

Babel

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The standard distribution of \LaTeX contains a number of document classes that are meant to be used, but also serve as examples for other users to create their own document classes. These document classes have become very popular among \LaTeX users. But it should be kept in mind that they were designed for American tastes and typography. At one time they even contained a number of hard-wired texts.

This manual describes babel, a package that makes use of the capabilities of \TeX version 3 and, to some extent, xetex and luatex, to provide an environment in which documents can be typeset in a language other than US English, or in more than one language or script.

Current development is focused on Unicode engines (Xe \TeX and Lua \TeX). New features related to font selection, bidi writing and the like will be added incrementally, but you may use babel for many languages.

Currently babel provides support (total or partial) for about 200 languages, either as a package option or as an `ini` file. Furthermore, new languages can be created from scratch easily.

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Part I

User guide

This user guide focuses on \LaTeX . There are also some notes on its use with Plain \TeX .

1 The user interface

1.1 Monolingual documents

In most cases, a single language is required, and then all you need in \LaTeX is to load the package using its standard mechanism for this purpose, namely, passing that language as an optional argument. In addition, you may want to set the font and input encodings.

EXAMPLE Here is a simple full example. The packages `fontenc` and `inputenc` do not belong to `babel`, but they are included in the example because typically you will need them:

```
\documentclass{article}

\usepackage[T1]{fontenc}
\usepackage[utf8]{inputenc}

\usepackage[french]{babel}

\begin{document}

Plus ça change, plus c'est la même chose!

\end{document}
```

WARNING A common source of trouble is a wrong setting of the input encoding. Make sure you set the encoding actually used by your editor.

Another approach is making the language (french in the example) a global option in order to let other packages detect and use it:

```
\documentclass[french]{article}
\usepackage{babel}
\usepackage{varioref}
```

In this last example, the package `varioref` will also see the option and will be able to use it.

NOTE Because of the way `babel` has evolved, “language” can refer to (1) a set of hyphenation patterns as preloaded into the format, (2) a package option, (3) an `\ldf` file, and (4) a name used in the document to select a language or dialect. So, a package option refers to a language in a generic way – sometimes it is the actual language name used to select it, sometimes it is a file name loading a language with a different name, sometimes it is a file name loading several languages. Please, read the documentation for specific languages for further info.

1.2 Multilingual documents

In multilingual documents, just use several options. The last one is considered the main language, activated by default. Sometimes, the main language changes the document layout (eg, spanish and french).

EXAMPLE In \LaTeX , the preamble of the document:

```
\documentclass{article}
\usepackage[dutch,english]{babel}
```

would tell \LaTeX that the document would be written in two languages, Dutch and English, and that English would be the first language in use, and the main one.

You can also set the main language explicitly:

```
\documentclass{article}
\usepackage[main=english,dutch]{babel}
```

WARNING Languages may be set as global and as package option at the same time, but in such a case you should set explicitly the main language with the package option `main`:

```
\documentclass[italian]{book}
\usepackage[ngerman,main=italian]{babel}
```

WARNING In the preamble the main language has *not* been selected, except hyphenation patterns and the name assigned to `\language` (in particular, shorthands, captions and date are not activated). If you need to define boxes and the like in the preamble, you might want to use some of the language selectors described below.

To switch the language there are two basic macros, described below in detail: `\selectlanguage` is used for blocks of text, while `\foreignlanguage` is for chunks of text inside paragraphs.

EXAMPLE A full bilingual document follows. The main language is french, which is activated when the document begins.

```
\documentclass{article}

\usepackage[T1]{fontenc}
\usepackage[utf8]{inputenc}

\usepackage[english,french]{babel}

\begin{document}

Plus ça change, plus c'est la même chose!

\selectlanguage{english}

And an English paragraph, with a short text in
\foreignlanguage{french}{français}.

\end{document}
```

1.3 Modifiers

New 3.9c The basic behaviour of some languages can be modified when loading `babel` by means of *modifiers*. They are set after the language name, and are prefixed with a dot (only when the language is set as package option – neither global options nor the main key accept them). An example is (spaces are not significant and they can be added or removed):¹

```
\usepackage[latin.medieval, spanish.notilde.lcroman, danish]{babel}
```

Attributes (described below) are considered modifiers, ie, you can set an attribute by including it in the list of modifiers. However, `modifiers` is a more general mechanism.

1.4 xelatex and luatex

Many languages are compatible with `xetex` and `luatex`. With them you can use `babel` to localize the documents, but an advanced interface to handle fonts is still under development (among other things, language and script will be set by `babel`). The Latin script is covered by default in current \LaTeX (provided the document encoding is UTF-8), because the font loader is preloaded and the font is switched to `lmroman`. Other scripts require loading `fontspec`.

EXAMPLE The following bilingual, single script document in UTF-8 encoding just prints a couple of ‘captions’ and `\today` in Danish and Vietnamese. No additional packages are required.

```
\documentclass{article}

\usepackage[vietnamese,danish]{babel}

\begin{document}

\prefacename{} -- \alsoname{} -- \today

\selectlanguage{vietnamese}

\prefacename{} -- \alsoname{} -- \today

\end{document}
```

EXAMPLE Here is a simple monolingual document in Russian (text from the Wikipedia). Note neither `fontenc` nor `inputenc` are necessary, but the document should be encoded in UTF-8 and a so-called Unicode font must be loaded with `fontspec`.

```
\documentclass{article}

\usepackage[russian]{babel}

\usepackage{fontspec}
\setmainfont[Language=Russian,Script=Cyrillic]{DejaVu Serif}

\begin{document}
```

¹No predefined “axis” for modifiers are provided because languages and their scripts have quite different needs.

```
Россия, находящаяся на пересечении множества культур, а также с учётом многонационального характера её населения, – отличается высокой степенью этнокультурного многообразия и способностью к межкультурному диалогу.
```

```
\end{document}
```

1.5 Troubleshooting

- Loading directly sty files in L^AT_EX (ie, `\usepackage{<language>}`) is deprecated and you will get the error:²

```
! Package babel Error: You are loading directly a language style.
(babel)                This syntax is deprecated and you must use
(babel)                \usepackage[language]{babel}.
```

- Another typical error when using babel is the following:³

```
! Package babel Error: Unknown language `LANG'. Either you have misspelled
(babel)                its name, it has not been installed, or you requested
(babel)                it in a previous run. Fix its name, install it or just
(babel)                rerun the file, respectively
```

The most frequent reason is, by far, the latest (for example, you included spanish, but you realized this language is not used after all, and therefore you removed it from the option list). In most cases, the error vanishes when the document is typeset again, but in more severe ones you will need to remove the aux file.

- The following warning is about hyphenation patterns and it is not under the direct control of babel:

```
Package babel Warning: No hyphenation patterns were preloaded for
(babel)                the language `LANG' into the format.
(babel)                Please, configure your TeX system to add them and
(babel)                rebuild the format. Now I will use the patterns
(babel)                preloaded for \language=0 instead on input line 57.
```

The document will be typeset, but very likely the text will not be correctly hyphenated. Some languages may be raising this warning wrongly (because they are not hyphenated); it is a bug to be fixed – just ignore it. See the manual of your distribution (MacT_EX, MikT_EX, T_EXLive, etc.) for further info about how to configure it.

1.6 Plain

In Plain, load languages styles with `\input` and then use `\begindocument` (the latter is defined by babel):

```
\input estonian.sty
\begindocument
```

Note not all languages provide a sty file and some of them are not compatible with Plain.⁴

²In old versions the error read “You have used an old interface to call babel”, not very helpful.

³In old versions the error read “You haven’t loaded the language LANG yet”.

⁴Even in the babel kernel there were some macros not compatible with plain. Hopefully these issues will be fixed soon.

1.7 Basic language selectors

This section describes the commands to be used in the document to switch the language in multilingual document. In most cases, only the two basic macros `\selectlanguage` and `\foreignlanguage` are necessary. The environments `otherlanguage`, `otherlanguage*` and `hyphenrules` are auxiliary, and described in the next section.

The main language is selected automatically when the document environment begins.

`\selectlanguage` $\langle language \rangle$

When a user wants to switch from one language to another he can do so using the macro `\selectlanguage`. This macro takes the language, defined previously by a language definition file, as its argument. It calls several macros that should be defined in the language definition files to activate the special definitions for the language chosen:

```
\selectlanguage{german}
```

This command can be used as environment, too.

NOTE For “historical reasons”, a macro name is converted to a language name without the leading `\`; in other words, `\selectlanguage{\german}` is equivalent to `\selectlanguage{german}`. Using a macro instead of a “real” name is deprecated.

WARNING If used inside braces there might be some non-local changes, as this would be roughly equivalent to:

```
{\selectlanguage{<inner-language>} ...}\selectlanguage{<outer-language>}
```

If you want a change which is really local, you must enclose this code with an additional grouping level.

`\foreignlanguage` $\langle language \rangle \langle text \rangle$

The command `\foreignlanguage` takes two arguments; the second argument is a phrase to be typeset according to the rules of the language named in its first one. This command (1) only switches the extra definitions and the hyphenation rules for the language, *not* the names and dates, (2) does not send information about the language to auxiliary files (i.e., the surrounding language is still in force), and (3) it works even if the language has not been set as package option (but in such a case it only sets the hyphenation patterns and a warning is shown).

1.8 Auxiliary language selectors

`\begin{otherlanguage}` $\langle language \rangle$... `\end{otherlanguage}`

The environment `otherlanguage` does basically the same as `\selectlanguage`, except the language change is (mostly) local to the environment. Actually, there might be some non-local changes, as this environment is roughly equivalent to:

```
\begingroup  
\selectlanguage{<inner-language>}
```

```
...
\endgroup
\selectlanguage{<outer-language>}
```

If you want a change which is really local, you must enclose this environment with an additional grouping, like braces {}.

Spaces after the environment are ignored.

`\begin{otherlanguage*}` {<language>} ... `\end{otherlanguage*}`

Same as `\foreignlanguage` but as environment. Spaces after the environment are *not* ignored.

This environment was originally intended for intermixing left-to-right typesetting with right-to-left typesetting in engines not supporting a change in the writing direction inside a line. However, by default it never complied with the documented behaviour and it is just a version as environment of `\foreignlanguage`.

`\begin{hyphenrules}` {<language>} ... `\end{hyphenrules}`

The environment `hyphenrules` can be used to select *only* the hyphenation rules to be used (it can be used as command, too). This can for instance be used to select 'nohyphenation', provided that in `language.dat` the 'language' nohyphenation is defined by loading `zerohyph.tex`. It deactivates language shorthands, too (but not user shorthands).

Except for these simple uses, `hyphenrules` is discouraged and `otherlanguage*` (the starred version) is preferred, as the former does not take into account possible changes in encodings of characters like, say, ' done by some languages (eg, italian, french, ukraineb). To set hyphenation exceptions, use `\babelhyphenation` (see below).

1.9 More on selection

`\babeltags` {<tag1> = <language1>, <tag2> = <language2>, ...}

New 3.9i In multilingual documents with many language switches the commands above can be cumbersome. With this tool shorter names can be defined. It adds nothing really new – it is just syntactical sugar.

It defines `\text<tag1>{<text>}` to be `\foreignlanguage{<language1>}{<text>}`, and `\begin{<tag1>}` to be `\begin{otherlanguage*}{<language1>}`, and so on. Note `\<tag1>` is also allowed, but remember to set it locally inside a group.

EXAMPLE With

```
\babeltags{de = german}
```

you can write

```
text \textde{German text} text
```

and

```
text
\begin{de}
  German text
\end{de}
text
```

NOTE Something like `\babeltags{finnish = finnish}` is legitimate - it defines `\textfinnish` and `\finnish` (and, of course, `\begin{finnish}`).

`\babelensure` `[include=<commands>,exclude=<commands>,fontenc=<encoding>]{<language>}`

New 3.9i Except in a few languages, like Russian, captions and dates are just strings, and do not switch the language. That means you should set it explicitly if you want to use them, or hyphenation (and in some cases the text itself will be wrong. For example:

```
\foreignlanguage{russian}{text \foreignlanguage{polish}{\seename} text}
```

Of course, T_EX can do it for you. To avoid switching the language all the while, `\babelensure` redefines the captions for a given language to wrap them with a selector:

```
\babelensure{polish}
```

By default only the basic captions and `\today` are redefined, but you can add further macros with the key `include` in the optional argument (without commas). Macros not to be modified are listed in `exclude`. You can also enforce a font encoding with `fontenc`.⁵ A couple of examples:

```
\babelensure[include=\Today]{spanish}  
\babelensure[fontenc=T5]{vietnamese}
```

They are activated when the language is selected (at the `afterextras` event), and it makes some assumptions which could not be fulfilled in some languages. Note also you should include only macros defined by the language, not global macros (eg, `\TeX` of `\dag`).

1.10 Getting the current language name

`\language` The control sequence `\language` contains the name of the current language.

WARNING Due to some internal inconsistencies in catcodes it should *not* be used to test its value. Use `iflang`, by Heiko Oberdiek.

`\iflanguage` `{<language>}{<true>}{<false>}`

If more than one language is used, it might be necessary to know which language is active at a specific time. This can be checked by a call to `\iflanguage`, but note here “language” is used in the T_EX sense, as a set of hyphenation patterns, and *not* as its babel name. This macro takes three arguments. The first argument is the name of a language; the second and third arguments are the actions to take if the result of the test is true or false respectively.

WARNING The advice about `\language` also applies here - use `iflang` instead of `\iflanguage` if possible.

⁵With it encoded string may not work as expected.

1.11 Selecting scripts

Currently babel provides no standard interface to select scripts, because they are best selected with either `\fontencoding` (low level) or a language name (high level). Even the Latin script may require different encodings (ie, sets of glyphs) depending on the language, and therefore such a switch would be in a sense incomplete.⁶

Some languages sharing the same script define macros to switch it (eg, `\textcyrillic`), but be aware they may also set the language to a certain default. Even the babel core defined `\textlatin`, but it was somewhat buggy because in some cases it messed up encodings and fonts (for example, if the main latin encoding was LY1), and therefore it has been deprecated.⁷

No macros to select the writing direction are provided, either - writing direction is intrinsic to each script and therefore it is best set by the language (which could be a dummy one). Furthermore, there are in fact two right-to-left modes, depending on the language, which differ in the way ‘weak’ numeric characters are ordered (Arabic %123 vs Hebrew 123%).

`\ensureascii` `{\text}`

New 3.9i This macro makes sure `\text` is typeset with a LICR-savvy encoding in the ASCII range. It is used to redefine `\TeX` and `\LaTeX` so that they are correctly typeset even with LGR or X2 (the complete list is stored in `\BabelNonASCII`, which by default is LGR, X2, OT2, OT3, OT6, LHE, LWN, LMA, LMC, LMS, LMU, but you can modify it). So, in some sense it fixes the bug described in the previous paragraph.

If non-ASCII encodings are not loaded (or no encoding at all), it is no-op (also `\TeX` and `\LaTeX` are not redefined); otherwise, `\ensureascii` switches to the encoding at the beginning of the document if ASCII-savvy, or else the last ASCII-savvy encoding loaded. For example, if you load LY1, LGR, then it is set to LY1, but if you load LY1, T2A it is set to T2A. The symbol encodings TS1, T3, and TS3 are not taken into account, since they are not used for “ordinary” text.

The foregoing rules (which are applied “at begin document”) cover most of cases. No assumption is made on characters above 127, which may not follow the LICR conventions - the goal is just to ensure most of the ASCII letters and symbols are the right ones.

1.12 Shorthands

A *shorthand* is a sequence of one or two characters that expands to arbitrary \TeX code.

Shorthands can be used for different kinds of things, as for example: (1) in some languages shorthands such as “a” are defined to be able to hyphenate the word if the encoding is OT1; (2) in some languages shorthands such as “!” are used to insert the right amount of white space; (3) several kinds of discretionaries and breaks can be inserted easily with “-”, “=”, etc.

The package `inputenc` as well as `xetex` and `luatex` have alleviated entering non-ASCII characters, but minority languages and some kinds of text can still require characters not directly available on the keyboards (and sometimes not even as separated or precomposed Unicode characters). As to the point 2, now `pdfTeX` provides `\knbcode`, and `luatex` can manipulate the glyph list. Tools for point 3 can be still very useful in general.

⁶The so-called Unicode fonts do not improve the situation either. So, a font suited for Vietnamese is not necessarily suited for, say, the romanization of Indic languages, and the fact it contains glyphs for Modern Greek does not mean it includes them for Classic Greek. As to directionality, it poses special challenges because it also affects individual characters and layout elements.

⁷But still defined for backwards compatibility.

There are three levels of shorthands: *user*, *language*, and *system* (by order of precedence). Version 3.9 introduces the *language user* level on top of the user level, as described below. In most cases, you will use only shorthands provided by languages.

Please, note the following:

1. Activated chars used for two-char shorthands cannot be followed by a closing brace } and the spaces following are gobbled. With one-char shorthands (eg, :), they are preserved.
2. If on a certain level (system, language, user) there is a one-char shorthand, two-char ones starting with that char and on the same level are ignored.
3. Since they are active, a shorthand cannot contain the same character in its definition (except if it is deactivated with, eg, string).

A typical error when using shorthands is the following:

```
! Argument of \language@active@arg" has an extra }.
```

It means there is a closing brace just after a shorthand, which is not allowed (eg, "). Just add {} after (eg, "{}}).

`\shorthandon` `{\shorthands-list}`
`\shorthandoff` `*{\shorthands-list}`

It is sometimes necessary to switch a shorthand character off temporarily, because it must be used in an entirely different way. For this purpose, the user commands `\shorthandoff` and `\shorthandon` are provided. They each take a list of characters as their arguments.

The command `\shorthandoff` sets the `\catcode` for each of the characters in its argument to other (12); the command `\shorthandon` sets the `\catcode` to active (13). Both commands only work on 'known' shorthand characters. If a character is not known to be a shorthand character its category code will be left unchanged.

New 3.9a However, `\shorthandoff` does not behave as you would expect with characters like ~ or ^, because they usually are not "other". For them `\shorthandoff*` is provided, so that with

```
\shorthandoff*{~^}
```

~ is still active, very likely with the meaning of a non-breaking space, and ^ is the superscript character. The catcodes used are those when the shorthands are defined, usually when language files are loaded.

`\usesshorthands` `*{\char}`

The command `\usesshorthands` initiates the definition of user-defined shorthand sequences. It has one argument, the character that starts these personal shorthands.

New 3.9a User shorthands are not always alive, as they may be deactivated by languages (for example, if you use " for your user shorthands and switch from german to french, they stop working). Therefore, a starred version `\usesshorthands*{\char}` is provided, which makes sure shorthands are always activated.

Currently, if the package option `shorthands` is used, you must include any character to be activated with `\usesshorthands`. This restriction will be lifted in a future release.

`\defineshorthand` [*⟨language⟩*, *⟨language⟩*, ...] {*⟨shorthand⟩*} {*⟨code⟩*}

The command `\defineshorthand` takes two arguments: the first is a one- or two-character shorthand sequence, and the second is the code the shorthand should expand to.

New 3.9a An optional argument allows to (re)define language and system shorthands (some languages do not activate shorthands, so you may want to add `\languageshorthands{⟨lang⟩}` to the corresponding `\extras{⟨lang⟩}`). By default, user shorthands are (re)defined.

User shorthands override language ones, which in turn override system shorthands. Language-dependent user shorthands (new in 3.9) take precedence over “normal” user shorthands.

EXAMPLE Let’s assume you want a unified set of shorthand for discretionary hyphens (languages do not define shorthands consistently, and “-”, “\”, “=” have different meanings). You could start with, say:

```
\usesshorthands*{"}
\defineshorthand{"*"}{\babelhyphen{soft}}
\defineshorthand{"-"}{\babelhyphen{hard}}
```

However, behaviour of hyphens is language dependent. For example, in languages like Polish and Portuguese, a hard hyphen inside compound words are repeated at the beginning of the next line. You could then set:

```
\defineshorthand[*polish,*portugese]{"-"}{\babelhyphen{repeat}}
```

Here, options with `*` set a language-dependent user shorthand, which means the generic one above only applies for the rest of languages; without `*` they would (re)define the language shorthands instead, which are overridden by user ones.

Now, you have a single unified shorthand (“-”), with a content-based meaning (‘compound word hyphen’) whose visual behavior is that expected in each context.

`\aliasshorthand` {*⟨original⟩*} {*⟨alias⟩*}

The command `\aliasshorthand` can be used to let another character perform the same functions as the default shorthand character. If one prefers for example to use the character `/` over `"` in typing Polish texts, this can be achieved by entering `\aliasshorthand{"}{/}`. *Please note* the substitute character must *not* have been declared before as shorthand (in such case, `\usesshorthands` is ignored).

The following example shows how to replace a shorthand by another

```
\aliasshorthand{~}{^}
\AtBeginDocument{\shorthandoff*{~}}
```

However, shorthands remember somehow the original character, and the fallback value is that of the latter. So, in this example, if no shorthand is found, `^` expands to a non-breaking space, because this is the value of `~` (internally, `^` calls `\active@char~` or `\normal@char~`). Furthermore, if you change the system value of `^` with `\defineshorthand` nothing happens.

`\languageshorthands` {*⟨language⟩*}

The command `\languageshorthands` can be used to switch the shorthands on the language level. It takes one argument, the name of a language or none (the latter

does what its name suggests).⁸ Note that for this to work the language should have been specified as an option when loading the babel package. For example, you can use in english the shorthands defined by ngerman with

```
\addto\extrasenglish{\languageshorthands{ngerman}}
```

(You may also need to activate them with, for example, \usesshorthands.) Very often, this is a more convenient way to deactivate shorthands than \shorthandoff, as for example if you want to define a macro to easy typing phonetic characters with tipa:

```
\newcommand{\myipa}[1]{\{\languageshorthands{none}\tipaencoding#1}}
```

`\babelshorthand` $\langle shorthand \rangle$

With this command you can use a shorthand even if (1) not activated in shorthands (in this case only shorthands for the current language are taken into account, ie, not user shorthands), (2) turned off with \shorthandoff or (3) deactivated with the internal \bbl@deactivate; for example, \babelshorthand{"u} or \babelshorthand{:}. (You can conveniently define your own macros, or even you own user shorthands provided they do not overlap.)

For your records, here is a list of shorthands, but you must double check them, as they may change:⁹

Languages with no shorthands Croatian, English (any variety), Indonesian, Hebrew, Interlingua, Irish, Lower Sorbian, Malaysian, North Sami, Romanian, Scottish, Welsh

Languages with only " as defined shorthand character Albanian, Bulgarian, Danish, Dutch, Finnish, German (old and new orthography, also Austrian), Icelandic, Italian, Norwegian, Polish, Portuguese (also Brazilian), Russian, Serbian (with Latin script), Slovene, Swedish, Ukrainian, Upper Sorbian

Basque " ' ~
Breton : ; ? !
Catalan " ' ` ^
Czech " -
Esperanto ^
Estonian " ~
French (all varieties) : ; ? !
Galician " . ' ~ < >
Greek ~
Hungarian ` ^
Kurmanji ^
Latin " ^ =
Slovak " ^ ' -
Spanish " . < > '
Turkish : ! =

In addition, the babel core declares ~ as a one-char shorthand which is let, like the standard ~, to a non breaking space.¹⁰

⁸Actually, any name not corresponding to a language group does the same as none. However, follow this convention because it might be enforced in future releases of babel to catch possible errors.

⁹Thanks to Enrico Gregorio

¹⁰This declaration serves to nothing, but it is preserved for backward compatibility.

1.13 Package options

New 3.9a These package options are processed before language options, so that they are taken into account irrespective of its order. The first three options have been available in previous versions.

