stex-master.sty: sTeX 2.0*

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Abstract

TODO

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TODO

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```
⟨*package⟩
% TODO
\newif\if@modules@html@\@modules@html@true
\DeclareOption{omdocmode}{\@modules@html@false}
% Modules:
\newif\ifmod@show\mod@showfalse
\DeclareOption{showmods}{\mod@showtrue}
% sref:
\newif\ifextrefs\extrefsfalse
\DeclareOption{extrefs}{\extrefstrue}
%
\ProcessOptions

\RequirePackage{standalone}
\RequirePackage{xspace}
\RequirePackage{metakeys}
```

2.1 sTeX base

The sTeX logo:

```
\protected\def\stex{%
  \@ifundefined{texorpdfstring}%
  {\let\texorpdfstring\@firstoftwo}%
  {}%
  \texorpdfstring{\raisebox{-.5ex}S\kern-.5ex\TeX}{sTeX}\xspace%
}
\def\sTeX{\stex}
```

and a conditional for LaTeXML:

```
\newif\if@latexml\@latexmlfalse
```

2.2 Paths and URIs

```
\RequirePackage{xstring}
\RequirePackage{etoolbox}
```

`\defpath` `\defpath[optional argument]{macro name}{base path}` defines a new macro which can take another path to formal one integrated path. For example, `\MathHub` in every `localpaths.tex` is defined as:

```
\defpath{MathHub}{/path/to/localmh/MathHub}
```

then we can use `\MathHub` to form other paths, for example,

```
\MathHub{source/smglom/sets}
```

will generate /path/to/localmh/MathHub/source/smglom/sets.

```
\newrobustcmd\defpath[3][]{%
  \expandafter\newcommand\csname #2\endcsname[1]{#3/##1}%
}%
```

2.2.1 Path Canonicalization

We define two macros for changing the category codes of common characters in URIs, in particular #.

```
\def\pathsuris@setcatcodes{%
    \edef\pathsuris@oldcatcode@hash{\the\catcode`\#}%
    \catcode`\#=12\relax%
    \edef\pathsuris@oldcatcode@slash{\the\catcode`\/}%
    \catcode`\/=12\relax%
    \edef\pathsuris@oldcatcode@colon{\the\catcode`\:}%
    \catcode`\:=12\relax%
    \edef\pathsuris@oldcatcode@qm{\the\catcode`\?}%
    \catcode`\?=12\relax%
}
\def\pathsuris@resetcatcodes{%
    \catcode`\#\pathsuris@oldcatcode@hash\relax%
    \catcode`\/\pathsuris@oldcatcode@slash\relax%
    \catcode`\:\pathsuris@oldcatcode@colon\relax%
    \catcode`\?\pathsuris@oldcatcode@qm\relax%
}
```

We define some macros for later comparison.

```
\def\@ToTop{..}
\def\@Slash{/}
\def\@Colon{:}
\def\@Space{ }
\def\@QuestionMark{?}
\def\@Dot{.}
\catcode`\&=12
\def\@Ampersand{&}
\catcode`\&=4
\pathsuris@setcatcodes
\def\@Fragment{#}
\pathsuris@resetcatcodes
\catcode`\.=0
.catcode`.\=12
.let.@BackSlash\
.catcode`.\=0
\catcode`\.=12
\edef\old@percent@catcode{\the\catcode`\%}
\catcode`\%=12
\let\@Percent%
\catcode`\%=\old@percent@catcode
```

`\@cpath` Canonicalizes (file) paths:

```
\def\@cpath#1{%
    \edef\pathsuris@cpath@temp{#1}%
    \def\@CanPath{}%
    \IfBeginWith\pathsuris@cpath@temp\@Slash{%
      \@cpath@loop%
      \edef\@CanPath{\@Slash\@CanPath}%
    }{%
        \IfBeginWith\pathsuris@cpath@temp{\@Dot\@Slash}{%
            \StrGobbleLeft\pathsuris@cpath@temp2[\pathsuris@cpath@temp]%
            \@cpath@loop%
        }{%
            \ifx\pathsuris@cpath@temp\@Dot\else%
            \@cpath@loop\fi%
        }%
    }%
    \IfEndWith\@CanPath\@Slash{%
      \ifx\@CanPath\@Slash\else%
        \StrGobbleRight\@CanPath1[\@CanPath]%
      \fi%
    }{}%
}

\def\@cpath@loop{%
    \IfSubStr\pathsuris@cpath@temp\@Slash{%
        \StrCut\pathsuris@cpath@temp\@Slash\pathsuris@cpath@temp@a\pathsuris@cpath@temp%
        \ifx\pathsuris@cpath@temp@a\@ToTop%
            \ifx\@CanPath\@empty%
                \edef\@CanPath{\@ToTop}%
            \else%
                \edef\@CanPath{\@CanPath\@Slash\@ToTop}%
            \fi%
            \@cpath@loop%
        \else%
        \ifx\pathsuris@cpath@temp@a\@Dot%
            \@cpath@loop%
        \else%
        \IfBeginWith\pathsuris@cpath@temp\@ToTop{%
            \StrBehind{\pathsuris@cpath@temp}{\@ToTop}[\pathsuris@cpath@temp]%
            \IfBeginWith\pathsuris@cpath@temp\@Slash{%
                \edef\pathsuris@cpath@temp{\@CanPath\pathsuris@cpath@temp}%
            }{%
                \ifx\@CanPath\@empty\else%
                    \edef\pathsuris@cpath@temp{\@CanPath\@Slash\pathsuris@cpath@temp}
                \fi%
            }%
            \def\@CanPath{}%
            \@cpath@loop%
        }{%
            \ifx\@CanPath\@empty%
                \edef\@CanPath{\pathsuris@cpath@temp@a}%
```

```
            \else%
                \edef\@CanPath{\@CanPath\@Slash\pathsuris@cpath@temp@a}%
            \fi%
            \@cpath@loop
        }%
        \fi\fi%
    }{
        \ifx\@CanPath\@empty%
            \edef\@CanPath{\pathsuris@cpath@temp}%
        \else%
            \edef\@CanPath{\@CanPath\@Slash\pathsuris@cpath@temp}%
        \fi%
    }%
}
```

Test:

path	canonicalized path	expected
aaa	aaa	aaa
../../aaa	../../aaa	../../aaa
aaa/bbb	aaa/bbb	aaa/bbb
aaa/..		
../../aaa/bbb	../../aaa/bbb	../../aaa/bbb
../aaa/../bbb	../bbb	../bbb
../aaa/bbb	../aaa/bbb	../aaa/bbb
aaa/bbb/../ddd	aaa/ddd	aaa/ddd
aaa/bbb/./ddd	aaa/bbb/ddd	aaa/bbb/ddd
./		
aaa/bbb/../..		

`\cpath` Implement `\cpath` to print the canonicalized path.

```
\newcommand\cpath[1]{%
    \@cpath{#1}%
    \@CanPath%
}
```

`\path@filename`

```
\def\path@filename#1#2{%
    \edef\filename@oldpath{#1}%
    \StrCount\filename@oldpath\@Slash[\filename@lastslash]%
    \ifnum\filename@lastslash>0%
        \StrBehind[\filename@lastslash]\filename@oldpath\@Slash[\filename@oldpath]%
        \edef#2{\filename@oldpath}%
    \else%
        \edef#2{\filename@oldpath}%
    \fi%
}
```

Test:
Path: /foo/bar/baz.tex
Filename: baz.tex

2.2.2 Windows

First, a conditional that tells us whether we have to use windows or unix file paths:

```
\newif\if@iswindows@\@iswindows@false
\IfFileExists{nul:}{\IfFileExists{/dev/null}{}{\@iswindows@true}}{}
```

Test:
We are on windows: no.

`\windows@to@path` Converts a windows-style file path to a unix-style file path:

```
\newif\if@windowstopath@inpath@
\def\windows@to@path#1{
    \@windowstopath@inpath@false
    \def\windows@temp{}
    \edef\windows@path{#1}
    \ifx\windows@path\@empty\else
        \expandafter\windows@path@loop\windows@path\windows@path@end
    \fi
    \let#1\windows@temp
}
\def\windows@path@loop#1#2\windows@path@end{
    \def\windows@temp@b{#2}
    \ifx\windows@temp@b\@empty
        \def\windows@continue{}
    \else
        \def\windows@continue{\windows@path@loop#2\windows@path@end}
    \fi
    \if@windowstopath@inpath@
        \ifx#1\@BackSlash
            \edef\windows@temp{\windows@temp\@Slash}
        \else
            \edef\windows@temp{\windows@temp#1}
        \fi
    \else
        \ifx#1:
            \edef\windows@temp{\@Slash\windows@temp}
            \@windowstopath@inpath@true
        \else
            \edef\windows@temp{\windows@temp#1}
        \fi
    \fi
    \windows@continue
}
```

Test:
Input: C:\foo \bar .baz
Output: /C/foo/bar.baz

`\path@to@windows` Converts a unix-style file path to a windows-style file path:

```
\def\path@to@windows#1{
    \@windowstopath@inpath@false
    \def\windows@temp{}
    \edef\windows@path{#1}
    \edef\windows@path{\expandafter\@gobble\windows@path}
    \ifx\windows@path\@empty\else
        \expandafter\path@windows@loop\windows@path\windows@path@end
    \fi
    \let#1\windows@temp
}
\def\path@windows@loop#1#2\windows@path@end{
    \def\windows@temp@b{#2}
    \ifx\windows@temp@b\@empty
        \def\windows@continue{}
    \else
        \def\windows@continue{\path@windows@loop#2\windows@path@end}
    \fi
    \if@windowstopath@inpath@
        \ifx#1/
            \edef\windows@temp{\windows@temp\@BackSlash}
        \else
            \edef\windows@temp{\windows@temp#1}
        \fi
    \else
        \ifx#1/
            \edef\windows@temp{\windows@temp:\@BackSlash}
            \@windowstopath@inpath@true
        \else
            \edef\windows@temp{\windows@temp#1}
        \fi
    \fi
    \windows@continue
}
```

Test:
Input: /C/foo/bar.baz
Output: C:\foo\bar.baz

2.2.3 Auxiliary methods

`\trimstring` Removes initial and trailing spaces from a string:

```
\def\trimstring#1{%
    \edef\pathsuris@trim@temp{#1}%
    \IfBeginWith\pathsuris@trim@temp\@Space{%
        \StrGobbleLeft\pathsuris@trim@temp1[#1]%
```

```
        \trimstring{#1}%
    }{%
        \IfEndWith\pathsuris@trim@temp\@Space{%
            \StrGobbleRight\pathsuris@trim@temp1[#1]%
            \trimstring{#1}%
        }{%
            \edef#1{\pathsuris@trim@temp}%
        }%
    }%
}
```

Test:
»bla blubb«

\kpsewhich Calls kpsewhich to get e.g. system variables:

```
\def\kpsewhich#1#2{\begingroup%
  \edef\kpsewhich@cmd{"|kpsewhich #2"}%
  \everyeof{\noexpand}%
  \catcode`\\=12%
  \edef#1{\@@input\kpsewhich@cmd\@Space}%
  \trimstring#1%
  \if@iswindows@\windows@to@path#1\fi%
  \xdef#1{\expandafter\detokenize\expandafter{#1}}%
\endgroup}
```

Test:
/usr/share/texlive/texmf-dist/tex/latex/etoolbox/etoolbox.sty

2.2.4 sTeX input hooks

We determine the PWD of the current main document:

```
\edef\pwd@cmd{\if@iswindows@ -expand-var \percent CD\percent\else -var-value PWD\fi}
\kpsewhich\stex@maindir\pwd@cmd
\edef\stex@mainfile{\stex@maindir\@Slash\jobname}
\edef\stex@mainfile{\expandafter\detokenize\expandafter{\stex@mainfile}}
```

Test:
/home/jazzpirate/work/Software/ext/sTeX/sty/stex-master

We keep a stack of \inputed files:

```
\def\stex@currfile@stack{}

\def\stex@currfile@push#1{%
    \edef\stex@temppath{#1}%
    \edef\stex@temppath{\expandafter\detokenize\expandafter{\stex@temppath}}%
  \edef\stex@currfile@stack{\stex@currfile\ifx\stex@currfile@stack\@empty\else,\stex@currfile@st
  \IfBeginWith\stex@temppath\@Slash{\@cpath{\stex@temppath}}{%
    \@cpath{\stex@maindir\@Slash#1}%
  }
  \let\stex@currfile\@CanPath%
  \path@filename\stex@currfile\stex@currfilename%
  \StrLen\stex@currfilename[\stex@currfile@tmp]%
```

```
  \StrGobbleRight\stex@currfile{\the\numexpr\stex@currfile@tmp+1 }[\stex@currpath]%
  \global\let\stex@currfile\stex@currfile%
  \global\let\stex@currpath\stex@currpath%
  \global\let\stex@currfilename\stex@currfilename%
}
\def\stex@currfile@pop{%
  \ifx\stex@currfile@stack\@empty%
    \global\let\stex@currfile\stex@mainfile%
    \global\let\stex@currpath\stex@maindir%
    \global\let\stex@currfilename\jobname%
  \else%
    \StrCut\stex@currfile@stack,\stex@currfile\stex@currfile@stack%
    \path@filename\stex@currfile\stex@currfilename%
    \StrLen\stex@currfilename[\stex@currfile@tmp]%
    \StrGobbleRight\stex@currfile{\the\numexpr\stex@currfile@tmp+1 }[\stex@currpath]%
    \global\let\stex@currfile\stex@currfile%
    \global\let\stex@currpath\stex@currpath%
    \global\let\stex@currfilename\stex@currfilename%
  \fi%
}
```

`\stexinput` Inputs a file by (if necessary) converting its path to a windows path first, and adding the file path to the input stack above:

```
\def\stexinput#1{
    \edef\temp@path{#1}
    \if@iswindows@\path@to@windows\temp@path\fi%
    \stex@currfile@push\temp@path%
    \IfFileExists\stex@currfile{\input{\stex@currfile}}{%
        \PackageError{stex-currfile}{File does not exist (#1): \stex@currfile}{}%
    }%
    \stex@currfile@pop%
}
\stex@currfile@pop
```

Test:
This file: /home/jazzpirate/work/Software/ext/sTeX/sty/stex-master/stex-master
A test file: /home/jazzpirate/work/Software/ext/sTeX/sty/stex-master/testfile.tex

2.2.5 MathHub repositories

We read the `MATHHUB` system variable and set `\MathHub` accordingly:

```
\kpsewhich\mathhub@path{--var-value MATHHUB}
\if@iswindows@\windows@to@path\mathhub@path\fi
\ifx\mathhub@path\@empty%
  \PackageWarning{stex}{MATHHUB system variable not found or wrongly set}{}
  \defpath{MathHub}{}
\else\defpath{MathHub}\mathhub@path\fi
```

Test:
/home/jazzpirate/work/MathHub

\findmanifest `\findmanifest{`⟨*path*⟩`}` searches for a file `MANIFEST.MF` up and over ⟨*path*⟩ in the file system tree.

```
\def\findmanifest#1{
  \@cpath{#1}
  \ifx\@CanPath\@Slash
    \def\manifest@mf{}
  \else\ifx\@CanPath\@empty
      \def\manifest@mf{}
  \else
    \edef\@findmanifest@path{\@CanPath/MANIFEST.MF}
    \if@iswindows@\path@to@windows\@findmanifest@path\fi
    \IfFileExists{\@findmanifest@path}{
      %\message{MANIFEST.MF found at \@findmanifest@path}
      \edef\manifest@mf{\@findmanifest@path}
      \xdef\temp@archive@dir{\expandafter\detokenize\expandafter{\@CanPath}}
    }{
    \edef\@findmanifest@path{\@CanPath/META-INF/MANIFEST.MF}
    \if@iswindows@\path@to@windows\@findmanifest@path\fi
    \IfFileExists{\@findmanifest@path}{
      %\message{MANIFEST.MF found at \@findmanifest@path}
      \edef\manifest@mf{\@findmanifest@path}
      \xdef\temp@archive@dir{\expandafter\detokenize\expandafter{\@CanPath}}
    }{
    \edef\@findmanifest@path{\@CanPath/meta-inf/MANIFEST.MF}
    \if@iswindows@\path@to@windows\@findmanifest@path\fi
    \IfFileExists{\@findmanifest@path}{
      %\message{MANIFEST.MF found at \@findmanifest@path}
      \edef\manifest@mf{\@findmanifest@path}
      \xdef\temp@archive@dir{\expandafter\detokenize\expandafter{\@CanPath}}
    }{
      \findmanifest{\@CanPath/..}
    }}}
  \fi\fi
}
```

Test:
/home/jazzpirate/work/MathHub/smglom/mv/META-INF/MANIFEST.MF

the next macro is a helper function for parsing `MANIFEST.MF`

```
\def\split@manifest@key{
  \IfSubStr{\manifest@line}{\@Colon}{
      \StrBefore{\manifest@line}{\@Colon}[\manifest@key]
      \StrBehind{\manifest@line}{\@Colon}[\manifest@line]
      \trimstring\manifest@line
      \trimstring\manifest@key
  }{
      \def\manifest@key{}
  }
}
```

the next helper function iterates over lines in `MANIFEST.MF`

```
\def\parse@manifest@loop{
  \ifeof\@manifest
  \else
    \read\@manifest to \manifest@line\relax
    \edef\manifest@line{\expandafter\detokenize\expandafter{\manifest@line}}
    \split@manifest@key
    % id
    \IfStrEq\manifest@key{\detokenize{id}}{
        \xdef\manifest@mf@id{\manifest@line}
    }{
    % narration-base
    \IfStrEq\manifest@key{\detokenize{narration-base}}{
        \xdef\manifest@mf@narr{\manifest@line}
    }{
    % namespace
    \IfStrEq\manifest@key{\detokenize{source-base}}{
        \xdef\manifest@mf@ns{\manifest@line}
    }{
    \IfStrEq\manifest@key{\detokenize{ns}}{
        \xdef\manifest@mf@ns{\manifest@line}
    }{
    % dependencies
    \IfStrEq\manifest@key{\detokenize{dependencies}}{
        \xdef\manifest@mf@deps{\manifest@line}
    }{
    }}}}}
    \parse@manifest@loop
  \fi
}
```

`\parsemanifest` `\parsemanifest{`⟨*macroname*⟩`}{`⟨*path*⟩`}` finds `MANIFEST.MF` via `\findmanifest{`⟨*path*⟩`}`, and parses the file, storing the individual fields (`id`, `narr`, `ns` and `dependencies`) in ⟨*macroname*⟩`id`, ⟨*macroname*⟩`narr`, etc.

