`
: This boolean parameter contains the indicator whether or not to trace the search for font files. Allowed values are `true` and `false`.

  Example:

```
extex.trace.font.files = false
```

`extex.trace.macros`
: This boolean parameter contains the indicator whether or not to trace the execution of macros. Allowed values are `true` and `false`.

  Example:

```
extex.trace.macros = false
```

`extex.trace.tokenizer`
: This boolean parameter contains the indicator whether or not to trace the work of the tokenizer. Allowed values are `true` and `false`.

  Example:

```
extex.trace.tokenizer = false
```

`extex.typesetter`
: This parameter contains the name of the typesetter to use. If it is not set then the default from the configuration file is used.

  Example:

```
extex.typesetter = default
```

2.4.2. Configuration Files

Configuration files of another kind contain the assembly instructions for ε_{χ}TEX. Those files can be used to provide additional features in ε_{χ}TEX.

To be completed.

2.4.3. Predefined Configurations

The Configuration `extex`

The configuration `extex` identifies itself as "ExTeX default mode". The configuration contains the primitive sets `tex`, `etex`, and `omega`. The configuration allows extended register names.

The Configuration `extex-jx`

The configuration `extex-jx` identifies itself as "Java extensions". The configuration contains the primitive sets `tex`, `etex`, and `jx`. The configuration allows extended register names.

The Configuration `extex-native`

The configuration `extex-native` identifies itself as "Native extensions". The configuration contains the primitive sets `tex`, `etex`, and `native`. The configuration allows extended register names.

The Configuration `nextex`

The configuration `nextex` identifies itself as "Namespace extension". The configuration contains the primitive sets `tex`, `etex`, and `namespace`. The configuration allows extended register names.

The Configuration `omega`

The configuration `omega` identifies itself as "Omega compatibility mode". The configuration contains the primitive sets `tex`, `etex`, and `omega`.

The Configuration `tex`

The configuration `tex` identifies itself as "TeX compatibility mode". The configuration contains the primitive set `tex`.

2.4.4. Primitive Sets

The Primitive Set `etex`

The primitive set `etex` defines the following primitives:

```
\beginL \beginR \botmarks \clubpenalties \currentgrouplevel
\currentgrouptype \currentifbranch \currentiflevel \currentiftype
\detokenize \dimenexpr \displaywidowpenalties \endL \endR \eTeXrevision
\eTeXversion \everyeof \firstmarks \fontchardp \fontcharht \fontcharic
\fontcharwd \glueexpr \glueshrink \glueshrinkorder \gluestretch
\gluestretchorder \ifcsname \ifdefined \iffontchar \interactionmode
\interlinepenalties \lastlinefit \lastnodetype \marks \middle \muexpr
\numexpr \pagediscarts \parshapedimen \parshapeindent \parshapelength
\predisplaydirection \protected \readline \savinghyphcodes
\savingvdiscarts \scantokens \showgroups \showtokens \splitbotmarks
\splitdiscarts \splitfirstmarks \TeXXeTstate \topmarks \tracingassigns
\tracingcommands \tracinggroups \tracingifs \tracingnesting
\tracingscantokens \unexpanded \unless \widowpenalties
```

The Primitive Set `jx`

The primitive set `jx` defines the following primitives:

```
\javadef \javaload
```

The Primitive Set `namespace`

The primitive set `namespace` defines the following primitives:

```
\export \import \namespace
```

The Primitive Set native

The primitive set native defines the following primitives:

\nativedef \nativeload

The Primitive Set omega

The primitive set omega defines the following primitives:

\addafterocplist \addbeforeocplist \clearocplists \DefaultInputMode
\DefaultInputTranslation \DefaultOutputMode \DefaultOutputTranslation
\hfi \InputMode \InputTranslation \localbrokenpenalty
\localinterlinepenalty \localleftbox \localrightbox \mathdir
\naturaldir \noDefaultInputMode \noDefaultInputTranslation
\noDefaultOutputMode \noDefaultOutputTranslation \nullocplist \ocp
\ocplist \odelmiter \omathaccent \omathchar \omathchardef \omathcode
\omathdelcode \oradical \OutputMode \OutputTranslation \pagedir
\pagedirHL \pagedirHR \popocplist \pushocplist \removebeforeocplist
\textdir \unnaturaldir \vfi

The Primitive Set tex

The primitive set tex defines the following primitives:

\␣ \/ \\ \above \abovedisplayshortskip \abovedisplayskip
\abovewithdelims \accent \adjdemerits \advance \afterassignment
\aftergroup \atop \atopwithdelims \badness \baselineskip \batchmode
\begingroup \belowdisplayshortskip \belowdisplayskip \binoppenalty
\botmark \box \boxmaxdepth \brokenpenalty \catcode \char \chardef
\cleaders \closein \closeout \clubpenalty \copy \count \countdef \cr
\crcr \csname \day \deadcycles \def \defaulthyphenchar \defaultskewchar
\delcode \delimiter \delimiterfactor \delimitershortfall \dimen
\dimendef \discretionary \displayindent \displaylimits \displaystyle
\displaywidowpenalty \displaywidth \divide \doublehyphendemerits
\dp \dump \edef \else \emergencystretch \end \endcsname \endgroup
\endinput \endlinechar \eqno \errhelp \errmessage \errorcontextlines
\errorstopmode \escapechar \everycr \everydisplay \everyhbox \everyjob
\everymath \everypar \everyvbox \exhyphenpenalty \expandafter \fam \fi
\finalhyphendemerits \firstmark \floatingpenalty \font \fontdimen
\fontname \futurelet \gdef \global \globaldefs \halign \hangafter
\hangindent \hbadness \hbox \hfil \hfill \hfilneg \hfuzz \hoffset
\holdinginserts \hrule \hsize \hskip \hss \ht \hyphenation \hyphenchar
\hyphenpenalty \if \ifcase \ifcat \ifdim \ifeof \iffalse \ifhbox
\ifhmode \ifinner \ifmmode \ifnum \ifodd \iftrue \ifvbox \ifvmode
\ifvoid \ifx \ignorespaces \immediate \indent \input \inputlineno
\insert \insertpenalties \interlinepenalty \jobname \kern \language
\lastbox \lastkern \lastpenalty \lastskip \lccode \leaders \left

```
\lefthyphenmin \leftskip \leqno \let \limits \linepenalty \lineskip
\lineskiplimit \long \looseness \lower \lowercase \mag \mark
\mathaccent \mathbin \mathchar \mathchardef \mathchoice \mathclose
\mathcode \mathinner \mathop \mathopen \mathord \mathpunct \mathrel
\mathsurround \maxdeadcycles \maxdepth \meaning \medmuskip \message
\mkern \month \moveleft \moveright \mskip \multiply \muskip \muskipdef
\newlinechar \noalign \noboundary \noexpand \noindent \nolimits
\nonscript \nonstopmode \nulldelimiterspace \nullfont \number
\omit \openin \openout \or \outer \output \outputpenalty \over
\overfullrule \overline \overwithdelims \pagedepth \pagefilllstretch
\pagefillstretch \pagefilstretch \pagegoal \pageshrink \pagestretch
\pagetotal \par \parfillskip \parindent \parshape \parskip
\patterns \pausing \penalty \postdisplaypenalty \predisplaypenalty
\predisplaysize \pretolerance \prevdepth \prevgraf \radical
\raise \read \relax \relpenalty \right \righthyphenmin \rightskip
\romannumeral \scriptfont \scriptscriptfont \scriptscriptstyle
\scriptspace \scriptstyle \scrollmode \setbox \setlanguage \sfcode
\shipout \show \showbox \showboxbreadth \showboxdepth \showlists
\showthe \skewchar \skip \skipdef \spacefactor \spaceskip \span
\special \splitbotmark \splitfirstmark \splitmaxdepth \splittopskip
\string \tabskip \textfont \textstyle \the \thickmuskip \thinmuskip
\time \toks \toksdef \tolerance \topmark \topskip \tracingcommands
\tracinglostchars \tracingmacros \tracingonline \tracingoutput
\tracingpages \tracingparagraphs \tracingrestores \tracingstats
\uccode \uchyph \underline \unhbox \unhcopy \unkern \unpenalty \unskip
\unvbox \unvcopy \uppercase \vadjust \valign \vbadness \vbox \vcenter
\vfil \vfill \vfilneg \vfuzz \voffset \vrule \vsize \vskip \vsplit \vss
\vtop \wd \widowpenalty \write \xdef \xleaders \xspaceskip \year
```

2.5. Running ε_{χ}TEX

Currently ε_{χ}TEX can be run from the command line. In this respect it is more or less identical to TEX and can be used as a plug-in replacement.

The following sample show a simple invocation of ε_{χ}TEX without any command line arguments.

```
# extex
This is ExTeX, Version 0.0 (TeX compatibility mode)
**\relax

*\end

No pages of output.
Transcript written on ./texput.log.
```

In this case ε_{χ}TEX enters interaction with the user and asks for an input file. This

is indicated by the two asterisks. We have entered `\relax` here to indicate that we are not willing to pass in a file name. The $\varepsilon_{\mathcal{X}}$TEX system asks us to enter some command – indicted by the single asterisk. Here we have entered `\end` to indicate that we want to finish the processing. Thus $\varepsilon_{\mathcal{X}}$TEX terminates normally.

To be completed.

```
# extex plain
This is ExTeX, Version 0.0 (TeX compatibility mode)
(plain Preloading the plain format: codes, registers, parameters, fonts,
more fonts, macros, math definitions, output routines, hyphenation(hyphen))
*\dump
Beginning to dump on file plain.fmt

*\end

No pages of output.
Transcript written on ./plain.log.
```

2.5.1. Command Line Parameters

The invocation of the executable `extex` can be controlled by large number of command line arguments. Those command line arguments are described in the following list:

⟨*code*⟩
: This parameter contains $\varepsilon_{\mathcal{X}}$TEX code to be executed directly. The execution is performed after any code specified in an input file. On the command line the code has to start with a backslash. This restriction does not hold for the property settings.

  This command line argument sets the property `extex.code`

⟨*file*⟩
: This parameter contains the file to read from. A file name may not start with a backslash or an ambercent. It has no default.

  This command line argument sets the property `extex.file`.

\- ⟨*file*⟩
: This parameter terminates the normal processing of arguments. The next argument – if present – is interpreted as input file. With this construction it is possible to process an input file which starts with one of the special characters `\` or `&`.

  This command line argument sets the property `extex.file` if a file argument is present.

`-configuration` ⟨*resource*⟩
: This parameter contains the name of the configuration resource to use. This configuration resource is sought on the class path.

  This command line argument sets the property `extex.config`.

`-copyright`
: This command line option produces a copyright notice on the standard output stream and terminates the program afterwards.

`&`⟨*format*⟩

`-fmt` ⟨*format*⟩
: This parameter contains the name of the format to read. An empty string denotes that no format should be read. This is the default.

  This command line argument sets the property `extex.fmt`.

`-debug` ⟨*spec*⟩
: This command line parameter can be used to instruct the program to produce debugging output of several kinds. The debug output is written to the log file. The specification ⟨*spec*⟩ is interpreted left to right. Each character is interpreted according to the following table:

Spec	*Description*	*See*
F	This specifier contains the indicator whether or not to trace the searching for input files.	`extex.trace.input.files`
f	This specifier contains the indicator whether or not to trace the searching for font files.	`extex.trace.font.files`
M	This specifier contains the indicator whether or not to trace the execution of macros.	`extex.trace.macros`
T	This specifier contains the indicator whether or not to trace the work of the tokenizer.	`extex.trace.tokenizer`

  The following example shows a possible invocation with this parameter:

```
# extex -debug FfMT abc.tex
This is ExTeX, Version 0.0 (TeX compatibility mode)
...
```

`-halt-on-error`
: This parameter contains the indicator whether the processing should halt after the first error which has been encountered.

  This command line argument sets the property `extex.halt.on.error`.

`-help`
: This command line option produces a short usage description on the standard output stream and terminates the program afterwards.

`-ini`
: If set to true then act as iniTEX. This command line option is defined for compatibility to TEX only. In $\varepsilon\chi$TEX it has no effect at all.

  This command line argument sets the property `extex.ini`.

  The following example shows a possible invocation with this parameter:

```
# extex -ini abc.tex
This is ExTeX, Version 0.0 (TeX compatibility mode)
...
```

`-interaction` ⟨*mode*⟩
: This parameter contains the interaction mode. possible values are the numbers 0...3 and the symbolic names `batchmode` (0), `nonstopmode` (1), `scrollmode` (2), and `errorstopmode` (3).

  This command line argument sets the property `extex.interaction`.

  The following example shows a possible invocation with this parameter:

```
# extex -interaction batchmode abc.tex
This is ExTeX, Version 0.0 (TeX compatibility mode)
...
```

`-job-name` ⟨*name*⟩
: This parameter contains the name of the job. It is overwritten if a file is given to read from. In this case the base name of the input file is used instead.

  This command line argument sets the property `extex.jobname`.

`-language` ⟨*language*⟩
: This parameter contains the name of the locale to be used for the messages.

  This command line argument sets the property `extex.lang`.

`-output` ⟨*format*⟩
: This parameter contains the output format. This logical name is resolved via the configuration.

  This command line argument sets the property `extex.output`.

  The following example shows a possible invocation with this parameter:

```
# extex -output pdf abc.tex
This is ExTeX, Version 0.0 (TeX compatibility mode)
```

`-progname` ⟨*name*⟩
: This parameter can be used to overrule the name of the program shown in the banner and the version information. The following example shows a possible invocation and the resulting output:

```
# extex -progname XeTxE -version
This is XeTxE, Version 0.0 (1.4.2_06)
#
```

This command line argument sets the property `extex.progname`.

`-texinputs` ⟨*path*⟩
: This parameter contains the additional directories for searching εχTEX input files. The directories are separated by the system-dependant separator. This separator is a colon (`:`) on Unix and the semicolon (`;`) on Windows.

This command line argument sets the property `extex.texinputs`.

`-texmfoutputs` ⟨*dir*⟩
: This parameter contains the name of the property for the fallback if the output directory fails to be writable.

This command line argument sets the property `extex.outputdir.fallback`.

`-texoutputs` ⟨*dir*⟩
: This parameter contain the directory where output files should be created.

This command line argument sets the property `extex.outputdir`.

`-version`
: This command line parameter forces that the version information is written to standard output and the program is terminated. The version of εχTEX is shown and the version of the Java engine in parentheses. The following example shows a possible invocation and the resulting output:

```
# extex -version
This is ExTeX, Version 0.0 (1.4.2_06)
#
```

Command line parameters can be abbreviated up to a unique prefix – and sometimes even more. Thus the following invocations are equivalent:

```
extex -v
extex -ve
extex -ver
extex -vers
extex -versi
extex -versio
extex -version
```

2.5.2. Creating Formats

To be completed.

3. Troubleshooting $\varepsilon_{\mathcal{X}}$TEX

This chapter contains some hints in the case of trouble.