KeepShorthandsActive Tells babel not to deactivate shorthands after loading a language file, so that they are also available in the preamble.

activeacute For some languages babel supports this options to set ' as a shorthand in case it is not done by default.

activegrave Same for `.

shorthands= $\langle char \rangle \langle char \rangle \dots$ | off

The only language shorthands activated are those given, like, eg:

```
\usepackage[esperanto,french,shorthands=;?!]{babel}
```

If ' is included, activeacute is set; if ` is included, activegrave is set. Active characters (like ~) should be preceded by `\string` (otherwise they will be expanded by \LaTeX before they are passed to the package and therefore they will not be recognized); however, `t` is provided for the common case of ~ (as well as `c` for not so common case of the comma).

With `shorthands=off` no language shorthands are defined, As some languages use this mechanism for tools not available otherwise, a macro `\babelshorthand` is defined, which allows using them; see above.

safe= none | ref | bib

Some \LaTeX macros are redefined so that using shorthands is safe. With `safe=bib` only `\nocite`, `\bibcite` and `\bibitem` are redefined. With `safe=ref` only `\newlabel`, `\ref` and `\pageref` are redefined (as well as a few macros from `varioref` and `ifthen`). With `safe=none` no macro is redefined. This option is strongly recommended, because a good deal of incompatibilities and errors are related to these redefinitions - of course, in such a case you cannot use shorthands in these macros, but this is not a real problem (just use "allowed" characters).

math= active | normal

Shorthands are mainly intended for text, not for math. By setting this option with the value `normal` they are deactivated in math mode (default is `active`) and things like `#{a'}` (a closing brace after a shorthand) are not a source of trouble any more.

config= $\langle file \rangle$

Load $\langle file \rangle$.`cfg` instead of the default config file `bblopts.cfg` (the file is loaded even with `noconfigs`).

main= $\langle language \rangle$

Sets the main language, as explained above, ie, this language is always loaded last. If it is not given as package or global option, it is added to the list of requested languages.

- headfoot=** $\langle language \rangle$
 By default, headlines and footlines are not touched (only marks), and if they contain language dependent macros (which is not usual) there may be unexpected results. With this option you may set the language in heads and foots.
- noconfigs** Global and language default config files are not loaded, so you can make sure your document is not spoilt by an unexpected .cfg file. However, if the key config is set, this file is loaded.
- showlanguages** Prints to the log the list of languages loaded when the format was created: number (remember dialects can share it), name, hyphenation file and exceptions file.
- nocase** New 3.9l Language settings for uppercase and lowercase mapping (as set by `\SetCase`) are ignored. Use only if there are incompatibilities with other packages.
- silent** New 3.9l No warnings and no *infos* are written to the log file.¹¹
- strings=** generic | unicode | encoded | $\langle label \rangle$ | $\langle font encoding \rangle$
 Selects the encoding of strings in languages supporting this feature. Predefined labels are generic (for traditional T_EX, LICR and ASCII strings), unicode (for engines like xetex and luatex) and encoded (for special cases requiring mixed encodings). Other allowed values are font encoding codes (T1, T2A, LGR, L7X...), but only in languages supporting them. Be aware with encoded captions are protected, but they work in `\MakeUppercase` and the like (this feature misuses some internal L^AT_EX tools, so use it only as a last resort).
- hyphenmap=** off | main | select | other | other*
New 3.9g Sets the behaviour of case mapping for hyphenation, provided the language defines it.¹² It can take the following values:
off deactivates this feature and no case mapping is applied;
first sets it at the first switching commands in the current or parent scope (typically, when the aux file is first read and at `\begin{document}`), but also the first `\selectlanguage` in the preamble), and it's the default if a single language option has been stated;¹³
select sets it only at `\selectlanguage`;
other also sets it at `otherlanguage`;
other* also sets it at `otherlanguage*` as well as in heads and foots (if the option `headfoot` is used) and in auxiliary files (ie, at `\select@language`), and it's the default if several language options have been stated. The option `first` can be regarded as an optimized version of `other*` for monolingual documents.¹⁴

1.14 The base option

With this package option `babel` just loads some basic macros (those in `switch.def`), defines `\AfterBabelLanguage` and exits. It also selects the hyphenations patterns

¹¹You can use alternatively the package `silence`.

¹²Turned off in plain.

¹³Duplicated options count as several ones.

¹⁴Providing `foreign` is pointless, because the case mapping applied is that at the end of paragraph, but if either `xetex` or `luatex` change this behaviour it might be added. On the other hand, `other` is provided even if I [JBL] think it isn't really useful, but who knows.

for the last language passed as option (by its name in `language.dat`). There are two main uses: classes and packages, and as a last resort in case there are, for some reason, incompatible languages. It can be used if you just want to select the hyphenations patterns of a single language, too.

`\AfterBabelLanguage` $\langle\textit{option-name}\rangle\{\langle\textit{code}\rangle\}$

This command is currently the only provided by base. Executes $\langle\textit{code}\rangle$ when the file loaded by the corresponding package option is finished (at `\ldf@finish`). The setting is global. So

```
\AfterBabelLanguage{french}{...}
```

does ... at the end of `french.ldf`. It can be used in `ldf` files, too, but in such a case the code is executed only if $\langle\textit{option-name}\rangle$ is the same as `\CurrentOption` (which could not be the same as the option name as set in `\usepackage!`).

EXAMPLE Consider two languages `foo` and `bar` defining the same `\macro` with `\newcommand`. An error is raised if you attempt to load both. Here is a way to overcome this problem:

```
\usepackage[base]{babel}
\AfterBabelLanguage{foo}{%
  \let\macroFoo\macro
  \let\macro\relax}
\usepackage[foo,bar]{babel}
```

1.15 Creating a language

New 3.10 And what if there is no style for your language or none fits your needs? You may then define quickly a language with the help of the following macro in the preamble.

`\babelprovide` $[\langle\textit{options}\rangle]\{\langle\textit{language-name}\rangle\}$

Defines the internal structure of the language with some defaults: the hyphen rules, if not available, are set to the current ones, left and right hyphen mins are set to 2 and 3, but captions and date are not defined. Conveniently, `babel` warns you about what to do. Very likely you will find alerts like that in the `log` file:

```
Package babel Warning: \mylangchaptername not set. Please, define
(babel)                it in the preamble with something like:
(babel)                \renewcommand\mylangchaptername{..}
(babel)                Reported on input line 18.
```

In most cases, you will only need to define a few macros.

EXAMPLE If you need a language named `arhinish`:

```
\usepackage[danish]{babel}
\babelprovide{arhinish}
\renewcommand\arhinishchaptername{Chapitula}
\renewcommand\arhinishrefname{Refirenke}
\renewcommand\arhinishhyphenmins{22}
```

The main language is not changed (`danish` in this example). So, you must add `\selectlanguage{arhinish}` or other selectors where necessary. If the language has been loaded as an argument in `\documentclass` or `\usepackage`, then `\babelprovide` redefines the requested data.

import= \langle language-tag \rangle

New 3.13 Imports data from an ini file, including captions, date, and hyphenmins. For example:

```
\babelprovide[import=hu]{hungarian}
```

Unicode engines load the UTF-8 variants, while 8-bit engines load the LICR (ie, with macros like \' or \ss) ones.

There are about 200 ini files, with data taken from the ldf files and the CLDR provided by Unicode. Not all languages in the latter are complete, and therefore neither are the ini files. A few languages will show a warning about the current lack of suitability of the date format (hindi, french, breton, and occitan).

Besides \today, there is a \langle language \rangle date macro with three arguments: year, month and day numbers. In fact, \today calls \langle language \rangle today which in turn calls \langle language \rangle date{\year}{\month}{\day}.

Encoding, font, fontspec language and script, writing direction, etc., are not touched at all. They will be loaded in the future and used in a forthcoming set of tools to set the language fonts.

captions= \langle language-tag \rangle

Loads only the strings. For example:

```
\babelprovide[captions=hu]{hungarian}
```

Encoding, font, fontspec language and script, writing direction, etc., are not touched at all.

hyphenrules= \langle language-list \rangle

With this option, with a space-separated list of hyphenation rules, babel assigns to the language the first valid hyphenation rules in the list. For example:

```
\babelprovide[hyphenrules=chavacano spanish italian]{chavacano}
```

If none of the listed hyphenrules exist, the default behaviour applies. Note in this example we set chavacano as first option - without it, it would select spanish even if chavacano exists.

A special value is +, which allocates a new language (in the T_EX sense). It only makes sense as the last value (or the only one; the subsequent ones are silently ignored). It is mostly useful with luatex, because you can add some patterns with \babelpatterns, as for example:

```
\babelprovide[hyphenrules=+]{neo}  
\babelpatterns[neo]{al e1 i1 o1 u1}
```

In other engines it just suppresses hyphenation (because the pattern list is empty).

main This valueless option makes the language the main one. Only in newly defined languages.

NOTE (1) If you need shorthands, you can use \usesshorthands and \defineshorthand as described above. (2) Captions and \today are “ensured” with \babelensure (because this will be the default in ini-based languages).

1.16 Hooks

New 3.9a A hook is a piece of code to be executed at certain events. Some hooks are predefined when luatex and xetex are used.

`\AddBabelHook` $\langle name \rangle \langle event \rangle \langle code \rangle$

The same name can be applied to several events. Hooks may be enabled and disabled for all defined events with `\EnableBabelHook` $\langle name \rangle$, `\DisableBabelHook` $\langle name \rangle$. Names containing the string `babel` are reserved (they are used, for example, by `\usesshortands*` to add a hook for the event `afterextras`).

Current events are the following; in some of them you can use one to three T_EX parameters (`#1`, `#2`, `#3`), with the meaning given:

addialect (language name, dialect name) Used by `luababel.def` to load the patterns if not preloaded.

patterns (language name, language with encoding) Executed just after the `\language` has been set. The second argument has the patterns name actually selected (in the form of either `lang:ENC` or `lang`).

hyphenation (language name, language with encoding) Executed locally just before exceptions given in `\babelhyphenation` are actually set.

defaultcommands Used (locally) in `\StartBabelCommands`.

encodedcommands (input, font encodings) Used (locally) in `\StartBabelCommands`. Both `xetex` and `luatex` make sure the encoded text is read correctly.

stopcommands Used to reset the the above, if necessary.

write This event comes just after the switching commands are written to the aux file.

beforeextras Just before executing `\extras` $\langle language \rangle$. This event and the next one should not contain language-dependent code (for that, add it to `\extras` $\langle language \rangle$).

afterextras Just after executing `\extras` $\langle language \rangle$. For example, the following deactivates shorthands in all languages:

```
\AddBabelHook{noshort}{afterextras}{\languageshorthands{none}}
```

stringprocess Instead of a parameter, you can manipulate the macro `\BabelString` containing the string to be defined with `\SetString`. For example, to use an expanded version of the string in the definition, write:

```
\AddBabelHook{myhook}{stringprocess}{%  
  \protected@edef\BabelString{\BabelString}}
```

initiateactive (char as active, char as other, original char) **New 3.9i** Executed just after a shorthand has been ‘initiated’. The three parameters are the same character with different catcodes: active, other (`\string’ed`) and the original one.

afterreset **New 3.9i** Executed when selecting a language just after `\originalTeX` is run and reset to its base value, before executing `\captions` $\langle language \rangle$ and `\date` $\langle language \rangle$.

Four events are used in `hyphen.cfg`, which are handled in a quite different way for efficiency reasons – unlike the precedent ones, they only have a single hook and replace a default definition.

everylanguage (language) Executed before every language patterns are loaded.

loadkernel (file) By default loads `switch.def`. It can be used to load a different version of this files or to load nothing.

loadpatterns (patterns file) Loads the patterns file. Used by `luababel.def`.

loadexceptions (exceptions file) Loads the exceptions file. Used by `luababel.def`.

`\BabelContentsFiles` **New 3.9a** This macro contains a list of “toc” types which require a command to switch the language. Its default value is `toc, lof, lot`, but you may redefine it with `\renewcommand` (it’s up to you to make sure no toc type is duplicated).

1.17 Hyphenation tools

`\babelhyphen` *{*type*}

`\babelhyphen` *{*text*}

New 3.9a It is customary to classify hyphens in two types: (1) *explicit* or *hard hyphens*, which in \TeX are entered as `-`, and (2) *optional* or *soft hyphens*, which are entered as `\-`. Strictly, a *soft hyphen* is not a hyphen, but just a breaking opportunity or, in \TeX terms, a “discretionary”; a *hard hyphen* is a hyphen with a breaking opportunity after it. A further type is a *non-breaking hyphen*, a hyphen without a breaking opportunity.

In \TeX , `-` and `\-` forbid further breaking opportunities in the word. This is the desired behaviour very often, but not always, and therefore many languages provide shorthands for these cases. Unfortunately, this has not been done consistently: for example, in Dutch, Portugese, Catalan or Danish, `-` is a hard hyphen, while in German, Spanish, Norwegian, Slovak or Russian, it is a soft hyphen. Furthermore, some of them even redefine `\-`, so that you cannot insert a soft hyphen without breaking opportunities in the rest of the word.

Therefore, some macros are provide with a set of basic “hyphens” which can be used by themselves, to define a user shorthand, or even in language files.

- `\babelhyphen{soft}` and `\babelhyphen{hard}` are self explanatory.
- `\babelhyphen{repeat}` inserts a hard hyphen which is repeated at the beginning of the next line, as done in languages like Polish, Portugese and Spanish.
- `\babelhyphen{nobreak}` inserts a hard hyphen without a break after it (even if a space follows).
- `\babelhyphen{empty}` inserts a break opportunity without a hyphen at all.
- `\babelhyphen{<text>}` is a hard “hyphen” using `<text>` instead. A typical case is `\babelhyphen{/}`.

With all of them hyphenation in the rest of the word is enabled. If you don’t want enabling it, there is a starred counterpart: `\babelhyphen*{soft}` (which in most cases is equivalent to the original `\-`), `\babelhyphen*{hard}`, etc.

Note `hard` is also good for isolated prefixes (eg, *anti-*) and `nobreak` for isolated suffixes (eg, *-ism*), but in both cases `\babelhyphen*{nobreak}` is usually better.

There are also some differences with \LaTeX : (1) the character used is that set for the current font, while in \LaTeX it is hardwired to `-` (a typical value); (2) the hyphen to be used in fonts with a negative `\hyphenchar` is `-`, like in \LaTeX , but it can be changed to another value by redefining `\babelnu\lhyphen`; (3) a break after the hyphen is forbidden if preceded by a glue `>0 pt` (at the beginning of a word, provided it is not immediately preceded by, say, a parenthesis).

`\babelhyphenation` [*<language>*, *<language>*, ...]{*<exceptions>*}

New 3.9a Sets hyphenation exceptions for the languages given or, without the optional argument, for *all* languages (eg, proper nouns or common loan words, and of course monolingual documents). Language exceptions take precedence over global ones.

It can be used only in the preamble, and exceptions are set when the language is first selected, thus taking into account changes of `\lccodes's` done in `\extras<lang>` as well as the language specific encoding (not set in the preamble by default). Multiple `\babelhyphenation's` are allowed. For example:

```
\babelhyphenation{Wal-hal-la Dar-bhan-ga}
```

Listed words are saved expanded and therefore it relies on the LICR. Of course, it also works without the LICR if the input and the font encodings are the same, like in Unicode based engines.

`\babelpatterns` [*<language>*, *<language>*, ...] {*<patterns>*}

New 3.9m *In luatex only*,¹⁵ adds or replaces patterns for the languages given or, without the optional argument, for *all* languages. If a pattern for a certain combination already exists, it gets replaced by the new one.

It can be used only in the preamble, and patterns are added when the language is first selected, thus taking into account changes of `\lccodes's` done in `\extras<lang>` as well as the language specific encoding (not set in the preamble by default). Multiple `\babelpatterns's` are allowed.

Listed patterns are saved expanded and therefore it relies on the LICR. Of course, it also works without the LICR if the input and the font encodings are the same, like in Unicode based engines.

1.18 Language attributes

`\languageattribute` This is a user-level command, to be used in the preamble of a document (after `\usepackage[...]{babel}`), that declares which attributes are to be used for a given language. It takes two arguments: the first is the name of the language; the second, a (list of) attribute(s) to be used. Attributes must be set in the preamble and only once - they cannot be turned on and off. The command checks whether the language is known in this document and whether the attribute(s) are known for this language.

Very often, using a *modifier* in a package option is better.

Several language definition files use their own methods to set options. For example, french uses `\frenchsetup`, magyar (1.5) uses `\magyarOptions`; modifiers provided by spanish have no attribute counterparts. Macros setting options are also used (eg, `\ProsodicMarksOn` in latin).

1.19 Languages supported by babel

In the following table most of the languages supported by babel are listed, together with the names of the options which you can load babel with for each language. Note this list is open and the current options may be different.

Afrikaans afrikaans

Bahasa bahasa, indonesian, indon, bahasai, bahasam, malay, melayu

Basque basque

Breton breton

Bulgarian bulgarian

Catalan catalan

Croatian croatian

Czech czech

¹⁵With luatex exceptions and patterns can be modified almost freely. However, this is very likely a task for a separate package and babel only provides the most basic tools.

Danish danish
Dutch dutch
English english, USenglish, american, UKenglish, british, canadian, australian, newzealand
Esperanto esperanto
Estonian estonian
Finnish finnish
French french, francais, canadien, acadian
Galician galician
German austrian, german, germanb, ngerman, naustrian
Greek greek, polutonikogreek
Hebrew hebrew
Icelandic icelandic
Interlingua interlingua
Irish Gaelic irish
Italian italian
Latin latin
Lower Sorbian lowersorbian
North Sami samin
Norwegian norsk, nynorsk
Polish polish
Portuguese portuges, portuguese, brazilian, brazil
Romanian romanian
Russian russian
Scottish Gaelic scottish
Spanish spanish
Slovakian slovak
Slovenian slovene
Swedish swedish
Serbian serbian
Turkish turkish
Ukrainian ukrainian
Upper Sorbian upporsorbian
Welsh welsh

There are more languages not listed above, including hindi, thai, thaicjk, latvian, turkmen, magyar, mongolian, romansh, lithuanian, spanglish, vietnamese, japanese, pinyin, arabic, farsi, ibygreek, bgreek, serbianc, frenchle, ethiop and friulan. Most of them work out of the box, but some may require extra fonts, encoding files, a preprocessor or even a complete framework (like CJK). For example, if you have got the velthuis/devnag package, you can create a file with extension .dn:

```

\documentclass{article}
\usepackage[hindi]{babel}
\begin{document}
{\dn devaanaa.m priya.h}
\end{document}

```

Then you preprocess it with devnag *<file>*, which creates *<file>.tex*; you can then typeset the latter with L^AT_EX.

1.20 Tips, workarounds, know issues and notes

- If you use the document class book *and* you use `\ref` inside the argument of `\chapter` (or just use `\ref` inside `\MakeUppercase`), L^AT_EX will keep complaining

about an undefined label. To prevent such problems, you could revert to using uppercase labels, you can use `\lowercase{\ref{foo}}` inside the argument of `\chapter`, or, if you will not use shorthands in labels, set the `safe` option to `none` or `bib`.

- Both `ltxdoc` and `babel` use `\AtBeginDocument` to change some catcodes, and `babel` reloads `hline` to make sure `:` has the right one, so if you want to change the catcode of `|` it has to be done using the same method at the proper place, with

```
\AtBeginDocument{\DeleteShortVerb{\|}}
```

before loading `babel`. This way, when the document begins the sequence is (1) make `|` active (`ltxdoc`); (2) make it unactive (your settings); (3) make `babel` shorthands active (`babel`); (4) reload `hline` (`babel`, now with the correct catcodes for `|` and `:`).

- Documents with several input encodings are not frequent, but sometimes are useful. You can set different encodings for different languages as the following example shows:

```
\addto\extrasfrench{\inputencoding{latin1}}
\addto\extrasrussian{\inputencoding{koi8-r}}
```

(A recent version of `inputenc` is required.)

- For the hyphenation to work correctly, `lccodes` cannot change, because \TeX only takes into account the values when the paragraph is hyphenated, i.e., when it has been finished.¹⁶ So, if you write a chunk of French text with `\foreignlanguage`, the apostrophes might not be taken into account. This is a limitation of \TeX , not of `babel`. Alternatively, you may use `\usesshorthands` to activate `'` and `\defineshorthand`, or redefine `\textquoteright` (the latter is called by the non-ASCII right quote).
- `\bibitem` is out of sync with `\selectlanguage` in the `.aux` file. The reason is `\bibitem` uses `\immediate` (and others, in fact), while `\selectlanguage` doesn't. There is no known workaround.
- `Babel` does not take into account `\normalsfcodes` and (non-)French spacing is not always properly (un)set by languages. However, problems are unlikely to happen and therefore this part remains untouched in version 3.9 (but it is in the 'to do' list).
- Using a character mathematically active (ie, with math code "8000) as a shorthand can make \TeX enter in an infinite loop in some rare cases. (Another issue in the 'to do' list, although there is a partial solution.)

The following packages can be useful, too (the list is still far from complete):

csquotes Logical markup for quotes.

iflang Tests correctly the current language.

hyphsubst Selects a different set of patterns for a language.

translator An open platform for packages that need to be localized.

siunitx Typesetting of numbers and physical quantities.

biblatex Programmable bibliographies and citations.

¹⁶This explains why \LaTeX assumes the lowercase mapping of T1 and does not provide a tool for multiple mappings. Unfortunately, `\savingshyphcodes` is not a solution either, because `lccodes` for hyphenation are frozen in the format and cannot be changed.

bicaption Bilingual captions.
babelbib Multilingual bibliographies.
microtype Adjusts the typesetting according to some languages (kerning and spacing). Ligatures can be disabled.
substitutefont Combines fonts in several encodings.
mkpattern Generates hyphenation patterns.
tracklang Tracks which languages have been requested.

1.21 Future work

Useful additions would be, for example, time, currency, addresses and personal names.¹⁷ But that is the easy part, because they don't require modifying the \LaTeX internals.

More interesting are differences in the sentence structure or related to it. For example, in Basque the number precedes the name (including chapters), in Hungarian "from (1)" is "(1)-ból", but "from (3)" is "(3)-ból", in Spanish an item labelled "3.º" may be referred to as either "ítem 3.º" or "3.º ítem", and so on. Even more interesting is right-to-left, vertical and bidi typesetting. Babel provided a basic support for bidi text as part of the style for Hebrew, but it is somewhat unsatisfactory and internally replaces some hardwired commands by other hardwired commands (generic changes would be much better).

1.22 Tentative and experimental code

Handling of "Unicode" fonts is problematic. There is `fontspec`, but special macros are required (not only the NFSS ones) and it doesn't provide "orthogonal axis" for features, including those related to the language (mainly language and script). A couple of tentative macros, which solve the two main cases, are provided by `babel` ($\geq 3.9g$) with a partial solution (only `xetex` and `luatex`, for obvious reasons), but use them at your own risk, as they might be removed in the future.

- `\babelFSstore{<babel-language>}` sets the current three basic families (`rm`, `sf`, `tt`) as the default for the language given. In most cases, this macro will be enough.
- `\babelFSdefault{<babel-language>}{<fontspec-features>}` patches `\fontspec` so that the given features are always passed as the optional argument or added to it (not an ideal solution). Use it only if you select some fonts in the document with `\fontspec`.

So, for example:

```
\setmainfont[Language=Turkish]{Minion Pro}
\setsansfont[Language=Turkish]{Myriad Pro}
\babelFSstore{turkish}
\setmainfont{Minion Pro}
\setsansfont{Myriad Pro}
\babelFSfeatures{turkish}{Language=Turkish}
```

Note you can set any feature required for the language - not only `Language`, but also `Script` and even raw features. This makes those macros a bit more verbose, but also more powerful.