```
\newread\@manifest
\def\parsemanifest#1#2{%
  \gdef\temp@archive@dir{}%
  \findmanifest{#2}%
  \begingroup%
    \gdef\manifest@mf@id{}%
    \gdef\manifest@mf@narr{}%
    \gdef\manifest@mf@ns{}%
    \gdef\manifest@mf@deps{}%
    \openin\@manifest\manifest@mf%
    \parse@manifest@loop%
    \closein\@manifest%
  \endgroup%
  \if@iswindows@\windows@to@path\manifest@mf\fi%
  \cslet{#1id}\manifest@mf@id%
```

```
  \cslet{#1narr}\manifest@mf@narr%
  \cslet{#1ns}\manifest@mf@ns%
  \cslet{#1deps}\manifest@mf@deps%
  \ifcsvoid{manifest@mf@id}{}{%
    \cslet{#1dir}\temp@archive@dir%
  }%
}
```

Test:
id: FOO/BAR
ns: http://mathhub.info/FOO/BAR
dir: FOO

`\setcurrentreposinfo` `\setcurrentreposinfo{`⟨*id*⟩`}` sets the current repository to ⟨*id*⟩, checks if the `MANIFEST.MF` of this repository has already been read, and if not, find it, parses it and stores the values in `\currentrepos@`⟨*key*⟩`@`⟨*id*⟩ for later retrieval.

```
\def\setcurrentreposinfo#1{%
  \ifcsdef{mathhub@dir@#1}{%
    \@inmhrepostrue
    \edef\mh@currentrepos{#1}%
    \expandafter\let\expandafter\currentrepos@dir\csname mathhub@dir@#1\endcsname%
    \expandafter\let\expandafter\currentrepos@narr\csname mathhub@narr@#1\endcsname%
    \expandafter\let\expandafter\currentrepos@ns\csname mathhub@ns@#1\endcsname%
    \expandafter\let\expandafter\currentrepos@deps\csname mathhub@deps@#1\endcsname%
  }{%
    \parsemanifest{currentrepos@}{\MathHub{#1}}%
    \@setcurrentreposinfo%
    \ifcsvoid{currentrepos@dir}{\PackageError{stex}{No archive with %
      name #1 found!}{make sure that #1 is directly in your MATHHUB folder %
      and contains a MANIFEST.MF, either directly in #1 or in a meta-inf %
      subfolder.}}{\@inmhrepostrue}%
  }%
}

\def\@setcurrentreposinfo{%
  \edef\mh@currentrepos{\currentrepos@id}%
  \ifcsvoid{currentrepos@dir}{}{%
    \csxdef{mathhub@dir@\currentrepos@id}{\currentrepos@dir}%
    \csxdef{mathhub@narr@\currentrepos@id}{\currentrepos@narr}%
    \csxdef{mathhub@ns@\currentrepos@id}{\currentrepos@ns}%
    \csxdef{mathhub@deps@\currentrepos@id}{\currentrepos@deps}%
  }
}
```

Finally – and that is the ultimate goal of all of the above, we set the current repos.

```
\newif\if@inmhrepos\@inmhreposfalse
\ifcsvoid{stex@maindir}{}{
\parsemanifest{currentrepos@}\stex@maindir
\@setcurrentreposinfo
\ifcsvoid{currentrepos@dir}{\PackageWarning{stex}{Not currently in a MathHub repository}{}}{%
```

```
  \message{Current repository: \mh@currentrepos}
}
}
```

2.3 Modules

```
\if@latexml\else\ifmod@show\RequirePackage{mdframed}\fi\fi
```

Aux:

```
\def\ignorespacesandpars{\begingroup\catcode13=10\@ifnextchar\relax{\endgroup}{\endgroup}}
```

and more adapted from `http://tex.stackexchange.com/questions/179016/ignore-spaces-and-pars-after-an-environment`

```
\def\ignorespacesandparsafterend#1\ignorespaces\fi{#1\fi\ignorespacesandpars}
\def\ignorespacesandpars{\ifhmode\unskip\fi\@ifnextchar\par{\expandafter\ignorespacesandpars\@g
```

Options for the `module`-environment:

```
\addmetakey*{module}{title}
\addmetakey*{module}{name}
\addmetakey*{module}{creators}
\addmetakey*{module}{contributors}
\addmetakey*{module}{srccite}
\addmetakey*{module}{ns}
\addmetakey*{module}{narr}
```

`module@heading` We make a convenience macro for the module heading. This can be customized.

```
\ifdef{\thesection}{\newcounter{module}[section]}{\newcounter{module}}%
\newrobustcmd\module@heading{%
  \stepcounter{module}%
  \ifmod@show%
  \noindent{\textbf{Module} \thesection.\themodule [\module@name]}%
  \sref@label@id{Module \thesection.\themodule [\module@name]}%
    \ifx\module@title\@empty :\quad\else\quad(\module@title)\hfill\\\fi%
  \fi%
}%
```

Test:
Module 2.1[Test]: Foo

`module` Finally, we define the begin module command for the module environment. Much of the work has already been done in the keyval bindings, so this is quite simple.

```
\newenvironment{module}[1][]{%
  \begin{@module}[#1]%
  \module@heading% make the headings
  \ignorespacesandpars\parsemodule@maybesetcodes}{%
  \end{@module}%
  \ignorespacesafterend%
}%
\ifmod@show\surroundwithmdframed{module@om@common}\fi%
```

Some auxiliary methods:

```
\def\g@addto@macro@safe#1#2{\ifx#1\relax\def#1{}\fi\g@addto@macro#1{#2}}
\def\addto@thismodule#1{%
  \@ifundefined{this@module}{}{%
    \expandafter\g@addto@macro@safe\this@module{#1}%
  }%
}
\def\addto@thismodulex#1{%
\@ifundefined{this@module}{}{%
  \edef\addto@thismodule@exp{#1}%
  \expandafter\expandafter\expandafter\g@addto@macro@safe%
  \expandafter\this@module\expandafter{\addto@thismodule@exp}%
}}
```

`@module` A variant of the `module` environment that does not create printed representations (in particular no frames).

To compute the ⟨*uri*⟩ of a module, `\set@default@ns` computes the namespace, if none is provided as an optional argument, as follows:

If the file of the module is `/some/path/file.tex` and we are not in a `MathHub` repository, the namespace is `file:///some/path`.

If the file of the module is `/some/path/in/mathhub/repo/sitory/source/sub/file.tex` and `repo/sitory` is an archive in the `MathHub` root, and the `MANIFEST.MF` of `repo/sitory` declares a namespace `http://some.namespace/foo`, then the namespace of the module is `http://some.namespace/foo/sub`.

```
\newif\ifarchive@ns@empty@\archive@ns@empty@false
\def\set@default@ns{%
  \edef\@module@ns@temp{\stex@currpath}%
  \if@iswindows@\windows@to@path\@module@ns@temp\fi%
  \archive@ns@empty@false%
  \ifcsvoid{mh@currentrepos}{\archive@ns@empty@true}%
  {\expandafter\ifx\csname mathhub@ns@\mh@currentrepos\endcsname\@empty\archive@ns@empty@true\fi
  }%
  \ifarchive@ns@empty@%
    \edef\@module@ns@tempuri{file\@Colon\@Slash\@Slash\@module@ns@temp}%
  \else%
    \edef\@module@filepath@temppath{\@module@ns@temp}%
    \edef\@module@ns@tempuri{\csname mathhub@ns@\mh@currentrepos\endcsname}%
    \edef\@module@archivedirpath{\csname mathhub@dir@\mh@currentrepos\endcsname\@Slash source}%
    \edef\@module@archivedirpath{\expandafter\detokenize\expandafter{\@module@archivedirpath}}%
    \IfBeginWith\@module@filepath@temppath\@module@archivedirpath{%
      \StrLen\@module@archivedirpath[\ns@temp@length]%
      \StrGobbleLeft\@module@filepath@temppath\ns@temp@length[\@module@filepath@temprest]%
      \edef\@module@ns@tempuri{\@module@ns@tempuri\@module@filepath@temprest}%
    }{}%
  \fi%
  \IfEndWith\@module@ns@tempuri\@Slash{\StrGobbleRight\@module@ns@tempuri1[\@module@ns@tempuri]}
  \setkeys{module}{ns=\@module@ns@tempuri}%
}
```

Test:
file:///home/jazzpirate/work/Software/ext/sTeX/sty/stex-master

If the module is not given a `name`, `\set@next@moduleid` computes one by enumeration, e.g. `module0`, `module1`, etc.