3.1. Why are my files not found?

$\varepsilon_{\mathcal{X}}$TEX has a configurable search for external resources. This search is controlled by several parameters.

To be completed.

3.2. Why are is the log file different from TEX's?

$\varepsilon_{\mathcal{X}}$TEX has the goal to produce a visual result comparable to the one of TEX. It has been decided explicitly that the contents of the log file is not considered for compatibility.

The log file is meant for a human reader who should not have any trouble with the differences. The log file is not meant to be a means for communicating with another program.

4. The Macro Language of $\varepsilon_{\mathcal{X}}$TEX

4.1. Primitives of $\varepsilon_{\mathcal{X}}$TEX

$\varepsilon_{\mathcal{X}}$TEX defines a lot of primitives. Those primitives are described below.

The Primitive \␣

This primitive inserts an explicite space into the current list. This has an effect in horizontal or restricted horizontal modes only. In other modes it has no effect.

The formal description of this primitive is the following:

⟨*space primitive*⟩
→ \␣

Examples:

```
123\ 456
```

```
123\ \ 456
```

The primitive \␣ is defined in the set `tex`.

The Primitive \/

The formal description of this primitive is the following:

⟨*italic correction*⟩
→ \/

Examples:

```
123\/456
```

The primitive \/ is defined in the set `tex`.

The Primitive \

The formal description of this primitive is the following:

⟨*newline*⟩
→ \\

Examples:

```
\\
```

The primitive \
is defined in the set `tex`.

The Primitive \above

The formal description of this primitive is the following:

⟨*above*⟩
→ \above

Examples:

```
{a \above b}
```

The primitive `\above` is defined in the set `tex`.

The Primitive \abovedisplayshortskip

`\abovedisplayshortskip` is a skip register. The primitive `\abovedisplayshortskip` is defined in the set `tex`.

The Primitive \abovedisplayskip

`\abovedisplayskip` is a skip register. The primitive `\abovedisplayskip` is defined in the set `tex`.

The Primitive \abovewithdelims

The formal description of this primitive is the following:

⟨*abovewithdelims*⟩
→ \abovewithdelims

Examples:

```
\abovewithdelims
```

The primitive `\abovewithdelims` is defined in the set `tex`.

The Primitive \accent

The formal description of this primitive is the following:

⟨*accent*⟩
→ `\accent` ...

Examples:

```
\accent 13 a
```

The primitive `\accent` is defined in the set `tex`.

The Primitive \addafterocplist

`\addafterocplist` is not implemented yet.
The primitive `\addafterocplist` is defined in the set `omega`.

The Primitive \addbeforeocplist

`\addbeforeocplist` is not implemented yet.
The primitive `\addbeforeocplist` is defined in the set `omega`.

The Primitive \adjdemerits

`\adjdemerits` is a count register. The primitive `\adjdemerits` is defined in the set `tex`.

The Primitive \advance

This primitive implements an assignment. The variable given as next tokens is incremented by the quantity given after the optional `by`.
The formal description of this primitive is the following:

⟨*advance*⟩
→ ⟨*optional prefix*⟩ `\advance` ⟨*advancable*⟩
⟨*optional prefix*⟩
→
| `\global` ⟨*optional prefix*⟩
⟨*advancable*⟩
→ ⟨*integer variable*⟩ ⟨*optional* `by`⟩ ⟨*number*⟩
| ⟨*dimen variable*⟩ ⟨*optional* `by`⟩ ⟨*dimen*⟩
| ⟨*glue variable*⟩ ⟨*optional* `by`⟩ ⟨*glue*⟩
| ⟨*muglue variable*⟩ ⟨*optional* `by`⟩ ⟨*muglue*⟩
⟨*optional* `by`⟩

→ [by]
| ⟨*optional spaces*⟩

Examples:

```
\advance\count12 345
```

```
\advance\count12 by -345
```

The primitive `\advance` is defined in the set `tex`.

The Primitive `\afterassignment`

The primitive `\afterassignment` registers the token to be inserted after the next assignment. Note that there is at most one token to be inserted after the next assignment. Thus the primitive may overwrite any previously registered token.

The formal description of this primitive is the following:

⟨*afterassignment*⟩
→ `\afterassignment` ⟨*token*⟩

Examples:

```
\afterassignment\abc
```

```
\afterassignment X
```

```
\afterassignment \~
```

The primitive `\afterassignment` is defined in the set `tex`.

The Primitive `\aftergroup`

This primitive takes the next token and saves it. The saved token will be inserted after the current group has been closed. If several tokens are saved then they will be inserted in the same sequence as they are saved.

The formal description of this primitive is the following:

⟨*aftergroup*⟩
→ `\aftergroup` ⟨*token*⟩

Examples:

```
{\aftergroup\~ xyz}
```

```
{\aftergroup\a\aftergroup\b xyz}
```

The primitive `\aftergroup` is defined in the set `tex`.

The Primitive \atop

The formal description of this primitive is the following:

⟨*atop*⟩
→ \atop

Examples:

```
\atop
```

The primitive \atop is defined in the set tex.

The Primitive \atopwithdelims

The formal description of this primitive is the following:

⟨*atopwithdelims*⟩
→ \atopwithdelims

Examples:

```
\atopwithdelims
```

The primitive \atopwithdelims is defined in the set tex.

The Primitive \badness

The formal description of this primitive is the following:

⟨*badness*⟩
→ \badness ⟨*equals*⟩ ⟨*number*⟩

Examples

```
\count1=\badness
```

The primitive \badness is defined in the set tex.

The Primitive \baselineskip

\baselineskip is a skip register. The primitive \baselineskip is defined in the set tex.

The Primitive \batchmode

This primitive is an assignment. The interaction mode is set to batch mode. In batch mode the processing is terminated if the program needs input from the terminal.

The formal description of this primitive is the following:

⟨*batchmode*⟩
→ \batchmode

Examples:

```
\batchmode
```

The primitive \batchmode is defined in the set tex.

The Primitive \begingroup

The formal description of this primitive is the following:

⟨*begingroup*⟩
→ \begingroup

Examples:

```
\begingroup 123 \endgroup
```

The primitive \begingroup is defined in the set tex.

The Primitive \beginL

\beginL is not implemented yet.

The primitive \beginL is defined in the set etex.

The Primitive \beginR

\beginR is not implemented yet.

The primitive \beginR is defined in the set etex.

The Primitive \belowdisplayshortskip

\belowdisplayshortskip is a skip register. The primitive \belowdisplayshortskip is defined in the set tex.

The Primitive \belowdisplayskip

\belowdisplayskip is a skip register. The primitive \belowdisplayskip is defined in the set tex.

The Primitive \binoppenalty

\binoppenalty is a count register. The primitive \binoppenalty is defined in the set tex.

The Primitive \botmark

The formal description of this primitive is the following:

\botmark ...

Examples:

```
\botmark ...
```

The primitive \botmark is defined in the set tex.

The Primitive \botmarks

\botmarks is not implemented yet.
The primitive \botmarks is defined in the set etex.

The Primitive \box

The formal description of this primitive is the following:

⟨*box*⟩
→ \box ⟨*8-bit number*⟩

Examples:

```
\box42
```

The primitive \box is defined in the set tex.

The Primitive \boxmaxdepth

\boxmaxdepth is a dimen register. The primitive \boxmaxdepth is defined in the set tex.

The Primitive \brokenpenalty

\brokenpenalty is a count register. The primitive \brokenpenalty is defined in the set tex.

The Primitive \catcode

The assignment is controlled by the modifier \global and the count parameter \globaldefs. Usually the assignment is acting on the current group only. if the integer parameter \globaldefs is not 0 or the modifier \global is given then the assignment is applied to all groups.

The formal description of this primitive is the following:

⟨*catcode*⟩
→ \catcode ⟨*8-bit number*⟩ ⟨*equals*⟩ ⟨*4-bit number*⟩

Examples:

```
\catcode ...
```

The primitive \catcode is defined in the set tex.

The Primitive \char

The primitive \char provides access to any character in the current font. The argument is the numeric value of the character. This value can be any expanded expression resulting in a number of the proper range.

If no proper argument is found then an error is raised.

The formal description of this primitive is the following:

⟨*char*⟩
→ \char ⟨*number*⟩

Examples:

```
\char42
\char\count1
```

The primitive \char is defined in the set tex.

The Primitive \chardef

The formal description of this primitive is the following:

⟨*chardef*⟩
→ \chardef ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\chardef\abc=45
```

```
\chardef\abc 33
```

The primitive \chardef is defined in the set tex.

The Primitive \cleaders

The formal description of this primitive is the following:

⟨*cleaders*⟩
→ `\cleaders` ...

Examples:

```
\cleaders\hrul\hfill
```

The primitive `\cleaders` is defined in the set `tex`.

The Primitive \clearocplists

`\clearocplists` is not implemented yet.
The primitive `\clearocplists` is defined in the set `omega`.

The Primitive \closein

The primitive takes one expanded integer argument. This argument denotes a read register which will be closed if it is currently assigned to a file.
The formal description of this primitive is the following:

⟨*closein*⟩
→ `\closein` ⟨*number*⟩

Examples:

```
\closein5
```

```
\closein\count120
```

The primitive `\closein` is defined in the set `tex`.

The Primitive \closeout

The formal description of this primitive is the following:

⟨*closeout*⟩
→ `\closeout` ⟨*number*⟩

Examples:

```
\closeout5
```

```
\closeout\count120
```

The primitive `\closeout` is defined in the set `tex`.

The Primitive \clubpenalties

\clubpenalties is not implemented yet.

The primitive \clubpenalties is defined in the set etex.

The Primitive \clubpenalty

\clubpenalty is a count register. The primitive \clubpenalty is defined in the set tex.

The Primitive \copy

The formal description of this primitive is the following:

⟨*copy*⟩
→ \copy ⟨*8-bit number*⟩

Examples:

```
\copy42
```

The primitive \copy is defined in the set tex.

The Primitive \count

The formal description of this primitive is the following:

⟨*count*⟩
→ \count ⟨*8-bit number*⟩ ⟨*equals*⟩ ⟨*number*⟩

Examples:

```
\count23=-456
```

The primitive \count is defined in the set tex.

The Primitive \countdef

The formal description of this primitive is the following:

⟨*countdef*⟩
→ \countdef ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\countdef\abc=45
```

```
\countdef\abc 33
```

The primitive \countdef is defined in the set tex.

The Primitive \cr

The formal description of this primitive is the following:

⟨*cr*⟩
→ \cr

Examples:

```
\cr
```

The primitive \cr is defined in the set tex.

The Primitive \crcr

The formal description of this primitive is the following:

⟨*crcr*⟩
→ \crcr

Examples:

```
\crcr
```

The primitive \crcr is defined in the set tex.

The Primitive \csname

When TEX expands \csname it reads to the matching \endcsname, expanding tokens as it goes; only character tokens should remain after this expansion has taken place. Then the "expansion" of the entire \csname...\endcsname text will be a single control sequence token, defined to be like \relax if its meaning is currently undefined.

The formal description of this primitive is the following:

⟨*csname*⟩
→ \csname ⟨...⟩ \endcsname

Examples:

```
\csname abc\endcsname
```

The primitive \csname is defined in the set tex.

The Primitive \currentgrouplevel

...

The formal description of this primitive is the following:

⟨*currentgrouplevel*⟩
→ \currentgrouplevel

Examples:

```
\the\currentgrouplevel
```

The primitive \currentgrouplevel is defined in the set etex.

The Primitive \currentgrouptype

\currentgrouptype is not implemented yet.

The primitive \currentgrouptype is defined in the set etex.

The Primitive \currentifbranch

\currentifbranch is not implemented yet.

The primitive \currentifbranch is defined in the set etex.

The Primitive \currentiflevel

\currentiflevel is not implemented yet.

The primitive \currentiflevel is defined in the set etex.

The Primitive \currentiftype

\currentiftype is not implemented yet.

The primitive \currentiftype is defined in the set etex.

The Primitive \day

\day is a count register. The primitive \day is defined in the set tex.

The Primitive \deadcycles

\deadcycles is a count register. The primitive \deadcycles is defined in the set tex.

The Primitive \def

The formal description of this primitive is the following:

⟨*def*⟩
→ ⟨*prefix*⟩ `\def` ⟨*control sequence*⟩ ⟨*parameter text*⟩ `{` ⟨*replacement text*⟩ `}`
⟨*prefix*⟩
→
| `\global` ⟨*prefix*⟩
| `\long` ⟨*prefix*⟩
| `\outer` ⟨*prefix*⟩

Examples:

```
\def#1{--#1--}
```

The primitive `\def` is defined in the set `tex`.

The Primitive \defaulthyphenchar

`\defaulthyphenchar` is a count register. The primitive `\defaulthyphenchar` is defined in the set `tex`.

The Primitive \DefaultInputMode

`\DefaultInputMode` is not implemented yet.
The primitive `\DefaultInputMode` is defined in the set `omega`.

The Primitive \DefaultInputTranslation

`\DefaultInputTranslation` is not implemented yet.
The primitive `\DefaultInputTranslation` is defined in the set `omega`.

The Primitive \DefaultOutputMode

`\DefaultOutputMode` is not implemented yet.
The primitive `\DefaultOutputMode` is defined in the set `omega`.

The Primitive \DefaultOutputTranslation

`\DefaultOutputTranslation` is not implemented yet.
The primitive `\DefaultOutputTranslation` is defined in the set `omega`.

The Primitive \defaultskewchar

\defaultskewchar is a count register. The primitive \defaultskewchar is defined in the set tex.

The Primitive \delcode

The TEX encoding interprets the number as 27 bit hex number: "csyylxx. Here the digits have the following meaning:

c the math class of this delimiter. It has a range from 0 to 7.

l the family for the large character. It has a range from 0 to 15.

xx the character code of the large character.

s the family for the small character. It has a range from 0 to 15.

yy the character code of the small character.

The formal description of this primitive is the following:

⟨*delcode*⟩
→ \delcode ⟨*8-bit number*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\delcode`x="123456
```

The primitive \delcode is defined in the set tex.

The Primitive \delimiter

The formal description of this primitive is the following:

⟨*delimiter*⟩
→ \delimiter

Examples:

```
\delimiter "426830A
```

The primitive \delimiter is defined in the set tex.

The Primitive \delimiterfactor

\delimiterfactor is a count register. The primitive \delimiterfactor is defined in the set tex.

The Primitive \delimitershortfall

\delimitershortfall is a dimen register. The primitive \delimitershortfall is defined in the set tex.

The Primitive \detokenize

\detokenize is not implemented yet.

The primitive \detokenize is defined in the set etex.

The Primitive \dimen

The primitive \dimen is defined in the set tex.

The Primitive \dimendef

The formal description of this primitive is the following:

⟨*dimendef*⟩
→ \dimendef ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\dimendef\abc=45
```

```
\dimendef\abc 33
```

The primitive \dimendef is defined in the set tex.

The Primitive \dimenexpr

\dimenexpr is not implemented yet.

The primitive \dimenexpr is defined in the set etex.