Bidi writing is taking its *first steps*. Here is a simple example:

¹⁷See for example POSIX, ISO 14652 and the Unicode Common Locale Data Repository (CLDR). Those system, however, have limited application to \TeX because their aim is just to display information and not fine typesetting.

```

\documentclass{article}

\usepackage[english]{babel}
\babelprovide{arabic} % declare a new empty language

\usepackage{fontenc}
\setmainfont[Script=Arabic,Language=Arabic]{Traditional Arabic}
\babelFSstore[Arabic]{arabic}

\begin{document}
English \foreignlanguage{arabic}{Arabic} English
\end{document}

```

First steps means exactly that. For example, in `luatex` digits and short Latin texts must be marked up explicitly in RL mode. On the other hand, `xetex` poses quite different challenges. The bidi mechanism is activated when an RL script is passed as the new optional argument of `\babelFSstore`.

See the code section for `\foreignlanguage*` (a new starred version of `\foreignlanguage`).

2 Loading languages with `language.dat`

`TEX` and most engines based on it (`pdfTEX`, `xetex`, `ε-TEX`, the main exception being `luatex`) require hyphenation patterns to be preloaded when a format is created (eg, `LATEX`, `XeLATEX`, `pdfLATEX`). `babel` provides a tool which has become standard in many distributions and based on a “configuration file” named `language.dat`. The exact way this file is used depends on the distribution, so please, read the documentation for the latter (note also some distributions generate the file with some tool).

New 3.9q With `luatex`, however, patterns are loaded on the fly when requested by the language (except the “0th” language, typically `english`, which is preloaded always).¹⁸ Until 3.9n, this task was delegated to the package `luatex-hyphen`, by Khaled Hosny, Élie Roux, and Manuel Pégourié-Gonnard, and required an extra file named `language.dat.lua`, but now a new mechanism has been devised based solely on `language.dat`. **You must rebuild the formats** if upgrading from a previous version. You may want to have a local `language.dat` for a particular project (for example, a book on Chemistry).¹⁹

Unfortunately, the new model is intrinsically incompatible with the previous one, which means you can experience some problems with `polyglossia`. If using the latter, you must load the patterns with `babel` as shown in the following example:

```

\usepackage[base,french,dutch,spanish,english]{babel}
\usepackage{polyglossia}
\setmainlanguage{french}
\setotherlanguages{dutch,spanish,english}

```

Be aware this is, very likely, a temporary solution.

2.1 Format

In that file the person who maintains a `TEX` environment has to record for which languages he has hyphenation patterns *and* in which files these are stored²⁰. When

¹⁸This feature was added to 3.9o, but it was buggy. Both 3.9o and 3.9p are deprecated.

¹⁹The loader for `lua(e)tex` is slightly different as it’s not based on `babel` but on `etex.src`. Until 3.9p it just didn’t work, but thanks to the new code it works by reloading the data in the `babel` way, i.e., with `language.dat`.

²⁰This is because different operating systems sometimes use very different file-naming conventions.

hyphenation exceptions are stored in a separate file this can be indicated by naming that file *after* the file with the hyphenation patterns.

The file can contain empty lines and comments, as well as lines which start with an equals (=) sign. Such a line will instruct L^AT_EX that the hyphenation patterns just processed have to be known under an alternative name. Here is an example:

```
% File      : language.dat
% Purpose   : tell iniTeX what files with patterns to load.
english    english.hyphenations
=british

dutch      hyphen.dutch exceptions.dutch % Nederlands
german     hyphen.ger
```

You may also set the font encoding the patterns are intended for by following the language name by a colon and the encoding code.²¹ For example:

```
german:T1 hyphenT1.ger
german hyphen.ger
```

With the previous settings, if the encoding when the language is selected is T1 then the patterns in hyphenT1.ger are used, but otherwise use those in hyphen.ger (note the encoding could be set in `\extras{lang}`).

A typical error when using babel is the following:

```
No hyphenation patterns were preloaded for
the language '<lang>' into the format.
Please, configure your TeX system to add them and
rebuild the format. Now I will use the patterns
preloaded for english instead}}
```

It simply means you must reconfigure language.dat, either by hand or with the tools provided by your distribution.

3 The interface between the core of babel and the language definition files

The *language definition files* (ldf) must conform to a number of conventions, because these files have to fill in the gaps left by the common code in babel.def, i. e., the definitions of the macros that produce texts. Also the language-switching possibility which has been built into the babel system has its implications.

The following assumptions are made:

- Some of the language-specific definitions might be used by plain T_EX users, so the files have to be coded so that they can be read by both L^AT_EX and plain T_EX. The current format can be checked by looking at the value of the macro `\fmtname`.
- The common part of the babel system redefines a number of macros and environments (defined previously in the document style) to put in the names of macros that replace the previously hard-wired texts. These macros have to be defined in the language definition files.
- The language definition files must define five macros, used to activate and deactivate the language-specific definitions. These macros are

²¹This is not a new feature, but in former versions it didn't work correctly.

`\langle lang \rangle hyphenmins`, `\captions\langle lang \rangle`, `\date\langle lang \rangle`, `\extras\langle lang \rangle` and `\noextras\langle lang \rangle` (the last two may be left empty); where `\langle lang \rangle` is either the name of the language definition file or the name of the \LaTeX option that is to be used. These macros and their functions are discussed below. You must define all or none for a language (or a dialect); defining, say, `\date\langle lang \rangle` but not `\captions\langle lang \rangle` does not raise an error but can lead to unexpected results.

- When a language definition file is loaded, it can define `\l@<lang>` to be a dialect of `\language0` when `\l@<lang>` is undefined.
- Language names must be all lowercase. If an unknown language is selected, `babel` will attempt setting it after lowercasing its name.
- The semantics of modifiers is not defined (on purpose). In most cases, they will just be simple separated options (eg, `spanish`), but a language might require, say, a set of options organized as a tree with suboptions (in such a case, the recommended separator is `/`).

Some recommendations:

- The preferred shorthand is `"`, which is not used in \LaTeX (quotes are entered as ``` and `'`). Other good choices are characters which are not used in a certain context (eg, `=` in an ancient language). Note however `=`, `<`, `>`, `:` and the like can be dangerous, because they may be used as part of the syntax of some elements (numeric expressions, key/value pairs, etc.).
- Captions should not contain shorthands or encoding dependent commands (the latter is not always possible, but should be clearly documented). They should be defined using the LICR. You may also use the new tools for encoded strings, described below.
- Avoid adding things to `\noextras\langle lang \rangle` except for `umlauthigh` and `friends`, `\bbl@deactivate`, `\bbl@(non)frenchspacing`, and language specific macros. Use always, if possible, `\bbl@save` and `\bbl@savevariable` (except if you still want to have access to the previous value). Do not reset a macro or a setting to a hardcoded value. Never. Instead save its value in `\extras\langle lang \rangle`.
- Do not switch scripts. If you want to make sure a set of glyphs is used, switch either the font encoding (low level) or the language (high level, which in turn may switch the font encoding). Usage of things like `\latintext` is deprecated.²²
- Please, for “private” internal macros do not use the `\bbl@` prefix. It is used by `babel` and it can lead to incompatibilities.

There are no special requirements for documenting your language files. Now they are not included in the base `babel` manual, so provide a standalone document suited for your needs, as well as other files you think can be useful. A PDF and a “readme” are strongly recommended.

3.1 Basic macros

In the core of the `babel` system, several macros are defined for use in language definition files. Their purpose is to make a new language known. The first two are related to hyphenation patterns.

`\addlanguage` The macro `\addlanguage` is a non-outer version of the macro `\newlanguage`, defined in `plain.tex` version 3.x. For older versions of `plain.tex` and `lplain.tex` a

²²But not removed, for backward compatibility.

substitute definition is used. Here “language” is used in the T_EX sense of set of hyphenation patterns.

\adddialect The macro `\adddialect` can be used when two languages can (or must) use the same hyphenation patterns. This can also be useful for languages for which no patterns are preloaded in the format. In such cases the default behaviour of the babel system is to define this language as a ‘dialect’ of the language for which the patterns were loaded as `\language0`. Here “language” is used in the T_EX sense of set of hyphenation patterns.

\<lang>hyphenmins The macro `\<lang>hyphenmins` is used to store the values of the `\lefthyphenmin` and `\righthyphenmin`. Redefine this macro to set your own values, with two numbers corresponding to these two parameters. For example:

```
\renewcommand\spanishhyphenmins{34}
```

(Assigning `\lefthyphenmin` and `\righthyphenmin` directly in `\extras<lang>` has no effect.)

\providehyphenmins The macro `\providehyphenmins` should be used in the language definition files to set `\lefthyphenmin` and `\righthyphenmin`. This macro will check whether these parameters were provided by the hyphenation file before it takes any action. If these values have been already set, this command is ignored (currently, default pattern files do *not* set them).

\captions<lang> The macro `\captions<lang>` defines the macros that hold the texts to replace the original hard-wired texts.

\date<lang> The macro `\date<lang>` defines `\today`.

\extras<lang> The macro `\extras<lang>` contains all the extra definitions needed for a specific language. This macro, like the following, is a hook – you can add things to it, but it must not be used directly.

\noextras<lang> Because we want to let the user switch between languages, but we do not know what state T_EX might be in after the execution of `\extras<lang>`, a macro that brings T_EX into a predefined state is needed. It will be no surprise that the name of this macro is `\noextras<lang>`.

\bbl@declare@attribute This is a command to be used in the language definition files for declaring a language attribute. It takes three arguments: the name of the language, the attribute to be defined, and the code to be executed when the attribute is to be used.

\main@language To postpone the activation of the definitions needed for a language until the beginning of a document, all language definition files should use `\main@language` instead of `\selectlanguage`. This will just store the name of the language, and the proper language will be activated at the start of the document.

\ProvidesLanguage The macro `\ProvidesLanguage` should be used to identify the language definition files. Its syntax is similar to the syntax of the L^AT_EX command `\ProvidesPackage`.

\LdfInit The macro `\LdfInit` performs a couple of standard checks that must be made at the beginning of a language definition file, such as checking the category code of the @-sign, preventing the .ldf file from being processed twice, etc.

\ldf@quit The macro `\ldf@quit` does work needed if a .ldf file was processed earlier. This includes resetting the category code of the @-sign, preparing the language to be activated at `\begin{document}` time, and ending the input stream.

\ldf@finish The macro `\ldf@finish` does work needed at the end of each .ldf file. This includes resetting the category code of the @-sign, loading a local configuration file, and preparing the language to be activated at `\begin{document}` time.

\loadlocalcfg After processing a language definition file, L^AT_EX can be instructed to load a local configuration file. This file can, for instance, be used to add strings to `\captions<lang>` to support local document classes. The user will be informed that this configuration file has been loaded. This macro is called by `\ldf@finish`.

\substitutefontfamily (Deprecated.) This command takes three arguments, a font encoding and two font family names. It creates a font description file for the first font in the given

encoding. This .fd file will instruct L^AT_EX to use a font from the second family when a font from the first family in the given encoding seems to be needed.

3.2 Skeleton

Here is the basic structure of an ldf file, with a language, a dialect and an attribute. Strings are best defined using the method explained in in sec. 3.7 (babel 3.9 and later).

```

\ProvidesLanguage{<language>}
  [2016/04/23 v0.0 <Language> support from the babel system]
\LdfInit{<language>}{captions<language>}

\ifx\undefined\l@<language>
  \@nopatterns{<Language>}
  \adddialect\l@<language>0
\fi

\adddialect\l@<dialect>\l@<language>

\bbld@declare@attribute{<language>}{<attrib>}{%
  \expandafter\addto\expandafter\extras<language>
  \expandafter{\extras<attrib><language>}%
  \let\captions<language>\captions<attrib><language>}

\providehyphenmins{<language>}{\tw@\thr@@}

\StartBabelCommands*{<language>}{captions}
\SetString\chaptername{<chapter name>}
% More strings

\StartBabelCommands*{<language>}{date}
\SetString\monthinname{<name of first month>}
% More strings

\StartBabelCommands*{<dialect>}{captions}
\SetString\chaptername{<chapter name>}
% More strings

\StartBabelCommands*{<dialect>}{date}
\SetString\monthinname{<name of first month>}
% More strings

\EndBabelCommands

\addto\extras<language>{}
\addto\noextras<language>{}
\let\extras<dialect>\extras<language>
\let\noextras<dialect>\noextras<language>

\ldf@finish{<language>}

```

3.3 Support for active characters

In quite a number of language definition files, active characters are introduced. To facilitate this, some support macros are provided.

`\initiate@active@char` The internal macro `\initiate@active@char` is used in language definition files to

instruct \LaTeX to give a character the category code ‘active’. When a character has been made active it will remain that way until the end of the document. Its definition may vary.

`\bbl@activate` The command `\bbl@activate` is used to change the way an active character expands. `\bbl@activate` ‘switches on’ the active behaviour of the character.
`\bbl@deactivate` `\bbl@deactivate` lets the active character expand to its former (mostly) non-active self.

`\declare@shorthand` The macro `\declare@shorthand` is used to define the various shorthands. It takes three arguments: the name for the collection of shorthands this definition belongs to; the character (sequence) that makes up the shorthand, i.e. `~` or `"a`; and the code to be executed when the shorthand is encountered. (It does *not* raise an error if the shorthand character has not been “initiated”.)

`\bbl@add@special` The \TeX book states: “Plain \TeX includes a macro called `\dospecials` that is essentially a set macro, representing the set of all characters that have a special category code.” [1, p. 380] It is used to set text ‘verbatim’. To make this work if more characters get a special category code, you have to add this character to the macro `\dospecial`. \LaTeX adds another macro called `\@sanitize` representing the same character set, but without the curly braces. The macros
`\bbl@add@special<char>` and `\bbl@remove@special<char>` add and remove the character `<char>` to these two sets.

3.4 Support for saving macro definitions

Language definition files may want to *redefine* macros that already exist. Therefore a mechanism for saving (and restoring) the original definition of those macros is provided. We provide two macros for this²³.

`\babel@save` To save the current meaning of any control sequence, the macro `\babel@save` is provided. It takes one argument, `<cname>`, the control sequence for which the meaning has to be saved.

`\babel@savevariable` A second macro is provided to save the current value of a variable. In this context, anything that is allowed after the `\the` primitive is considered to be a variable. The macro takes one argument, the `<variable>`.

The effect of the preceding macros is to append a piece of code to the current definition of `\originalTeX`. When `\originalTeX` is expanded, this code restores the previous definition of the control sequence or the previous value of the variable.

3.5 Support for extending macros

`\addto` The macro `\addto{<control sequence>}{<TEX code>}` can be used to extend the definition of a macro. The macro need not be defined (ie, it can be undefined or `\relax`). This macro can, for instance, be used in adding instructions to a macro like `\extrasenglish`.

Be careful when using this macro, because depending on the case the assignment could be either global (usually) or local (sometimes). That does not seem very consistent, but this behaviour is preserved for backward compatibility. If you are using `etoolbox`, by Philipp Lehman, consider using the tools provided by this package instead of `\addto`.

3.6 Macros common to a number of languages

`\bbl@allowhyphens` In several languages compound words are used. This means that when \TeX has to hyphenate such a compound word, it only does so at the ‘-’ that is used in such

²³This mechanism was introduced by Bernd Raichle.

words. To allow hyphenation in the rest of such a compound word, the macro `\bbl@allowhyphens` can be used.

`\allowhyphens` Same as `\bbl@allowhyphens`, but does nothing if the encoding is T1. It is intended mainly for characters provided as real glyphs by this encoding but constructed with `\accent` in OT1.

Note the previous command (`\bbl@allowhyphens`) has different applications (hyphens and discretionaries) than this one (composite chars). Note also prior to version 3.7, `\allowhyphens` had the behaviour of `\bbl@allowhyphens`.

`\set@low@box` For some languages, quotes need to be lowered to the baseline. For this purpose the macro `\set@low@box` is available. It takes one argument and puts that argument in an `\hbox`, at the baseline. The result is available in `\box0` for further processing.

`\save@sf@q` Sometimes it is necessary to preserve the `\spacefactor`. For this purpose the macro `\save@sf@q` is available. It takes one argument, saves the current `spacefactor`, executes the argument, and restores the `spacefactor`.

`\bbl@frenchspacing`
`\bbl@nonfrenchspacing` The commands `\bbl@frenchspacing` and `\bbl@nonfrenchspacing` can be used to properly switch French spacing on and off.

3.7 Encoding-dependent strings

New 3.9a Babel 3.9 provides a way of defining strings in several encodings, intended mainly for `luatex` and `xetex`. This is the only new feature requiring changes in language files if you want to make use of it.

Furthermore, it must be activated explicitly, with the package option `strings`. If there is no `strings`, these blocks are ignored, except `\SetCases` (and except if forced as described below). In other words, the old way of defining/switching strings still works and it's used by default.

It consist is a series of blocks started with `\StartBabelCommands`. The last block is closed with `\EndBabelCommands`. Each block is a single group (ie, local declarations apply until the next `\StartBabelCommands` or `\EndBabelCommands`). An `ldf` may contain several series of this kind.

Thanks to this new feature, string values and string language switching are not mixed any more. No need of `\addto`. If the language is `french`, just redefine `\frenchchaptername`.

`\StartBabelCommands` $\{ \langle \textit>language-list \rangle \} \{ \langle \textit>category \rangle \} [\langle \textit>selector \rangle]$

The $\langle \textit>language-list \rangle$ specifies which languages the block is intended for. A block is taken into account only if the `\CurrentOption` is listed here. Alternatively, you can define `\BabelLanguages` to a comma-separated list of languages to be defined (if undefined, `\StartBabelCommands` sets it to `\CurrentOption`). You may write `\CurrentOption` as the language, but this is discouraged - a explicit name (or names) is much better and clearer.

A “selector” is a name to be used as value in package option `strings`, optionally followed by extra info about the encodings to be used. The name `unicode` must be used for `xetex` and `luatex` (the key `strings` has also other two special values: `generic` and `encoded`).

If a string is set several times (because several blocks are read), the first one take precedence (ie, it works much like `\providecommand`).

Encoding info is `charset=` followed by a `charset`, which if given sets how the strings should be traslated to the internal representation used by the engine, typically `utf8`, which is the only value supported currently (default is no traslations). Note `charset` is applied by `luatex` and `xetex` when reading the file, not when the macro or string is used in the document.

A list of font encodings which the strings are expected to work with can be given after `fontenc=` (separated with spaces, if two or more) - recommended, but not mandatory, although blocks without this key are not taken into account if you have requested `strings=encoded`.

Blocks without a selector are read always if the key `strings` has been used. They provide fallback values, and therefore must be the last blocks; they should be provided always if possible and all strings should be defined somehow inside it; they can be the only blocks (mainly LGC scripts using the LICR). Blocks without a selector can be activated explicitly with `strings=generic` (no block is taken into account except those). With `strings=encoded`, strings in those blocks are set as default (internally, ?). With `strings=encoded` strings are protected, but they are correctly expanded in `\MakeUppercase` and the like. If there is no key `strings`, string definitions are ignored, but `\SetCases` are still honoured (in a encoded way). The `<category>` is either `captions`, `date` or `extras`. You must stick to these three categories, even if no error is raised when using other name.²⁴ It may be empty, too, but in such a case using `\SetString` is an error (but not `\SetCase`).

```
\StartBabelCommands{language}{captions}
  [unicode, fontenc=TU EU1 EU2, charset=utf8]
\SetString{\chaptername}{utf8-string}

\StartBabelCommands{language}{captions}
\SetString{\chaptername}{ascii-maybe-LICR-string}

\EndBabelCommands
```

A real example is:

```
\StartBabelCommands{austrian}{date}
  [unicode, fontenc=TU EU1 EU2, charset=utf8]
  \SetString\monthiname{Jänner}

\StartBabelCommands{german,austrian}{date}
  [unicode, fontenc=TU EU1 EU2, charset=utf8]
  \SetString\monthiiiname{März}

\StartBabelCommands{austrian}{date}
  \SetString\monthiname{J\"{a}nner}

\StartBabelCommands{german}{date}
  \SetString\monthiname{Januar}

\StartBabelCommands{german,austrian}{date}
  \SetString\monthiiiname{Februar}
  \SetString\monthiiiname{M\"{a}rz}
  \SetString\monthivname{April}
  \SetString\monthvname{Mai}
  \SetString\monthviname{Juni}
  \SetString\monthviiname{Juli}
  \SetString\monthviiiname{August}
  \SetString\monthixname{September}
  \SetString\monthxname{Oktober}
  \SetString\monthxiname{November}
  \SetString\monthxiiname{Dezenber}
  \SetString\today{\number\day.~%
    \csname month\romannumeral\month name\endcsname\space
    \number\year}
```

²⁴In future releases further categories may be added.

```

\StartBabelCommands{german,austrian}{captions}
  \SetString\prefacename{Vorwort}
  [etc.]

\EndBabelCommands

```

When used in ldf files, previous values of $\langle category \rangle \langle language \rangle$ are overridden, which means the old way to define strings still works and used by default (to be precise, is first set to undefined and then strings are added). However, when used in the preamble or in a package, new settings are added to the previous ones, if the language exists (in the babel sense, ie, if $\langle date \rangle \langle language \rangle$ exists).

\StartBabelCommands * $\langle language-list \rangle \langle category \rangle [\langle selector \rangle]$

The starred version just forces strings to take a value - if not set as package option, then the default for the engine is used. This is not done by default to prevent backward incompatibilities, but if you are creating a new language this version is better. It's up to the maintainers of the current languages to decide if using it is appropriate.²⁵

\EndBabelCommands Marks the end of the series of blocks.

\AfterBabelCommands $\langle code \rangle$

The code is delayed and executed at the global scope just after \EndBabelCommands .

\SetString $\langle macro-name \rangle \langle string \rangle$

Adds $\langle macro-name \rangle$ to the current category, and defines globally $\langle lang-macro-name \rangle$ to $\langle code \rangle$ (after applying the transformation corresponding to the current charset or defined with the hook `stringprocess`). Use this command to define strings, without including any "logic" if possible, which should be a separated macro. See the example above for the date.

\SetStringLoop $\langle macro-name \rangle \langle string-list \rangle$

A convenient way to define several ordered names at once. For example, to define \abmoniname , \abmoniname , etc. (and similarly with `abday`):

```

\SetStringLoop{abmon#1name}{en,fb,mr,ab,my,jn,jl,ag,sp,oc,nv,dc}
\SetStringLoop{abday#1name}{lu,ma,mi,ju,vi,sa,do}

```

$\#1$ is replaced by the roman numeral.

\SetCase $[\langle map-list \rangle] \langle toupper-code \rangle \langle tolower-code \rangle$

Sets globally code to be executed at \MakeUppercase and \MakeLowercase . The code would be typically things like \let\BB\bb and \uccode or \lccode (although for the reasons explained above, changes in lc/uc codes may not work). A $\langle map-list \rangle$ is a series of macros using the internal format of \@uclclist (eg, \bb\BB\cc\CC). The mandatory arguments take precedence over the optional one. This command, unlike \SetString , is executed always (even without strings), and it is intended for minor readjustments only.