```
\def\set@next@moduleid{%
  \unless\ifcsname namespace@\module@ns @unnamedmodules\endcsname%
      \csgdef{namespace@\module@ns @unnamedmodules}{0}%
  \fi%
  \edef\namespace@currnum{\csname namespace@\module@ns @unnamedmodules\endcsname}%
  \edef\module@temp@setidname{\noexpand\setkeys{module}{name=module\namespace@currnum}}%
  \module@temp@setidname%
  \csxdef{namespace@\module@ns @unnamedmodules}{\the\numexpr\namespace@currnum+1}%
}
```

Test:
module0
module1

Finally, the `@module` environment does the actual work, i.e. setting metakeys, computing namespace/id, defining `\this@module`, etc.

For a module with name ⟨*name*⟩ (`\module@name`) and uri ⟨*uri*⟩ (`\module@uri`), this defines the following macros:

- `\module@defs@`⟨*uri*⟩ that acts as a repository for semantic macros of the current module. It will be called by `\importmodule` to activate them.
- We will add the internal forms of the semantic macros whenever `\symdef` is invoked. To do this, we will need an unexpended form `\this@module` that expands to `\module@defs@`⟨*uri*⟩; we define it first and then initialize `\module@defs@`⟨*uri*⟩ as empty.
- `\module@names@`⟨*uri*⟩ will store all symbol names declared in this module.
- `\module@imports@`⟨*uri*⟩ will store the URIs of all modules direclty included in this module
- \⟨*uri*⟩ that expands to `\invoke@module{`⟨*uri*⟩`}` (see below).
- `\Module`⟨*name*⟩ that expands to \⟨*uri*⟩.

If we are currently in a mathhub repository, this information will also be stored in `\module@defs@`⟨*uri*⟩, so we can resolve includes properly when this module is activated.

```
\newenvironment{@module}[1][]{%
  \metasetkeys{module}{#1}%
  \ifcsvoid{module@name}{\let\module@name\module@id}{}% % TODO deprecate
  \ifx\module@ns\@empty\set@default@ns\fi%
  \ifx\module@narr\@empty%
    \setkeys{module}{narr=\module@ns}%
  \fi%
```

```
  \ifcsvoid{module@name}{\set@next@moduleid}{}%
  \let\module@id\module@name% % TODO deprecate
  \edef\module@uri{\module@ns\@QuestionMark\module@name}%
  \csgdef{module@names@\module@uri}{}%
  \csgdef{module@imports@\module@uri}{}%
  \csxdef{\module@uri}{\noexpand\@invoke@module{\module@uri}}%
  \expandafter\global\expandafter\let\csname Module\module@name\expandafter\endcsname\csname\mod
  \edef\this@module{%
    \expandafter\noexpand\csname module@defs@\module@uri\endcsname%
  }%
  \csdef{module@defs@\module@uri}{}%
  \ifcsvoid{mh@currentrepos}{}{%
    \@inmhrepostrue%
    \addto@thismodulex{\expandafter\edef\expandafter\noexpand\csname mh@old@repos@\module@uri\en
      {\noexpand\mh@currentrepos}}%
    \addto@thismodulex{\noexpand\setcurrentreposinfo{\mh@currentrepos}}%
  }%
}{%
  \if@inmhrepos%
  \@inmhreposfalse%
  \addto@thismodulex{\noexpand\setcurrentreposinfo{\expandafter\noexpand\csname mh@old@repos@\mo
  \fi%
}%
```

Test:
Module 2.2[Foo]:
Name: Foo
URI: file:///home/jazzpirate/work/Software/ext/sTeX/sty/stex-master?Foo
this@module: macro:->
Test:
Faking a MathHub archive Foo/Bar with URI `http://foo.bar/baz`:
Module 2.3[Foo2]:
Name: Foo2
URI: http://foo.bar/baz?Foo2
this@module: macro:->\edef \mh@old@repos@http://foo.bar/baz?Foo2 {\mh@currentrepos }\setcurrentreposinfo {Foo/Bar}
Test:
Removing the `/home/jazzpirate/work/MathHub/` system variable first:
Module 2.4[Foo]:
Name: Foo
URI: file:///home/jazzpirate/work/Software/ext/sTeX/sty/stex-master?Foo
this@module: macro:->Faking a MathHub archive Foo/Bar with URI `http://foo.bar/baz`:
Module 2.5[Foo2]:
Name: Foo2
URI: http://foo.bar/baz?Foo2
this@module: macro:->\edef \mh@old@repos@http://foo.bar/baz?Foo2 {\mh@currentrepos }\setcurrentreposinfo {Foo/Bar}

A module with URI $\langle uri \rangle$ and id $\langle id \rangle$ creates two macros $\backslash\langle uri \rangle$ and

`\Module`⟨*id*⟩, that ultimately expand to `\@invoke@module{`⟨*uri*⟩`}`. Currently, the only functionality is `\@invoke@module{`⟨*uri*⟩`}\@URI`, which expands to the full uri of a module (i.e. via `\Module`⟨*id*⟩`\@URI`). In the future, this macro can be extended with additional functionality, e.g. accessing symbols in a macro for overloaded (macro-)names.

```
\def\@URI{uri}
\def\@invoke@module#1#2{%
  \ifx\@URI#2%
    #1%
  \else%
    % TODO something else
    #2%
  \fi%
}
```

2.4 Inheritance

2.4.1 Selective Inclusion

The next great goal is to establish the `\requiremodules` macro, which reads an STEX file and processes all the module signature information in them, but does not produce any output. This is a tricky business, as we need to "parse" the modules and treat the module signature macros specially (we refer to this as "**sms mode**", since it is equivalent to what the – now deprecated – `sms` utility did).

In the following we introduce a lot of auxiliary functionality before we can define `\requiremodules`.

`\parsemodule@allow*` The first step is setting up a functionality for registering `\sTeX` macros and environments as part of a module signature.

```
\newif\if@smsmode\@smsmodefalse
\def\parsemodule@escapechar@allowed{true}
\def\parsemodule@allow#1{
  \expandafter\let\csname parsemodule@allowedmacro@#1\endcsname\parsemodule@escapechar@allowed
}
\def\parsemodule@allowenv#1{
  \expandafter\let\csname parsemodule@allowedenv@#1\endcsname\parsemodule@escapechar@allowed
}
\def\parsemodule@escapechar@beginstring{begin}
\def\parsemodule@escapechar@endstring{end}
```

and now we use that to actually register all the STEX functionality as relevant for `sms` mode.

```
\parsemodule@allow{symdef}
\parsemodule@allow{abbrdef}
\parsemodule@allow{importmodule}
\parsemodule@allowenv{module}
\parsemodule@allow{importmhmodule}
\parsemodule@allow{gimport}
```

```
\parsemodule@allowenv{modsig}
\parsemodule@allowenv{mhmodsig}
\parsemodule@allowenv{mhmodnl}
\parsemodule@allowenv{modnl}
\parsemodule@allow{symvariant}
\parsemodule@allow{symi}
\parsemodule@allow{symii}
\parsemodule@allow{symiii}
\parsemodule@allow{symiv}
\parsemodule@allow{notation}
\parsemodule@allow{symdecl}
%\parsemodule@allow{defi}
%\parsemodule@allow{defii}
%\parsemodule@allow{defiii}
%\parsemodule@allow{defiv}
%\parsemodule@allow{adefi}
%\parsemodule@allow{adefii}
%\parsemodule@allow{adefiii}
%\parsemodule@allow{adefiv}
%\parsemodule@allow{defis}
%\parsemodule@allow{defiis}
%\parsemodule@allow{defiiis}
%\parsemodule@allow{defivs}
%\parsemodule@allow{Defi}
%\parsemodule@allow{Defii}
%\parsemodule@allow{Defiii}
%\parsemodule@allow{Defiv}
%\parsemodule@allow{Defis}
%\parsemodule@allow{Defiis}
%\parsemodule@allow{Defiiis}
%\parsemodule@allow{Defivs}
```

To read external modules without producing output, `\requiremodules` redefines the \-character to be an *active* character that, instead of executing a macro, checks whether a macro name has been registered using `\parsemodule@allow` before selectively executing the corresponding macro or ignoring it. To produce the relevant code, we therefore define a macro `\@active@slash` that produces a \-character with category code 13 (*active*), as well as `\@open@brace` and `\@close@brace`, which produce open and closing braces with category code 12 (*other*).