The Primitive \discretionary

The formal description of this primitive is the following:

⟨*discretionary*⟩
→ \discretionary ...

Examples:

```
\discretionary{f-}{fi}{ffi}
\discretionary{-}{}{}
```

The primitive \discretionary is defined in the set tex.

The Primitive \displayindent

\displayindent is a dimen register. The primitive \displayindent is defined in the set tex.

The Primitive \displaylimits

The formal description of this primitive is the following:

⟨*displaylimits*⟩
→ \displaylimits

Examples:

```
\displaylimits
```

The primitive \displaylimits is defined in the set tex.

The Primitive \displaystyle

The formal description of this primitive is the following:

⟨*displaystyle*⟩
→ \displaystyle

Examples:

```
\displaystyle
```

The primitive \displaystyle is defined in the set tex.

The Primitive \displaywidowpenalties

\displaywidowpenalties is not implemented yet.
The primitive \displaywidowpenalties is defined in the set etex.

The Primitive \displaywidowpenalty

\displaywidowpenalty is a count register. The primitive \displaywidowpenalty is defined in the set tex.

The Primitive \displaywidth

\displaywidth is a dimen register. The primitive \displaywidth is defined in the set tex.

The Primitive \divide

This primitive implements an assignment. The variable given as next tokens is divided by the quantity given after the optional by.

The formal description of this primitive is the following:

⟨*divide*⟩
→ \divide ⟨*dividable*⟩
⟨*dividable*⟩
→ ⟨*integer variable*⟩ ⟨*optional* by⟩ ⟨*8-bit number*⟩
| ⟨*dimen variable*⟩ ⟨*optional* by⟩ ⟨*8-bit number*⟩
| ⟨*glue variable*⟩ ⟨*optional* by⟩ ⟨*8-bit number*⟩
| ⟨*muglue variable*⟩ ⟨*optional* by⟩ ⟨*8-bit number*⟩
⟨*optional* by⟩
→ [by]
| ⟨*optional spaces*⟩

Examples:

```
\divide\count12 345
```

```
\divide\count12 by -345
```

The primitive \divide is defined in the set tex.

The Primitive \doublehyphendemerits

\doublehyphendemerits is a count register. The primitive \doublehyphendemerits is defined in the set tex.

The Primitive \dp

The primitive \dp refers to the depth of a box register. It can be used in various contexts.

Execution of the Primitive

If the primitive is used in a context it initiated an assignment to the actual depth of the box register. This has an effect only in the case that the box register is not void.

The formal description of this primitive is the following:

⟨*dp*⟩
→ ⟨*optional prefix*⟩ \dp ⟨*8-bit number*⟩ ⟨*equals*⟩ ⟨*dimen*⟩
⟨*optional prefix*⟩
→
| \global ⟨*optional prefix*⟩

Examples:

```
\dp42 = 12mm
```

```
\dp42 = \dimen3
```

Expansion of the Primitive

In an expansion context the primitive results in the the currentr depth of the given box register. In case that the box register is empty the result is 0 pt.

The formal description of this primitive is the following:

`\dp` ⟨*8-bit number*⟩

Examples:

```
\dimen0 = \dp42
```

Conversion to a Count

Interaction with `\the`

The primitive `\dp` is defined in the set `tex`.

The Primitive `\dump`

The primitive writes out the current state of the interpreter to an format file. This format file can be read back in to restore the saved state.

The primitive can be used outside of any group only.

The formal description of this primitive is the following:

⟨*dump*⟩
→ `\dump`

Examples:

```
\dump
```

The primitive `\dump` is defined in the set `tex`.

The Primitive \edef

The formal description of this primitive is the following:

⟨*edef*⟩
→ ⟨*prefix*⟩ `\edef` ⟨*control sequence*⟩ ⟨*parameter text*⟩ `{` ⟨*replacement text*⟩ `}`
⟨*prefix*⟩
→
| `\global` ⟨*prefix*⟩
| `\long` ⟨*prefix*⟩
| `\outer` ⟨*prefix*⟩

Examples:

```
\edef#1{--#1--}
```

The primitive `\edef` is defined in the set `tex`.

The Primitive \else

The formal description of this primitive is the following:

⟨*else*⟩
→ `\else` ⟨...⟩

Examples:

```
\ifnum 1<2\else no\fi
```

The primitive `\else` is defined in the set `tex`.

The Primitive \emergencystretch

`\emergencystretch` is a dimen register. The primitive `\emergencystretch` is defined in the set `tex`.

The Primitive \end

The formal description of this primitive is the following:

⟨*end*⟩
→ `\end`

Examples:

```
\end
```

The primitive `\end` is defined in the set `tex`.

The Primitive \endcsname

The macro \endcsname is used in combination with the macro \csname only. Whenever a \endcsname is seen alone it must be an error. Thus thus primitive produces an error message in any case.

The formal description of this primitive is the following:

⟨*endcsname*⟩
→ \endscsname

Examples

The following example shows a complicated way to invoke the macro abc. Here \endcsname is legal.

```
\csname abc\endcsname
```

The primitive \endcsname is defined in the set tex.

The Primitive \endgroup

The formal description of this primitive is the following:

⟨*endgroup*⟩
→ \endgroup

Examples:

```
\begingroup 123 \endgroup
```

The primitive \endgroup is defined in the set tex.

The Primitive \endinput

The primitive \endinput closes the topmost file input stream. All tokens collected for this input stream and the ones above are discarted. This means that you can place arbitray text behind this primitive in a file. This text is ignored immediately.

The formal description of this primitive is the following:

⟨*endinput*⟩
→ \endinput

Examples:

```
\endinput
```

The primitive \endinput is defined in the set tex.

The Primitive \endL

\endL is not implemented yet.
The primitive \endL is defined in the set etex.

The Primitive \endlinechar

\endlinechar is a count register. The primitive \endlinechar is defined in the set tex.

The Primitive \endR

\endR is not implemented yet.
The primitive \endR is defined in the set etex.

The Primitive \eqno

The formal description of this primitive is the following:

⟨*eqno*⟩
→ \eqno

Examples:

```
\eqno
```

The primitive \eqno is defined in the set tex.

The Primitive \errhelp

\errhelp is a toks register. The primitive \errhelp is defined in the set tex.

The Primitive \errmessage

The primitive \errmessage takes one argument. This argument is an expanded list of tokens. Those tokens are presented as error message
The formal description of this primitive is the following:

⟨*eqno*⟩
→ \errmessage ⟨*tokens*⟩

Examples:

```
\errmessage{}
```

The primitive \errmessage is defined in the set tex.

The Primitive \errorcontextlines

\errorcontextlines is a count register. The primitive \errorcontextlines is defined in the set tex.

The Primitive \errorstopmode

The formal description of this primitive is the following:

⟨*errorstopmode*⟩
→ \errorstopmode

Examples:

```
\errorstopmode
```

The primitive \errorstopmode is defined in the set tex.

The Primitive \escapechar

\escapechar is a count register. The primitive \escapechar is defined in the set tex.

The Primitive \eTeXrevision

\eTeXrevision is a toks register. The primitive \eTeXrevision is defined in the set etex.

The Primitive \eTeXversion

\eTeXversion is a count register. The primitive \eTeXversion is defined in the set etex.

The Primitive \everycr

\everycr is a toks register. The primitive \everycr is defined in the set tex.

The Primitive \everydisplay

\everydisplay is a toks register. The primitive \everydisplay is defined in the set tex.

The Primitive \everyeof

\everyeof is a toks register. The primitive \everyeof is defined in the set etex.

The Primitive \everyhbox

\everyhbox is a toks register. The primitive \everyhbox is defined in the set tex.

The Primitive \everyjob

\everyjob is a toks register. The primitive \everyjob is defined in the set tex.

The Primitive \everymath

\everymath is a toks register. The primitive \everymath is defined in the set tex.

The Primitive \everypar

\everypar is a toks register. The primitive \everypar is defined in the set tex.

The Primitive \everyvbox

\everyvbox is a toks register. The primitive \everyvbox is defined in the set tex.

The Primitive \exhyphenpenalty

\exhyphenpenalty is a count register. The primitive \exhyphenpenalty is defined in the set tex.

The Primitive \expandafter

TEX first reads the token that comes immediately after \expandafter, without expanding it; let's call this token t. Then TEX reads the token that comes after t (and possibly more tokens, if that token has an argument), replacing it by its expansion. Finally TEX puts t back in front of that expansion.

The formal description of this primitive is the following:

⟨*expandafter*⟩
→ \expandafter ⟨*control sequence*⟩ ...

Examples:

```
\expandafter ...
```

The primitive \expandafter is defined in the set tex.

The Primitive \export

The primitive \export takes a list of tokens and saves them away for an associated \import. The tokens in the list are either control sequence tokens or active characters. All other tokens are ignored.

The formal description of this primitive is the following:

⟨*export*⟩
→ \export ⟨*replacement text*⟩

Examples:

```
\export{\a\b}
```

The primitive \export is defined in the set namespace.

The Primitive \fam

\fam is a count register. The primitive \fam is defined in the set tex.

The Primitive \fi

This primitive indicates the end of an conditional. As such it can not appear alone but only in combination with a preceeding \if*.

The formal description of this primitive is the following:

⟨*fi*⟩
→ \fi

Examples:

```
\fi
```

The primitive \fi is defined in the set tex.

The Primitive \finalhyphendemerits

\finalhyphendemerits is a count register. The primitive \finalhyphendemerits is defined in the set tex.

The Primitive \firstmark

The formal description of this primitive is the following:

```
\firstmark ...
```

Examples:

```
\firstmark ...
```

The primitive `\firstmark` is defined in the set `tex`.

The Primitive `\firstmarks`

`\firstmarks` is not implemented yet.

The primitive `\firstmarks` is defined in the set `etex`.

The Primitive `\floatingpenalty`

`\floatingpenalty` is a count register. The primitive `\floatingpenalty` is defined in the set `tex`.

The Primitive `\font`

The primitive `\font` can be used to load a font with some specified properties and assign it to a control sequence. The primary option is the specification of a size for the font. If no size is given then the font is loaded at its design size.

An exact size can be specified with the `at` keyword. The dimension following this keyword determines the size of the font.

The design size can be multiplied by a scale factor. This scale fator is given as number after the keyword `scaled`. The value given is 1000 times the scale factor to be used.

This primitive is an assignment.

The formal description of this primitive is the following:

⟨*font*⟩
→ `\font` ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*font name*⟩ ⟨*options*⟩
⟨*options*⟩
→ ⟨*option*⟩
| ⟨*option*⟩ ⟨*options*⟩
⟨*option*⟩
→ [`scaled`] ⟨*number*⟩
| [`at`] ⟨*size...*⟩
| [`noligatures`]
| [`nokerning`]
| [`letterspaced`]

Examples

In the following example the font cmr12 is loaded at its design size. The macro `\myfont` is bound to this font.

```
\font\myfont=cmr12
```

In the following example the font cmr12 is loaded at the size 15pt. The macro `\myfont` is bound to this font.

```
\font\myfont=cmr12 at 15pt
```

In the following example the font cmr12 is loaded at the double design size. The scale factor 2000 is divided by 1000 to get the effective scaling factor. The macro `\myfont` is bound to this font.

```
\font\magnifiedfiverm=cmr5 scaled 2000
```

In the following example the font cmr10 is loaded at the size of 12 true pt. The macro `\myfont` is bound to this font.

```
\font\second=cmr10 at 12truept
```

The primitive `\font` is defined in the set `tex`.

The Primitive `\fontchardp`

The formal description of this primitive is the following:

⟨*fontchardp*⟩
→ `\fontchardp` ⟨*font*⟩ ⟨*number*⟩

Examples:

```
\dimen0 = \fontchardp\tenrm `a
```

The primitive `\fontchardp` is defined in the set `etex`.

The Primitive `\fontcharht`

The formal description of this primitive is the following:

`\fontcharht`

Examples:

```
\fontcharht\tenrm `a
```

The primitive `\fontcharht` is defined in the set `etex`.

The Primitive \fontcharic

The formal description of this primitive is the following:

\fontcharic

Examples:

```
\fontcharic\tenrm `a
```

The primitive \fontcharic is defined in the set etex.

The Primitive \fontcharwd

The formal description of this primitive is the following:

\fontcharwd

Examples:

```
\fontcharwd\tenrm `a
```

The primitive \fontcharwd is defined in the set etex.

The Primitive \fontdimen

The primitive \fontdimen can be used to set a font dimension value. Each font has an arbitrary number of dimen values which are addressed by an numerical index in TEX. In ε_{χ}TEX this has been extended to arbitrary strings.

The primitive expands to the value of the font dimension in a right hand context.

The formal description of this primitive is the following:

\fontdimen ⟨*8-bit number*⟩ ⟨*font*⟩ ⟨*equals*⟩ ⟨*dimen*⟩

Examples:

```
\fontdimen13\ff=5pt
```

```
\the\fontdimen13\ff
```

```
\the\fontdimen{em}\ff=8pt
```

The primitive \fontdimen is defined in the set tex.

The Primitive \fontname

The primitive \fontname can be used to retrieve the name of a font. It takes a font specification as argument. It expands to the name of the font. If this font is not loaded at its design size then the actual size is appended after the tokens at . All tokens produced this way are *other* tokens except of the spaces. Ths means that even the letters are of category *other*.

The primitive \fontname is defined in the set tex.

The Primitive \futurelet

The formal description of this primitive is the following:

⟨*futurelet*⟩
→ \futurelet ⟨*control sequence*⟩ ⟨*token*⟩ ...

Examples:

```
\futurelet ...
```

The primitive \futurelet is defined in the set tex.

The Primitive \gdef

The formal description of this primitive is the following:

⟨*gdef*⟩
→ ⟨*prefix*⟩ \gdef ⟨*control sequence*⟩ ⟨*parameter text*⟩ { ⟨*replacement text*⟩ }
⟨*prefix*⟩
→
| ⟨*prefix*⟩ \global
| ⟨*prefix*⟩ \long
| ⟨*prefix*⟩ \outer

Examples:

```
\gdef#1{--#1--}
```

The primitive \gdef is defined in the set tex.

The Primitive \global

The primitive \global is a prefix macro. It does not do anything by its own but works in combination with a following primitive token only. If the following token constitutes an assignment then the assignment is not restricted to the current group but acts globallay in all groups.

If the following command token does not happen to be an operation for which the global modifier is applicable then a warning might be raised.

The formal description of this primitive is the following:

⟨*global*⟩
→ `\global` ⟨...⟩

Examples

The following example shows that two macros defined in a group. The first macro falls back to its previous binding when the group is closed. The second macro has the same binding in all groups. defined.

```
\begingroup
  \def\a{123}
  \global\def\b{123}
\endgroup
```

The following example shows that two count registers are set in a group. The first count register keeps its value untile the group is closed and falls back to the value it had when the group has been entered. The second count register keeps its value even when the group is closed.

```
\begingroup
  \count1=123
  \global\count2=45
\endgroup
```

The primitive `\global` is defined in the set `tex`.