For example, as T1 is the default case mapping in L^AT_EX, we could set for Turkish:

²⁵This replaces in 3.9g a short-lived \UseStrings which has been removed because it did not work.

```

\StartBabelCommands{turkish}{}[otlenc, fontenc=OT1]
\SetCase
  {\uccode"10=`I\relax}
  {\lccode`I="10\relax}

\StartBabelCommands{turkish}{}[unicode, fontenc=TU EU1 EU2, charset=utf8]
\SetCase
  {\uccode`i=`I\relax
  \uccode`i="10\relax}
  {\lccode`I=`i\relax
  \lccode`I="10\relax}

\StartBabelCommands{turkish}{}
\SetCase
  {\uccode`i="9D\relax
  \uccode"19=`I\relax}
  {\lccode"9D=`i\relax
  \lccode`I="19\relax}

\EndBabelCommands

```

(Note the mapping for OT1 is not complete.)

`\SetHyphenMap` `{\to-lower-macros}`

New 3.9g Case mapping serves in T_EX for two unrelated purposes: case transforms (upper/lower) and hyphenation. `\SetCase` handles the former, while hyphenation is handled by `\SetHyphenMap` and controlled with the package option `hyphenmap`. So, even if internally they are based on the same T_EX primitive (`\lccode`), `babel` sets them separately.

There are three helper macros to be used inside `\SetHyphenMap`:

- `\BabelLower{\uccode}{\lccode}` is similar to `\lccode` but it's ignored if the char has been set and saves the original `\lccode` to restore it when switching the language (except with `hyphenmap=first`).
- `\BabelLowerMM{\uccode-from}{\uccode-to}{\step}{\lccode-from}` loops through the given uppercase codes, using the `step`, and assigns them the `\lccode`, which is also increased (MM stands for *many-to-many*).
- `\BabelLowerMO{\uccode-from}{\uccode-to}{\step}{\lccode}` loops through the given uppercase codes, using the `step`, and assigns them the `\lccode`, which is fixed (MO stands for *many-to-one*).

An example is (which is redundant, because these assignments are done by both `luatex` and `xetex`):

```

\SetHyphenMap{\BabelLowerMM{"100}{11F}{2}{101}}

```

This macro is not intended to fix wrong mappings done by Unicode (which are the default in both `xetex` and `luatex`) – if an assignment is wrong, fix it directly.

4 Changes

4.1 Changes in babel version 3.9

Most of changes in version 3.9 are related to bugs, either to fix them (there were lots), or to provide some alternatives. Even new features like `\babelhyphen` are

intended to solve a certain problem (in this case, the lacking of a uniform syntax and behaviour for shorthands across languages). These changes are described in this manual in the corresponding place. A selective list follows:

- `\select@language` did not set `\languagename`. This meant the language in force when auxiliary files were loaded was the one used in, for example, shorthands – if the language was german, a `\select@language{spanish}` had no effect.
- `\foreignlanguage` and `otherlanguage*` messed up `\extras<language>`. Scripts, encodings and many other things were not switched correctly.
- The `:ENC` mechanism for hyphenation patterns used the encoding of the *previous* language, not that of the language being selected.
- `'` (with `activeacute`) had the original value when writing to an auxiliary file, and things like an infinite loop could happen. It worked incorrectly with `^` (if activated) and also if deactivated.
- Active chars were not reset at the end of language options, and that lead to incompatibilities between languages.
- `\textormath` raised an error with a conditional.
- `\aliasshorthand` didn't work (or only in a few and very specific cases).
- `\l@english` was defined incorrectly (using `\let` instead of `\chardef`).
- `ldf` files not bundled with babel were not recognized when called as global options.

4.2 Changes in babel version 3.7

In babel version 3.7 a number of bugs that were found in version 3.6 are fixed. Also a number of changes and additions have occurred:

- Shorthands are expandable again. The disadvantage is that one has to type `'{ }a` when the acute accent is used as a shorthand character. The advantage is that a number of other problems (such as the breaking of ligatures, etc.) have vanished.
- Two new commands, `\shorthandon` and `\shorthandoff` have been introduced to enable to temporarily switch off one or more shorthands.
- Support for typesetting Greek has been enhanced. Code from the `kdgreek` package (suggested by the author) was added and `\greeknumeral` has been added.
- Support for typesetting Basque is now available thanks to Juan Aguirregabiria.
- Support for typesetting Serbian with Latin script is now available thanks to Dejan Muhamedagić and Jankovic Slobodan.
- Support for typesetting Hebrew (and potential support for typesetting other right-to-left written languages) is now available thanks to Rama Porrat and Boris Lavva.
- Support for typesetting Bulgarian is now available thanks to Georgi Boshnakov.
- Support for typesetting Latin is now available, thanks to Claudio Beccari and Krzysztof Konrad Żelechowski.

- Support for typesetting North Sami is now available, thanks to Regnor Jernsletten.
- The options `canadian`, `canadien` and `acadien` have been added for Canadian English and French use.
- A language attribute has been added to the `\mark...` commands in order to make sure that a Greek header line comes out right on the last page before a language switch.
- Hyphenation pattern files are now read *inside a group*; therefore any changes a pattern file needs to make to lowercase codes, uppercase codes, and category codes are kept local to that group. If they are needed for the language, these changes will need to be repeated and stored in `\extras...`
- The concept of language attributes is introduced. It is intended to give the user some control over the features a language-definition file provides. Its first use is for the Greek language, where the user can choose the πολυτονικό (“polytonikó” or multi-accented) Greek way of typesetting texts. These attributes will possibly find wider use in future releases.
- The environment `hyphenrules` is introduced.
- The syntax of the file `language.dat` has been extended to allow (optionally) specifying the font encoding to be used while processing the patterns file.
- The command `\providehyphenmins` should now be used in language definition files in order to be able to keep any settings provided by the pattern file.

4.3 Changes in babel version 3.6

In babel version 3.6 a number of bugs that were found in version 3.5 are fixed. Also a number of changes and additions have occurred:

- A new environment `otherlanguage*` is introduced. it only switches the ‘specials’, but leaves the ‘captions’ untouched.
- The shorthands are no longer fully expandable. Some problems could only be solved by peeking at the token following an active character. The advantage is that `'{ }a` works as expected for languages that have the `'` active.
- Support for typesetting french texts is much enhanced; the file `francais.ldf` is now replaced by `french.ldf` which is maintained by Daniel Flipo.
- Support for typesetting the russian language is again available. The language definition file was originally developed by Olga Lapko from CyrTUG. The fonts needed to typeset the russian language are now part of the babel distribution. The support is not yet up to the level which is needed according to Olga, but this is a start.
- Support for typesetting greek texts is now also available. What is offered in this release is a first attempt; it will be enhanced later on by Yannis Haralambous.
- in babel 3.6j some hooks have been added for the development of support for Hebrew typesetting.
- Support for typesetting texts in Afrikaans (a variant of Dutch, spoken in South Africa) has been added to `dutch.ldf`.

- Support for typesetting Welsh texts is now available.
- A new command `\aliasshorthand` is introduced. It seems that in Poland various conventions are used to type the necessary Polish letters. It is now possible to use the character `/` as a shorthand character instead of the character `"`, by issuing the command `\aliasshorthand{"}{/}`.
- The shorthand mechanism now deals correctly with characters that are already active.
- Shorthand characters are made active at `\begin{document}`, not earlier. This is to prevent problems with other packages.
- A *preambleonly* command `\substitutefontfamily` has been added to create `.fd` files on the fly when the font families of the Latin text differ from the families used for the Cyrillic or Greek parts of the text.
- Three new commands `\LdfInit`, `\ldf@quit` and `\ldf@finish` are introduced that perform a number of standard tasks.
- In babel 3.6k the language Ukrainian has been added and the support for Russian typesetting has been adapted to the package 'cyrillic' to be released with the December 1998 release of $\text{\LaTeX} 2_{\epsilon}$.

4.4 Changes in babel version 3.5

In babel version 3.5 a lot of changes have been made when compared with the previous release. Here is a list of the most important ones:

- the selection of the language is delayed until `\begin{document}`, which means you must add appropriate `\selectlanguage` commands if you include `\hyphenation` lists in the preamble of your document.
- babel now has a language environment and a new command `\foreignlanguage`;
- the way active characters are dealt with is completely changed. They are called 'shorthands'; one can have three levels of shorthands: on the user level, the language level, and on 'system level'. A consequence of the new way of handling active characters is that they are now written to auxiliary files 'verbatim';
- A language change now also writes information in the `.aux` file, as the change might also affect typesetting the table of contents. The consequence is that an `.aux` file generated by a \LaTeX format with babel preloaded gives errors when read with a \LaTeX format without babel; but I think this probably doesn't occur;
- babel is now compatible with the `inputenc` and `fontenc` packages;
- the language definition files now have a new extension, `ldf`;
- the syntax of the file `language.dat` is extended to be compatible with the `french` package by Bernard Gaulle [this package is now named `frenchle`];
- each language definition file looks for a configuration file which has the same name, but the extension `.cfg`. It can contain any valid \LaTeX code.

Part II

The code

babel is being developed incrementally, which means parts of the code are under development and therefore incomplete. Only documented features are considered complete. In other words, use babel only as documented (except, of course, if you want to explore and test them – you can post suggestions about multilingual issues to kadingira@tug.org on <http://tug.org/mailman/listinfo/kadingira>).

5 Identification and loading of required files

Code documentation is still under revision.

The babel package after unpacking it consists of the following files:

switch.def defines macros to set and switch languages.

babel.def defines the rest of macros. It has two parts: a generic one and a second one only for LaTeX.

babel.sty is the \LaTeX package, which sets options and loads language styles.

plain.def defines some \LaTeX macros required by `babel.def` and provides a few tools for Plain.

hyphen.cfg is the file to be used when generating the formats to load hyphenation patterns. By default it also loads `switch.def`.

The babel installer extends `docstrip` with a few “pseudo-guards” to set “variables” used at installation time. They are used with `<@name@>` at the appropriated places in the source code and shown below with `<<name>>`. That brings a little bit of literate programming.

```
1 <<version=3.13>>
2 <<date=2017/09/18>>
```

6 Tools

Do not use the following macros in ldf files. They may change in the future.

This applies mainly to those recently added for replacing, trimming and looping.

The older ones, like `\bbl@afterfi`, will not change.

We define some basic macros which just make the code cleaner. `\bbl@add` is now used internally instead of `\addto` because of the unpredictable behaviour of the latter. Used in `babel.def` and in `babel.sty`, which means in \LaTeX is executed twice, but we need them when defining options and `babel.def` cannot be loaded until options have been defined. This does not hurt, but should be fixed somehow.

```
3 <<*Basic macros>> ≡
4 \def\bbl@stripslash{\expandafter\@gobble\string}
5 \def\bbl@add#1#2{%
6   \bbl@ifunset{\bbl@stripslash#1}%
7     {\def#1{#2}}%
8     {\expandafter\def\expandafter#1\expandafter{#1#2}}
9 \def\bbl@csarg#1#2{\expandafter#1\csname bbl@#2\endcsname}%
10 \def\bbl@loop#1#2#3{\bbl@loop#1{#3}#2,\@nnil,}
11 \def\bbl@loopx#1#2{\expandafter\bbl@loop\expandafter#1\expandafter{#2}}
12 \def\bbl@loop#1#2#3,{%
13   \ifx\@nnil#3\relax\else
14     \def#1{#3}#2\bbl@afterfi\bbl@loop#1{#2}%
```

```

15 \fi}
16 \def\bbbl@for#1#2#3{\bbbl@loopx#1{#2}{\ifx#1\@empty\else#3\fi}}

```

`\bbbl@add@list` This internal macro adds its second argument to a comma separated list in its first argument. When the list is not defined yet (or empty), it will be initiated. It presumes expandable character strings.

```

17 \def\bbbl@add@list#1#2{%
18 \edef#1{%
19 \bbbl@ifunset{\bbbl@stripslash#1}%
20 }%
21 {\ifx#1\@empty\else#1,\fi}%
22 #2}}

```

`\bbbl@afterelse` `\bbbl@afterfi` Because the code that is used in the handling of active characters may need to look ahead, we take extra care to ‘throw’ it over the `\else` and `\fi` parts of an `\if`-statement²⁶. These macros will break if another `\if... \fi` statement appears in one of the arguments and it is not enclosed in braces.

```

23 \long\def\bbbl@afterelse#1\else#2\fi{\fi#1}
24 \long\def\bbbl@afterfi#1\fi{\fi#1}

```

The following piece of code is stolen (with some changes) from `keyval`, by David Carlisle. It defines two macros: `\bbbl@trim` and `\bbbl@trim@def`. The first one strips the leading and trailing spaces from the second argument and then applies the first argument (a macro, `\toks@` and the like). The second one, as its name suggests, defines the first argument as the stripped second argument.

```

25 \def\bbbl@tempa#1{%
26 \long\def\bbbl@trim##1##2{%
27 \futurelet\bbbl@trim@a\bbbl@trim@c##2\@nil\@nil#1\@nil\relax{##1}}%
28 \def\bbbl@trim@c{%
29 \ifx\bbbl@trim@a\@sptoken
30 \expandafter\bbbl@trim@b
31 \else
32 \expandafter\bbbl@trim@b\expandafter#1%
33 \fi}%
34 \long\def\bbbl@trim@b#1##1 \@nil{\bbbl@trim@i##1}}
35 \bbbl@tempa{ }
36 \long\def\bbbl@trim@i#1\@nil#2\relax#3{#3{#1}}
37 \long\def\bbbl@trim@def#1{\bbbl@trim{\def#1}}

```

To check if a macro is defined, we create a new macro, which does the same as `\@ifundefined`. However, in an ϵ -tex engine, it is redefined more robust

```

38 \def\bbbl@ifunset#1{%
39 \expandafter\ifx\csname#1\endcsname\relax
40 \expandafter\@firstoftwo
41 \else
42 \expandafter\@secondoftwo
43 \fi}
44 \bbbl@ifunset{ifcsname}%
45 {}%
46 {\def\bbbl@ifunset#1{%
47 \ifcsname#1\endcsname
48 \expandafter\ifx\csname#1\endcsname\relax
49 \bbbl@afterelse\expandafter\@firstoftwo
50 \else
51 \bbbl@afterfi\expandafter\@secondoftwo

```

²⁶This code is based on code presented in TUGboat vol. 12, no2, June 1991 in “An expansion Power Lemma” by Sonja Maus.


```

52     \fi
53     \else
54     \expandafter\@firstoftwo
55     \fi}}

```

A tool from url, by Donald Arseneau, which tests if a string is empty or space.

```

56 \def\bb@ifblank#1{%
57   \bb@ifblank@i#1\@nil\@nil\@secondoftwo\@firstoftwo\@nil}
58 \long\def\bb@ifblank@i#1#2\@nil#3#4#5\@nil{#4}

```

For each element in the comma separated <key>=<value> list, execute <code> with #1 and #2 as the key and the value of current item (trimmed). In addition, the item is passed verbatim as #3. With the <key> alone, it passes \@empty (ie, the macro thus named, not an empty argument, which is what you get with <key>= and no value).

```

59 \def\bb@forkv#1#2{%
60   \def\bb@kvcmd##1##2##3{#2}%
61   \bb@kvnnext#1,\@nil,}
62 \def\bb@kvnnext#1,{%
63   \ifx\@nil#1\relax\else
64   \bb@ifblank{#1}{}\bb@forkv@eq#1=\@empty=\@nil{#1}}%
65   \expandafter\bb@kvnnext
66   \fi}
67 \def\bb@forkv@eq#1=#2=#3\@nil#4{%
68   \bb@trim@def\bb@forkv@a{#1}%
69   \bb@trim{\expandafter\bb@kvcmd\expandafter{\bb@forkv@a}}{#2}{#4}}

```

A *for* loop. Each item (trimmed), is #1. It cannot be nested (it's doable, but we don't need it).

```

70 \def\bb@vforeach#1#2{%
71   \def\bb@forcmd##1{#2}%
72   \bb@fornext#1,\@nil,}
73 \def\bb@fornext#1,{%
74   \ifx\@nil#1\relax\else
75   \bb@ifblank{#1}{}\bb@trim\bb@forcmd{#1}}%
76   \expandafter\bb@fornext
77   \fi}
78 \def\bb@foreach#1{\expandafter\bb@vforeach\expandafter{#1}}
79 \def\bb@replace#1#2#3{% in #1 -> repl #2 by #3
80   \toks@{}}%
81   \def\bb@replace@aux##1#2##2#2{%
82     \ifx\bb@nil##2%
83     \toks@\expandafter{\the\toks@##1}%
84     \else
85     \toks@\expandafter{\the\toks@##1#3}%
86     \bb@afterfi
87     \bb@replace@aux##2#2%
88     \fi}%
89   \expandafter\bb@replace@aux#1#2\bb@nil#2%
90   \edef#1{\the\toks@}}

```

Now, just syntactical sugar, but it makes partial expansion of some code a lot more simple and readable. Here \\ stands for \noexpand and \<. .> for \noexpand applied to a built macro name (the latter does not define the macro if undefined to \relax, because it is created locally). The result may be followed by extra arguments, if necessary.

```

91 \def\bb@exp#1{%
92   \begingroup

```

```

93   \let\\\noexpand
94   \def<##1>{\expandafter\noexpand\curname##1\endcurname}%
95   \edef\bbl@exp@aux{\endgroup#1}%
96   \bbl@exp@aux}

```

Two more tools. `\bbl@samestring` first expand its arguments and then compare their expansion (sanitized, so that the catcodes do not matter). `\bbl@engine` takes the following values: 0 is pdf \TeX , 1 is `luatex`, and 2 is `xetex`. You may use the latter in your language style if you want.

```

97 \def\bbl@ifsamestring#1#2{%
98   \begingroup
99   \protected@edef\bbl@tempb{#1}%
100  \edef\bbl@tempb{\expandafter\strip@prefix\meaning\bbl@tempb}%
101  \protected@edef\bbl@tempc{#2}%
102  \edef\bbl@tempc{\expandafter\strip@prefix\meaning\bbl@tempc}%
103  \ifx\bbl@tempb\bbl@tempc
104    \aftergroup\@firstoftwo
105  \else
106    \aftergroup\@secondoftwo
107  \fi
108 \endgroup}
109 \chardef\bbl@engine=%
110 \ifx\directlua\@undefined
111   \ifx\XeTeXinputencoding\@undefined
112     \z@
113   \else
114     \tw@
115   \fi
116 \else
117   \@ne
118 \fi
119 <</Basic macros>>

```

Some files identify themselves with a \LaTeX macro. The following code is placed before them to define (and then undefine) if not in \LaTeX .

```

120 << *Make sure ProvidesFile is defined >> ≡
121 \ifx\ProvidesFile\@undefined
122   \def\ProvidesFile#1[#2 #3 #4]{%
123     \wlog{File: #1 #4 #3 <#2>}%
124     \let\ProvidesFile\@undefined}
125 \fi
126 <</Make sure ProvidesFile is defined >>

```

The following code is used in `babel.sty` and `babel.def`, and loads (only once) the data in `language.dat`.

```

127 << *Load patterns in luatex >> ≡
128 \ifx\directlua\@undefined\else
129   \ifx\bbl@luapatterns\@undefined
130     \input luababel.def
131   \fi
132 \fi
133 <</Load patterns in luatex >>

```

The following code is used in `babel.def` and `switch.def`.

```

134 << *Load macros for plain if not LaTeX >> ≡
135 \ifx\AtBeginDocument\@undefined
136   \input plain.def\relax
137 \fi
138 <</Load macros for plain if not LaTeX >>

```

6.1 Multiple languages

`\language` Plain TeX version 3.0 provides the primitive `\language` that is used to store the current language. When used with a pre-3.0 version this function has to be implemented by allocating a counter. The following block is used in `switch.def` and `hyphen.cfg`; the latter may seem redundant, but remember babel doesn't require loading `switch.def` in the format.

```
139 <<*Define core switching macros>> ≡
140 \ifx\language\undefined
141   \csname newcount\endcsname\language
142 \fi
143 <</Define core switching macros>>
```

`\last@language` Another counter is used to store the last language defined. For pre-3.0 formats an extra counter has to be allocated.

`\addlanguage` To add languages to TeX's memory plain TeX version 3.0 supplies `\newlanguage`, in a pre-3.0 environment a similar macro has to be provided. For both cases a new macro is defined here, because the original `\newlanguage` was defined to be `\outer`. For a format based on plain version 2.x, the definition of `\newlanguage` can not be copied because `\count 19` is used for other purposes in these formats. Therefore `\addlanguage` is defined using a definition based on the macros used to define `\newlanguage` in plain TeX version 3.0. For formats based on plain version 3.0 the definition of `\newlanguage` can be simply copied, removing `\outer`. Plain TeX version 3.0 uses `\count 19` for this purpose.

```
144 <<*Define core switching macros>> ≡
145 \ifx\newlanguage\undefined
146   \csname newcount\endcsname\last@language
147   \def\addlanguage#1{%
148     \global\advance\last@language@ne
149     \ifnum\last@language<\@cc@lvi
150       \else
151         \errmessage{No room for a new \string\language!}%
152       \fi
153     \global\chardef#1\last@language
154     \wlog{\string#1 = \string\language\the\last@language}}
155 \else
156   \countdef\last@language=19
157   \def\addlanguage{\alloc@9\language\chardef\@cc@lvi}
158 \fi
159 <</Define core switching macros>>
```

Identify each file that is produced from this source file.

```
160 <*driver&!user>
161 \ProvidesFile{babel.drv}[<<date>> <<version>>]
162 </driver&!user>
163 <*driver & user>
164 \ProvidesFile{user.drv}[<<date>> <<version>>]
165 </driver & user>
```

Now we make sure all required files are loaded. When the command `\AtBeginDocument` doesn't exist we assume that we are dealing with a plain-based format or L^AT_EX 2.09. In that case the file `plain.def` is needed (which also defines `\AtBeginDocument`, and therefore it is not loaded twice). We need the first part when the format is created, and `\orig@dump` is used as a flag. Otherwise, we need to use the second part, so `\orig@dump` is not defined (`plain.def` undefines it).

Check if the current version of `switch.def` has been previously loaded (mainly, `hyphen.cfg`). If not, load it now. We cannot load `babel.def` here because we first need to declare and process the package options.

7 The Package File (\LaTeX , `babel.sty`)

In order to make use of the features of $\text{\LaTeX} 2_{\epsilon}$, the babel system contains a package file, `babel.sty`. This file is loaded by the `\usepackage` command and defines all the language options whose name is different from that of the `.ldf` file (like variant spellings). It also takes care of a number of compatibility issues with other packages and defines a few additional package options.

Apart from all the language options below we also have a few options that influence the behaviour of language definition files.

Many of the following options don't do anything themselves, they are just defined in order to make it possible for babel and language definition files to check if one of them was specified by the user.