```
\catcode`\.=0
.catcode`.\=13
.def.@active@slash{\}
.catcode`.<=1
.catcode`.>=2
.catcode`.{=12
.catcode`.}=12
.def.@open@brace<{>
.def.@close@brace<}>
```

```
.catcode`.\=0
\catcode`\.=12
\catcode`\{=1
\catcode`\}=2
\catcode`\<=12
\catcode`\>=12
```

The next two macros set and reset the category codes before/after `sms` mode.

`\set@parsemodule@catcodes`

```
\def\set@parsemodule@catcodes{%
    \global\catcode`\\=13%
    \global\catcode`\#=12%
    \global\catcode`\{=12%
    \global\catcode`\}=12%
    \global\catcode`\$=12%$
    \global\catcode`\^=12%
    \global\catcode`\_=12%
    \global\catcode`\&=12%
    \expandafter\let\@active@slash\parsemodule@escapechar%
}
```

`\reset@parsemodule@catcodes`

```
\def\reset@parsemodule@catcodes{%
    \global\catcode`\\=0%
    \global\catcode`\#=6%
    \global\catcode`\{=1%
    \global\catcode`\}=2%
    \global\catcode`\$=3%$
    \global\catcode`\^=7%
    \global\catcode`\_=8%
    \global\catcode`\&=4%
}
```

`\parsemodule@maybesetcodes` Before a macro is executed in `sms`-mode, the category codes will be reset to normal, to ensure that all macro arguments are parsed correctly. Consequently, the macros need to set the category codes back to `sms` mode after having read all arguments iff the macro got executed in `sms` mode. `\parsemodule@maybesetcodes` takes care of that.

```
\def\parsemodule@maybesetcodes{%
  \if@smsmode\set@parsemodule@catcodes\fi%
}
```

`\parsemodule@escapechar` This macro gets called whenever a \-character occurs in `sms` mode. It is split into several macros that parse and store characters in `\parsemodule@escape@currcs` until a character with category code $\neq 11$ occurs (i.e. the macro name is complete), check whether the macro is allowed in `sms` mode, and then either ignore it or execute it after setting category codes back to normal. Special care needs to be taken to make sure that braces have the right category codes (1 and 2 for open and closing braces, respectively) when delimiting macro arguments.

Entry point:

```
\def\parsemodule@escapechar{%
    \def\parsemodule@escape@currcs{}%
    \parsemodule@escape@parse@nextchar@%
}%
```

The next macro simply reads the next character and checks whether it has category code 11. If so, it stores it in `\parsemodule@escape@currcs`. Otherwise, the macro name is complete, it stores the last character in `\parsemodule@last@char` and calls `\parsemodule@escapechar@checkcs`.

```
\long\def\parsemodule@escape@parse@nextchar@#1{%
    \ifcat a#1\relax%
        \edef\parsemodule@escape@currcs{\parsemodule@escape@currcs#1}%
        \let\parsemodule@do@next\parsemodule@escape@parse@nextchar@%
    \else%
      \def\parsemodule@last@char{#1}%
      \def\parsemodule@do@next{\parsemodule@escapechar@checkcs}%
    \fi%
    \parsemodule@do@next%
}
```

The next macro checks whether the currently stored macroname is allowed in `sms` mode. There are four cases that need to be considered: `\begin`, `\end`, allowed macros, and others. In the first two cases, we reinsert `\parsemodule@last@char` and continue with `\parsemodule@escapechar@checkbeginenv` or `\parsemodule@escapechar@checkende` respectively, to check whether the environment being openend/closed is allowed in `sms` mode. In both cases, `\parsemodule@last@char` is an open brace with category code 12. In the third case, we need to check whether `\parsemodule@last@char` is an open brace, in which case we call `\parsemodule@converttoproperbraces`, otherwise, we set category codes to normal and execute the macro. In the fourth case, we just reinsert `\parsemodule@last@char` and continue.

```
\def\parsemodule@escapechar@checkcs{%
    \ifx\parsemodule@escape@currcs\parsemodule@escapechar@beginstring%
        \edef\parsemodule@do@next{\noexpand\parsemodule@escapechar@checkbeginenv\parsemodule@las
    \else%
        \ifx\parsemodule@escape@currcs\parsemodule@escapechar@endstring%
          \edef\parsemodule@do@next{\noexpand\parsemodule@escapechar@checkendenv\parsemodule@las
        \else%
            \expandafter\ifx\csname parsemodule@allowedmacro@\parsemodule@escape@currcs\endcsnam
                \parsemodule@escapechar@allowed%
              \ifx\parsemodule@last@char\@open@brace%
                \expandafter\let\expandafter\parsemodule@do@next@ii\csname\parsemodule@escape@cu
                \edef\parsemodule@do@next{\noexpand\parsemodule@converttoproperbraces\@open@brac
              \else%
                \reset@parsemodule@catcodes%
                \edef\parsemodule@do@next{\expandafter\noexpand\csname\parsemodule@escape@currcs
              \fi%
            \else\def\parsemodule@do@next{\relax\parsemodule@last@char}\fi%
```

```
        \fi%
    \fi%
    \parsemodule@do@next%
}
```

This macro simply takes an argument in braces (with category codes 12), reinserts it with "proper" braces (category codes 1 and 2), sets category codes back to normal and calls `\parsemodule@do@next@ii`, which has been `\let` as the macro to be executed.

```
\expandafter\expandafter\expandafter\def%
\expandafter\expandafter\expandafter\parsemodule@converttoproperbraces%
\expandafter\@open@brace\expandafter#\expandafter1\@close@brace{%
  \reset@parsemodule@catcodes%
  \parsemodule@do@next@ii{#1}%
}
```

The next two macros apply in the `\begin` and `\end` cases. They check whether the environment is allowed in `sms` mode, if so, open/close the environment, and otherwise do nothing.

Notably, `\parsemodule@escapechar@checkendenv` does not set category codes back to normal, since `\end{environment}` never takes additional arguments that need to be parsed anyway.

```
\expandafter\expandafter\expandafter\def%
\expandafter\expandafter\expandafter\parsemodule@escapechar@checkbeginenv%
\expandafter\@open@brace\expandafter#\expandafter1\@close@brace{%
    \expandafter\ifx\csname parsemodule@allowedenv@#1\endcsname\parsemodule@escapechar@allowed%
        \reset@parsemodule@catcodes%
        \def\parsemodule@do@next{\begin{#1}}%
    \else%
        \def\parsemodule@do@next{#1}%
    \fi%
    \parsemodule@do@next%
}
\expandafter\expandafter\expandafter\def%
\expandafter\expandafter\expandafter\parsemodule@escapechar@checkendenv%
\expandafter\@open@brace\expandafter#\expandafter1\@close@brace{%
    \expandafter\ifx\csname parsemodule@allowedenv@#1\endcsname\parsemodule@escapechar@allowed%
        %\reset@parsemodule@catcodes%
        \def\parsemodule@do@next{\end{#1}}%
    \else%
      \def\parsemodule@do@next{#1}%
    \fi%
    \parsemodule@do@next%
}
```

`\@requiremodules` the internal version of `\requiremodules` for use in the `*.aux` file. We disable it at the end of the document, so that when the `aux` file is read again, nothing is loaded.

```
\newrobustcmd\@requiremodules[1]{%
```

```
  \if@tempswa\requiremodules{#1}\fi%
}%
```

`\requiremodules` This macro loads the module signatures in a file using the `\requiremodules@smsmode` above. We set the flag `\mod@showfalse` in the local group, so that the macros know now to pollute the result.

```
\newrobustcmd\requiremodules[1]{%
  \mod@showfalse%
  \edef\mod@path{#1}%
  \edef\mod@path{\expandafter\detokenize\expandafter{\mod@path}}%
  \requiremodules@smsmode{#1}%
}%
```

`\requiremodules@smsmode` this reads STEX modules by setting the category codes for `sms` mode, `\input`ting the required file and wrapping it in a `\vbox` that gets stored away and ignored, in order to not produce any output. It also sets `\hbadness`, `\hfuzz` and friends to values that suppress overfull and underfull hbox messages.

```
\newbox\modules@import@tempbox
\def\requiremodules@smsmode#1{%
  \setbox\modules@import@tempbox\vbox{%
    \@smsmodetrue%
    \set@parsemodule@catcodes%
    \hbadness=100000\relax%
    \hfuzz=10000pt\relax%
    \vbadness=100000\relax%
    \vfuzz=10000pt\relax%
    \stexinput{#1.tex}%
    \reset@parsemodule@catcodes%
    }%
    \parsemodule@maybesetcodes%
}
```

Test:
parsing FOO/testmodule.tex
macro:->\@invoke@module {file:///home/jazzpirate/work/Software/ext/sTeX/sty/stex-master/FOO?testmodule}

2.5 Symbols and Notations

`\if@symdeflocal` A flag whether a symbol declaration is local (i.e. does not get exported) or not.