The Primitive `\globaldefs`

`\globaldefs` is a count register. The primitive `\globaldefs` is defined in the set `tex`.

The Primitive `\glueexpr`

`\glueexpr` is not implemented yet.

The primitive `\glueexpr` is defined in the set `etex`.

The Primitive `\glueshrink`

`\glueshrink` is not implemented yet.

The primitive `\glueshrink` is defined in the set `etex`.

The Primitive \glueshrinkorder

The primitive \glueshrinkorder determines the order of the glue shrink component of the following glue specification. A fixed, non-shrinkable glue returns the value 0. Glue with the order fil gives 1, fill gives 2, and filll gives 3.

Note that the glue specification of 1 fi returns also 1. This is due to the compatibility with ε-TEX which does not have this unit. This unit has been introduced by Omega.

The formal description of this primitive is the following:

⟨*glueshrinkorder*⟩
→ \glueshrinkorder ...

Examples

```
\glueshrinkorder\skip1
```

The primitive \glueshrinkorder is defined in the set etex.

The Primitive \gluestretch

\gluestretch is not implemented yet.

The primitive \gluestretch is defined in the set etex.

The Primitive \gluestretchorder

The primitive \gluestretchorder determines the order of the glue stretch component of the following glue specification. A fixed, non-stretchable glue returns the value 0. Glue with the order fil gives 1, fill gives 2, and filll gives 3.

Note that the glue specification of 1 fi returns also 1. This is due to the compatibility with ε-TEX which does not have this unit. This unit has been introduced by Omega.

The formal description of this primitive is the following:

⟨*gluestretchorder*⟩
→ \gluestretchorder ...

Examples

```
\gluestretchorder\skip1
```

The primitive \gluestretchorder is defined in the set etex.

The Primitive \halign

The formal description of this primitive is the following:

⟨*halign*⟩
→ `\halign` ⟨*box specification*⟩ `{` ⟨*preamble*⟩ `\cr` ⟨*rows*⟩ `}`
⟨*box specification*⟩
→
| `to` ⟨*rule dimension*⟩
| `spread` ⟨*rule dimension*⟩
⟨*rows*⟩
→
| ⟨*row*⟩ ⟨*rows*⟩
⟨*preamble*⟩
→ ...

Examples:

```
\halign
```

The primitive `\halign` is defined in the set `tex`.

The Primitive \hangafter

`\hangafter` is a count register. The primitive `\hangafter` is defined in the set `tex`.

The Primitive \hangindent

`\hangindent` is a dimen register. The primitive `\hangindent` is defined in the set `tex`.

The Primitive \hbadness

`\hbadness` is a count register. The primitive `\hbadness` is defined in the set `tex`.

The Primitive \hbox

The contents of the toks register `\everyhbox` is inserted at the beginning of the horizontal material of the box.

The formal description of this primitive is the following:

⟨*hbox*⟩
→ `\hbox` ⟨*box specification*⟩ `{` ⟨*horizontal material*⟩ `}`
⟨*box specification*⟩
→
| `to` ⟨*rule dimension*⟩
| `spread` ⟨*rule dimension*⟩

Examples:

```
\hbox{abc}
```

```
\hbox to 120pt{abc}
```

```
\hbox spread 12pt{abc}
```

The tokens parameter is used in /hbox. The tokens contained are inserted at the beginnig of the horizontal material of the hbox.

The primitive \hbox is defined in the set tex.

The Primitive \hfi

The formal description of this primitive is the following:

⟨*hfi*⟩
→ \hfi

Examples:

```
\hfi
```

The primitive \hfi is defined in the set omega.

The Primitive \hfil

The formal description of this primitive is the following:

⟨*hfil*⟩
→ \hfil

Examples:

```
\hfil
```

The primitive \hfil is defined in the set tex.

The Primitive \hfill

The formal description of this primitive is the following:

⟨*hfill*⟩
→ \hfill

Examples:

```
\hfill
```

The primitive \hfill is defined in the set tex.

The Primitive \hfilneg

The formal description of this primitive is the following:

⟨*hfilneg*⟩
→ `\hfilneg`

Examples:

```
\hfilneg
```

The primitive `\hfilneg` is defined in the set `tex`.

The Primitive \hfuzz

`\hfuzz` is a dimen register. The primitive `\hfuzz` is defined in the set `tex`.

The Primitive \hoffset

`\hoffset` is a dimen register. The primitive `\hoffset` is defined in the set `tex`.

The Primitive \holdinginserts

`\holdinginserts` is a count register. The primitive `\holdinginserts` is defined in the set `tex`.

The Primitive \hrule

This primitive produces a horizontal rule. This is a rectangular area of specified dimensions. If not overwritten the width and depth are 0pt and the height is 0.4 pt (26214 sp).

The formal description of this primitive is the following:

⟨*hrule*⟩
→ `\hrule` ⟨*rule specification*⟩
⟨*rule specification*⟩
→ ⟨*optional spaces*⟩
| ⟨*rule dimension*⟩ ⟨*rule specification*⟩
⟨*rule dimension*⟩
→ `width` ⟨*dimen*⟩
| `height` ⟨*dimen*⟩
| `depth` ⟨*dimen*⟩

The color from the typographic context is taken as foreground color for the rule. The default color is black.

Examples:

```
\hrule
```

```
\hrule width 2pt
```

```
\hrule width 2pt depth 3mm height \dimen4
```

The primitive `\hrule` is defined in the set `tex`.

The Primitive `\hsize`

`\hsize` is a dimen register. The primitive `\hsize` is defined in the set `tex`.

The Primitive `\hskip`

The formal description of this primitive is the following:

⟨*hskip*⟩
→ `\hskip` ⟨*Glue*⟩

Examples:

```
\hskip 1em plus 1pt minus 1pt
```

The primitive `\hskip` is defined in the set `tex`.

The Primitive `\hss`

The formal description of this primitive is the following:

⟨*hss*⟩
→ `\hss`

Examples:

```
\hss
```

The primitive `\hss` is defined in the set `tex`.

The Primitive `\ht`

The formal description of this primitive is the following:

⟨*ht*⟩
→ `\ht` ⟨*8-bit number*⟩ ⟨*equals*⟩ ⟨*dimen*⟩

Examples:

```
\ht42
```

The primitive \ht is defined in the set tex.

The Primitive \hyphenation

The primitive \hyphenation is defined in the set tex.

The Primitive \hyphenchar

The formal description of this primitive is the following:

\hyphenchar ⟨*font*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\hyphenchar\font=132
```

Incompatibility

The TeXbook gives no indication ow the primitive should react for negative values – except -1. The implementation of TEX allows to store and retrieve arbirary negative values. This behaviour of TEX is not preserved in ε_{χ}TEX.

The primitive \hyphenchar is defined in the set tex.

The Primitive \hyphenpenalty

\hyphenpenalty is a count register. The primitive \hyphenpenalty is defined in the set tex.

The Primitive \if

The primitive expands the tokens following it until two unexpandable tokens are found. The conditional is true iff the character codes of the two tokens agree.

The formal description of this primitive is the following:

⟨*if*⟩
→ \if ⟨$token_1$⟩ ⟨$token_2$⟩ ⟨*true text*⟩ \fi
| \if ⟨$token_1$⟩ ⟨$token_2$⟩ ⟨*true text*⟩ \else ⟨*false text*⟩ \fi

Examples:

```
\if\a\x ok \fi
```

The primitive \if is defined in the set tex.

The Primitive \ifcase

⟨*ifcase*⟩
→ \ifcase ...

The primitive \ifcase is defined in the set tex.

The Primitive \ifcat

⟨*ifcat*⟩
→ \ifcat ...

The primitive \ifcat is defined in the set tex.

The Primitive \ifcsname

\ifcsname is not implemented yet.

The primitive \ifcsname is defined in the set etex.

The Primitive \ifdefined

Copied of the eTeX reference.

similar in effect to \unless \ifx \undefined, but does not require \undefined to actually be undefined, since no explicit comparison is made with any particular control sequence.

The formal description of this primitive is the following:

Examples:

```
\ifdefined\TESTNAME\else not\fi defined
```

The primitive \ifdefined is defined in the set etex.

The Primitive \ifdim

The formal description of this primitive is the following:

⟨*ifdim*⟩
→ \ifdim ⟨*dimen*⟩ ⟨*op*⟩ ⟨*dimen*⟩ ⟨*true text*⟩ \fi
| \ifdim ⟨*dimen*⟩ ⟨*op*⟩ ⟨*dimen*⟩ ⟨*true text*⟩ \else ⟨*false text*⟩ \fi
⟨*op*⟩
→ [<]
| [=]
| [>]

The primitive \ifdim is defined in the set tex.

The Primitive \ifeof

This primitive tests for end of file on the given read register. The read register is specified as a (expanded) number.

The formal description of this primitive is the following:

⟨*ifeof*⟩
→ `\ifeof` ⟨*number*⟩ ⟨*true text*⟩ `\fi`
| `\ifeof` ⟨*number*⟩ ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifeof 3 -E-O-F- \else ready \fi
```

The primitive `\ifeof` is defined in the set `tex`.

The Primitive \iffalse

The primitive does not take any further arguments. The conditional is always false. Thus only the else branch is expanded.

The formal description of this primitive is the following:

⟨*iffalse*⟩
→ `\iffalse` ⟨*true text*⟩ `\fi`
| `\iffalse` ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\iffalse abc \fi
```

The primitive `\iffalse` is defined in the set `tex`.

The Primitive \iffontchar

The primitive `\iffontchar` can be used to check whether a certain glyph exists in a font. For this purpose it takes a font and the code of a character and performs the test. If the character exists the then branch is expanded otherwise the else branch.

The formal description of this primitive is the following:

⟨*iffontchar*⟩
→ `\iffontchar` ... ⟨*true text*⟩ `\fi`
| `\iffontchar` ... ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\iffontchar abc \fi
```

The primitive `\iffontchar` is defined in the set `etex`.

The Primitive \ifhbox

The primitive takes one expanded integer argument. The conditional is true iff the box denoted by the argument is a horizontal box.

The formal description of this primitive is the following:

⟨*ifhbox*⟩
→ `\ifhbox` ⟨*number*⟩ ⟨*true text*⟩ `\fi`
| `\ifhbox` ⟨*number*⟩ ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifhbox255 abc \fi
```

```
\ifhbox\count120 abc \fi
```

The primitive `\ifhbox` is defined in the set `tex`.

The Primitive \ifhmode

The primitive does not take any further arguments. The conditional is true iff the typesetter is in a horizontal mode. This is either the restricted horizontal vertical mode or the horizontal mode.

The formal description of this primitive is the following:

⟨*ifhmode*⟩
→ `\ifhmode` ⟨*true text*⟩ `\fi`
| `\ifhmode` ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifhmode abc \fi
```

The primitive `\ifhmode` is defined in the set `tex`.

The Primitive \ifinner

The primitive does not take any further arguments. The conditional is true iff the typesetter is in an internal mode. This is either the internal vertical mode, the restricted horizontal mode, or the math mode (non-display).

The formal description of this primitive is the following:

⟨*ifinner*⟩
→ `\ifinner` ⟨*true text*⟩ `\fi`
| `\ifinner` ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifinner abc \fi
```

The primitive `\ifinner` is defined in the set `tex`.

The Primitive `\ifmmode`

The primitive does not take any further arguments. The conditional is true iff the typesetter is in math mode or display math mode.

The formal description of this primitive is the following:

⟨*ifmmode*⟩
→ `\ifmmode` ⟨*true text*⟩ `\fi`
| `\ifmmode` ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifmmode abc \fi
```

The primitive `\ifmmode` is defined in the set `tex`.

The Primitive `\ifnum`

The formal description of this primitive is the following:

⟨*ifnum*⟩
→ `\ifnum` ⟨*number*⟩ ⟨*op*⟩ ⟨*number*⟩ ⟨*true text*⟩ `\fi`
| `\ifodd` ⟨*number*⟩ ⟨*op*⟩ ⟨*number*⟩ ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`
⟨*op*⟩
→ [<]
| [=]
| [>]

Examples:

```
\ifodd\count0 abc \fi
```

The primitive `\ifnum` is defined in the set `tex`.

The Primitive `\ifodd`

The primitive takes one expanded integer argument. The conditional is true iff the argument is odd.

The formal description of this primitive is the following:

⟨*ifodd*⟩
→ `\ifodd` ⟨*number*⟩ ⟨*true text*⟩ `\fi`
| `\ifodd` ⟨*number*⟩ ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifodd\count0 abc \fi
```

The primitive `\ifodd` is defined in the set `tex`.

The Primitive `\iftrue`

The primitive does not take any further arguments. The conditional is always true. Thus only the then branch is expanded.

The formal description of this primitive is the following:

⟨*iftrue*⟩
→ `\iftrue` ⟨*true text*⟩ `\fi`
| `\ifture` ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\iftrue abc \fi
```

The primitive `\iftrue` is defined in the set `tex`.

The Primitive `\ifvbox`

The primitive takes one expanded integer argument. The conditional is true iff the box denoted by the argument is a vertical box.

The formal description of this primitive is the following:

⟨*ifvbox*⟩
→ `\ifvbox` ⟨*number*⟩ ⟨*true text*⟩ `\fi`
| `\ifvbox` ⟨*number*⟩ ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifvbox255 abc \fi
```

```
\ifvbox\count120 abc \fi
```

The primitive `\ifvbox` is defined in the set `tex`.

The Primitive \ifvmode

The primitive does not take any further arguments. The conditional is true iff the typesetter is in a vertical mode. This is either the internal vertical mode or the vertical mode.

The formal description of this primitive is the following:

⟨*ifvmode*⟩
→ `\ifvmode` ⟨*true text*⟩ `\fi`
| `\ifvmode` ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifvmode abc \fi
```

The primitive `\ifvmode` is defined in the set `tex`.

The Primitive \ifvoid

The primitive takes one expanded integer argument. The conditional is true iff the box denoted by the argument is void.