7.1 base

The first option to be processed is `base`, which set the hyphenation patterns then resets `ver@babel.sty` so that \LaTeX forgets about the first loading. After `switch.def` has been loaded (above) and `\AfterBabelLanguage` defined, exits.

```

166 (*package)
167 \NeedsTeXFormat{LaTeX2e}[2005/12/01]
168 \ProvidesPackage{babel}[(\langle date \rangle) (\langle version \rangle)] The Babel package]
169 \@ifpackagewith{babel}{debug}
170   {\let\bbl@debug\@firstofone}
171   {\let\bbl@debug\@gobble}
172 \input switch.def\relax
173 \langle Load patterns in luatex \rangle
174 \langle Basic macros \rangle
175 \def\AfterBabelLanguage#1{%
176   \global\expandafter\bbl@add\csname#1.ldf-h@k\endcsname}%

```

If the format created a list of loaded languages (in `\bbl@languages`), get the name of the 0-th to show the actual language used.

```

177 \ifx\bbl@languages\undefined\else
178   \begingroup
179     \catcode\^^I=12
180     \@ifpackagewith{babel}{showlanguages}{%
181       \begingroup
182         \def\bbl@elt#1#2#3#4{\wlog{#2^^I#1^^I#3^^I#4}}%
183         \wlog{<*languages>}%
184         \bbl@languages
185         \wlog{</languages>}%
186       \endgroup}{%
187     \endgroup
188     \def\bbl@elt#1#2#3#4{%
189       \ifnum#2=\z@
190         \gdef\bbl@nulllanguage{#1}%
191         \def\bbl@elt##1##2##3##4{%
192           \fi}%
193     \bbl@languages
194 \fi

```

Now the base option. With it we can define (and load, with luatex) hyphenation patterns, even if we are not interested in the rest of babel. Useful for old versions of polyglossia, too.

```

195 \@ifpackagewith{babel}{base}{%
196   \ifx\directlua\undefined
197     \DeclareOption*{\bbl@patterns{\CurrentOption}}%
198   \else
199     \DeclareOption*{\bbl@patterns@lua{\CurrentOption}}%
200   \fi
201   \DeclareOption{base}{}%
202   \DeclareOption{showlanguages}{}%
203   \ProcessOptions
204   \global\expandafter\let\csname opt@babel.sty\endcsname\relax
205   \global\expandafter\let\csname ver@babel.sty\endcsname\relax
206   \global\let\@ifl@ter@@\@ifl@ter
207   \def\@ifl@ter#1#2#3#4#5{\global\let\@ifl@ter\@ifl@ter@@}%
208   \endinput}{}%

```

7.2 key=value options and other general option

The following macros extract language modifiers, and only real package options are kept in the option list. Modifiers are saved and assigned to `\BabelModifiers` at `\bbl@load@language`; when no modifiers have been given, the former is `\relax`. How modifiers are handled are left to language styles; they can use `\in@`, loop them with `\@for` or `load keyval`, for example).

```

209 \bbl@csarg\let{tempa\expandafter}\csname opt@babel.sty\endcsname
210 \def\bbl@tempb#1.#2{%
211   #1\ifx\@empty#2\else,\bbl@afterfi\bbl@tempb#2\fi}%
212 \def\bbl@tempd#1.#2\@nnil{%
213   \ifx\@empty#2%
214     \edef\bbl@tempc{\ifx\bbl@tempc\@empty\else\bbl@tempc,\fi#1}%
215   \else
216     \in@{=}{#1}\ifin@
217     \edef\bbl@tempc{\ifx\bbl@tempc\@empty\else\bbl@tempc,\fi#1.#2}%
218   \else
219     \edef\bbl@tempc{\ifx\bbl@tempc\@empty\else\bbl@tempc,\fi#1}%
220     \bbl@csarg\edef{mod@#1}{\bbl@tempb#2}%
221   \fi
222 \fi}
223 \let\bbl@tempc\@empty
224 \bbl@foreach\bbl@tempa{\bbl@tempd#1.\@empty\@nnil}
225 \expandafter\let\csname opt@babel.sty\endcsname\bbl@tempc

```

The next option tells babel to leave shorthand characters active at the end of processing the package. This is *not* the default as it can cause problems with other packages, but for those who want to use the shorthand characters in the preamble of their documents this can help.

```

226 \DeclareOption{KeepShorthandsActive}{}
227 \DeclareOption{activeacute}{}
228 \DeclareOption{activegrave}{}
229 \DeclareOption{debug}{}
230 \DeclareOption{noconfigs}{}
231 \DeclareOption{showlanguages}{}
232 \DeclareOption{silent}{}
233 \DeclareOption{shorthands=off}{\bbl@tempa shorthands=\bbl@tempa}
234 <<More package options>>

```

Handling of package options is done in three passes. (I [JBL] am not very happy with the idea, anyway.) The first one processes options which has been declared above or follow the syntax <key>=<value>, the second one loads the requested languages, except the main one if set with the key main, and the third one loads the latter. First, we “flag” valid keys with a nil value.

```
235 \let\bbl@opt@shorthands\@nnil
236 \let\bbl@opt@config\@nnil
237 \let\bbl@opt@main\@nnil
238 \let\bbl@opt@headfoot\@nnil
```

The following tool is defined temporarily to store the values of options.

```
239 \def\bbl@tempa#1=#2\bbl@tempa{%
240   \bbl@csarg\ifx{opt@#1}\@nnil
241     \bbl@csarg\edef{opt@#1}{#2}%
242   \else
243     \bbl@error{%
244       Bad option `#1=#2'. Either you have misspelled the\\%
245       key or there is a previous setting of `#1'}{%
246       Valid keys are `shorthands', `config', `strings', `main',\\%
247       `headfoot', `safe', `math'}
248   \fi}
```

Now the option list is processed, taking into account only currently declared options (including those declared with a =), and <key>=<value> options (the former take precedence). Unrecognized options are saved in \bbl@language@opts, because they are language options.

```
249 \let\bbl@language@opts\@empty
250 \DeclareOption*{%
251   \@expandtwoargs\in@{\string=}{\CurrentOption}%
252   \ifin@
253     \expandafter\bbl@tempa\CurrentOption\bbl@tempa
254   \else
255     \bbl@add@list\bbl@language@opts{\CurrentOption}%
256   \fi}
```

Now we finish the first pass (and start over).

```
257 \ProcessOptions*
```

7.3 Conditional loading of shorthands

If there is no shorthands=<chars>, the original babel macros are left untouched, but if there is, these macros are wrapped (in babel.def) to define only those given. A bit of optimization: if there is no shorthands=, then \bbl@ifshorthands is always true, and it is always false if shorthands is empty. Also, some code makes sense only with shorthands=...

```
258 \def\bbl@sh@string#1{%
259   \ifx#1\@empty\else
260     \ifx#1t\string~%
261     \else\ifx#1c\string,%
262     \else\string#1%
263   \fi\fi
264   \expandafter\bbl@sh@string
265   \fi}
266 \ifx\bbl@opt@shorthands\@nnil
267   \def\bbl@ifshorthand#1#2#3{#2}%
268 \else\ifx\bbl@opt@shorthands\@empty
269   \def\bbl@ifshorthand#1#2#3{#3}%
270 \else
```

The following macro tests if a shorthand is one of the allowed ones.

```
271 \def\bb@ifshorthand#1{%
272   \@expandtwoargs\in@{\string#1}{\bb@opt@shorthands}%
273   \ifin@
274     \expandafter\@firstoftwo
275   \else
276     \expandafter\@secondoftwo
277   \fi}
```

We make sure all chars in the string are ‘other’, with the help of an auxiliary macro defined above (which also zaps spaces).

```
278 \edef\bb@opt@shorthands{%
279   \expandafter\bb@sh@string\bb@opt@shorthands\@empty}%
```

The following is ignored with `shorthands=off`, since it is intended to take some additional actions for certain chars.

```
280 \bb@ifshorthand{'}%
281   {\PassOptionsToPackage{activeacute}{babel}}{}
282 \bb@ifshorthand{`}%
283   {\PassOptionsToPackage{activegrave}{babel}}{}
284 \fi\fi
```

With `headfoot=lang` we can set the language used in heads/foots. For example, in `babel/3796` just adds `headfoot=english`. It misuses `\@resetactivechars` but seems to work.

```
285 \ifx\bb@opt@headfoot\@nnil\else
286   \g@addto@macro\@resetactivechars{%
287     \set@typeset@protect
288     \expandafter\select@language@x\expandafter{\bb@opt@headfoot}%
289     \let\protect\noexpand}
290 \fi
```

For the option `safe` we use a different approach - `\bb@opt@safe` says which macros are redefined (B for bibs and R for refs). By default, both are set.

```
291 \ifx\bb@opt@safe\@undefined
292   \def\bb@opt@safe{BR}
293 \fi
294 \ifx\bb@opt@main\@nnil\else
295   \edef\bb@language@opts{%
296     \ifx\bb@language@opts\@empty\else\bb@language@opts,\fi
297     \bb@opt@main}
298 \fi
```

7.4 Language options

Languages are loaded when processing the corresponding option *except* if a main language has been set. In such a case, it is not loaded until all options has been processed. The following macro inputs the `ldf` file and does some additional checks (`\input` works, too, but possible errors are not caught).

```
299 \let\bb@afterlang\relax
300 \let\BabelModifiers\relax
301 \let\bb@loaded\@empty
302 \def\bb@load@language#1{%
303   \InputIfFileExists{#1. ldf}%
304   {\edef\bb@loaded{\CurrentOption
305     \ifx\bb@loaded\@empty\else,\bb@loaded\fi}%
306   \expandafter\let\expandafter\bb@afterlang
```

```

307 \csname\CurrentOption.ldf-h@k\endcsname
308 \expandafter\let\expandafter\BabelModifiers
309 \csname bbl@mod@\CurrentOption\endcsname}%
310 {\bbl@error{%
311   Unknown option ``CurrentOption'. Either you misspelled it\\%
312   or the language definition file \CurrentOption.ldf was not found}{%
313   Valid options are: shorthands=, KeepShorthandsActive,\\%
314   activeacute, activegrave, noconfigs, safe=, main=, math=\\%
315   headfoot=, strings=, config=, hyphenmap=, or a language name.}}}
```

Now, we set language options whose names are different from ldf files.

```

316 \def\bbl@try@load@lang#1#2#3{%
317   \IfFileExists{\CurrentOption.ldf}%
318     {\bbl@load@language{\CurrentOption}}%
319     {#1\bbl@load@language{#2}#3}}
320 \DeclareOption{afrikaans}{\bbl@try@load@lang{}{dutch}}
321 \DeclareOption{brazil}{\bbl@try@load@lang{}{portuges}}
322 \DeclareOption{brazilian}{\bbl@try@load@lang{}{portuges}}
323 \DeclareOption{hebrew}{%
324   \input{rlbabel.def}%
325   \bbl@load@language{hebrew}}
326 \DeclareOption{hungarian}{\bbl@try@load@lang{}{magyar}}
327 \DeclareOption{lowersorbian}{\bbl@try@load@lang{}{lsorbian}}
328 \DeclareOption{nynorsk}{\bbl@try@load@lang{}{norsk}}
329 \DeclareOption{polutonikogreek}{%
330   \bbl@try@load@lang{}{greek}{\languageattribute{greek}{polutoniko}}}
331 \DeclareOption{portuguese}{\bbl@try@load@lang{}{portuges}}
332 \DeclareOption{russian}{\bbl@try@load@lang{}{russianb}}
333 \DeclareOption{ukrainian}{\bbl@try@load@lang{}{ukraineb}}
334 \DeclareOption{uppersorbian}{\bbl@try@load@lang{}{usorbian}}
```

Another way to extend the list of ‘known’ options for babel was to create the file `bblopts.cfg` in which one can add option declarations. However, this mechanism is deprecated – if you want an alternative name for a language, just create a new `.ldf` file loading the actual one. You can also set the name of the file with the package option `config=<name>`, which will load `<name>.cfg` instead.

```

335 \ifx\bbl@opt@config\@nnil
336   \@ifpackagewith{babel}{noconfigs}}%
337   {\InputIfFileExists{bblopts.cfg}%
338     {\typeout{*****^J%
339       * Local config file bblopts.cfg used^^J%
340       *}}%
341     {}}%
342 \else
343   \InputIfFileExists{\bbl@opt@config.cfg}%
344     {\typeout{*****^J%
345       * Local config file \bbl@opt@config.cfg used^^J%
346       *}}%
347     {\bbl@error{%
348       Local config file ``\bbl@opt@config.cfg' not found}{%
349       Perhaps you misspelled it.}}%
350 \fi
```

Recognizing global options in packages not having a closed set of them is not trivial, as for them to be processed they must be defined explicitly. So, package options not yet taken into account and stored in `bbl@language@opts` are assumed to be languages (note this list also contains the language given with `main`). If not declared above, the name of the option and the file are the same.


```

351 \bbl@for\bbl@tempa\bbl@language@opts{%
352   \bbl@ifunset{ds@\bbl@tempa}%
353   {\edef\bbl@tempb{%
354     \noexpand\DeclareOption
355     {\bbl@tempa}%
356     {\noexpand\bbl@load@language{\bbl@tempa}}}%
357   \bbl@tempb}%
358   \@empty}

```

Now, we make sure an option is explicitly declared for any language set as global option, by checking if an ldf exists. The previous step was, in fact, somewhat redundant, but that way we minimize accessing the file system just to see if the option could be a language.

```

359 \bbl@foreach\@classoptionslist{%
360   \bbl@ifunset{ds@#1}%
361   {\IfFileExists{#1.ldf}%
362    {\DeclareOption{#1}{\bbl@load@language{#1}}}%
363    {}}%
364   {}}

```

If a main language has been set, store it for the third pass.

```

365 \ifx\bbl@opt@main\@nnil\else
366   \expandafter
367   \let\expandafter\bbl@loadmain\csname ds@\bbl@opt@main\endcsname
368   \DeclareOption{\bbl@opt@main}{}
369 \fi

```

And we are done, because all options for this pass has been declared. Those already processed in the first pass are just ignored.

The options have to be processed in the order in which the user specified them (except, of course, global options, which L^AT_EX processes before):

```

370 \def\AfterBabelLanguage#1{%
371   \bbl@ifsamestring\CurrentOption{#1}{\global\bbl@add\bbl@afterlang{}}
372   \DeclareOption*{}
373   \ProcessOptions*

```

This finished the second pass. Now the third one begins, which loads the main language set with the key main. A warning is raised if the main language is not the same as the last named one, or if the value of the key main is not a language. Then execute directly the option (because it could be used only in main). After loading all languages, we deactivate \AfterBabelLanguage.

```

374 \ifx\bbl@opt@main\@nnil
375   \edef\bbl@tempa{\@classoptionslist,\bbl@language@opts}
376   \let\bbl@tempc\@empty
377   \bbl@for\bbl@tempb\bbl@tempa{%
378     \@expandtwoargs\in@{\,\bbl@tempb,}{,\bbl@loaded,}%
379     \ifin\edef\bbl@tempc{\bbl@tempb}\fi}
380   \def\bbl@tempa#1,#2\@nnil{\def\bbl@tempb{#1}}
381   \expandafter\bbl@tempa\bbl@loaded,\@nnil
382   \ifx\bbl@tempb\bbl@tempc\else
383     \bbl@warning{%
384       Last declared language option is '\bbl@tempc',\%
385       but the last processed one was '\bbl@tempb'.\%
386       The main language cannot be set as both a global\%
387       and a package option. Use `main=\bbl@tempc' as\%
388       option. Reported}%
389   \fi
390 \else

```

```

391 \DeclareOption{\bbl@opt@main}{\bbl@loadmain}
392 \ExecuteOptions{\bbl@opt@main}
393 \DeclareOption*{}
394 \ProcessOptions*
395 \fi
396 \def\AfterBabelLanguage{%
397   \bbl@error
398   {Too late for \string\AfterBabelLanguage}%
399   {Languages have been loaded, so I can do nothing}}

```

In order to catch the case where the user forgot to specify a language we check whether `\bbl@main@language`, has become defined. If not, no language has been loaded and an error message is displayed.

```

400 \ifx\bbl@main@language\undefined
401   \bbl@error{%
402     You haven't specified a language option}{%
403     You need to specify a language, either as a global option\\%
404     or as an optional argument to the \string\usepackage\space
405     command;\\%
406     You shouldn't try to proceed from here, type x to quit.}
407 \fi
408 \end{package}

```

8 The kernel of Babel (`babel.def`, `common`)

The kernel of the babel system is stored in either `hyphen.cfg` or `switch.def` and `babel.def`. The file `babel.def` contains most of the code, while `switch.def` defines the language switching commands; both can be read at run time. The file `hyphen.cfg` is a file that can be loaded into the format, which is necessary when you want to be able to switch hyphenation patterns (by default, it also inputs `switch.def`, for “historical reasons”, but it is not necessary). When `babel.def` is loaded it checks if the current version of `switch.def` is in the format; if not it is loaded. A further file, `babel.sty`, contains \LaTeX -specific stuff.

Because plain \TeX users might want to use some of the features of the babel system too, care has to be taken that plain \TeX can process the files. For this reason the current format will have to be checked in a number of places. Some of the code below is common to plain \TeX and \LaTeX , some of it is for the \LaTeX case only. Plain formats based on `etex` (`etex`, `xetex`, `luatex`) don’t load `hyphen.cfg` but `etex.src`, which follows a different naming convention, so we need to define the babel names. It presumes `language.def` exists and it is the same file used when formats were created.

8.1 Tools

```

409 \core
410 \MakeSureProvidesFile{is defined}
411 \ProvidesFile{babel.def}[\date] \version Babel common definitions]
412 \LoadMacrosForPlainIfNotLaTeX
413 \ifx\bbl@ifshorthand\undefined
414   \def\bbl@ifshorthand#1#2#3{#2}%
415   \def\bbl@opt@safe{BR}
416   \def\AfterBabelLanguage#1#2{}
417   \let\bbl@afterlang\relax
418   \let\bbl@language@opts\empty
419 \fi
420 \input switch.def\relax

```

```

421 \ifx\bbl@languages\@undefined
422 \ifx\directlua\@undefined
423 \openin1 = language.def
424 \ifeof1
425 \closein1
426 \message{I couldn't find the file language.def}
427 \else
428 \closein1
429 \begingroup
430 \def\addlanguage#1#2#3#4#5{%
431 \expandafter\ifx\csname lang@#1\endcsname\relax\else
432 \global\expandafter\let\csname l@#1\expandafter\endcsname
433 \csname lang@#1\endcsname
434 \fi}%
435 \def\uselanguage#1{%
436 \input language.def
437 \endgroup
438 \fi
439 \fi
440 \chardef\l@english\z@
441 \fi
442 <<Load patterns in luatex>>
443 <<Basic macros>>

```

\addto For each language four control sequences have to be defined that control the language-specific definitions. To be able to add something to these macro once they have been defined the macro \addto is introduced. It takes two arguments, a *<control sequence>* and T_EX-code to be added to the *<control sequence>*. If the *<control sequence>* has not been defined before it is defined now. The control sequence could also expand to \relax, in which case a circular definition results. The net result is a stack overflow. Otherwise the replacement text for the *<control sequence>* is expanded and stored in a token register, together with the T_EX-code to be added. Finally the *<control sequence>* is redefined, using the contents of the token register.

```

444 \def\addto#1#2{%
445 \ifx#1\@undefined
446 \def#1{#2}%
447 \else
448 \ifx#1\relax
449 \def#1{#2}%
450 \else
451 {\toks@\expandafter{#1#2}%
452 \xdef#1{\the\toks@}}%
453 \fi
454 \fi}

```

The macro \initiate@active@char takes all the necessary actions to make its argument a shorthand character. The real work is performed once for each character.

```

455 \def\bbl@withactive#1#2{%
456 \begingroup
457 \lccode`~=#2\relax
458 \lowercase{\endgroup#1~}}

```

\bbl@redefine To redefine a command, we save the old meaning of the macro. Then we redefine it to call the original macro with the ‘sanitized’ argument. The reason why we do it this way is that we don’t want to redefine the L^AT_EX macros completely in case their definitions change (they have changed in the past).

Because we need to redefine a number of commands we define the command `\bbl@redefine` which takes care of this. It creates a new control sequence, `\org@...`

```
459 \def\bbl@redefine#1{%
460   \edef\bbl@tempa{\bbl@stripslash#1}%
461   \expandafter\let\csname org@\bbl@tempa\endcsname#1%
462   \expandafter\def\csname\bbl@tempa\endcsname}
```

This command should only be used in the preamble of the document.

```
463 \@onlypreamble\bbl@redefine
```

`\bbl@redefine@long` This version of `\babel@redefine` can be used to redefine `\long` commands such as `\ifthenelse`.

```
464 \def\bbl@redefine@long#1{%
465   \edef\bbl@tempa{\bbl@stripslash#1}%
466   \expandafter\let\csname org@\bbl@tempa\endcsname#1%
467   \expandafter\long\expandafter\def\csname\bbl@tempa\endcsname}
468 \@onlypreamble\bbl@redefine@long
```

`\bbl@redefineroobust` For commands that are redefined, but which *might* be robust we need a slightly more intelligent macro. A robust command `foo` is defined to expand to `\protect\foo_`. So it is necessary to check whether `\foo_` exists. The result is that the command that is being redefined is always robust afterwards. Therefore all we need to do now is define `\foo_`.

```
469 \def\bbl@redefineroobust#1{%
470   \edef\bbl@tempa{\bbl@stripslash#1}%
471   \bbl@ifunset{\bbl@tempa\space}%
472     {\expandafter\let\csname org@\bbl@tempa\endcsname#1%
473       \bbl@exp{\def\#1{\protect\<\bbl@tempa\space>}}}%
474     {\bbl@exp{\let\<org@\bbl@tempa>\<\bbl@tempa\space>}}}%
475     \@namedef{\bbl@tempa\space}}
```

This command should only be used in the preamble of the document.

```
476 \@onlypreamble\bbl@redefineroobust
```

8.2 Hooks

Note they are loaded in `babel.def`. `switch.def` only provides a “hook” for hooks (with a default value which is a no-op, below). Admittedly, the current implementation is a somewhat simplistic and does very little to catch errors, but it is intended for developers, after all. `\bbl@usehooks` is the commands used by `babel` to execute hooks defined for an event.

```
477 \def\AddBabelHook#1#2{%
478   \bbl@ifunset{\bbl@hk@#1}{\EnableBabelHook{#1}}}%
479   \def\bbl@tempa##1,##2=##3\@empty{\def\bbl@tempb{##2}}%
480   \expandafter\bbl@tempa\bbl@evargs,##2=,\@empty
481   \bbl@ifunset{\bbl@ev@#1@#2}%
482     {\bbl@csarg\bbl@add{ev@#2}{\bbl@elt{#1}}%
483       \bbl@csarg\newcommand}%
484     {\bbl@csarg\let{ev@#1@#2}\relax
485       \bbl@csarg\newcommand}%
486     {ev@#1@#2}[\bbl@tempb]}
487 \def\EnableBabelHook#1{\bbl@csarg\let{hk@#1}\@firstofone}
488 \def\DisableBabelHook#1{\bbl@csarg\let{hk@#1}\@gobble}
489 \def\bbl@usehooks#1#2{%
490   \def\bbl@elt##1%
```

```

491 \@nameuse{bbl@hk@##1}{\@nameuse{bbl@ev@##1@#1}#2}%
492 \@nameuse{bbl@ev@#1}

```

To ensure forward compatibility, arguments in hooks are set implicitly. So, if a further argument is added in the future, there is no need to change the existing code. Note events intended for hyphen.cfg are also loaded (just in case you need them for some reason).

```

493 \def\bbl@evargs{,% don't delete the comma
494 everylanguage=1,loadkernel=1,loadpatterns=1,loadexceptions=1,%
495 adddialect=2,patterns=2,defaultcommands=0,encodedcommands=2,write=0,%
496 beforeextras=0,afterextras=0,stopcommands=0,stringprocess=0,%
497 hyphenation=2,initiateactive=3,afterreset=0,foreign=0,foreign*=0}

```

`\babelensure` The user command just parses the optional argument and creates a new macro named `\bbl@e@<language>`. We register a hook at the `afterextras` event which just executes this macro in a “complete” selection (which, if undefined, is `\relax` and does nothing). This part is somewhat involved because we have to make sure things are expanded the correct number of times.