```
\newif\if@symdeflocal\@symdeflocalfalse
```

`\define@in@module` calls `\edef\#1{#2}` and adds the macro definition to `\this@module`

```
\def\define@in@module#1#2{
  \expandafter\edef\csname #1\endcsname{#2}%
  \edef\define@in@module@temp{%
    \def\expandafter\noexpand\csname#1\endcsname%
    {#2}%
  }%
```

```
  \if@symdeflocal\else%
    \expandafter\g@addto@macro@safe\csname module@defs@\module@uri%
    \expandafter\endcsname\expandafter{\define@in@module@temp}%
  \fi%
}
```

\symdecl `\symdecl[name=foo]{bar}` Declares a new symbol in the current module with URI ⟨*module-uri*⟩`?foo` and defines new macros \⟨*uri*⟩ and `\bar`. If no optional name is given, `bar` is used as a name.

```
\addmetakey{symdecl}{name}%

\newcommand\symdecl[2][]{%
  \ifcsdef{this@module}{%
    \metasetkeys{symdecl}{#1}%
    \ifcsvoid{symdecl@name}{\edef\symdecl@name{#2}}{}%
    \edef\symdef@uri{\module@uri\@QuestionMark\symdecl@name}%
    \ifcsvoid{\symdef@uri}{
      \ifcsvoid{module@names@\module@uri}{%
        \csxdef{module@names@\module@uri}{\symdecl@name}%
      }{%
        \csxdef{module@names@\module@uri}{\symdecl@name,%
          \csname module@names@\module@uri\endcsname}%
      }%
      \define@in@module\symdef@uri{\noexpand\@invoke@symbol{\symdef@uri}}%
      \define@in@module{#2}{\noexpand\@invoke@symbol{\symdef@uri}}%
    }{%
    % not compatible with circular dependencies, e.g. test/omdoc/07-modules/smstesta.tex
      \PackageWarning{stex}{symbol already defined: \symdef@uri}{%
        You need to pick a fresh name for your symbol%
      }%
      \define@in@module\symdef@uri{\noexpand\@invoke@symbol{\symdef@uri}}%
      \define@in@module{#2}{\noexpand\@invoke@symbol{\symdef@uri}}%
    }%
  }{%
    \PackageError{stex}{\detokenize{\symdecl} not in a module}{You need to be in a module%
    in order to declare a new symbol}
  }%
  \if@insymdef@\else\parsemodule@maybesetcodes\fi%
}
```

Test:
Module 2.7[foo]: \symdecl {bar}
Yields: macro:->\@invoke@symbol {file:///home/jazzpirate/work/Software/ext/sTeX/sty/stex-master?foo?bar}

2.5.1 Notations

\modules@getURIfromName This macro searches for the full URI given a symbol name and stores it in `\notation@uri`. Used by e.g. `\notation[...]{foo}{...}` to figure out what

symbol `foo` refers to:

```
\def\modules@getURIfromName#1{%
  % TODO check whether #1 is a URI
  \def\notation@uri{}%
  \def\modules@getURI@name{#1}%
  \ifcsvoid{this@module}{}{%
    \expandafter\modules@getURIfromModule\expandafter{\module@uri}%
    \ifx\notation@uri\@empty%
      \edef\modules@getURI@modules{\csname module@imports@\module@uri\endcsname}%
      \expandafter\@for\expandafter\@I\expandafter:\expandafter=\modules@getURI@modules\do{%
        \ifx\notation@uri\@empty%
          \expandafter\modules@getURIfromModule\expandafter{\@I}%
        \fi%
      }%
    \fi%
    \ifx\notation@uri\@empty%
      \def\notation@extract@uri@currcs{}%
      \notation@extracturifrommacro{#1}%
    \fi%
    \ifx\notation@uri\@empty%
      \PackageError{modules}{No symbol with name, URI or macroname \detokenize{#1} found!}{}%
    \fi%
  }%
}

\def\modules@getURIfromModule#1{%
  \edef\modules@getURI@names{\csname module@names@#1\endcsname}%
  \expandafter\@for\expandafter\@I\expandafter:\expandafter=%
  \modules@getURI@names\do{%
    \ifx\notation@uri\@empty%
      \ifx\@I\modules@getURI@name%
        \edef\notation@uri{#1\@QuestionMark\@I}%
      \fi%
    \fi%
  }%
}

% extracts the full URI from \foo or anything being \ifx-equal to \foo,
% by expanding until we reach \@invoke@symbol{<uri>}
\def\notation@extracturifrommacro#1{%
  \ifcsvoid{#1}{}{%
    \expandafter\let\expandafter\notation@extract@uri@nextcs\csname#1\endcsname%
    \ifx\notation@extract@uri@nextcs\notation@extract@uri@currcs\else%
      \let\notation@extract@uri@currcs\notation@extract@uri@nextcs%
      \expandafter\notation@extract@uriII\notation@extract@uri@nextcs\notation@end%
    \fi%
  }%
}
\long\def\notation@extract@uriII#1#2\notation@end{%
```

```
  \def\notation@extract@check@temp{#2}
  \ifx\@invoke@symbol#1%
    \edef\notation@uri{#2}%
  \else%
    \ifx\notation@extract@check@temp\@empty\else%
      \expandafter\def\expandafter\notation@extract@uri@nextcs\expandafter{#1{#2}}%
      \notation@extract@uri{notation@extract@uri@nextcs}%
    \fi%
  \fi%
}
```

`\notation` Adds a new notation to a symbol `foo`, as in: `\notation[lang=en,arity=0,variant=op]{foo}{...}` `\notation[variant=bar]{foo}[2]{...}` `\notation[args=aia,prec=500;50x49x51]{foo}{#1 bla #2` TODO with brackets, e.g. `\notation[withbrackets={\langle,\rangle}]{foo}{...}`

```
% parses the first two arguments:
\providerobustcmd\notation[2][]{%
  \edef\notation@first{#1}%
  \edef\notation@second{#2}%
  \notation@%
}

% parses the last two arguments
\newcommand\notation@[2][0]{%
  \edef\notation@donext{\noexpand\notation@@[\notation@first]%
    {\notation@second}[#1]}%
  \notation@donext{#2}%
}

% parses the notation arguments and wraps them in
% \notation@assoc and \notation@argprec for flexary arguments and precedences
\def\notation@@[#1]#2[#3]#4{%
  \modules@getURIfromName{#2}%
  \notation@parse@params{#1}{#3}
  \let\notation@curr@todo@args\notation@curr@args%
  \def\notation@temp@notation{}%
  \StrLen\notation@curr@args[\notation@temp@arity]%
  \expandafter\renewcommand\expandafter\notation@temp@notation%
    \expandafter[\notation@temp@arity]{#4}%
  % precedence
  \IfSubStr\notation@curr@precs;{%
    \StrCut\notation@curr@precs;\notation@curr@prec\notation@curr@precs%
    \ifx\notation@curr@prec\@empty\def\notation@curr@prec{0}\fi%
  }{%
    \ifx\notation@curr@precs\@empty%
      \ifnum\notation@temp@arity=0\relax%
        \edef\notation@curr@prec{\infprec}%
      \else%
        \def\notation@curr@prec{0}%
      \fi%
```

```
    \else%
      \edef\notation@curr@prec{\notation@curr@precs}%
      \def\notation@curr@precs{}%
    \fi%
  }%
  % arguments
  \def\notation@curr@extargs{}
  \def\notation@nextarg@index{1}%
  \notation@do@args%
}

% parses additional notation components for (associative) arguments
\def\notation@do@args{%
  \def\notation@nextarg@temp{}%
  \ifx\notation@curr@todo@args\@empty%
    \notation@after%
  \else%
    % argument precedence
    \IfSubStr\notation@curr@precs{x}{%
      \StrCut\notation@curr@precs{x}\notation@curr@argprec\notation@curr@precs%
    }{%
      \edef\notation@curr@argprec{\notation@curr@precs}%
      \def\notation@curr@precs{}%
    }%
    \ifx\notation@curr@argprec\@empty%
      \let\notation@curr@argprec\notation@curr@prec%
    \fi%
    \StrChar\notation@curr@todo@args1[\notation@argchar]%
    \StrGobbleLeft\notation@curr@todo@args1[\notation@curr@todo@args]%
    \expandafter\ifx\notation@argchar i%
      % normal argument
      \edef\notation@nextarg@temp{{\noexpand\notation@argprec{\notation@curr@argprec}{########\
      \edef\notation@nextarg@index{\the\numexpr\notation@nextarg@index+1 }
      \expandafter\g@addto@macro@safe\expandafter\notation@curr@extargs%
        \expandafter{\notation@nextarg@temp}%
      \expandafter\expandafter\expandafter\notation@do@args%
    \else%
      % associative argument
      \expandafter\expandafter\expandafter\notation@parse@assocarg%
    \fi%
  \fi%
}