The formal description of this primitive is the following:

⟨*ifvoid*⟩
→ `\ifvoid` ⟨*number*⟩ ⟨*true text*⟩ `\fi`
| `\ifvoid` ⟨*number*⟩ ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifvoid255 abc \fi
```

```
\ifvoid\count120 abc \fi
```

The primitive `\ifvoid` is defined in the set `tex`.

The Primitive \ifx

The formal description of this primitive is the following:

⟨*ifx*⟩
→ `\ifx` ⟨$token_1$⟩ ⟨$token_2$⟩; ⟨*true text*⟩ `\fi`
| `\ifx` ⟨$token_1$⟩ ⟨$token_2$⟩ ⟨*true text*⟩ `\else` ⟨*false text*⟩ `\fi`

Examples:

```
\ifx\a\x ok \fi
```

The primitive `\ifx` is defined in the set `tex`.

The Primitive \ignorespaces

The formal description of this primitive is the following:

⟨*ignorespaces*⟩
→ `\ignorespaces`

Examples:

```
\ignorespaces
```

The primitive `\ignorespaces` is defined in the set `tex`.

The Primitive \immediate

The formal description of this primitive is the following:

⟨*immediate*⟩
→ `\immediate ...`

Examples:

```
\immediate\write1{abc}
```

The primitive `\immediate` is defined in the set `tex`.

The Primitive \import

The formal description of this primitive is the following:

⟨*import*⟩
→ `\import` ⟨*replacement text*⟩

Examples:

```
\import{de.dante.dtk}
```

The primitive `\import` is defined in the set `namespace`.

The Primitive \indent

The formal description of this primitive is the following:

⟨*indent*⟩
→ `\indent`

Examples:

The primitive `\indent` is defined in the set `tex`.

The Primitive \input

The formal description of this primitive is the following:

⟨*input*⟩
→ `\input` ⟨*filename*⟩

Examples: The traditional version of the file name parsing allows the following syntax:

```
\input file.name
```

If the parsing is not configured to be strict then the following syntax is allowed as well:

```
\input{file.name}
```

The primitive `\input` is defined in the set `tex`.

The Primitive \inputlineno

Examples:

```
\count1=\inputlineno
```

The primitive `\inputlineno` is defined in the set `tex`.

The Primitive \InputMode

`\InputMode` is not implemented yet.
The primitive `\InputMode` is defined in the set `omega`.

The Primitive \InputTranslation

`\InputTranslation` is not implemented yet.
The primitive `\InputTranslation` is defined in the set `omega`.

The Primitive \insert

The formal description of this primitive is the following:

⟨*insert*⟩
→ `\insert`

Examples:

```
\insert42{abc}
```

The primitive `\insert` is defined in the set `tex`.

The Primitive \insertpenalties

\insertpenalties is a count register. The primitive \insertpenalties is defined in the set tex.

The Primitive \interactionmode

The formal description of this primitive is the following:

⟨*interactionmode*⟩
→ \interactionmode

Examples:

```
\interactionmode
```

The primitive \interactionmode is defined in the set etex.

The Primitive \interlinepenalties

\interlinepenalties is not implemented yet.

The primitive \interlinepenalties is defined in the set etex.

The Primitive \interlinepenalty

\interlinepenalty is a count register. The primitive \interlinepenalty is defined in the set tex.

The Primitive \javadef

The primitive \javadef attaches a definition to a macro or active character. This is done in a similar way as \def works. The difference is that the definition has to be provided in form of a Java class.

The general form of this primitive is

⟨*javadef*⟩
→ \javadef ⟨*control sequence*⟩ ⟨*tokens*⟩

The ⟨*control sequence*⟩ is any macro or active character. If this token is missing or of the wrong type then an error is raised.

The ⟨*tokens*⟩ is any specification of a list of tokens like a constant list enclosed in braces or a toks register. The value of these tokens are taken and interpreted as the name of a Java class. This class is loaded if needed and instantiated. The instance is bound as code to the ⟨*control sequence*⟩.

The following example illustrates the use of this primitive:

```
\javadef\abc{de.dante.extex.interpreter.primitive.Relax}
```

The primitive `\javadef` is local to the enclosing group as is `\def`. And similar to `\def` the modifier `\global` can be used to make the definition in all groups instead of the current group only. This is shown in the following example:

```
\global\javadef\abc{de.dante.extex.interpreter.primitive.Relax}
```

Now we come to the Java side of the definition. The class given as ⟨*tokens*⟩ must implement the interface Code. The easiest way to achieve this is by declaring a class derived from AbstractCode.

```
package my.package;

import de.dante.extex.interpreter.AbstractCode;
import de.dante.extex.interpreter.contect.Context;
import de.dante.extex.interpreter.Flags;
import de.dante.extex.interpreter.TokenSource;
import de.dante.extex.typesetter.Typesetter;
import de.dante.util.GeneralException;

class MyPrimitive extends AbstractCode {

  public MyPrimitive(final String name) {
    super(name);
    // initialization code --if required
  }

  public boolean execute(final Flags prefix,
                         final Context context,
                         final TokenSource source,
                         final Typesetter typesetter
                        ) {
    // implement the execution behaviour here
    return true;
  }
}
```

There is more to say about primitives like how to write expandable primitives or ifs. Those details can be found in section Primitives.

The primitive `\javadef` is defined in the set `jx`.

The Primitive `\javaload`

The primitive `\javaload` loads a java class and invokes its `init()` method. With this method it is possible to load larger extensions of εχTEX in one junk. There is no need to declare each single macro with `\javadef`.

The general form of this primitive is

⟨*javaload*⟩
→ `\javaload` ⟨*tokens*⟩

The ⟨*tokens*⟩ is any specification of a list of tokens like a constant list enclosed in braces or a toks register. The value of these tokens are taken and interpreted as the name of a Java class. This class is loaded if needed, instantiated, and its method de.dante.extex.interpreter.context.Context, de.dante.extex.typesetter.Typesetter) init() is invoked. The instantiation requires the empty contructor to be visible.

The following example illustrates the use of this primitive:

```
\javaload{de.dante.extex.extensions.Basic}
```

For the loading of the Java class it is necessary that this Java class implements the interface Loadable.

```
package my.package;

import de.dante.extex.interpreter.contect.Context;
import de.dante.extex.interpreter.primitives.dynamic.java.Loadable;
import de.dante.extex.typesetter.Typesetter;
import de.dante.util.GeneralException;

class MyModule implements Loadable {

  public MyModule() {
    super();
    // initialization code --if required
  }

  public void init(final Context context,
                   final Typesetter typesetter
                  ) throws GeneralException {
    // implement the initialization code here
  }
}
```

The primitive `\javaload` is defined in the set `jx`.

The Primitive `\jobname`

The primitive `\jobname` expands to the name of the job currently processed. The job name is usually the name of the first input file. If this can not be determined – e.g. because the input is not coming from a file – then the fallback `texput` is usd as default value.

The formal description of this primitive is the following:

⟨*jobname*⟩
→ `\jobname`

Examples:

```
\jobname
```

The primitive `\jobname` is defined in the set `tex`.

The Primitive `\kern`

This primitive produces a horizontal or vertical kerning. This is a (minor) adjustment of the position. The meaning depends on the current mode of the typesetter. In vertical modes it means a vertival adjustment. Otherwise it means a horizontal adjustment.

The formal description of this primitive is the following:

⟨*kern*⟩
→ `\kern` ⟨*dimen*⟩

Examples:

```
\kern 12pt
```

```
\kern -3mm
```

```
\kern -\dimen123
```

The primitive `\kern` is defined in the set `tex`.

The Primitive `\language`

`\language` is a count register. The primitive `\language` is defined in the set `tex`.

The Primitive `\lastbox`

The formal description of this primitive is the following:

⟨*lastbox*⟩
→ `\lastbox`

Examples:

```
\lastbox
```

```
\box1=\lastbox
```

The primitive `\lastbox` is defined in the set `tex`.

The Primitive \lastkern

Examples:

```
\dimen1=\lastkern
```

The primitive \lastkern is defined in the set tex.

The Primitive \lastlinefit

\lastlinefit is not implemented yet.
The primitive \lastlinefit is defined in the set etex.

The Primitive \lastnodetype

Examples:

```
Test\the\lastnodetype
```

The primitive \lastnodetype is defined in the set etex.

The Primitive \lastpenalty

Examples:

```
\count1=\lastpenalty
```

The primitive \lastpenalty is defined in the set tex.

The Primitive \lastskip

\lastskip is a skip register. The primitive \lastskip is defined in the set tex.

The Primitive \lccode

The formal description of this primitive is the following:

⟨*lccode*⟩
→ \lccode ⟨...⟩

Examples:

```
\lccode ...
```

The primitive \lccode is defined in the set tex.

The Primitive \leaders

The formal description of this primitive is the following:

⟨*leaders*⟩
→ \leaders ...

Examples:

```
\leaders\hrul\hfill
```

The primitive \leaders is defined in the set tex.

The Primitive \left

The formal description of this primitive is the following:

⟨*left*⟩
→ \left

Examples:

```
\left
```

The primitive \left is defined in the set tex.

The Primitive \lefthyphenmin

The primitive \lefthyphenmin is defined in the set tex.

The Primitive \leftskip

\leftskip is a skip register. The primitive \leftskip is defined in the set tex.

The Primitive \leqno

The formal description of this primitive is the following:

⟨*span*⟩
→ \leqno

Examples:

```
\leqno
```

The primitive \leqno is defined in the set tex.

The Primitive \let

The formal description of this primitive is the following:

⟨*let*⟩
→ \let ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*token*⟩

Examples:

```
\let\a=\b
```

The primitive \let is defined in the set tex.

The Primitive \limits

The formal description of this primitive is the following:

⟨*limits*⟩
→ \limits

Examples:

```
\limits
```

The primitive \limits is defined in the set tex.

The Primitive \linepenalty

\linepenalty is a count register. The primitive \linepenalty is defined in the set tex.

The Primitive \lineskip

\lineskip is a skip register. The primitive \lineskip is defined in the set tex.

The Primitive \lineskiplimit

\lineskiplimit is a dimen register. The primitive \lineskiplimit is defined in the set tex.

The Primitive \localbrokenpenalty

\localbrokenpenalty is a count register. The primitive \localbrokenpenalty is defined in the set omega.

The Primitive \localinterlinepenalty

\localinterlinepenalty is a count register. The primitive \localinterlinepenalty is defined in the set omega.

The Primitive \localleftbox

\localleftbox is not implemented yet.

The primitive \localleftbox is defined in the set omega.

The Primitive \localrightbox

\localrightbox is not implemented yet.

The primitive \localrightbox is defined in the set omega.

The Primitive \long

The formal description of this primitive is the following:

⟨*long*⟩
→ \long ...

Examples:

```
\long\def#1{--#1--}
```

The primitive \long is defined in the set tex.

The Primitive \looseness

\looseness is a count register. The primitive \looseness is defined in the set tex.

The Primitive \lower

The formal description of this primitive is the following:

⟨*lower*⟩
→ \lower ⟨*dimen*⟩ ⟨*box*⟩

Examples:

```
\lower 2em \hbox{abc}
```

```
\lower -1pt \hbox to 120pt {abc}
```

```
\lower 2mm \hbox spread 12pt {abc}
```

The primitive \lower is defined in the set tex.

The Primitive \lowercase

The formal description of this primitive is the following:

⟨*lowercase*⟩
→ `\lowercase` ⟨*...*⟩

Examples:

```
\lowercase ...
```

The primitive `\lowercase` is defined in the set `tex`.

The Primitive \mag

The formal description of this primitive is the following:

⟨*mag*⟩
→ `\mag`

Examples:

```
\count23=-456
```

The primitive `\mag` is defined in the set `tex`.

The Primitive \mark

The formal description of this primitive is the following:

`\mark ...`

Examples:

```
\mark{abc}
```

The primitive `\mark` is defined in the set `tex`.

The Primitive \marks

The formal description of this primitive is the following:

`\marks ...`

Examples:

```
\marks123{abc}
```

The primitive `\marks` is defined in the set `etex`.

The Primitive \mathaccent

The formal description of this primitive is the following:

⟨*mathaccent*⟩
→ \mathaccent

Examples:

```
\mathaccent
```

The primitive \mathaccent is defined in the set tex.

The Primitive \mathbin

The formal description of this primitive is the following:

⟨*mathbin*⟩
→ \mathbin

Examples:

```
\mathbin
```

The primitive \mathbin is defined in the set tex.

The Primitive \mathchar

The primitive \mathchar inserts a mathematical character consisting of a math class and a character code inti the current math list. This is supposed to work in math mode only.

The formal description of this primitive is the following:

\mathchar ...

Examples:

```
\mathchar"041
```

```
\mathchar{ordinary}0 ‘A
```

The primitive \mathchar is defined in the set tex.

The Primitive \mathchardef

The formal description of this primitive is the following:

`\mathchardef ...`

Examples:

```
\mathchardef\alpha ...
```

The primitive `\mathchardef` is defined in the set `tex`.

The Primitive \mathchoice

The formal description of this primitive is the following:

⟨*mathchoice*⟩
→ `\mathchoice`

Examples:

```
\mathchoice{d}{t}{s}{ss}
```

The primitive `\mathchoice` is defined in the set `tex`.

The Primitive \mathclose

The formal description of this primitive is the following:

⟨*mathclose*⟩
→ `\mathclose`

Examples:

```
\mathclose
```

The primitive `\mathclose` is defined in the set `tex`.

The Primitive \mathcode

The formal description of this primitive is the following:

`\mathcode ...`

Examples:

```
\mathcode ...
```

The primitive `\mathcode` is defined in the set `tex`.

The Primitive \mathdir

\mathdir is not implemented yet.

The primitive \mathdir is defined in the set omega.

The Primitive \mathinner

The formal description of this primitive is the following:

⟨*mathinner*⟩
→ \mathinner ⟨*math block*⟩

Examples:

```
\mathinner{a^b}
```

The primitive \mathinner is defined in the set tex.

The Primitive \mathop

The formal description of this primitive is the following:

⟨*mathop*⟩
→ \mathop

Examples:

```
\mathop
```

The primitive \mathop is defined in the set tex.

The Primitive \mathopen

The formal description of this primitive is the following:

⟨*mathopen*⟩
→ \mathopen

Examples:

```
\mathopen
```

The primitive \mathopen is defined in the set tex.

The Primitive \mathord

The formal description of this primitive is the following:

⟨*mathord*⟩
→ \mathord

Examples:

```
\mathord
```

The primitive \mathord is defined in the set tex.

The Primitive \mathpunct

The formal description of this primitive is the following:

⟨*mathpunct*⟩
→ \mathpunct

Examples:

```
\mathpunct
```

The primitive \mathpunct is defined in the set tex.

The Primitive \mathrel

The formal description of this primitive is the following:

⟨*mathrel*⟩
→ \mathrel

Examples:

```
\mathrel
```

The primitive \mathrel is defined in the set tex.

The Primitive \mathsurround

\mathsurround is a dimen register. The primitive \mathsurround is defined in the set tex.

The Primitive \maxdeadcycles

\maxdeadcycles is a count register. The primitive \maxdeadcycles is defined in the set tex.

The Primitive \maxdepth

\maxdepth is a dimen register. The primitive \maxdepth is defined in the set tex.

The Primitive \meaning

The formal description of this primitive is the following:

⟨*meaning*⟩
→ \meaning ⟨*token*⟩

Examples:

```
\meaning a
```

The primitive \meaning is defined in the set tex.

The Primitive \medmuskip

The primitive \medmuskip is defined in the set tex.

The Primitive \message

The primitive \message is defined in the set tex.

The Primitive \middle

The formal description of this primitive is the following:

⟨*span*⟩
→ \middle

Examples:

```
\middle
```

The primitive \middle is defined in the set etex.

The Primitive \mkern

The formal description of this primitive is the following:

⟨*mkern*⟩
→ \mkern

Examples:

```
\mkern
```

The primitive \mkern is defined in the set tex.

The Primitive \month

\month is a count register. The primitive \month is defined in the set tex.

The Primitive \moveleft

The formal description of this primitive is the following:

⟨*moveleft*⟩
→ \moveleft ⟨*dimen*⟩ ⟨*box*⟩

Examples:

```
\moveleft 2em \hbox{abc}
```

```
\moveleft -1pt \hbox to 120pt {abc}
```

```
\moveleft 2mm \hbox spread 12pt {abc}
```

The primitive \moveleft is defined in the set tex.

The Primitive \moveright

The formal description of this primitive is the following:

⟨*moveright*⟩
→ \moveright ⟨*dimen*⟩ ⟨*box*⟩

The color from the typographic context is taken as foregroud color for the rule. The default color is black.

Examples:

```
\moveright 2em \hbox{abc}
```

```
\moveright -1pt \hbox to 120pt {abc}
```

```
\moveright 2mm \hbox spread 12pt {abc}
```

The primitive \moveright is defined in the set tex.

The Primitive \mskip

The formal description of this primitive is the following:

⟨*mskip*⟩
→ \mskip

Examples:

```
\mskip 12mu plus 3mu minus 4 mu
```

The primitive `\mskip` is defined in the set `tex`.

The Primitive `\muexpr`

`\muexpr` is not implemented yet.

The primitive `\muexpr` is defined in the set `etex`.

The Primitive `\multiply`

This primitive implements an assignment. The variable given as next tokens is multiplied by the quantity given after the optional `by`.

The formal description of this primitive is the following:

⟨*multiply*⟩
→ `\multiply` ⟨*multiplyable*⟩
⟨*multiplyable*⟩
→ ⟨*integer variable*⟩ ⟨*optional* `by`⟩ ⟨*8-bit number*⟩
| ⟨*dimen variable*⟩ ⟨*optional* `by`⟩ ⟨*8-bit number*⟩
| ⟨*glue variable*⟩ ⟨*optional* `by`⟩ ⟨*8-bit number*⟩
| ⟨*muglue variable*⟩ ⟨*optional* `by`⟩ ⟨*8-bit number*⟩
⟨*optional* `by`⟩
→ [by]
| ⟨*optional spaces*⟩

Examples:

```
\multiply\count12 345
```

```
\multiply\count12 by -345
```

The primitive `\multiply` is defined in the set `tex`.

The Primitive `\muskip`

The primitive `\muskip` is defined in the set `tex`.

The Primitive `\muskipdef`

The formal description of this primitive is the following:

`\muskipdef` ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\muskipdef\abc=45
```

```
\muskipdef\abc 33
```

The primitive `\muskipdef` is defined in the set `tex`.

The Primitive `\namespace`

The formal description of this primitive is the following:

⟨*namespace*⟩
→ `\namespace` ⟨*replacement text*⟩

Examples:

```
\namespace{org.dante.dtk}
```

The primitive `\namespace` is defined in the set `namespace`.

The Primitive `\nativedef`

The primitive `\nativedef` attaches a definition to a macro or active character. This is done in a similar way as `\def` works. The difference is that the definition has to be provided in form of a Java class which glues in native code.

The general form of this primitive is

⟨*nativedef*⟩
→ `\nativedef` ⟨*control sequence*⟩ ⟨*name*⟩

The ⟨*control sequence*⟩ is any macro or active character. If this token is missing or of the wrong type then an error is raised.

The ⟨*name*⟩ is any specification of a list of tokens like a constant list enclosed in braces or a toks register. The value of these tokens are taken and resolved via the configuration. This appropriate class is loaded if needed and instantiated. The instance is bound as code to the ⟨*control sequence*⟩.

The primitive `\javadef` is local to the enclosing group as is `\def`. And similar to `\def` the modifier `\global` can be used to make the definition in all groups instead of the current group only.

The primitive `\nativedef` is defined in the set `native`.

The Primitive \nativeload

The general form of this primitive is

⟨*nativeload*⟩
→ `\nativeload` ⟨*type*⟩ ⟨*tokens*⟩

The primitive `\nativeload` is defined in the set `native`.

The Primitive \naturaldir

`\naturaldir` is not implemented yet.
The primitive `\naturaldir` is defined in the set `omega`.

The Primitive \newlinechar

`\newlinechar` is a count register. The primitive `\newlinechar` is defined in the set `tex`.

The Primitive \noalign

The formal description of this primitive is the following:

⟨*noalign*⟩
→ `\noalign`

Examples:

```
\cr\noalign
```

The primitive `\noalign` is defined in the set `tex`.

The Primitive \noboundary

The formal description of this primitive is the following:

⟨*noboundary*⟩
→ `\\`

Examples:

```
\\
```

The primitive `\noboundary` is defined in the set `tex`.

The Primitive \noDefaultInputMode

\noDefaultInputMode is not implemented yet.
The primitive \noDefaultInputMode is defined in the set omega.

The Primitive \noDefaultInputTranslation

\noDefaultInputTranslation is not implemented yet.
The primitive \noDefaultInputTranslation is defined in the set omega.

The Primitive \noDefaultOutputMode

\noDefaultOutputMode is not implemented yet.
The primitive \noDefaultOutputMode is defined in the set omega.

The Primitive \noDefaultOutputTranslation

\noDefaultOutputTranslation is not implemented yet.
The primitive \noDefaultOutputTranslation is defined in the set omega.

The Primitive \noexpand

The formal description of this primitive is the following:

⟨*noexpand*⟩
→ \noexpand

Examples:

```
\noexpand
```

The primitive \noexpand is defined in the set tex.

The Primitive \noindent

The formal description of this primitive is the following:

⟨*noindent*⟩
→ \noindent

Examples:

```
\noindent
```

The primitive \noindent is defined in the set tex.

The Primitive \nolimits

The formal description of this primitive is the following:

⟨*nolimits*⟩
→ `\nolimits`

Examples:

```
\nolimits
```

The primitive `\nolimits` is defined in the set `tex`.

The Primitive \nonscript

The primitive can be used in math modes only. It cancels following glue if the current style is script style or scriptscript style.

The formal description of this primitive is the following:

⟨*nonscript*⟩
→ `\nonscript`

Examples:

```
\nonscript
```

The primitive `\nonscript` is defined in the set `tex`.

The Primitive \nonstopmode

The formal description of this primitive is the following:

⟨*nonstopmode*⟩
→ `\nonstopmode`

Examples:

```
\nonstopmode
```

The primitive `\nonstopmode` is defined in the set `tex`.

The Primitive \nulldelimiterspace

`\nulldelimiterspace` is a dimen register. The primitive `\nulldelimiterspace` is defined in the set `tex`.

The Primitive \nullfont

The formal description of this primitive is the following:

\nullfont

Examples:

```
\font123=\nullfont
```

The primitive \nullfont is defined in the set tex.

The Primitive \nullocplist

\nullocplist is not implemented yet.
The primitive \nullocplist is defined in the set omega.

The Primitive \number

The formal description of this primitive is the following:

⟨*number*⟩
→ \number ⟨...⟩

Examples:

```
\number ...
```

The primitive \number is defined in the set tex.

The Primitive \numexpr

The primitive \numexpr provides a means to use a inline way of writing mathematical expressions to be evaluated. Mathematical expressions can be evaluated in $\varepsilon_{\mathcal{X}}$TEX using \advance, \multiply, and \divide. Nevertheless those primitives result in an assignment. This is not the case for \numexpr. Here the intermediate results are not stored in count registers but kept internally. Also the application of \afterassignment and \tracingassigns is suppressed.

The mathematical expression to be evaluated can be made up of the basic operations addition (+), subtraction (-), multiplication (*), and division(/). The unary minus can be used. Parentheses can be used for grouping. Anything which looks like a number can be used as argument. White-space can be used freely without any harm.

The expression is terminated at the first token which can not be part of an expression. For instance a letter may signal the end of the expression. If the expression should terminate without a proper token following it, the token \relax can be used to signal the end of the expression. This \relax token is silently consumed by \numexpr.

The primitive `\numexpr` can be used in any place where a number is required. This includes assignments to count registers and comparisons.

The formal description of this primitive is the following:

⟨*numexpr*⟩
    → `\numexpr` ⟨*expr*⟩ `\relax`
    | `\numexpr` ⟨*expr*⟩
⟨*expr*⟩
    → ⟨*number*⟩
    | ⟨*operand*⟩
    | ⟨*operand*⟩ `+` ⟨*operand*⟩
    | ⟨*operand*⟩ `-` ⟨*operand*⟩
    | ⟨*operand*⟩ `*` ⟨*operand*⟩
    | ⟨*operand*⟩ `/` ⟨*operand*⟩
⟨*operand*⟩
    → ⟨*number*⟩
    | `-` ⟨*expr*⟩
    | `(` ⟨*expr*⟩ `)`

Examples

```
\count1=\numexpr 23 \relax
```

```
\count1=\numexpr 2 * 3 \relax
```

```
\count1=\numexpr 2*\count2
```

```
\count1=\numexpr 2*(1+3)
```

```
\count1=\numexpr 2*-\count0
```

The primitive `\numexpr` is defined in the set `etex`.

The Primitive `\ocp`

`\ocp` is not implemented yet.

The primitive `\ocp` is defined in the set `omega`.

The Primitive `\ocplist`

`\ocplist` is not implemented yet.

The primitive `\ocplist` is defined in the set `omega`.

The Primitive \odelmiter

\odelmiter is not implemented yet.
The primitive \odelmiter is defined in the set omega.

The Primitive \omathaccent

\omathaccent is not implemented yet.
The primitive \omathaccent is defined in the set omega.

The Primitive \omathchar

\omathchar is not implemented yet.
The primitive \omathchar is defined in the set omega.

The Primitive \omathchardef

\omathchardef is not implemented yet.
The primitive \omathchardef is defined in the set omega.

The Primitive \omathcode

\omathcode is not implemented yet.
The primitive \omathcode is defined in the set omega.

The Primitive \omathdelcode

\omathdelcode is not implemented yet.
The primitive \omathdelcode is defined in the set omega.

The Primitive \omit

The formal description of this primitive is the following:

⟨*omit*⟩
→ \omit

Examples:

```
\omit 1
```

The primitive \omit is defined in the set tex.

The Primitive \openin

The primitive \openin is defined in the set tex.

The Primitive \openout

The primitive \openout is defined in the set tex.

The Primitive \or

⟨*or*⟩
→ \ifcase ... \or ... \fi

The primitive \or is defined in the set tex.

The Primitive \oradical

\oradical is not implemented yet.
The primitive \oradical is defined in the set omega.

The Primitive \outer

The formal description of this primitive is the following:

⟨*outer*⟩
→ \outer ...

Examples:

```
\outer\def#1{--#1--}
```

The primitive \outer is defined in the set tex.

The Primitive \output

\output is a toks register. The primitive \output is defined in the set tex.

The Primitive \OutputMode

\OutputMode is not implemented yet.
The primitive \OutputMode is defined in the set omega.

The Primitive \outputpenalty

\outputpenalty is a count register. The primitive \outputpenalty is defined in the set tex.

The Primitive \OutputTranslation

\OutputTranslation is not implemented yet.

The primitive \OutputTranslation is defined in the set omega.

The Primitive \over

The formal description of this primitive is the following:

⟨*over*⟩
→ \over

Examples:

```
a \over b
```

The primitive \over is defined in the set tex.

The Primitive \overfullrule

\overfullrule is a dimen register. The primitive \overfullrule is defined in the set tex.

The Primitive \overline

The formal description of this primitive is the following:

⟨*span*⟩
→ \overline

Examples:

```
\overline
```

The primitive \overline is defined in the set tex.

The Primitive \overwithdelims

The formal description of this primitive is the following:

⟨*overwithdelims*⟩
→ \overwithdelims

Examples:

```
\overwithdelims
```

The primitive \overwithdelims is defined in the set tex.

The Primitive \pagedepth

\pagedepth is a dimen register. The primitive \pagedepth is defined in the set tex.

The Primitive \pagedir

\pagedir is not implemented yet.
The primitive \pagedir is defined in the set omega.

The Primitive \pagedirHL

\pagedirHL is not implemented yet.
The primitive \pagedirHL is defined in the set omega.

The Primitive \pagedirHR

\pagedirHR is not implemented yet.
The primitive \pagedirHR is defined in the set omega.

The Primitive \pagediscarts

\pagediscarts is not implemented yet.
The primitive \pagediscarts is defined in the set etex.

The Primitive \pagefilllstretch

\pagefilllstretch is a dimen register. The primitive \pagefilllstretch is defined in the set tex.

The Primitive \pagefillstretch

\pagefillstretch is a dimen register. The primitive \pagefillstretch is defined in the set tex.

The Primitive \pagefilstretch

\pagefilstretch is a dimen register. The primitive \pagefilstretch is defined in the set tex.

The Primitive \pagegoal

\pagegoal is a dimen register. The primitive \pagegoal is defined in the set tex.

The Primitive \pageshrink

\pageshrink is a dimen register. The primitive \pageshrink is defined in the set tex.

The Primitive \pagestretch

\pagestretch is a dimen register. The primitive \pagestretch is defined in the set tex.

The Primitive \pagetotal

\pagetotal is a dimen register. The primitive \pagetotal is defined in the set tex.

The Primitive \par

The formal description of this primitive is the following:

⟨*par*⟩
→ \par

Examples:

The primitive \par is defined in the set tex.

The Primitive \parfillskip

\parfillskip is a skip register. The primitive \parfillskip is defined in the set tex.

The Primitive \parindent

\parindent is a dimen register. The primitive \parindent is defined in the set tex.

The Primitive \parshape

The primitive \parshape is a declaration of the shape of the paragraph. With its help it is possible to control the left and right margin of the current paragraph.

The formal description of this primitive is the following:

⟨*parshape*⟩
→ \parshape ⟨*8-bit number*⟩ ...

Examples:

```
\parshape 3 20pt \linewidth
          20pt \linewidth
          0pt \linewidth
```

```
\parshape 0
```

\parshape acts as special register which can be queried. It returns the size of the current parshape specification or 0 if none is present.

The primitive \parshape is defined in the set tex.

The Primitive \parshapedimen

\parshapedimen is not implemented yet.

The primitive \parshapedimen is defined in the set etex.

The Primitive \parshapeindent

\parshapeindent is not implemented yet.

The primitive \parshapeindent is defined in the set etex.

The Primitive \parshapelength

\parshapelength is not implemented yet.

The primitive \parshapelength is defined in the set etex.

The Primitive \parskip

\parskip is a skip register. The primitive \parskip is defined in the set tex.

The Primitive \patterns

The formal description of this primitive is the following:

⟨*patterns*⟩
→ \patterns ⟨*patterns*⟩

Examples:

```
\patterns{.ach4 .ad4der .af1t}
```

The primitive \patterns is defined in the set tex.

The Primitive \pausing

\pausing is a count register. The primitive \pausing is defined in the set tex.

The Primitive \penalty

This primitive inserts penalty into the current node list. In vertical mode the page builder is also invoked.

A penalty of 10000 or more will inhibit a break at this position. A penalty of -10000 or less will force a break at this position.