The macro `\bbl@e@<language>` contains `\bbl@ensure{<include>}{<exclude>}{<fontenc>}`, which in turn loops over the macros names in `\bbl@captionslist`, excluding (with the help of `\in@`) those in the exclude list. If the fontenc is given (and not `\relax`), the `\fontencoding` is also added. Then we loop over the include list, but if the macro already contains `\foreignlanguage`, nothing is done. Note this macro (1) is not restricted to the preamble, and (2) changes are local.

```

498 \newcommand\babelensure[2][]{% TODO - revise test files
499 \AddBabelHook{babel-ensure}{afterextras}{%
500 \ifcase\bbl@select@type
501 \@nameuse{bbl@e@\languagename}%
502 \fi}%
503 \begingroup
504 \let\bbl@ens@include\@empty
505 \let\bbl@ens@exclude\@empty
506 \def\bbl@ens@fontenc{\relax}%
507 \def\bbl@tempb##1{%
508 \ifx\@empty##1\else\noexpand##1\expandafter\bbl@temp\fi}%
509 \edef\bbl@tempa{\bbl@tempb##1\@empty}%
510 \def\bbl@tempb##1=##2\@{\@namedef{bbl@ens@##1}{##2}}%
511 \bbl@foreach\bbl@tempa{\bbl@tempb##1\@}%
512 \def\bbl@tempc{\bbl@ensure}%
513 \expandafter\bbl@add\expandafter\bbl@tempc\expandafter{%
514 \expandafter{\bbl@ens@include}}%
515 \expandafter\bbl@add\expandafter\bbl@tempc\expandafter{%
516 \expandafter{\bbl@ens@exclude}}%
517 \toks@\expandafter{\bbl@tempc}%
518 \bbl@exp{%
519 \endgroup
520 \def<bbl@e@#2>{\the\toks@{\bbl@ens@fontenc}}}}
521 \def\bbl@ensure#1#2#3{% 1: include 2: exclude 3: fontenc
522 \def\bbl@tempb##1{% elt for (excluding) \bbl@captionslist list
523 \ifx##1\@empty\else
524 \in@{##1}{#2}%
525 \ifin@\else
526 \bbl@ifunset{bbl@ensure@\languagename}%
527 {\bbl@exp{%
528 \\\DeclareRobustCommand<bbl@ensure@\languagename>[1]{%
529 \\\foreignlanguage{\languagename}%

```

```

530         {\ifx\relax#3\else
531           \\fontencoding{#3}\\selectfont
532           \fi
533           #####1}}}%
534     }%
535     \toks@\expandafter{##1}%
536     \edef##1{%
537       \bbl@csarg\noexpand{ensure@\language}%
538       {\the\toks@}}%
539     \fi
540     \expandafter\bbl@tempb
541   \fi}%
542 \expandafter\bbl@tempb\bbl@captionslist\today\@empty
543 \def\bbl@tempa##1{% elt for include list
544   \ifx##1\@empty\else
545     \bbl@csarg\in@{ensure@\language\expandafter}\expandafter{##1}%
546     \ifin@else
547       \bbl@tempb##1\@empty
548     \fi
549     \expandafter\bbl@tempa
550   \fi}%
551 \bbl@tempa##1\@empty}
552 \def\bbl@captionslist{%
553   \prefacename\refname\abstractname\bibname\chaptername\appendixname
554   \contentsname\listfigurename\listtablename\indexname\figurename
555   \tablename\partname\enclname\ccname\headtoname\pagename\seename
556   \alsoname\proofname\glossaryname}

```

8.3 Setting up language files

`\LdfInit` The second version of `\LdfInit` macro takes two arguments. The first argument is the name of the language that will be defined in the language definition file; the second argument is either a control sequence or a string from which a control sequence should be constructed. The existence of the control sequence indicates that the file has been processed before.

At the start of processing a language definition file we always check the category code of the at-sign. We make sure that it is a ‘letter’ during the processing of the file. We also save its name as the last called option, even if not loaded.

Another character that needs to have the correct category code during processing of language definition files is the equals sign, ‘=’, because it is sometimes used in constructions with the `\let` primitive. Therefore we store its current catcode and restore it later on.

Now we check whether we should perhaps stop the processing of this file. To do this we first need to check whether the second argument that is passed to `\LdfInit` is a control sequence. We do that by looking at the first token after passing #2 through `string`. When it is equal to `\@backslashchar` we are dealing with a control sequence which we can compare with `\@undefined`.

If so, we call `\ldf@quit` to set the main language, restore the category code of the @-sign and call `\endinput`

When #2 was *not* a control sequence we construct one and compare it with `\relax`. Finally we check `\originalTeX`.

```

557 \def\bbl@ldfinit{%
558   \let\bbl@screaset\@empty
559   \let\BabelStrings\bbl@opt@string
560   \let\BabelOptions\@empty
561   \let\BabelLanguages\relax

```

```

562 \ifx\originalTeX\@undefined
563   \let\originalTeX\@empty
564 \else
565   \originalTeX
566 \fi}
567 \def\LdfInit#1#2{%
568   \chardef\atcatcode=\catcode` \@
569   \catcode`\@=11\relax
570   \chardef\eqcatcode=\catcode`=
571   \catcode`\==12\relax
572   \expandafter\if\expandafter\@backslashchar
573     \expandafter\@car\string#2\@nil
574   \ifx#2\@undefined\else
575     \ldf@quit{#1}%
576   \fi
577 \else
578   \expandafter\ifx\csname#2\endcsname\relax\else
579     \ldf@quit{#1}%
580   \fi
581 \fi
582 \bbl@ldfinit}

```

`\ldf@quit` This macro interrupts the processing of a language definition file.

```

583 \def\ldf@quit#1{%
584   \expandafter\main@language\expandafter{#1}%
585   \catcode`\@=\atcatcode \let\atcatcode\relax
586   \catcode`\==\eqcatcode \let\eqcatcode\relax
587   \endinput}

```

`\ldf@finish` This macro takes one argument. It is the name of the language that was defined in the language definition file.

We load the local configuration file if one is present, we set the main language (taking into account that the argument might be a control sequence that needs to be expanded) and reset the category code of the @-sign.

```

588 \def\bbl@afterldf#1{%
589   \bbl@afterlang
590   \let\bbl@afterlang\relax
591   \let\BabelModifiers\relax
592   \let\bbl@screset\relax}%
593 \def\ldf@finish#1{%
594   \loadlocalcfg{#1}%
595   \bbl@afterldf{#1}%
596   \expandafter\main@language\expandafter{#1}%
597   \catcode`\@=\atcatcode \let\atcatcode\relax
598   \catcode`\==\eqcatcode \let\eqcatcode\relax}

```

After the preamble of the document the commands `\LdfInit`, `\ldf@quit` and `\ldf@finish` are no longer needed. Therefore they are turned into warning messages in \LaTeX .

```

599 \@onlypreamble\LdfInit
600 \@onlypreamble\ldf@quit
601 \@onlypreamble\ldf@finish

```

`\main@language` This command should be used in the various language definition files. It stores its argument in `\bbl@main@language`; to be used to switch to the correct language at the beginning of the document.

```

602 \def\main@language#1{%

```

```

603 \def\bbl@main@language{#1}%
604 \let\languagename\bbl@main@language
605 \bbl@patterns{\languagename}}

```

We also have to make sure that some code gets executed at the beginning of the document.

```

606 \AtBeginDocument{%
607 \expandafter\selectlanguage\expandafter{\bbl@main@language}}

```

A bit of optimization. Select in heads/foots the language only if necessary.

```

608 \def\select@language@x#1{%
609 \ifcase\bbl@select@type
610 \bbl@ifsamestring\languagename{#1}{\select@language{#1}}%
611 \else
612 \select@language{#1}%
613 \fi}

```

8.4 Shorthands

`\bbl@add@special` The macro `\bbl@add@special` is used to add a new character (or single character control sequence) to the macro `\dospecials` (and `\@sanitize` if \LaTeX is used). It is used only at one place, namely when `\initiate@active@char` is called (which is ignored if the char has been made active before). Because `\@sanitize` can be undefined, we put the definition inside a conditional. Items are added to the lists without checking its existence or the original catcode. It does not hurt, but should be fixed. It's already done with `\nfss@catcodes`, added in 3.10.

```

614 \def\bbl@add@special#1{% 1:a macro like ", \?, etc.
615 \bbl@add\dospecials{\do#1}% test \@sanitize = \relax, for back. compat.
616 \bbl@ifunset{@sanitize}{\bbl@add\@sanitize{\@makeother#1}}%
617 \ifx\nfss@catcodes\undefined\else % TODO - same for above
618 \begingroup
619 \catcode`#1\active
620 \nfss@catcodes
621 \ifnum\catcode`#1=\active
622 \endgroup
623 \bbl@add\nfss@catcodes{\@makeother#1}%
624 \else
625 \endgroup
626 \fi
627 \fi}

```

`\bbl@remove@special` The companion of the former macro is `\bbl@remove@special`. It removes a character from the set macros `\dospecials` and `\@sanitize`, but it is not used at all in the babel core.

```

628 \def\bbl@remove@special#1{%
629 \begingroup
630 \def\x##1##2{\ifnum`#1=`##2\noexpand\@empty
631 \else\noexpand##1\noexpand##2\fi}%
632 \def\do{\x\do}%
633 \def\@makeother{\x\@makeother}%
634 \edef\x{\endgroup
635 \def\noexpand\dospecials{\dospecials}%
636 \expandafter\ifx\csgname @sanitize\endcsgname\relax\else
637 \def\noexpand\@sanitize{\@sanitize}%
638 \fi}%
639 \x}

```


`\initiate@active@char` A language definition file can call this macro to make a character active. This macro takes one argument, the character that is to be made active. When the character was already active this macro does nothing. Otherwise, this macro defines the control sequence `\normal@char⟨char⟩` to expand to the character in its ‘normal state’ and it defines the active character to expand to `\normal@char⟨char⟩` by default (`⟨char⟩` being the character to be made active). Later its definition can be changed to expand to `\active@char⟨char⟩` by calling `\bbl@activate{⟨char⟩}`. For example, to make the double quote character active one could have `\initiate@active@char{"}` in a language definition file. This defines " as `\active@prefix "\active@char"` (where the first " is the character with its original catcode, when the shorthand is created, and `\active@char"` is a single token). In protected contexts, it expands to `\protect "` or `\noexpand "` (ie, with the original "); otherwise `\active@char"` is executed. This macro in turn expands to `\normal@char"` in “safe” contexts (eg, `\label`), but `\user@active"` in normal “unsafe” ones. The latter search a definition in the user, language and system levels, in this order, but if none is found, `\normal@char"` is used. However, a deactivated shorthand (with `\bbl@deactivate` is defined as `\active@prefix "\normal@char"`. The following macro is used to define shorthands in the three levels. It takes 4 arguments: the (string’ed) character, `\<level>@group`, `<level>@active` and `<next-level>@active` (except in system).

```
640 \def\bbl@active@def#1#2#3#4{%
641   \@namedef{#3#1}{%
642     \expandafter\ifx\csname#2@sh@#1@endcsname\relax
643       \bbl@afterelse\bbl@sh@select#2#1{#3@arg#1}{#4#1}%
644     \else
645       \bbl@afterfi\csname#2@sh@#1@endcsname
646     \fi}%
```

When there is also no current-level shorthand with an argument we will check whether there is a next-level defined shorthand for this active character.

```
647   \long\@namedef{#3@arg#1}##1{%
648     \expandafter\ifx\csname#2@sh@#1@string##1@endcsname\relax
649       \bbl@afterelse\csname#4#1@endcsname##1%
650     \else
651       \bbl@afterfi\csname#2@sh@#1@string##1@endcsname
652     \fi}}%
```

`\initiate@active@char` calls `\@initiate@active@char` with 3 arguments. All of them are the same character with different catcodes: active, other (`\string’ed`) and the original one. This trick simplifies the code a lot.

```
653 \def\@initiate@active@char#1#2#3{%
654   \bbl@ifunset{active@char\string#1}%
655   {\bbl@withactive
656    {\expandafter\@initiate@active@char\expandafter}#1\string#1#1}%
657   {}}
```

The very first thing to do is saving the original catcode and the original definition, even if not active, which is possible (undefined characters require a special treatment to avoid making them `\relax`).

```
658 \def\@initiate@active@char#1#2#3{%
659   \bbl@csarg\edef{oricat@#2}{\catcode`#2=\the\catcode`#2\relax}%
660   \ifx#1@undefined
661     \bbl@csarg\edef{oridef@#2}{\let\noexpand#1\noexpand\@undefined}%
662   \else
663     \bbl@csarg\let{oridef@#2}#1%
664     \bbl@csarg\edef{oridef@#2}{%
```

```

665     \let\noexpand#1%
666     \expandafter\noexpand\csname bbl@oridef@@#2\endcsname}%
667 \fi

```

If the character is already active we provide the default expansion under this shorthand mechanism. Otherwise we write a message in the transcript file, and define `\normal@char⟨char⟩` to expand to the character in its default state. If the character is mathematically active when babel is loaded (for example ') the normal expansion is somewhat different to avoid an infinite loop (but it does not prevent the loop if the mathcode is set to "8000 *a posteriori*").

```

668 \ifx#1#3\relax
669   \expandafter\let\csname normal@char#2\endcsname#3%
670 \else
671   \bbl@info{Making #2 an active character}%
672   \ifnum\mathcode`#2="8000
673     \@namedef{normal@char#2}{%
674       \textormath{#3}{\csname bbl@oridef@@#2\endcsname}}%
675   \else
676     \@namedef{normal@char#2}{#3}%
677 \fi

```

To prevent problems with the loading of other packages after babel we reset the catcode of the character to the original one at the end of the package and of each language file (except with `KeepShorthandsActive`). It is re-activate again at `\begin{document}`. We also need to make sure that the shorthands are active during the processing of the `.aux` file. Otherwise some citations may give unexpected results in the printout when a shorthand was used in the optional argument of `\bibitem` for example. Then we make it active (not strictly necessary, but done for backward compatibility).

```

678   \bbl@restoreactive{#2}%
679   \AtBeginDocument{%
680     \catcode`#2\active
681     \if@filesw
682       \immediate\write\@mainaux{\catcode`\string#2\active}%
683     \fi}%
684   \expandafter\bbl@add@special\csname#2\endcsname
685   \catcode`#2\active
686 \fi

```

Now we have set `\normal@char⟨char⟩`, we must define `\active@char⟨char⟩`, to be executed when the character is activated. We define the first level expansion of `\active@char⟨char⟩` to check the status of the `@safe@actives` flag. If it is set to true we expand to the 'normal' version of this character, otherwise we call `\user@active⟨char⟩` to start the search of a definition in the user, language and system levels (or eventually `normal@char⟨char⟩`).

```

687 \let\bbl@tempa\@firstoftwo
688 \if\string^#2%
689   \def\bbl@tempa{\noexpand\textormath}%
690 \else
691   \ifx\bbl@mathnormal\@undefined\else
692     \let\bbl@tempa\bbl@mathnormal
693   \fi
694 \fi
695 \expandafter\edef\csname active@char#2\endcsname{%
696   \bbl@tempa
697   {\noexpand\if@safe@actives
698     \noexpand\expandafter

```

```

699     \expandafter\noexpand\csname normal@char#2\endcsname
700     \noexpand\else
701     \noexpand\expandafter
702     \expandafter\noexpand\csname bbl@doactive#2\endcsname
703     \noexpand\fi}%
704     {\expandafter\noexpand\csname normal@char#2\endcsname}}%
705 \bbl@csarg\edef{doactive#2}{%
706 \expandafter\noexpand\csname user@active#2\endcsname}%

```

We now define the default values which the shorthand is set to when activated or deactivated. It is set to the deactivated form (globally), so that the character expands to

$$\backslash\text{active@prefix } \langle char \rangle \backslash\text{normal@char} \langle char \rangle$$

(where $\backslash\text{active@char} \langle char \rangle$ is *one* control sequence!).

```

707 \bbl@csarg\edef{active@#2}{%
708 \noexpand\active@prefix\noexpand#1%
709 \expandafter\noexpand\csname active@char#2\endcsname}%
710 \bbl@csarg\edef{normal@#2}{%
711 \noexpand\active@prefix\noexpand#1%
712 \expandafter\noexpand\csname normal@char#2\endcsname}%
713 \expandafter\let\expandafter#1\csname bbl@normal@#2\endcsname

```

The next level of the code checks whether a user has defined a shorthand for himself with this character. First we check for a single character shorthand. If that doesn't exist we check for a shorthand with an argument.

```

714 \bbl@active@def#2\user@group{user@active}{language@active}%
715 \bbl@active@def#2\language@group{language@active}{system@active}%
716 \bbl@active@def#2\system@group{system@active}{normal@char}%

```

In order to do the right thing when a shorthand with an argument is used by itself at the end of the line we provide a definition for the case of an empty argument. For that case we let the shorthand character expand to its non-active self. Also, When a shorthand combination such as ' ' ends up in a heading T_EX would see $\backslash\text{protect}'\backslash\text{protect}'$. To prevent this from happening a couple of shorthand needs to be defined at user level.

```

717 \expandafter\edef\csname\user@group @sh@#2@\endcsname
718 {\expandafter\noexpand\csname normal@char#2\endcsname}%
719 \expandafter\edef\csname\user@group @sh@#2@\string\protect@\endcsname
720 {\expandafter\noexpand\csname user@active#2\endcsname}%

```

Finally, a couple of special cases are taken care of. (1) If we are making the right quote (') active we need to change $\backslash\text{pr@m@s}$ as well. Also, make sure that a single ' in math mode 'does the right thing'. (2) If we are using the caret (^) as a shorthand character special care should be taken to make sure math still works. Therefore an extra level of expansion is introduced with a check for math mode on the upper level.

```

721 \if\string'#2%
722 \let\prim@s\bbl@prim@s
723 \let\active@math@prime#1%
724 \fi
725 \bbl@usehooks{initiateactive}{{#1}{#2}{#3}}

```

The following package options control the behaviour of shorthands in math mode.

```

726 <<{*More package options}>> ≡
727 \DeclareOption{math=active}{}
728 \DeclareOption{math=normal}{\def\bbl@mathnormal{\noexpand\textormath}}
729 <</More package options>>

```

Initiating a shorthand makes active the char. That is not strictly necessary but it is still done for backward compatibility. So we need to restore the original catcode at the end of package *and* and the end of the `\df`.

```
730 \@ifpackagewith{babel}{KeepShorthandsActive}%
731   {\let\bbl@restoreactive@gobble}%
732   {\def\bbl@restoreactive#1{%
733     \bbl@exp{%
734       \\AfterBabelLanguage\\CurrentOption
735       {\catcode`#1=\the\catcode`#1\relax}%
736       \\AtEndOfPackage
737       {\catcode`#1=\the\catcode`#1\relax}}}%
738   \AtEndOfPackage{\let\bbl@restoreactive@gobble}}
```

`\bbl@sh@select` This command helps the shorthand supporting macros to select how to proceed. Note that this macro needs to be expandable as do all the shorthand macros in order for them to work in expansion-only environments such as the argument of `\hyphenation`.

This macro expects the name of a group of shorthands in its first argument and a shorthand character in its second argument. It will expand to either `\bbl@firstcs` or `\bbl@scndcs`. Hence two more arguments need to follow it.

```
739 \def\bbl@sh@select#1#2{%
740   \expandafter\ifx\csname#1@sh@#2@sel\endcsname\relax
741     \bbl@afterelse\bbl@scndcs
742   \else
743     \bbl@afterfi\csname#1@sh@#2@sel\endcsname
744   \fi}
```

`\active@prefix` The command `\active@prefix` which is used in the expansion of active characters has a function similar to `\OT1-cmd` in that it `\protects` the active character whenever `\protect` is *not* `\@typeset@protect`.

```
745 \def\active@prefix#1{%
746   \ifx\protect\@typeset@protect
747   \else
```

When `\protect` is set to `\@unexpandable@protect` we make sure that the active character is also *not* expanded by inserting `\noexpand` in front of it. The `\@gobble` is needed to remove a token such as `\activechar:` (when the double colon was the active character to be dealt with).

```
748   \ifx\protect\@unexpandable@protect
749     \noexpand#1%
750   \else
751     \protect#1%
752   \fi
753   \expandafter\@gobble
754   \fi}
```

`\if@safe@actives` In some circumstances it is necessary to be able to change the expansion of an active character on the fly. For this purpose the switch `@safe@actives` is available. The setting of this switch should be checked in the first level expansion of `\active@char{char}`.

```
755 \newif\if@safe@actives
756 \@safe@activesfalse
```

`\bbl@restore@actives` When the output routine kicks in while the active characters were made “safe” this must be undone in the headers to prevent unexpected typeset results. For this situation we define a command to make them “unsafe” again.

```
757 \def\bbl@restore@actives{\if@safe@actives\@safe@activesfalse\fi}
```

`\bbl@activate` Both macros take one argument, like `\initiate@active@char`. The macro is used to
`\bbl@deactivate` change the definition of an active character to expand to `\active@char<char>` in the
 case of `\bbl@activate`, or `\normal@char<char>` in the case of `\bbl@deactivate`.

```
758 \def\bbl@activate#1{%
759   \bbl@withactive{\expandafter\let\expandafter}#1%
760   \csname bbl@active@\string#1\endcsname}
761 \def\bbl@deactivate#1{%
762   \bbl@withactive{\expandafter\let\expandafter}#1%
763   \csname bbl@normal@\string#1\endcsname}
```

`\bbl@firstcs` These macros have two arguments. They use one of their arguments to build a
`\bbl@scndcs` control sequence from.

```
764 \def\bbl@firstcs#1#2{\csname#1\endcsname}
765 \def\bbl@scndcs#1#2{\csname#2\endcsname}
```

`\declare@shorthand` The command `\declare@shorthand` is used to declare a shorthand on a certain
 level. It takes three arguments:

1. a name for the collection of shorthands, i.e. ‘system’, or ‘dutch’;
2. the character (sequence) that makes up the shorthand, i.e. ~ or "a;
3. the code to be executed when the shorthand is encountered.

```
766 \def\declare@shorthand#1#2{\@decl@short{#1}#2\@nil}
767 \def\@decl@short#1#2#3\@nil#4{%
768   \def\bbl@tempa{#3}%
769   \ifx\bbl@tempa\@empty
770     \expandafter\let\csname #1@sh@\string#2@sel\endcsname\bbl@scndcs
771     \bbl@ifunset{#1@sh@\string#2@}{}%
772     {\def\bbl@tempa{#4}%
773       \expandafter\ifx\csname#1@sh@\string#2@\endcsname\bbl@tempa
774       \else
775         \bbl@info
776         {Redefining #1 shorthand \string#2\%
777         in language \CurrentOption}%
778       \fi}%
779     \@namedef{#1@sh@\string#2@}{#4}%
780   \else
781     \expandafter\let\csname #1@sh@\string#2@sel\endcsname\bbl@firstcs
782     \bbl@ifunset{#1@sh@\string#2@\string#3@}{}%
783     {\def\bbl@tempa{#4}%
784       \expandafter\ifx\csname#1@sh@\string#2@\string#3@\endcsname\bbl@tempa
785       \else
786         \bbl@info
787         {Redefining #1 shorthand \string#2\string#3\%
788         in language \CurrentOption}%
789       \fi}%
790     \@namedef{#1@sh@\string#2@\string#3@}{#4}%
791   \fi}
```

`\textormath` Some of the shorthands that will be declared by the language definition files have to
 be usable in both text and mathmode. To achieve this the helper macro
`\textormath` is provided.

```
792 \def\textormath{%
793   \ifmmode
794     \expandafter\@secondoftwo
795   \else
796     \expandafter\@firstoftwo
797   \fi}
```

`\user@group` The current concept of ‘shorthands’ supports three levels or groups of shorthands.
`\language@group` For each level the name of the level or group is stored in a macro. The default is to
`\system@group` have a user group; use language group ‘english’ and have a system group called ‘system’.

```
798 \def\user@group{user}
799 \def\language@group{english}
800 \def\system@group{system}
```