\def\notation@parse@assocarg#1{%
  \edef\notation@nextarg@temp{{\noexpand\notation@argprec{\notation@curr@argprec}{\noexpand\nota
  \edef\notation@nextarg@index{\the\numexpr\notation@nextarg@index+1 }%
  \expandafter\g@addto@macro@safe\expandafter\notation@curr@extargs%
  \expandafter{\notation@nextarg@temp}%
  \notation@do@args%
}
```

```
885
886 \protected\def\safe@newcommand#1{%
887   \ifdefined#1\expandafter\renewcommand\else\expandafter\newcommand\fi#1%
888 }
889
890 % finally creates the actual macros
891 \def\notation@after{
892   \let\ex\expandafter%
893   \ex\ex\ex\def\ex\ex\ex\notation@temp@notation\ex\ex\ex%
894     {\ex\notation@temp@notation\notation@curr@extargs}%
895   \edef\notation@temp@notation{\noexpand\notation@symprec{\notation@curr@prec}{\ex\unexpanded\ex
896   \def\notation@temp@fragment{}%
897   \ifx\notation@curr@arity\@empty\else%
898     \edef\notation@temp@fragment{arity=\notation@curr@arity}
899   \fi%
900   \ifx\notation@curr@lang\@empty\else%
901     \ifx\notation@temp@fragment\@empty%
902       \edef\notation@temp@fragment{lang=\notation@curr@lang}%
903     \else%
904       \edef\notation@temp@fragment{\notation@temp@fragment\@Ampersand lang=\notation@curr@lang}%
905     \fi%
906   \fi%
907   \ifx\notation@curr@variant\@empty\else%
908     \ifx\notation@temp@fragment\@empty%
909       \edef\notation@temp@fragment{variant=\notation@curr@variant}%
910     \else%
911       \edef\notation@temp@fragment{\notation@temp@fragment\@Ampersand variant=\notation@curr@var
912     \fi%
913   \fi%
914   \edef\notation@csname{\notation@uri\@Fragment\notation@temp@fragment}%
915   \ifcsvoid{\notation@csname}{%
916     \ex\ex\ex\ex\ex\ex\ex\newcommand\ex\ex\ex\csname\ex\ex\ex\notation@csname%
917       \ex\ex\ex\endcsname\ex\ex\ex[\ex\notation@temp@arity\ex]%
918       \ex{\notation@temp@notation}%
919     \edef\symdecl@temps{%
920       \noexpand\safe@newcommand\ex\noexpand\csname\notation@csname\endcsname[\notation@temp@arit
921     }%
922     \ex\g@addto@macro@safe\csname module@defs@\module@uri\ex\endcsname\ex{\symdecl@temps}%
923     \ex\g@addto@macro@safe\csname module@defs@\module@uri\ex\endcsname\ex{\ex{\notation@temp@not
924   }{%
925     \PackageWarning{modules}{notation already defined: \notation@csname}{%
926       Choose a different set of notation options (variant,lang,arity)%
927     }%
928   }%
929   \parsemodule@maybesetcodes%
930 }
931
932 % parses optional parameters
933 \def\notation@parse@params#1#2{%
934   \def\notation@curr@precs{}%
```

```
  \def\notation@curr@args{}%
  \def\notation@curr@variant{}%
  \def\notation@curr@arity{}%
  \def\notation@curr@provided@arity{#2}
  \def\notation@curr@lang{}%
  \def\notation@options@temp{#1}
  \notation@parse@params@%
  \ifx\notation@curr@args\@empty%
    \ifx\notation@curr@provided@arity\@empty%
      \notation@num@to@ia\notation@curr@arity%
    \else%
      \notation@num@to@ia\notation@curr@provided@arity%
    \fi%
  \fi%
}
\def\notation@parse@params@{%
  \IfSubStr\notation@options@temp,{%
    \StrCut\notation@options@temp,\notation@option@temp\notation@options@temp%
    \notation@parse@param%
    \notation@parse@params@%
  }{\ifx\notation@options@temp\@empty\else%
    \let\notation@option@temp\notation@options@temp%
    \notation@parse@param%
  \fi}%
}

%parses an individual optional argument/key-value-pair
\def\notation@parse@param{%
  \trimstring\notation@option@temp%
  \ifx\notation@option@temp\@empty\else%
    \IfSubStr\notation@option@temp={%
      \StrCut\notation@option@temp=\notation@key\notation@value%
      \trimstring\notation@key%
      \trimstring\notation@value%
      \IfStrEq\notation@key{prec}{%
        \edef\notation@curr@precs{\notation@value}%
      }{%
      \IfStrEq\notation@key{args}{%
        \edef\notation@curr@args{\notation@value}%
      }{%
      \IfStrEq\notation@key{lang}{%
        \edef\notation@curr@lang{\notation@value}%
      }{%
      \IfStrEq\notation@key{variant}{%
        \edef\notation@curr@variant{\notation@value}%
      }{%
      \IfStrEq\notation@key{arity}{%
        \edef\notation@curr@arity{\notation@value}%
      }{%
      }}}}}%
```

```
    }{%
        \edef\notation@curr@variant{\notation@option@temp}%
    }%
  \fi%
}

% converts an integer to a string of 'i's, e.g. 3 => iii,
% and stores the result in \notation@curr@args
\def\notation@num@to@ia#1{%
  \IfInteger{#1}{
    \notation@num@to@ia@#1%
  }{%
    %
  }%
}
\def\notation@num@to@ia@#1{%
  \ifnum#1>0%
    \edef\notation@curr@args{\notation@curr@args i}%
    \expandafter\notation@num@to@ia@\expandafter{\the\numexpr#1-1\@Space}%
  \fi%
}
```

The following macros take care of precedences, parentheses/bracketing, associative (flexary) arguments etc. in presentation:

```
\def\notation@assoc#1#2{% function, argv
  \let\@tmpop=\relax% do not print the function the first time round
  \@for\@I:=#2\do{\@tmpop% print the function
    % write the i-th argument with locally updated precedence
    \@I%
    \def\@tmpop{#1}%
  }%
}%

\def\notation@lparen{(}
\def\notation@rparen{)}
\def\infprec{1000000}
\def\neginfprec{-\infprec}

\newcount\notation@downprec
\notation@downprec=\neginfprec

% patching displaymode
\newif\if@displaymode\@displaymodefalse
\expandafter\everydisplay\expandafter{\the\everydisplay\@displaymodetrue}
\let\old@displaystyle\displaystyle
\def\displaystyle{\old@displaystyle\@displaymodetrue}

\def\dobrackets#1{% avoiding groups at all costs to ensure \parray still works!
  \def\notation@innertmp{#1}%
  \let\ex\expandafter%
```

```
  \if@displaymode%
    \ex\ex\ex\left\ex\ex\ex\notation@lparen%
    \ex\notation@resetbrackets\ex\notation@innertmp%
    \ex\right\notation@rparen%
  \else%
    \ex\ex\ex\notation@lparen%
    \ex\notation@resetbrackets\ex\notation@innertmp%
    \notation@rparen%
  \fi%
}

\def\withbrackets#1#2#3{%
  \edef\notation@lparen{#1}%
  \edef\notation@rparen{#2}%
  #3%
  \notation@resetbrackets%
}

\def\notation@resetbrackets{%
  \def\notation@lparen{(}%
  \def\notation@rparen{)}%
}

\def\notation@symprec#1#2{%
  \ifnum#1>\notation@downprec\relax%
    \notation@resetbrackets#2%
  \else%
    \ifnum\notation@downprec=\infprec\relax%
      \notation@resetbrackets#2%
    \else
      \if@inparray@
        \notation@resetbrackets#2
      \else\dobrackets{#2}\fi%
  \fi\fi%
}

\newif\if@inparray@\@inparray@false

\def\notation@argprec#1#2{%
  \def\notation@innertmp{#2}
  \edef\notation@downprec@temp{\number#1}%
  \notation@downprec=\expandafter\notation@downprec@temp%
  \expandafter\relax\expandafter\notation@innertmp%
  \expandafter\notation@downprec\expandafter=\number\notation@downprec\relax%
}
```

`\@invoke@symbol` after `\symdecl{foo}`, `\foo` expands to `\@invoke@symbol{<uri>}`:

```
\protected\def\@invoke@symbol#1{%
  \def\@invoke@symbol@first{#1}%
  \symbol@args%
```

```
}
```

takes care of the optional notation-option-argument, and either invokes `\@invoke@symbol@math` for symbolic presentation or `\@invoke@symbol@text` for verbalization (TODO)