The formal description of this primitive is the following:

⟨*penalty*⟩
→ `\penalty` ⟨*8-bit number*⟩

Examples:

```
\penalty 123
```

```
\penalty -456
```

```
\penalty -\count254
```

The primitive `\penalty` is defined in the set `tex`.

The Primitive \popocplist

`\popocplist` is not implemented yet.

The primitive `\popocplist` is defined in the set `omega`.

The Primitive \postdisplaypenalty

`\postdisplaypenalty` is a count register. The primitive `\postdisplaypenalty` is defined in the set `tex`.

The Primitive \predisplaydirection

`\predisplaydirection` is not implemented yet.

The primitive `\predisplaydirection` is defined in the set `etex`.

The Primitive \predisplaypenalty

`\predisplaypenalty` is a count register. The primitive `\predisplaypenalty` is defined in the set `tex`.

The Primitive \predisplaysize

`\predisplaysize` is a dimen register. The primitive `\predisplaysize` is defined in the set `tex`.

The Primitive \pretolerance

\pretolerance is a count register. The primitive \pretolerance is defined in the set tex.

The Primitive \prevdepth

The formal description of this primitive is the following:

⟨*prevdepth*⟩
→ \prevdepth ...

Examples:

```
\prevdepth ...
```

The primitive \prevdepth is defined in the set tex.

The Primitive \prevgraf

The formal description of this primitive is the following:

⟨*prevgraf*⟩
→ \prevgraf

Examples:

```
\prevgraf
```

The primitive \prevgraf is defined in the set tex.

The Primitive \protected

The formal description of this primitive is the following:

⟨*protected*⟩
→ \protected

Examples:

```
\protected\def\abc{123}
```

The primitive \protected is defined in the set etex.

The Primitive \pushocplist

\pushocplist is not implemented yet.
The primitive \pushocplist is defined in the set omega.

The Primitive \radical

The formal description of this primitive is the following:

⟨*radical*⟩
→ `\radical`

Examples:

```
\radical
```

The primitive `\radical` is defined in the set `tex`.

The Primitive \raise

The formal description of this primitive is the following:

⟨*raise*⟩
→ `\raise` ⟨*dimen*⟩ ⟨*box*⟩

Examples:

```
\raise 2em \hbox{abc}
```

```
\raise -1pt \hbox to 120pt {abc}
```

```
\raise 2mm \hbox spread 12pt {abc}
```

The primitive `\raise` is defined in the set `tex`.

The Primitive \read

The formal description of this primitive is the following:

⟨*read*⟩
→ `\read` ⟨*read*⟩ `to` ⟨*control sequence*⟩

The primitive `\read` is defined in the set `tex`.

The Primitive \readline

`\readline` is not implemented yet.
The primitive `\readline` is defined in the set `etex`.

The Primitive \relax

This primitive simply does nothing. It acts as a no-op for the TEX macro language.

The formal description of this primitive is the following:

⟨*relax*⟩
→ `\relax`

Examples:

```
\relax
```

```
\the\count123\relax456
```

The primitive `\relax` is defined in the set `tex`.

The Primitive \relpenalty

`\relpenalty` is a count register. The primitive `\relpenalty` is defined in the set `tex`.

The Primitive \removebeforeocplist

`\removebeforeocplist` is not implemented yet.

The primitive `\removebeforeocplist` is defined in the set `omega`.

The Primitive \right

The formal description of this primitive is the following:

⟨*span*⟩
→ `\right`

Examples:

```
\right
```

The primitive `\right` is defined in the set `tex`.

The Primitive \righthyphenmin

The primitive `\righthyphenmin` is defined in the set `tex`.

The Primitive \rightskip

`\rightskip` is a skip register. The primitive `\rightskip` is defined in the set `tex`.

The Primitive \romannumeral

The formal description of this primitive is the following:

⟨*romannumeral*⟩
→ `\romannumeral` ⟨*number*⟩

Examples:

```
\romannumeral\count1
```

```
\romannumeral 2004
```

The primitive `\romannumeral` is defined in the set `tex`.

The Primitive \savinghyphcodes

`\savinghyphcodes` is not implemented yet.
The primitive `\savinghyphcodes` is defined in the set `etex`.

The Primitive \savingvdiscarts

`\savingvdiscarts` is not implemented yet.
The primitive `\savingvdiscarts` is defined in the set `etex`.

The Primitive \scantokens

`\scantokens` is not implemented yet.
The primitive `\scantokens` is defined in the set `etex`.

The Primitive \scriptfont

The primitive `\scriptfont` is defined in the set `tex`.

The Primitive \scriptscriptfont

The primitive `\scriptscriptfont` is defined in the set `tex`.

The Primitive \scriptscriptstyle

The formal description of this primitive is the following:

⟨*scriptscriptstyle*⟩
→ `\scriptscriptstyle`

Examples:

```
\scriptscriptstyle
```

The primitive `\scriptscriptstyle` is defined in the set `tex`.

The Primitive `\scriptspace`

`\scriptspace` is a dimen register. The primitive `\scriptspace` is defined in the set `tex`.

The Primitive `\scriptstyle`

The formal description of this primitive is the following:

⟨*scriptstyle*⟩
→ `\scriptstyle`

Examples:

```
\scriptstyle
```

The primitive `\scriptstyle` is defined in the set `tex`.

The Primitive `\scrollmode`

The formal description of this primitive is the following:

⟨*scrollmode*⟩
→ `\scrollmode`

Examples:

```
\scrollmode
```

The primitive `\scrollmode` is defined in the set `tex`.

The Primitive `\setbox`

The formal description of this primitive is the following:

⟨*setbox*⟩
→ `\setbox` ⟨*8-bit number*⟩...

Examples:

```
\setbox0\hbox{abc}
```

The primitive `\setbox` is defined in the set `tex`.

The Primitive \setlanguage

The formal description of this primitive is the following:

⟨*setlanguage*⟩
→ `\setlanguage` ⟨*number*⟩

Examples:

```
\setlanguage2
```

The primitive `\setlanguage` is defined in the set `tex`.

The Primitive \sfcode

The formal description of this primitive is the following:

⟨*sfcode*⟩
→ `\sfcode ...`

Examples:

```
\sfcode ...
```

The primitive `\sfcode` is defined in the set `tex`.

The Primitive \shipout

The primitive `\shipout` takes a box and send the contents of the box to the document writer.

In addition the count register `\deadcyles` is reset to 0. This count register is used to break out of infinite loops when no material is shipped out in the output routine.

The formal description of this primitive is the following:

⟨*shipout*⟩
→ `\shipout` ⟨*box*⟩

Examples:

```
\shipout\box255
```

The primitive `\shipout` is defined in the set `tex`.

The Primitive \show

The formal description of this primitive is the following:

⟨*show*⟩
→ \show ⟨*token*⟩

Examples:

```
\show\abc
```

The primitive \show is defined in the set tex.

The Primitive \showbox

The formal description of this primitive is the following:

⟨*showbox*⟩
→ \showbox ⟨*8-bit number*⟩

Examples:

```
\showbox 1
```

The primitive \showbox is defined in the set tex.

The Primitive \showboxbreadth

\showboxbreadth is a count register. The primitive \showboxbreadth is defined in the set tex.

The Primitive \showboxdepth

\showboxdepth is a count register. The primitive \showboxdepth is defined in the set tex.

The Primitive \showgroups

\showgroups is not implemented yet.

The primitive \showgroups is defined in the set etex.

The Primitive \showlists

The formal description of this primitive is the following:

⟨*showlists*⟩
→ \showlists

Examples:

```
\showlists 1
```

The primitive \showlists is defined in the set tex.

The Primitive \showthe

The primitive \showthe is defined in the set tex.

The Primitive \showtokens

\showtokens is not implemented yet.
The primitive \showtokens is defined in the set etex.

The Primitive \skewchar

The formal description of this primitive is the following:

\skewchar ⟨*font*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\skewchar\font=123
```

Incompatibility

The TeXbook gives no indication ow the primitive should react for negative values – except -1. The implementation of TEX allows to store and retrieve arbirary negative values. This behaviour of TEX is not preserved in $\varepsilon_{\mathcal{X}}$TEX.
The primitive \skewchar is defined in the set tex.

The Primitive \skip

The primitive \skip is defined in the set tex.

The Primitive \skipdef

The formal description of this primitive is the following:

\skipdef ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\skipdef\abc=45
```

```
\skipdef\abc 33
```

The primitive \skipdef is defined in the set tex.

The Primitive \spacefactor

The formal description of this primitive is the following:

⟨*spacefactor*⟩
→ \spacefactor ...

Examples:

```
\spacefactor ...
```

The primitive \spacefactor is defined in the set tex.

The Primitive \spaceskip

\spaceskip is a skip register. The primitive \spaceskip is defined in the set tex.

The Primitive \span

The formal description of this primitive is the following:

⟨*span*⟩
→ \span

Examples:

```
\span 1
```

The primitive \span is defined in the set tex.

The Primitive \special

This primitive sends a string to the backend driver. The argument is a balanced block of text which is expanded and translated into a string. The string is given in a SpecialNode to the typesetter for passing it down.

The formal description of this primitive is the following:

⟨*special*⟩
→ `\special` ⟨*general text*⟩

Examples:

```
\special{hello world}
```

```
\special{ps: \abc}
```

For several backend drivers for TEX a quasi-standard has emerged which uses a prefix ended by a colon to indicate the backend driver the special is targeted at.

The primitive `\special` is defined in the set `tex`.

The Primitive \splitbotmark

The formal description of this primitive is the following:

`\splitbotmark ...`

Examples:

```
\splitbotmark ...
```

The primitive `\splitbotmark` is defined in the set `tex`.

The Primitive \splitbotmarks

`\splitbotmarks` is not implemented yet.

The primitive `\splitbotmarks` is defined in the set `etex`.

The Primitive \splitdiscarts

`\splitdiscarts` is not implemented yet.

The primitive `\splitdiscarts` is defined in the set `etex`.

The Primitive \splitfirstmark

The formal description of this primitive is the following:

\splitfirstmark ...

Examples:

```
\splitfirstmark ...
```

The primitive \splitfirstmark is defined in the set tex.

The Primitive \splitfirstmarks

\splitfirstmarks is not implemented yet.
The primitive \splitfirstmarks is defined in the set etex.

The Primitive \splitmaxdepth

\splitmaxdepth is a dimen register. The primitive \splitmaxdepth is defined in the set tex.

The Primitive \splittopskip

\splittopskip is a skip register. The primitive \splittopskip is defined in the set tex.

The Primitive \string

This primitive takes the next unexpanded token. If this token is a control sequence – and no active character – then the value of escapechar followed by the characters from the name of the control sequence. Otherwise it is a single character token containing the character code of the token.

The formal description of this primitive is the following:

⟨*string*⟩
→ \string ⟨*token*⟩

Examples:

```
\string ...
```

The primitive \string is defined in the set tex.

The Primitive \tabskip

\tabskip is a skip register. The primitive \tabskip is defined in the set tex.

The Primitive \textdir

\textdir is not implemented yet.

The primitive \textdir is defined in the set omega.

The Primitive \textfont

The primitive \textfont is defined in the set tex.

The Primitive \textstyle

The formal description of this primitive is the following:

⟨*textstyle*⟩
→ \textstyle

Examples:

```
\textstyle
```

The primitive \textstyle is defined in the set tex.

The Primitive \TeXXeTstate

\TeXXeTstate is a count register. The primitive \TeXXeTstate is defined in the set etex.

The Primitive \the

The formal description of this primitive is the following:

⟨*the*⟩
→ \the ⟨*internal quantity*⟩

Examples:

```
\the\count123
```

The primitive \the is defined in the set tex.

The Primitive \thickmuskip

The primitive \thickmuskip is defined in the set tex.

The Primitive \thinmuskip

The primitive \thinmuskip is defined in the set tex.

The Primitive \time

\time is a count register. The primitive \time is defined in the set tex.

The Primitive \toks

The primitive \toks is defined in the set tex.

The Primitive \toksdef

The formal description of this primitive is the following:

\toksdef ⟨*control sequence*⟩ ⟨*equals*⟩ ⟨*8-bit number*⟩

Examples:

```
\toksdef\abc=45
```

```
\toksdef\abc 33
```

The primitive \toksdef is defined in the set tex.

The Primitive \tolerance

\tolerance is a count register. The primitive \tolerance is defined in the set tex.

The Primitive \topmark

The formal description of this primitive is the following:

\topmark ...

Examples:

```
\topmark ...
```

The primitive \topmark is defined in the set tex.

The Primitive \topmarks

\topmarks is not implemented yet.
The primitive \topmarks is defined in the set etex.

The Primitive \topskip

\topskip is a skip register. The primitive \topskip is defined in the set tex.

The Primitive \tracingassigns

\tracingassigns is a count register. The primitive \tracingassigns is defined in the set etex.

The Primitive \tracingcommands

\tracingcommands is a count register. The primitive \tracingcommands is defined in the set tex.

The Primitive \tracinggroups

\tracinggroups is a count register. The primitive \tracinggroups is defined in the set etex.

The Primitive \tracingifs

\tracingifs is a count register. The primitive \tracingifs is defined in the set etex.

The Primitive \tracinglostchars

\tracinglostchars is a count register. The primitive \tracinglostchars is defined in the set tex.

The Primitive \tracingmacros

\tracingmacros is a count register. The primitive \tracingmacros is defined in the set tex.

The Primitive \tracingnesting

\tracingnesting is a count register. The primitive \tracingnesting is defined in the set etex.

The Primitive \tracingonline

\tracingonline is a count register. The primitive \tracingonline is defined in the set tex.

The Primitive \tracingoutput

\tracingoutput is a count register. The primitive \tracingoutput is defined in the set tex.

The Primitive \tracingpages

\tracingpages is a count register. The primitive \tracingpages is defined in the set tex.

The Primitive \tracingparagraphs

\tracingparagraphs is a count register. The primitive \tracingparagraphs is defined in the set tex.

The Primitive \tracingrestores

\tracingrestores is a count register. The primitive \tracingrestores is defined in the set tex.

The Primitive \tracingscantokens

\tracingscantokens is a count register. The primitive \tracingscantokens is defined in the set etex.

The Primitive \tracingstats

\tracingstats is a count register. The primitive \tracingstats is defined in the set tex.

The Primitive \uccode

The formal description of this primitive is the following:

⟨*uccode*⟩
→ \uccode ⟨...⟩

Examples:

```
\uccode ...
```

The primitive \uccode is defined in the set tex.

The Primitive \uchyph

\uchyph is a count register. The primitive \uchyph is defined in the set tex.

The Primitive \underline

The formal description of this primitive is the following:

⟨*span*⟩
→ \underline

Examples:

```
\underline
```

The primitive \underline is defined in the set tex.

The Primitive \unexpanded

\unexpanded is not implemented yet.
The primitive \unexpanded is defined in the set etex.

The Primitive \unhbox

The formal description of this primitive is the following:

⟨*unhbox*⟩
→ \unhbox ⟨*8-bit number*⟩

Examples:

```
\unhbox42
```

The primitive \unhbox is defined in the set tex.