`\useshorthands` This is the user level command to tell L^AT_EX that user level shorthands will be used in the document. It takes one argument, the character that starts a shorthand. First note that this is user level, and then initialize and activate the character for use as a shorthand character (ie, it’s active in the preamble). Languages can deactivate shorthands, so a starred version is also provided which activates them always after the language has been switched.

```
801 \def\useshorthands{%
802   \ifstar\bbl@usesh@s{\bbl@usesh@x{}}
803 \def\bbl@usesh@s#1{%
804   \bbl@usesh@x
805   {\AddBabelHook{babel-sh-\string#1}{afterextras}{\bbl@activate{#1}}}%
806   {#1}}
807 \def\bbl@usesh@x#1#2{%
808   \bbl@ifshorthand{#2}%
809   {\def\user@group{user}%
810    \initiate@active@char{#2}%
811    #1%
812    \bbl@activate{#2}}%
813   {\bbl@error
814    {Cannot declare a shorthand turned off (\string#2)}
815    {Sorry, but you cannot use shorthands which have been\\%
816     turned off in the package options}}}
```

`\defineshorthand` Currently we only support two groups of user level shorthands, named internally `user` and `user@<lang>` (language-dependent user shorthands). By default, only the first one is taken into account, but if the former is also used (in the optional argument of `\defineshorthand`) a new level is inserted for it (`user@generic`, done by `\bbl@set@user@generic`); we make also sure `{}` and `\protect` are taken into account in this new top level.

```
817 \def\user@language@group{user@\language@group}
818 \def\bbl@set@user@generic#1#2{%
819   \bbl@ifunset{user@generic@active#1}%
820   {\bbl@active@def#1\user@language@group{user@active}{user@generic@active}%
821    \bbl@active@def#1\user@group{user@generic@active}{language@active}%
822    \expandafter\edef\csname#2@sh@#1@\endcsname{%
823     \expandafter\noexpand\csname normal@char#1\endcsname}%
824    \expandafter\edef\csname#2@sh@#1@\string\protect@\endcsname{%
825     \expandafter\noexpand\csname user@active#1\endcsname}}%
826   \@empty}
827 \newcommand\defineshorthand[3][user]{%
828   \edef\bbl@tempa{\zap@space#1 \@empty}%
829   \bbl@for\bbl@tempb\bbl@tempa{%
830     \if*\expandafter\@car\bbl@tempb\@nil
831     \edef\bbl@tempb{user@\expandafter@gobble\bbl@tempb}%
832     \@expandtwoargs
833     \bbl@set@user@generic{\expandafter\string\@car#2\@nil}\bbl@tempb
834   }
835   \declare@shorthand{\bbl@tempb}{#2}{#3}}
```

`\languageshorthands` A user level command to change the language from which shorthands are used. Unfortunately, babel currently does not keep track of defined groups, and therefore there is no way to catch a possible change in casing.

```
836 \def\languageshorthands#1{\def\language@group{#1}}
```

`\aliasshorthand` First the new shorthand needs to be initialized,

```
837 \def\aliasshorthand#1#2{%
838   \bbl@ifshorthand{#2}%
839   {\expandafter\ifx\csname active@char\string#2\endcsname\relax
840     \ifx\document\@notprerr
841       \@notshorthand{#2}%
842     \else
843       \initiate@active@char{#2}%
```

Then, we define the new shorthand in terms of the original one, but note with `\aliasshorthands{"}/}` is `\active@prefix /\active@char/`, so we still need to let the latest to `\active@char`.

```
844     \expandafter\let\csname active@char\string#2\expandafter\endcsname
845     \csname active@char\string#1\endcsname
846     \expandafter\let\csname normal@char\string#2\expandafter\endcsname
847     \csname normal@char\string#1\endcsname
848     \bbl@activate{#2}%
849   \fi
850 \fi}%
851 {\bbl@error
852   {Cannot declare a shorthand turned off (\string#2)}
853   {Sorry, but you cannot use shorthands which have been\\%
854     turned off in the package options}}
```

`\@notshorthand`

```
855 \def\@notshorthand#1{%
856   \bbl@error{%
857     The character '\string #1' should be made a shorthand character;\\%
858     add the command \string\usesshorthands\string{#1\string} to
859     the preamble.\\%
860     I will ignore your instruction}%
861   {You may proceed, but expect unexpected results}}
```

`\shorthandon` The first level definition of these macros just passes the argument on to `\shorthandoff` `\bbl@switch@sh`, adding `\@nil` at the end to denote the end of the list of characters.

```
862 \newcommand*\shorthandon[1]{\bbl@switch@sh\@ne#1\@nnil}
863 \DeclareRobustCommand*\shorthandoff{%
864   \@ifstar{\bbl@shorthandoff\tw@}{\bbl@shorthandoff\z@}}
865 \def\bbl@shorthandoff#1#2{\bbl@switch@sh#1#2\@nnil}
```

`\bbl@switch@sh` The macro `\bbl@switch@sh` takes the list of characters apart one by one and subsequently switches the category code of the shorthand character according to the first argument of `\bbl@switch@sh`.
But before any of this switching takes place we make sure that the character we are dealing with is known as a shorthand character. If it is, a macro such as `\active@char` should exist.
Switching off and on is easy – we just set the category code to ‘other’ (12) and `\active`. With the starred version, the original catcode and the original definition, saved in `@initiate@active@char`, are restored.

```
866 \def\bbl@switch@sh#1#2{%
867   \ifx#2\@nnil\else
```

```

868 \bbl@ifunset{bbl@active@\string#2}%
869 {\bbl@error
870 {I cannot switch ``\string#2' on or off--not a shorthand}%
871 {This character is not a shorthand. Maybe you made\\%
872 a typing mistake? I will ignore your instruction}}%
873 {\ifcase#1%
874 \catcode`#2\relax
875 \or
876 \catcode`#2\active
877 \or
878 \csname bbl@oricat@\string#2\endcsname
879 \csname bbl@oridef@\string#2\endcsname
880 \fi}%
881 \bbl@afterfi\bbl@switch@sh#1%
882 \fi}

```

Note the value is that at the expansion time, eg, in the preamble shorhands are usually deactivated.

```

883 \def\babelshorthand{\active@prefix\babelshorthand\bbl@putsh}
884 \def\bbl@putsh#1{%
885 \bbl@ifunset{bbl@active@\string#1}%
886 {\bbl@putsh@i#1\@empty\@nnil}%
887 {\csname bbl@active@\string#1\endcsname}}
888 \def\bbl@putsh@i#1#2\@nnil{%
889 \csname\languagename @sh@\string#1@%
890 \ifx\@empty#2\else\string#2@\fi\endcsname}
891 \ifx\bbl@opt@shorthands\@nnil\else
892 \let\bbl@s@initiate@active@char\initiate@active@char
893 \def\initiate@active@char#1{%
894 \bbl@ifshorthand{#1}{\bbl@s@initiate@active@char{#1}}{}}
895 \let\bbl@s@switch@sh\bbl@switch@sh
896 \def\bbl@switch@sh#1#2{%
897 \ifx#2\@nnil\else
898 \bbl@afterfi
899 \bbl@ifshorthand{#2}{\bbl@s@switch@sh#1{#2}}{\bbl@switch@sh#1}%
900 \fi}
901 \let\bbl@s@activate\bbl@activate
902 \def\bbl@activate#1{%
903 \bbl@ifshorthand{#1}{\bbl@s@activate{#1}}{}}
904 \let\bbl@s@deactivate\bbl@deactivate
905 \def\bbl@deactivate#1{%
906 \bbl@ifshorthand{#1}{\bbl@s@deactivate{#1}}{}}
907 \fi

```

\bbl@prim@s One of the internal macros that are involved in substituting \prime for each right quote in mathmode is \prim@s. This checks if the next character is a right quote. When the right quote is active, the definition of this macro needs to be adapted to look also for an active right quote; the hat could be active, too.

```

908 \def\bbl@prim@s{%
909 \prime\futurelet\@let@token\bbl@pr@m@s}
910 \def\bbl@if@primes#1#2{%
911 \ifx#1\@let@token
912 \expandafter\@firstoftwo
913 \else\ifx#2\@let@token
914 \bbl@afterelse\expandafter\@firstoftwo
915 \else
916 \bbl@afterfi\expandafter\@secondoftwo
917 \fi\fi}

```



```

918 \begingroup
919 \catcode`\^=7 \catcode`\*=\active \lccode`\*=\^^
920 \catcode`\'=12 \catcode`\"=\active \lccode`\"=\^^
921 \lowercase{%
922   \gdef\bbl@pr@ms{%
923     \bbl@if@primes" '%
924     \pr@@s
925     {\bbl@if@primes*\pr@@t\egroup}}
926 \endgroup

```

Usually the ~ is active and expands to `\penalty\M\.`. When it is written to the .aux file it is written expanded. To prevent that and to be able to use the character ~ as a start character for a shorthand, it is redefined here as a one character shorthand on system level. The system declaration is in most cases redundant (when ~ is still a non-break space), and in some cases is inconvenient (if ~ has been redefined); however, for backward compatibility it is maintained (some existing documents may rely on the babel value).

```

927 \initiate@active@char{~}
928 \declare@shorthand{system}{~}{\leavevmode\nobreak\ }
929 \bbl@activate{~}

```

`\OT1dqpos` The position of the double quote character is different for the OT1 and T1 encodings. It will later be selected using the `\f@encoding` macro. Therefore we define two macros here to store the position of the character in these encodings.

```

930 \expandafter\def\csname OT1dqpos\endcsname{127}
931 \expandafter\def\csname T1dqpos\endcsname{4}

```

When the macro `\f@encoding` is undefined (as it is in plain T_EX) we define it here to expand to OT1

```

932 \ifx\f@encoding\undefined
933 \def\f@encoding{OT1}
934 \fi

```

8.5 Language attributes

Language attributes provide a means to give the user control over which features of the language definition files he wants to enable.

`\languageattribute` The macro `\languageattribute` checks whether its arguments are valid and then activates the selected language attribute. First check whether the language is known, and then process each attribute in the list.

```

935 \newcommand\languageattribute[2]{%
936   \def\bbl@tempc{#1}%
937   \bbl@fixname\bbl@tempc
938   \bbl@iflanguage\bbl@tempc{%
939     \bbl@vforeach{#2}{%

```

We want to make sure that each attribute is selected only once; therefore we store the already selected attributes in `\bbl@known@attribs`. When that control sequence is not yet defined this attribute is certainly not selected before.

```

940   \ifx\bbl@known@attribs\undefined
941     \in@false
942   \else

```

Now we need to see if the attribute occurs in the list of already selected attributes.

```

943     \@expandtwoargs\in{,\bbl@tempc-##1,}{,\bbl@known@attribs,}%
944   \fi

```

When the attribute was in the list we issue a warning; this might not be the users intention.

```

945     \ifin@
946     \bbl@warning{%
947         You have more than once selected the attribute '##1'\%
948         for language #1}%
949     \else

```

When we end up here the attribute is not selected before. So, we add it to the list of selected attributes and execute the associated T_EX-code.

```

950     \bbl@exp{%
951         \\bbl@add@list\\bbl@known@attrs{\bbl@tempc-##1}}%
952     \edef\bbl@tempa{\bbl@tempc-##1}%
953     \expandafter\bbl@ifknown@trib\expandafter{\bbl@tempa}\bbl@attributes%
954     {\csname\bbl@tempc @attr##1\endcsname}%
955     {\@attrerr{\bbl@tempc}{##1}}%
956     \fi}}

```

This command should only be used in the preamble of a document.

```

957 \@onlypreamble\languageattribute

```

The error text to be issued when an unknown attribute is selected.

```

958 \newcommand*{\@attrerr}[2]{%
959     \bbl@error
960     {The attribute #2 is unknown for language #1.}%
961     {Your command will be ignored, type <return> to proceed}}

```

`\bbl@declare@attribute` This command adds the new language/attribute combination to the list of known attributes. Then it defines a control sequence to be executed when the attribute is used in a document. The result of this should be that the macro `\extras...` for the current language is extended, otherwise the attribute will not work as its code is removed from memory at `\begin{document}`.

```

962 \def\bbl@declare@attribute#1#2#3{%
963     \@expandtwoargs\in@{,#2,}{,\BabelModifiers,}%
964     \ifin@
965     \AfterBabelLanguage{#1}{\languageattribute{#1}{#2}}%
966     \fi
967     \bbl@add@list\bbl@attributes{#1-#2}%
968     \expandafter\def\csname#1@attr@#2\endcsname{#3}}

```

`\bbl@ifattributeset` This internal macro has 4 arguments. It can be used to interpret T_EX code based on whether a certain attribute was set. This command should appear inside the argument to `\AtBeginDocument` because the attributes are set in the document preamble, *after* babel is loaded.

The first argument is the language, the second argument the attribute being checked, and the third and fourth arguments are the true and false clauses.

```

969 \def\bbl@ifattributeset#1#2#3#4{%

```

First we need to find out if any attributes were set; if not we're done.

```

970     \ifx\bbl@known@attrs\undefined
971         \in@false
972     \else

```

The we need to check the list of known attributes.

```

973     \@expandtwoargs\in@{,#1-#2,}{,\bbl@known@attrs,}%
974     \fi

```

When we're this far `\ifin@` has a value indicating if the attribute in question was set or not. Just to be safe the code to be executed is 'thrown over the `\fi`'.

```
975 \ifin@
976   \bbl@afterelse#3%
977 \else
978   \bbl@afterfi#4%
979 \fi
980 }
```

`\bbl@ifknown@ttrib` An internal macro to check whether a given language/attribute is known. The macro takes 4 arguments, the language/attribute, the attribute list, the \TeX -code to be executed when the attribute is known and the \TeX -code to be executed otherwise.

```
981 \def\bbl@ifknown@ttrib#1#2{%
    We first assume the attribute is unknown.
982   \let\bbl@tempa\@secondoftwo
    Then we loop over the list of known attributes, trying to find a match.
983   \bbl@loopx\bbl@tempb{#2}{%
984     \expandafter\in\expandafter{\expandafter,\bbl@tempb,}{, #1,}%
985     \ifin@
    When a match is found the definition of \bbl@tempa is changed.
986     \let\bbl@tempa\@firstoftwo
987     \else
988     \fi}%
    Finally we execute \bbl@tempa.
989   \bbl@tempa
990 }
```

`\bbl@clear@ttribs` This macro removes all the attribute code from \LaTeX 's memory at `\begin{document}` time (if any is present).

```
991 \def\bbl@clear@ttribs{%
992   \ifx\bbl@attributes\undefined\else
993     \bbl@loopx\bbl@tempa{\bbl@attributes}{%
994       \expandafter\bbl@clear@ttrib\bbl@tempa.
995     }%
996     \let\bbl@attributes\undefined
997   \fi}
998 \def\bbl@clear@ttrib#1-#2.{%
999   \expandafter\let\csname#1@attr@#2\endcsname\undefined}
1000 \AtBeginDocument{\bbl@clear@ttribs}
```

8.6 Support for saving macro definitions

To save the meaning of control sequences using `\babel@save`, we use temporary control sequences. To save hash table entries for these control sequences, we don't use the name of the control sequence to be saved to construct the temporary name. Instead we simply use the value of a counter, which is reset to zero each time we begin to save new values. This works well because we release the saved meanings before we begin to save a new set of control sequence meanings (see `\selectlanguage` and `\originalTeX`). Note undefined macros are not undefined any more when saved - they are `\relax`'ed.

`\babel@savecnt` The initialization of a new save cycle: reset the counter to zero.
`\babel@beginsave` `\def\babel@beginsave{\babel@savecnt\z@}`

Before it's forgotten, allocate the counter and initialize all.

```
1002 \newcount\babel@savecnt
1003 \babel@beginsave
```

`\babel@save` The macro `\babel@save⟨curname⟩` saves the current meaning of the control sequence `⟨curname⟩` to `\originalTeX`²⁷. To do this, we let the current meaning to a temporary control sequence, the restore commands are appended to `\originalTeX` and the counter is incremented.

```
1004 \def\babel@save#1{%
1005   \expandafter\let\curname babel@\number\babel@savecnt\endcurname#1\relax
1006   \toks@\expandafter{\originalTeX\let#1=}%
1007   \bbl@exp{%
1008     \def\originalTeX{\the\toks@<babel@\number\babel@savecnt>\relax}}%
1009   \advance\babel@savecnt\@ne}
```

`\babel@savevariable` The macro `\babel@savevariable⟨variable⟩` saves the value of the variable. `⟨variable⟩` can be anything allowed after the `\the` primitive.

```
1010 \def\babel@savevariable#1{%
1011   \toks@\expandafter{\originalTeX #1=}%
1012   \bbl@exp{\def\originalTeX{\the\toks@\the#1\relax}}}
```

`\bbl@frenchspacing` Some languages need to have `\frenchspacing` in effect. Others don't want that.

`\bbl@nonfrenchspacing` The command `\bbl@frenchspacing` switches it on when it isn't already in effect and `\bbl@nonfrenchspacing` switches it off if necessary.

```
1013 \def\bbl@frenchspacing{%
1014   \ifnum\the\sfcode\.\@m
1015     \let\bbl@nonfrenchspacing\relax
1016   \else
1017     \frenchspacing
1018     \let\bbl@nonfrenchspacing\nonfrenchspacing
1019   \fi}
1020 \let\bbl@nonfrenchspacing\nonfrenchspacing
```

8.7 Short tags

`\babeltags` This macro is straightforward. After zapping spaces, we loop over the list and define the macros `\text⟨tag⟩` and `\⟨tag⟩`. Definitions are first expanded so that they don't contain `\curname` but the actual macro.

```
1021 \def\babeltags#1{%
1022   \edef\bbl@tempa{\zap@space#1 \@empty}%
1023   \def\bbl@tempb##1=##2\@@{%
1024     \edef\bbl@tempc{%
1025       \noexpand\newcommand
1026       \expandafter\noexpand\curname ##1\endcurname{%
1027         \noexpand\protect
1028         \expandafter\noexpand\curname otherlanguage*\endcurname{##2}}
1029       \noexpand\newcommand
1030       \expandafter\noexpand\curname text##1\endcurname{%
1031         \noexpand\foreignlanguage{##2}}
1032     \bbl@tempc}%
1033   \bbl@for\bbl@tempa\bbl@tempa{%
1034     \expandafter\bbl@tempb\bbl@tempa\@@}}
```

²⁷`\originalTeX` has to be expandable, i. e. you shouldn't let it to `\relax`.

8.8 Hyphens

`\babelhyphenation` This macro saves hyphenation exceptions. Two macros are used to store them: `\bbl@hyphenation@` for the global ones and `\bbl@hyphenation<lang>` for language ones. See `\bbl@patterns` above for further details. We make sure there is a space between words when multiple commands are used.

```
1035 \@onlypreamble\babelhyphenation
1036 \@AtEndOfPackage{%
1037   \newcommand\babelhyphenation[2][\@empty]{%
1038     \ifx\bbl@hyphenation@\relax
1039       \let\bbl@hyphenation@\@empty
1040     \fi
1041     \ifx\bbl@hyphlist\@empty\else
1042       \bbl@warning{%
1043         You must not intermingle \string\selectlanguage\space and\\%
1044         \string\babelhyphenation\space or some exceptions will not\\%
1045         be taken into account. Reported}%
1046     \fi
1047     \ifx\@empty#1%
1048       \protected@edef\bbl@hyphenation@{\bbl@hyphenation@\space#2}%
1049     \else
1050       \bbl@vforeach{#1}{%
1051         \def\bbl@tempa{##1}%
1052         \bbl@fixname\bbl@tempa
1053         \bbl@iflanguage\bbl@tempa{%
1054           \bbl@csarg\protected@edef{hyphenation@\bbl@tempa}{%
1055             \bbl@ifunset{bbl@hyphenation@\bbl@tempa}%
1056               \@empty
1057             {\csname bbl@hyphenation@\bbl@tempa\endcsname\space}%
1058             #2}}}%
1059       \fi}}
```

`\bbl@allowhyphens` This macro makes hyphenation possible. Basically its definition is nothing more than `\nobreak \hskip 0pt plus 0pt28`.

```
1060 \def\bbl@allowhyphens{\ifvmode\else\nobreak\hskip\z@skip\fi}
1061 \def\bbl@t@one{T1}
1062 \def\allowhyphens{\ifx\cf@encoding\bbl@t@one\else\bbl@allowhyphens\fi}
```

`\babelhyphen` Macros to insert common hyphens. Note the space before `@` in `\babelhyphen`. Instead of protecting it with `\DeclareRobustCommand`, which could insert a `\relax`, we use the same procedure as shorthands, with `\active@prefix`.

```
1063 \newcommand\babelnullhyphen{\char\hyphenchar\font}
1064 \def\babelhyphen{\active@prefix\babelhyphen\bbl@hyphen}
1065 \def\bbl@hyphen{%
1066   \@ifstar{\bbl@hyphen@i @}{\bbl@hyphen@i \@empty}}
1067 \def\bbl@hyphen@i#1#2{%
1068   \bbl@ifunset{bbl@hy@#1#2\@empty}%
1069   {\csname bbl@#1usehyphen\endcsname{\discretionary{#2}{}{#2}}}%
1070   {\csname bbl@hy@#1#2\@empty\endcsname}}
```

The following two commands are used to wrap the “hyphen” and set the behaviour of the rest of the word – the version with a single `@` is used when further hyphenation is allowed, while that with `@@` if no more hyphens are allowed. In both cases, if the hyphen is preceded by a positive space, breaking after the hyphen is disallowed.

²⁸TeX begins and ends a word for hyphenation at a glue node. The penalty prevents a linebreak at this glue node.

There should not be a discretionary after a hyphen at the beginning of a word, so it is prevented if preceded by a skip. Unfortunately, this does handle cases like “(-suffix)”. `\nobreak` is always preceded by `\leavevmode`, in case the shorthand starts a paragraph.

```
1071 \def\bb@usehyphen#1{%
1072   \leavevmode
1073   \ifdim\lastskip>\z@\mbox{#1}\else\nobreak#1\fi
1074   \nobreak\hskip\z@skip}
1075 \def\bb@usehyphen#1{%
1076   \leavevmode\ifdim\lastskip>\z@\mbox{#1}\else#1\fi}
```

The following macro inserts the hyphen char.

```
1077 \def\bb@hyphenchar{%
1078   \ifnum\hyphenchar\font=\m@ne
1079     \babe\nullhyphen
1080   \else
1081     \char\hyphenchar\font
1082   \fi}
```

Finally, we define the hyphen “types”. Their names will not change, so you may use them in ldf’s. After a space, the `\mbox` in `\bb@hy@nobreak` is redundant.

```
1083 \def\bb@hy@soft{\bb@usehyphen{\discretionary{\bb@hyphenchar}{}}{}}
1084 \def\bb@hy@soft{\bb@usehyphen{\discretionary{\bb@hyphenchar}{}}{}}
1085 \def\bb@hy@hard{\bb@usehyphen\bb@hyphenchar}
1086 \def\bb@hy@hard{\bb@usehyphen\bb@hyphenchar}
1087 \def\bb@hy@nobreak{\bb@usehyphen{\mbox{\bb@hyphenchar}}}
1088 \def\bb@hy@nobreak{\mbox{\bb@hyphenchar}}
1089 \def\bb@hy@repeat{%
1090   \bb@usehyphen{%
1091     \discretionary{\bb@hyphenchar}{\bb@hyphenchar}{\bb@hyphenchar}}}
1092 \def\bb@hy@repeat{%
1093   \bb@usehyphen{%
1094     \discretionary{\bb@hyphenchar}{\bb@hyphenchar}{\bb@hyphenchar}}}
1095 \def\bb@hy@empty{\hskip\z@skip}
1096 \def\bb@hy@empty{\discretionary{}{}}{}}
```

`\bb@disc` For some languages the macro `\bb@disc` is used to ease the insertion of discretionaries for letters that behave ‘abnormally’ at a breakpoint.

```
1097 \def\bb@disc#1#2{\nobreak\discretionary{#2-}{#1}\bb@allowhyphens}
```

8.9 Multiencoding strings

The aim following commands is to provide a common interface for strings in several encodings. They also contains several hooks which can be used by `luatex` and `xetex`. The code is organized here with pseudo-guards, so we start with the basic commands.