```
\newcommand\symbol@args[1][]{%
  \ifmmode\def\invoke@symbol@next{\@invoke@symbol@math\@invoke@symbol@first{#1}}%
  \else\def\invoke@symbol@next{\@invoke@symbol@text\@invoke@symbol@first{#1}}\fi%
  \invoke@symbol@next%
}
```

This finally gets called with both uri and notation-option, convenient for e.g. a LaTeXML binding:

```
\def\@invoke@symbol@math#1#2{%
  % #1: URI
  % #2: options
  % TODO \setnotation variants
  \notation@parse@params{#2}{}%
  \def\notation@temp@fragment{}%
  \ifx\notation@curr@arity\@empty\else%
    \edef\notation@temp@fragment{arity=\notation@curr@arity}%
  \fi%
  \ifx\notation@curr@lang\@empty\else%
    \ifx\notation@temp@fragment\@empty%
      \edef\notation@temp@fragment{lang=\notation@curr@lang}%
    \else%
      \edef\notation@temp@fragment{\notation@temp@fragment\@Ampersand lang=\notation@curr@lang}%
    \fi%
  \fi%
  \ifx\notation@curr@variant\@empty\else%
    \ifx\notation@temp@fragment\@empty%
      \edef\notation@temp@fragment{variant=\notation@curr@variant}%
    \else%
      \edef\notation@temp@fragment{\notation@temp@fragment\@Ampersand variant=\notation@curr@va
    \fi%
  \fi%
  \csname #1\@Fragment\notation@temp@fragment\endcsname%
}
```

TODO:

```
\def\@invoke@symbol@text#1#2{%
    % TODO
}
```

TODO: To set notational options (globally or locally) generically:

```
\def\setstexlang#1{%
  \def\stex@lang{#1}%
}%
\setstexlang{en}
\def\setstexvariant#1#2{%
```

```
  % TODO
}
\def\setstexvariants#1{%
  \def\stex@variants{#1}%
}
```

Test:

Module 2.8[FooBar]: \symdecl {barbar}
\notation [arity=0]{barbar}{\psi }
\notation [prec=50;\infprec]{barbar}[1]{\barbar [arity=0]\dobrackets {##1}}

\notation [arity=0,variant=cap]{barbar}{\Psi }
\notation [variant=cap]{barbar}[1]{\barbar [arity=0,variant=cap]\dobrackets {##1}}

$\barbar {A}$: $\psi(A)$
$\barbar [variant=cap]{A}$: $\Psi(A)$

\symdecl {plus}
\symdecl {times}
\symdecl {vara}
\symdecl {varb}
\symdecl {varc}
\symdecl {vard}
\symdecl {vare}
\notation {vara}{a}
\notation {varb}{b}
\notation {varc}{c}
\notation {vard}{d}
\notation {vare}{e}
\notation [prec=500;500,args=a]{plus}{\withbrackets \langle \rangle {##1}}{+}

\notation [prec=600;600,args=a]{times}{##1}{\cdot }

$\times {\frac \vara \varb ,\plus {\frac \vara {\frac \vara \varb },\times {\varc ,\plus {\vard ,\vare }}}}$:
$\frac{a}{b} \cdot (\frac{a}{\frac{a}{b}} + c \cdot (d + e))$

\[\times {\frac \vara \varb ,\plus {\frac \vara {\frac \vara \varb },\times {\varc ,\plus {\vard ,\vare }}}}\]:

$$\frac{a}{b} \cdot \left(\frac{a}{\frac{a}{b}} + c \cdot (d + e)\right)$$

2.6 sref

`\@sref@def` This macro stores the value of its last argument in a custom macro for reference.

```
\newcommand\@sref@def[3]{\csgdef{sref@#1@#2}{#3}}
```

The next step is to set up a file to which the references are written, this is normally the `.aux` file, but if the `extref` option is set, we have to use an `.ref` file.

```
\ifextrefs%
  \newwrite\refs@file%
\else%
  \def\refs@file{\@auxout}%
\fi%
```

`\sref@def` This macro writes an `\@sref@def` command to the current aux file and also executes it.

```
\newcommand\sref@def[3]{%
  \protected@write\refs@file{}{\string\@sref@def{#1}{#2}{#3}}%
}%
```

`\sref@label` The `\sref@label` macro writes a label definition to the auxfile.

```
\newcommand\sref@label[2]{%
  \sref@def{\ifcsundef{sref@part}{}{\sref@part @}#2}{page}{\thepage}%
  \sref@def{\ifcsundef{sref@part}{}{\sref@part @}#2}{label}{#1}%
}%
```

`\sreflabel` The `\sreflabel` macro is a semantic version of `\label`, it combines the categorization given in the first argument with LaTeX's `\@currentlabel`.

```
\newcommand\sreflabel[2]{\sref@label{#1 \@currentlabel}{#2}}
```

`\sref@label@id` The `\sref@label@id` writes a label definition for the current `\sref@id` if it is defined.

```
\def\sref@id{} % make sure that defined
\newcommand\sref@label@id[1]{%
  \ifx\sref@id\@empty%
    \relax%
  \else%
    \sref@label{#1}{\sref@id}%
  \fi%
}%
```

3 Things to deprecate

Module options:

```
\addmetakey*{module}{id} % TODO: deprecate properly
\addmetakey*{module}{load}
\addmetakey*{module}{path}
\addmetakey*{module}{dir}
```

```
\addmetakey*{module}{align}[WithTheModuleOfTheSameName]
\addmetakey*{module}{noalign}[true]

\newif\if@insymdef@\@insymdef@false
```

symdef:keys The optional argument local specifies the scope of the function to be defined. If local is not present as an optional argument then `\symdef` assumes the scope of the function is global and it will include it in the pool of macros of the current module. Otherwise, if local is present then the function will be defined only locally and it will not be added to the current module (i.e. we cannot inherit a local function). Note, the optional key local does not need a value: we write `\symdef[local]{somefunction}[0]{some expansion}`. The other keys are not used in the LaTeX part.

```
%\srefaddidkey{symdef}% what does this do?
\define@key{symdef}{local}[true]{\@symdeflocaltrue}%
\define@key{symdef}{noverb}[all]{}%
\define@key{symdef}{align}[WithTheSymbolOfTheSameName]{}%
\define@key{symdef}{specializes}{}%
\addmetakey*{symdef}{noalign}[true]
\define@key{symdef}{primary}[true]{}%
\define@key{symdef}{assocarg}{}%
\define@key{symdef}{bvars}{}%
\define@key{symdef}{bargs}{}%
\addmetakey{symdef}{lang}%
\addmetakey{symdef}{prec}%
\addmetakey{symdef}{arity}%
\addmetakey{symdef}{variant}%
\addmetakey{symdef}{ns}%
\addmetakey{symdef}{args}%
\addmetakey{symdef}{name}%
\addmetakey*{symdef}{title}%
\addmetakey*{symdef}{description}%
\addmetakey{symdef}{subject}%
\addmetakey*{symdef}{display}%
```

EdN:1 [1]

\symdef The the `\symdef`, and `\@symdef` macros just handle optional arguments.

```
\def\symdef{\@ifnextchar[{\@symdef}{\@symdef[]}}%
\def\@symdef[#1]#2{\@ifnextchar[{\@@symdef[#1]{#2}}{\@@symdef[#1]{#2}[0]}}%
```

\@@symdef now comes the real meat: the `\@@symdef` macro does two things, it adds the macro definition to the macro definition pool of the current module and also provides it.

```
\def\@@symdef[#1]#2[#3]{%
  \@insymdef@true%
  \metasetkeys{symdef}{#1}%
  \edef\symdef@tmp@optpars{\ifcsvoid{symdef@name}{[]}{[name=\symdef@name]}}%
```

[1] EdNote: MK@MK: we need to document the binder keys above.

```
  \expandafter\symdecl\symdef@tmp@optpars{#2}%
  \@insymdef@false%
  \notation[#1]{#2}[#3]%
}% mod@show
\def\symdef@type{Symbol}%
\providecommand{\stDMemph}[1]{\textbf{#1}}
```

\symvariant `\symvariant{`⟨*sym*⟩`}[`⟨*args*⟩`]{`⟨*var*⟩`}{`⟨*cseq*⟩`}` just extends the internal macro `\modules@`⟨*sym*⟩`@pres@` defined by `\symdef{`⟨*sym*⟩`}[`⟨*args*⟩`]{...}` with a variant `\modules@`⟨*sym*⟩`@pres@`⟨*var*⟩ which expands to ⟨*cseq*⟩. Recall that this is called by the macro `\`⟨*sym*⟩`[`⟨*var*⟩`]` induced by the `\symdef`.

```
\def\symvariant#1{%
  \@ifnextchar[{\@symvariant{#1}}{\@symvariant{#1}[0]}%
  }%
\def\@symvariant#1[#2]#3#4{%
  \notation[#3]{#1}[#2]{#4}%
\ignorespacesandpars}%
```