The Primitive \unhcopy

The formal description of this primitive is the following:

⟨*unhcopy*⟩
→ \unhcopy ⟨*8-bit number*⟩

Examples:

```
\unhcopy42
```

The primitive \unhcopy is defined in the set tex.

The Primitive \unkern

The formal description of this primitive is the following:

⟨*unkern*⟩
→ \unkern

Examples:

```
\unkern
```

The primitive \unkern is defined in the set tex.

The Primitive \unless

Copied of the ε-TEX reference.

TEX has, by design, a rather sparse set of conditional primitives: \ifeof, \ifodd, \ifvoid, etc., have no complementary counterparts. Whilst this normally poses no problems since each accepts both a \then (implicit) and an \else (explicit) part, they fall down when used as the final \if... of a \loop ... \if ... \repeat construct, since no \else is allowed after the final \if.... \unless allows the sense of all Boolean conditionals to be inverted, and thus (for example) \unless \ifeof yields true iff end-of-file has not yet been reached.

The formal description of this primitive is the following:

Examples:

```
\unless\if\x\y not ok \fi
```

The primitive \unless is defined in the set etex.

The Primitive \unnaturaldir

\unnaturaldir is not implemented yet.

The primitive \unnaturaldir is defined in the set omega.

The Primitive \unpenalty

The formal description of this primitive is the following:

⟨*unpenalty*⟩
→ \unpenalty

Examples:

```
\unpenalty
```

The primitive \unpenalty is defined in the set tex.

The Primitive \unskip

The formal description of this primitive is the following:

⟨*unskip*⟩
→ `\unskip`

Examples:

```
\unskip
```

The primitive `\unskip` is defined in the set `tex`.

The Primitive \unvbox

The formal description of this primitive is the following:

⟨*unvbox*⟩
→ `\unvbox` ⟨*8-bit number*⟩

Examples:

```
\unvbox42
```

The primitive `\unvbox` is defined in the set `tex`.

The Primitive \unvcopy

The formal description of this primitive is the following:

⟨*unvcopy*⟩
→ `\unvcopy` ⟨*8-bit number*⟩

Examples:

```
\unvcopy42
```

The primitive `\unvcopy` is defined in the set `tex`.

The Primitive \uppercase

The formal description of this primitive is the following:

⟨*uppercase*⟩
→ `\uppercase` ⟨...⟩

Examples:

```
\uppercase ...
```

The primitive `\uppercase` is defined in the set `tex`.

The Primitive \vadjust

The formal description of this primitive is the following:

⟨*vadjust*⟩
→ `\vadjust` ...

Examples:

```
\vadjust{\kern2pt}
```

The primitive `\vadjust` is defined in the set `tex`.

The Primitive \valign

The formal description of this primitive is the following:

⟨*valign*⟩
→ `\valign`

Examples:

```
\valign
```

The primitive `\valign` is defined in the set `tex`.

The Primitive \vbadness

`\vbadness` is a count register. The primitive `\vbadness` is defined in the set `tex`.

The Primitive \vbox

The contents of the toks register `\everyvbox` is inserted at the beginning of the vertical material of the box.

The formal description of this primitive is the following:

⟨*vbox*⟩
→ `\vbox` ⟨*box specification*⟩ `{` ⟨*vertical material*⟩ `{`
⟨*box specification*⟩
→
| `to` ⟨*rule dimension*⟩
| `spread` ⟨*rule dimension*⟩

Examples:

```
\vbox{abc}
```

```
\vbox to 120pt{abc}
```

```
\vbox spread 12pt{abc}
```

The tokens parameter is used in /vbox. The tokens contained are inserted at the beginnig of the vertical material of the vbox.

The primitive \vbox is defined in the set tex.

The Primitive \vcenter

The formal description of this primitive is the following:

⟨*vcenter*⟩
→ \vcenter

Examples:

```
\vcenter
```

The primitive \vcenter is defined in the set tex.

The Primitive \vfi

The formal description of this primitive is the following:

⟨*vfi*⟩
→ \vfi

Examples:

```
\vfi
```

The primitive \vfi is defined in the set omega.

The Primitive \vfil

The formal description of this primitive is the following:

⟨*vfil*⟩
→ \vfil

Examples:

```
\vfil
```

The primitive \vfil is defined in the set tex.

The Primitive \vfill

The formal description of this primitive is the following:

⟨*vfill*⟩
→ `\vfill`

Examples:

```
\vfill
```

The primitive `\vfill` is defined in the set `tex`.

The Primitive \vfilneg

The formal description of this primitive is the following:

⟨*vfilneg*⟩
→ `\vfilneg`

Examples:

```
\vfilneg
```

The primitive `\vfilneg` is defined in the set `tex`.

The Primitive \vfuzz

`\vfuzz` is a dimen register. The primitive `\vfuzz` is defined in the set `tex`.

The Primitive \voffset

`\voffset` is a dimen register. The primitive `\voffset` is defined in the set `tex`.

The Primitive \vrule

This primitive produces a vertical rule. This is a rectangular area of specified dimensions. If not overwritten the height and depth are 0pt and the width is 0.4 pt (26214 sp).

The formal description of this primitive is the following:

⟨*vrule*⟩
→ `\vrule`⟨*rule specification*⟩
⟨*rule specification*⟩
→ ⟨*optional spaces*⟩
| ⟨*rule dimension*⟩ ⟨*rule specification*⟩

⟨*rule dimension*⟩
→ `width` ⟨*dimen*⟩
| `height` ⟨*dimen*⟩
| `depth` ⟨*dimen*⟩

The color from the typographic context is taken as foregroud color for the rule. The default color is black.

Examples:

```
\vrule
```

```
\vrule height 2pt
```

```
\vrule width 2pt depth 3mm height \dimen4
```

The primitive `\vrule` is defined in the set `tex`.

The Primitive `\vsize`

`\vsize` is a dimen register. The primitive `\vsize` is defined in the set `tex`.

The Primitive `\vskip`

The formal description of this primitive is the following:

⟨*vskip*⟩
→ `\vskip` ⟨*Glue*⟩

Examples:

```
\vskip 1em plus 1pt minus 1pt
```

The primitive `\vskip` is defined in the set `tex`.

The Primitive `\vsplit`

The formal description of this primitive is the following:

⟨*vsplit*⟩
→ `\vsplit`

Examples:

```
\vsplit ...
```

The primitive `\vsplit` is defined in the set `tex`.

The Primitive \vss

The formal description of this primitive is the following:

⟨*vss*⟩
→ `\vss`

Examples:

```
\vss
```

The primitive `\vss` is defined in the set `tex`.

The Primitive \vtop

The contents of the toks register `\everyvbox` is inserted at the beginning of the vertical material of the box.

The formal description of this primitive is the following:

⟨*vtop*⟩
→ `\vtop` ⟨*box specification*⟩ `{` ⟨*vertical material*⟩ `{`
⟨*box specification*⟩
→
| `to` ⟨*rule dimension*⟩
| `spread` ⟨*rule dimension*⟩

Examples:

```
\vtop{abc}
```

```
\vtop to 120pt{abc}
```

```
\vtop spread 12pt{abc}
```

The primitive `\vtop` is defined in the set `tex`.

The Primitive \wd

The formal description of this primitive is the following:

⟨*wd*⟩
→ `\wd` ⟨*8-bit number*⟩ ⟨*equals*⟩ ⟨*dimen*⟩

Examples:

```
\wd42
```

The primitive `\wd` is defined in the set `tex`.

The Primitive \widowpenalties

\widowpenalties is not implemented yet.

The primitive \widowpenalties is defined in the set etex.

The Primitive \widowpenalty

\widowpenalty is a count register. The primitive \widowpenalty is defined in the set tex.

The Primitive \write

The primitive \write is defined in the set tex.

The Primitive \xdef

The formal description of this primitive is the following:

⟨*xdef*⟩
→ ⟨*prefix*⟩ \xdef ⟨*control sequence*⟩ ⟨*parameter text*⟩ { ⟨*replacement text*⟩ }
⟨*prefix*⟩
→
| \global ⟨*prefix*⟩
| \long ⟨*prefix*⟩
| \outer ⟨*prefix*⟩

Examples:

```
\xdef#1{--#1--}
```

The primitive \xdef is defined in the set tex.

The Primitive \xleaders

The formal description of this primitive is the following:

⟨*xleaders*⟩
→ \xleaders ...

Examples:

```
\xleaders\hrul\hfill
```

The primitive \xleaders is defined in the set tex.

The Primitive \xspaceskip

\xspaceskip is a skip register. The primitive \xspaceskip is defined in the set tex.

The Primitive \year

\year is a count register. The primitive \year is defined in the set tex.

4.2. Basic Syntactic Entities of ε_{χ}TEX

To be completed.

A. Licenses

A.1. GNU Free Documentation License

Preamble

The purpose of this License is to make a manual, textbook, or other functional and useful document "free" in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or noncommercially. Secondarily, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work, in any medium, that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. Such a notice grants a world-wide, royalty-free license, unlimited in duration, to use that work under the conditions stated herein. The **"Document"**, below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as **"you"**. You accept the license if you copy, modify or distribute the work in a way requiring permission under copyright law.

A **"Modified Version"** of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A **"Secondary Section"** is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (Thus, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The **"Invariant Sections"** are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License. If a section does not fit the above definition of Secondary then it is not allowed to be designated as Invariant. The Document may contain zero Invariant Sections. If the Document does not identify any Invariant Sections then there are none.

The **"Cover Texts"** are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License. A Front-Cover Text may be at most 5 words, and a Back-Cover Text may be at most 25 words.

A **"Transparent"** copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, that is suitable for revising the document straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup, or absence of markup, has been arranged to thwart or discourage subsequent modification by readers is not Transparent. An image format is not Transparent if used for any substantial amount of text. A copy that is not "Transparent" is called **"Opaque"**.

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML, PostScript or PDF designed for human modification. Examples of transparent image formats include PNG, XCF and JPG. Opaque formats include proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML, PostScript or PDF produced by some word processors for output purposes only.

The **"Title Page"** means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

A section **"Entitled XYZ"** means a named subunit of the Document whose title either is precisely XYZ or contains XYZ in parentheses following text that translates XYZ in another language. (Here XYZ stands for a specific section name mentioned below, such as **"Acknowledgements"**, **"Dedications"**, **"Endorsements"**, or **"History"**.) To **"Preserve the Title"** of such a section when you modify the Document means that it remains a section "Entitled XYZ" according to this definition.

The Document may include Warranty Disclaimers next to the notice which states that this License applies to the Document. These Warranty Disclaimers are considered to be included by reference in this License, but only as regards disclaiming warranties: any other implication that these Warranty Disclaimers may have is void and has no effect on the meaning of this License.

2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

3. COPYING IN QUANTITY

If you publish printed copies (or copies in media that commonly have printed covers) of the Document, numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a computer-network location from which the general network-using public has access to download using public-standard network protocols a complete Transparent copy of the Document, free of added material. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at

the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.

B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has fewer than five), unless they release you from this requirement.

C. State on the Title page the name of the publisher of the Modified Version, as the publisher.

D. Preserve all the copyright notices of the Document.

E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.

F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.

G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.

H. Include an unaltered copy of this License.

I. Preserve the section Entitled "History", Preserve its Title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section Entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.

J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.

K. For any section Entitled "Acknowledgements" or "Dedications", Preserve the Title of the section, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.

L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.

M. Delete any section Entitled "Endorsements". Such a section may not be included in the Modified Version.

N. Do not retitle any existing section to be Entitled "Endorsements" or to conflict in title with any Invariant Section.

O. Preserve any Warranty Disclaimers.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section Entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties–for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

5. COMBINING DOCUMENTS

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice, and that you preserve all their Warranty Disclaimers.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections Entitled "History" in the various original documents, forming one section Entitled "History"; likewise combine any sections Entitled "Acknowledgements", and any sections Entitled "Dedications". You must delete all sections Entitled "Endorsements".

6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, is called an "aggregate" if the copyright resulting from the compilation is not used to limit the legal rights of the compilation's users beyond what the individual works permit. When the Document is included in an aggregate, this License does not apply to the other works in the aggregate which are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one half of the entire aggregate, the Document's Cover Texts may be placed on covers that bracket the Document within the aggregate, or the electronic equivalent of covers if the Document is in electronic form. Otherwise they must appear on printed covers that bracket the whole aggregate.

8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License, and all the license notices in the Document, and any Warranty Disclaimers, provided that you also include the original English version of this License and the original versions of those notices and disclaimers. In case of a disagreement between the translation and the original version of this License or a notice or disclaimer, the original version will prevail.

If a section in the Document is Entitled "Acknowledgements", "Dedications", or "History", the requirement (section 4) to Preserve its Title (section 1) will typically require changing the actual title.

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See http://www.gnu.org/copyleft/.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

ADDENDUM: How to use this License for your documents

To use this License in a document you have written, include a copy of the License in the document and put the following copyright and license notices just after the title page:

> Copyright ©YEAR YOUR NAME.
> Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

If you have Invariant Sections, Front-Cover Texts and Back-Cover Texts, replace the "with. . . Texts." line with this:

> with the Invariant Sections being LIST THEIR TITLES, with the Front-Cover Texts being LIST, and with the Back-Cover Texts being LIST.

If you have Invariant Sections without Cover Texts, or some other combination of the three, merge those two alternatives to suit the situation.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.

A.2. GNU Library General Public License

Version 2, June 1991

[This is the first released version of the library GPL. It is numbered 2 because it goes with version 2 of the ordinary GPL.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software–to make sure the software is free for all its users.

This license, the Library General Public License, applies to some specially designated Free Software Foundation software, and to any other libraries whose authors decide to use it. You can use it for your libraries, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library, or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link a program with the library, you must provide complete object files to the recipients so that they can relink them with the library, after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

Our method of protecting your rights has two steps: (1) copyright the library, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the library.

Also, for each distributor's protection, we want to make certain that everyone understands that there is no warranty for this free library. If the library is modified by someone else and passed on, we want its recipients to know that what they have is not the original version, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that companies distributing free software will individually obtain patent licenses, thus in effect transforming the program into proprietary software. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License, which was designed for utility programs. This license, the GNU Library General Public License, applies to certain designated libraries. This license is quite different from the ordinary one; be sure to read it in full, and don't assume that anything in it is the same as in the ordinary license.

The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.

Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.

However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, while the latter only works together with the library.

Note that it is possible for a library to be covered by the ordinary General Public License rather than by this special one.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Library General Public License (also called "this License"). Each licensee is addressed as "you".

   A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

   The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

   "Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

   Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of

the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

   You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

   a) The modified work must itself be a software library.

   b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

   c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

   d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful. (For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

   These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

   Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

   In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

   Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

   This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

   If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

   However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

   When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

   If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

   Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

   You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

   a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

   b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

   c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

   d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

   a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

   b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

    If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

    It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

    This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Library General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

    Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Index

Symbols

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

V

W

X

Y