Tools But first, a couple of tools. The first one makes global a local variable. This is not the best solution, but it works.

```
1098 \def\bb@tglobal#1{\global\let#1#1}
1099 \def\bb@recatcode#1{%
1100   \@tempcnta="7F
1101   \def\bb@tempa{%
1102     \ifnum\@tempcnta>"FF\else
1103       \catcode\@tempcnta=#1\relax
1104     \advance\@tempcnta\@ne
```

```

1105     \expandafter\bb@tempa
1106     \fi}%
1107 \bb@tempa}

```

The second one. We need to patch `\@uclclist`, but it is done once and only if `\SetCase` is used or if strings are encoded. The code is far from satisfactory for several reasons, including the fact `\@uclclist` is not a list any more. Therefore a package option is added to ignore it. Instead of gobbling the macro getting the next two elements (usually `\reserved@a`), we pass it as argument to `\bb@uclc`. The parser is restarted inside `\langle lang\rangle@bb@uclc` because we do not know how many expansions are necessary (depends on whether strings are encoded). The last part is tricky – when uppercasing, we have:

```

% \let\bb@tolower\@empty\bb@toupper\@empty
%

```

and starts over (and similarly when lowercasing).

```

1108 \@ifpackagewith{babel}{nocase}%
1109   {\let\bb@patchuclc\relax}%
1110   {\def\bb@patchuclc{%
1111     \global\let\bb@patchuclc\relax
1112     \@addto@macro\@uclclist{\reserved@b{\reserved@b\bb@uclc}}%
1113     \gdef\bb@uclc##1{%
1114       \let\bb@encoded\bb@encoded@uclc
1115       \bb@ifunset{\language @bb@uclc}% and resumes it
1116       {##1}%
1117       {\let\bb@tempa##1\relax % Used by LANG@bb@uclc
1118         \csname\language @bb@uclc\endcsname}%
1119       {\bb@tolower\@empty}{\bb@toupper\@empty}}}%
1120   \gdef\bb@tolower{\csname\language @bb@lc\endcsname}%
1121   \gdef\bb@toupper{\csname\language @bb@uc\endcsname}}
1122 <<More package options>> ≡
1123 \DeclareOption{nocase}{}
1124 <</More package options>>

```

The following package options control the behaviour of `\SetString`.

```

1125 <<More package options>> ≡
1126 \let\bb@opt@strings\@nnil % accept strings=value
1127 \DeclareOption{strings}{\def\bb@opt@strings{\BabelStringsDefault}}
1128 \DeclareOption{strings=encoded}{\let\bb@opt@strings\relax}
1129 \def\BabelStringsDefault{generic}
1130 <</More package options>>

```

Main command This is the main command. With the first use it is redefined to omit the basic setup in subsequent blocks. We make sure strings contain actual letters in the range 128-255, not active characters.

```

1131 \@onlypreamble\StartBabelCommands
1132 \def\StartBabelCommands{%
1133   \begingroup
1134   \bb@reccatcode{11}%
1135   <<Macros local to BabelCommands>>
1136   \def\bb@provstring##1##2{%
1137     \providecommand##1{##2}%
1138     \bb@tglobal##1}%
1139   \global\let\bb@scafter\@empty
1140   \let\StartBabelCommands\bb@startcmds
1141   \ifx\BabelLanguages\relax

```

```

1142 \let\BabelLanguages\CurrentOption
1143 \fi
1144 \begingroup
1145 \let\bbl@screset\@nnil % local flag - disable 1st stopcommands
1146 \StartBabelCommands}
1147 \def\bbl@startcmds{%
1148 \ifx\bbl@screset\@nnil\else
1149 \bbl@usehooks{stopcommands}{}%
1150 \fi
1151 \endgroup
1152 \begingroup
1153 \@ifstar
1154 {\ifx\bbl@opt@strings\@nnil
1155 \let\bbl@opt@strings\BabelStringsDefault
1156 \fi
1157 \bbl@startcmds@i}%
1158 \bbl@startcmds@i}
1159 \def\bbl@startcmds@i#1#2{%
1160 \edef\bbl@L{\zap@space#1 \@empty}%
1161 \edef\bbl@G{\zap@space#2 \@empty}%
1162 \bbl@startcmds@ii}

```

Parse the encoding info to get the label, input, and font parts.

Select the behaviour of `\SetString`. There are two main cases, depending of if there is an optional argument: without it and `strings=encoded`, strings are defined always; otherwise, they are set only if they are still undefined (ie, fallback values). With labelled blocks and `strings=encoded`, define the strings, but with another value, define strings only if the current label or font encoding is the value of strings; otherwise (ie, no strings or a block whose label is not in `strings=`) do nothing.

We presume the current block is not loaded, and therefore set (above) a couple of default values to gobble the arguments. Then, these macros are redefined if necessary according to several parameters.

```

1163 \newcommand\bbl@startcmds@ii[1][\@empty]{%
1164 \let\SetString\@gobbletwo
1165 \let\bbl@stringdef\@gobbletwo
1166 \let\AfterBabelCommands\@gobble
1167 \ifx\@empty#1%
1168 \def\bbl@sc@label{generic}%
1169 \def\bbl@encstring##1##2{%
1170 \ProvideTextCommandDefault##1{##2}%
1171 \bbl@tglobal##1%
1172 \expandafter\bbl@tglobal\csname\string?\string##1\endcsname}%
1173 \let\bbl@sctest\in@true
1174 \else
1175 \let\bbl@sc@charset\space % <- zapped below
1176 \let\bbl@sc@fontenc\space % <- " "
1177 \def\bbl@tempa##1=##2\@nil{%
1178 \bbl@csarg\edef{sc@\zap@space##1 \@empty}{##2 }}%
1179 \bbl@vforeach{label=#1}{\bbl@tempa##1\@nil}%
1180 \def\bbl@tempa##1 ##2{% space -> comma
1181 ##1%
1182 \ifx\@empty##2\else\ifx,##1,\else,\fi\bbl@afterfi\bbl@tempa##2\fi}%
1183 \edef\bbl@sc@fontenc{\expandafter\bbl@tempa\bbl@sc@fontenc\@empty}%
1184 \edef\bbl@sc@label{\expandafter\zap@space\bbl@sc@label\@empty}%
1185 \edef\bbl@sc@charset{\expandafter\zap@space\bbl@sc@charset\@empty}%
1186 \def\bbl@encstring##1##2{%
1187 \bbl@foreach\bbl@sc@fontenc{%

```



```

1188     \bbl@ifunset{T@###1}%
1189     {}%
1190     {\ProvideTextCommand##1{###1}{##2}%
1191     \bbl@tglobal##1%
1192     \expandafter
1193     \bbl@tglobal\csname###1\string##1\endcsname}}}%
1194 \def\bbl@sctest{%
1195     \@expandtwoargs
1196     \in@{,\bbl@opt@strings,}{,\bbl@sc@label,\bbl@sc@fontenc,}}%
1197 \fi
1198 \ifx\bbl@opt@strings\@nnil      % ie, no strings key -> defaults
1199 \else\ifx\bbl@opt@strings\relax % ie, strings=encoded
1200     \let\AfterBabelCommands\bbl@aftercmds
1201     \let\SetString\bbl@setstring
1202     \let\bbl@stringdef\bbl@encstring
1203 \else      % ie, strings=value
1204     \bbl@sctest
1205 \ifin@
1206     \let\AfterBabelCommands\bbl@aftercmds
1207     \let\SetString\bbl@setstring
1208     \let\bbl@stringdef\bbl@provstring
1209 \fi\fi\fi
1210 \bbl@scswitch
1211 \ifx\bbl@G@empty
1212     \def\SetString##1##2{%
1213         \bbl@error{Missing group for string \string##1}%
1214         {You must assign strings to some category, typically\\%
1215         captions or extras, but you set none}}%
1216 \fi
1217 \ifx\@empty#1%
1218     \bbl@usehooks{defaultcommands}{}%
1219 \else
1220     \@expandtwoargs
1221     \bbl@usehooks{encodedcommands}{\bbl@sc@charset}{\bbl@sc@fontenc}}%
1222 \fi}

```

There are two versions of `\bbl@scswitch`. The first version is used when `ldfs` are read, and it makes sure `\langle group \rangle \langle language \rangle` is reset, but only once (`\bbl@screset` is used to keep track of this). The second version is used in the preamble and packages loaded after `babel` and does nothing. The macro `\bbl@forlang` loops `\bbl@L` but its body is executed only if the value is in `\BabelLanguages` (inside `babel`) or `\date \langle language \rangle` is defined (after `babel` has been loaded). There are also two version of `\bbl@forlang`. The first one skips the current iteration if the language is not in `\BabelLanguages` (used in `ldfs`), and the second one skips undefined languages (after `babel` has been loaded) .

```

1223 \def\bbl@forlang#1#2{%
1224     \bbl@for#1\bbl@L{%
1225         \@expandtwoargs\in@{,#1,}{,\BabelLanguages,}%
1226         \ifin@#2\relax\fi}}
1227 \def\bbl@scswitch{%
1228     \bbl@forlang\bbl@tempa{%
1229         \ifx\bbl@G@empty\else
1230             \ifx\SetString@gobbletwo\else
1231                 \edef\bbl@GL{\bbl@G\bbl@tempa}%
1232                 \@expandtwoargs\in@{,\bbl@GL,}{,\bbl@screset,}%
1233                 \ifin@\else
1234                     \global\expandafter\let\csname\bbl@GL\endcsname\@undefined
1235                     \xdef\bbl@screset{\bbl@screset,\bbl@GL}%

```

```

1236     \fi
1237     \fi
1238     \fi}}
1239 \AtEndOfPackage{%
1240   \def\bbL@forlang#1#2{\bbL@for#1\bbL@L{\bbL@ifunset{date#1}{#2}}}%
1241   \let\bbL@scswitch\relax}
1242 \@onlypreamble\EndBabelCommands
1243 \def\EndBabelCommands{%
1244   \bbL@usehooks{stopcommands}{}%
1245   \endgroup
1246   \endgroup
1247   \bbL@scafter}

```

Now we define commands to be used inside `\StartBabelCommands`.

Strings The following macro is the actual definition of `\SetString` when it is “active”

First save the “switcher”. Create it if undefined. Strings are defined only if undefined (ie, like `\providescommand`). With the event `stringprocess` you can preprocess the string by manipulating the value of `\BabelString`. If there are several hooks assigned to this event, preprocessing is done in the same order as defined. Finally, the string is set.

```

1248 \def\bbL@setstring#1#2{%
1249   \bbL@forlang\bbL@tempa{%
1250     \edef\bbL@LC{\bbL@tempa\bbL@stripslash#1}%
1251     \bbL@ifunset{\bbL@LC}% eg, \germanchaptername
1252     {\global\expandafter % TODO - con \bbL@exp ?
1253       \bbL@add\csname\bbL@G\bbL@tempa\expandafter\endcsname\expandafter
1254       {\expandafter\bbL@scset\expandafter#1\csname\bbL@LC\endcsname}}%
1255     }%
1256     \def\BabelString{#2}%
1257     \bbL@usehooks{stringprocess}{}%
1258     \expandafter\bbL@stringdef
1259     \csname\bbL@LC\expandafter\endcsname\expandafter{\BabelString}}

```

Now, some additional stuff to be used when encoded strings are used. Captions then include `\bbL@encoded` for string to be expanded in case transformations. It is `\relax` by default, but in `\MakeUppercase` and `\MakeLowercase` its value is a modified expandable `\@changed@cmd`.

```

1260 \ifx\bbL@opt@strings\relax
1261   \def\bbL@scset#1#2{\def#1{\bbL@encoded#2}}
1262   \bbL@patchuclc
1263   \let\bbL@encoded\relax
1264   \def\bbL@encoded@uclc#1{%
1265     \@inmathwarn#1%
1266     \expandafter\ifx\csname\cf@encoding\string#1\endcsname\relax
1267       \expandafter\ifx\csname ?\string#1\endcsname\relax
1268         \TextSymbolUnavailable#1%
1269       \else
1270         \csname ?\string#1\endcsname
1271         \fi
1272       \else
1273         \csname\cf@encoding\string#1\endcsname
1274         \fi}
1275 \else
1276   \def\bbL@scset#1#2{\def#1{#2}}
1277 \fi

```

Define `\SetStringLoop`, which is actually set inside `\StartBabelCommands`. The current definition is somewhat complicated because we need a count, but `\count@` is not under our control (remember `\SetString` may call hooks). Instead of defining a dedicated count, we just “pre-expand” its value.

```

1278 <<*Macros local to BabelCommands>> ≡
1279 \def\SetStringLoop##1##2{%
1280   \def\bbl@templ####1{\expandafter\noexpand\csname##1\endcsname}%
1281   \count@\z@
1282   \bbl@loop\bbl@tempa{##2}{% empty items and spaces are ok
1283     \advance\count@\@ne
1284     \toks@\expandafter{\bbl@tempa}%
1285     \bbl@exp{%
1286       \\SetString\bbl@templ{\romannumeral\count@}{\the\toks@}%
1287       \count@=\the\count@\relax}}%
1288 <</Macros local to BabelCommands>>

```

Delaying code Now the definition of `\AfterBabelCommands` when it is activated.

```

1289 \def\bbl@aftercmds#1{%
1290   \toks@\expandafter{\bbl@scafter#1}%
1291   \xdef\bbl@scafter{\the\toks@}}

```

Case mapping The command `\SetCase` provides a way to change the behaviour of `\MakeUppercase` and `\MakeLowercase`. `\bbl@tempa` is set by the patched `\@uclclist` to the parsing command.

```

1292 <<*Macros local to BabelCommands>> ≡
1293 \newcommand\SetCase[3][]{%
1294   \bbl@patchuclc
1295   \bbl@forlang\bbl@tempa{%
1296     \expandafter\bbl@encstring
1297     \csname\bbl@tempa @bbl@uclc\endcsname{\bbl@tempa##1}%
1298     \expandafter\bbl@encstring
1299     \csname\bbl@tempa @bbl@uc\endcsname{##2}%
1300     \expandafter\bbl@encstring
1301     \csname\bbl@tempa @bbl@lc\endcsname{##3}}}%
1302 <</Macros local to BabelCommands>>

```

Macros to deal with case mapping for hyphenation. To decide if the document is monolingual or multilingual, we make a rough guess – just see if there is a comma in the languages list, built in the first pass of the package options.

```

1303 <<*Macros local to BabelCommands>> ≡
1304 \newcommand\SetHyphenMap[1]{%
1305   \bbl@forlang\bbl@tempa{%
1306     \expandafter\bbl@stringdef
1307     \csname\bbl@tempa @bbl@hyphenmap\endcsname{##1}}}%
1308 <</Macros local to BabelCommands>>

```

There are 3 helper macros which do most of the work for you.

```

1309 \newcommand\BabelLower[2]{% one to one.
1310   \ifnum\lccode#1=#2\else
1311     \babel@savevariable{\lccode#1}%
1312     \lccode#1=#2\relax
1313   \fi}
1314 \newcommand\BabelLowerMM[4]{% many-to-many
1315   \@tempcnta=#1\relax
1316   \@tempcntb=#4\relax
1317   \def\bbl@tempa{%

```

```

1318 \ifnum\@tempcnta>#2\else
1319 \expandtwoargs\BabelLower{\the\@tempcnta}{\the\@tempcntb}%
1320 \advance\@tempcnta#3\relax
1321 \advance\@tempcntb#3\relax
1322 \expandafter\bbl@tempa
1323 \fi}%
1324 \bbl@tempa}
1325 \newcommand\BabelLowerM0[4]{% many-to-one
1326 \@tempcnta=#1\relax
1327 \def\bbl@tempa{%
1328 \ifnum\@tempcnta>#2\else
1329 \expandtwoargs\BabelLower{\the\@tempcnta}{#4}%
1330 \advance\@tempcnta#3
1331 \expandafter\bbl@tempa
1332 \fi}%
1333 \bbl@tempa}

```

The following package options control the behaviour of hyphenation mapping.

```

1334 <<{*More package options}>> ≡
1335 \DeclareOption{hyphenmap=off}{\chardef\bbl@opt@hyphenmap\z@}
1336 \DeclareOption{hyphenmap=first}{\chardef\bbl@opt@hyphenmap\@ne}
1337 \DeclareOption{hyphenmap=select}{\chardef\bbl@opt@hyphenmap\tw@}
1338 \DeclareOption{hyphenmap=other}{\chardef\bbl@opt@hyphenmap\thr@}
1339 \DeclareOption{hyphenmap=other*}{\chardef\bbl@opt@hyphenmap4\relax}
1340 <</More package options>>

```

Initial setup to provide a default behaviour if hyphenmap is not set.

```

1341 \AtEndOfPackage{%
1342 \ifx\bbl@opt@hyphenmap\undefined
1343 \expandtwoargs\in@{,}{\bbl@language@opts}%
1344 \chardef\bbl@opt@hyphenmap\ifin@4\else\@ne\fi
1345 \fi}

```

8.10 Macros common to a number of languages

`\set@low@box` The following macro is used to lower quotes to the same level as the comma. It prepares its argument in box register 0.

```

1346 \def\set@low@box#1{\setbox\tw@\hbox{,}\setbox\z@\hbox{#1}%
1347 \dimen\z@=\ht\z@ \advance\dimen\z@ -\ht\tw@%
1348 \setbox\z@\hbox{\lower\dimen\z@ \box\z@}\ht\z@\ht\tw@ \dp\z@\dp\tw@}

```

`\save@sf@q` The macro `\save@sf@q` is used to save and reset the current space factor.

```

1349 \def\save@sf@q#1{\leavevmode
1350 \begingroup
1351 \edef\@SF{\spacefactor\the\spacefactor}#1\@SF
1352 \endgroup}

```

8.11 Making glyphs available

This section makes a number of glyphs available that either do not exist in the OT1 encoding and have to be ‘faked’, or that are not accessible through T1enc.def.

8.11.1 Quotation marks

`\quotedblbase` In the T1 encoding the opening double quote at the baseline is available as a separate character, accessible via `\quotedblbase`. In the OT1 encoding it is not

available, therefore we make it available by lowering the normal open quote character to the baseline.

```
1353 \ProvideTextCommand{\quotedblbase}{OT1}{%
1354 \save@sf@q{\set@low@box{\textquotedblright\}}%
1355 \box\z@\kern-.04em\bbl@allowhyphens}}
```

Make sure that when an encoding other than OT1 or T1 is used this glyph can still be typeset.

```
1356 \ProvideTextCommandDefault{\quotedblbase}{%
1357 \UseTextSymbol{OT1}{\quotedblbase}}
```

`\quotesinglbase` We also need the single quote character at the baseline.

```
1358 \ProvideTextCommand{\quotesinglbase}{OT1}{%
1359 \save@sf@q{\set@low@box{\textquoteright\}}%
1360 \box\z@\kern-.04em\bbl@allowhyphens}}
```

Make sure that when an encoding other than OT1 or T1 is used this glyph can still be typeset.

```
1361 \ProvideTextCommandDefault{\quotesinglbase}{%
1362 \UseTextSymbol{OT1}{\quotesinglbase}}
```

`\guillemotleft` The guillemet characters are not available in OT1 encoding. They are faked.

```
\guillemotright 1363 \ProvideTextCommand{\guillemotleft}{OT1}{%
1364 \ifmmode
1365 \ll
1366 \else
1367 \save@sf@q{\nobreak
1368 \raise.2ex\hbox{\scriptscriptstyle\ll}\bbl@allowhyphens}%
1369 \fi}
1370 \ProvideTextCommand{\guillemotright}{OT1}{%
1371 \ifmmode
1372 \gg
1373 \else
1374 \save@sf@q{\nobreak
1375 \raise.2ex\hbox{\scriptscriptstyle\gg}\bbl@allowhyphens}%
1376 \fi}
```

Make sure that when an encoding other than OT1 or T1 is used these glyphs can still be typeset.

```
1377 \ProvideTextCommandDefault{\guillemotleft}{%
1378 \UseTextSymbol{OT1}{\guillemotleft}}
1379 \ProvideTextCommandDefault{\guillemotright}{%
1380 \UseTextSymbol{OT1}{\guillemotright}}
```

`\guilsinglleft` The single guillemets are not available in OT1 encoding. They are faked.

```
\guilsinglright 1381 \ProvideTextCommand{\guilsinglleft}{OT1}{%
1382 \ifmmode
1383 <%
1384 \else
1385 \save@sf@q{\nobreak
1386 \raise.2ex\hbox{\scriptscriptstyle<}\bbl@allowhyphens}%
1387 \fi}
1388 \ProvideTextCommand{\guilsinglright}{OT1}{%
1389 \ifmmode
1390 >%
1391 \else
1392 \save@sf@q{\nobreak
1393 \raise.2ex\hbox{\scriptscriptstyle>}\bbl@allowhyphens}%
1394 \fi}
```

Make sure that when an encoding other than OT1 or T1 is used these glyphs can still be typeset.

```
1395 \ProvideTextCommandDefault{\guilsinglleft}{%
1396 \UseTextSymbol{OT1}{\guilsinglleft}}
1397 \ProvideTextCommandDefault{\guilsinglright}{%
1398 \UseTextSymbol{OT1}{\guilsinglright}}
```

8.11.2 Letters

`\ij` The dutch language uses the letter 'ij'. It is available in T1 encoded fonts, but not in `\IJ` the OT1 encoded fonts. Therefore we fake it for the OT1 encoding.

```
1399 \DeclareTextCommand{\ij}{OT1}{%
1400 i\kern-0.02em\bbl@allowhyphens j}
1401 \DeclareTextCommand{\IJ}{OT1}{%
1402 I\kern-0.02em\bbl@allowhyphens J}
1403 \DeclareTextCommand{\ij}{T1}{\char188}
1404 \DeclareTextCommand{\IJ}{T1}{\char156}
```

Make sure that when an encoding other than OT1 or T1 is used these glyphs can still be typeset.

```
1405 \ProvideTextCommandDefault{\ij}{%
1406 \UseTextSymbol{OT1}{\ij}}
1407 \ProvideTextCommandDefault{\IJ}{%
1408 \UseTextSymbol{OT1}{\IJ}}
```

`\dj` The croatian language needs the letters `\dj` and `\DJ`; they are available in the T1 `\DJ` encoding, but not in the OT1 encoding by default.

Some code to construct these glyphs for the OT1 encoding was made available to me by Stipcevic Mario, (stipcevic@olimp.irb.hr).

```
1409 \def\crrtic@{\hrule height0.1ex width0.3em}
1410 \def\crttic@{\hrule height0.1ex width0.33em}
1411 \def\ddj@{%
1412 \setbox0\hbox{d}\dimen@=\ht0
1413 \advance\dimen@lex
1414 \dimen@.45\dimen@
1415 \dimen@ii\expandafter\rem@pt\the\fontdimen\@ne\font\dimen@
1416 \advance\dimen@ii.5ex
1417 \leavevmode\rlap{\raise\dimen@\hbox{\kern\dimen@ii\vbox{\crrtic@}}}}
1418 \def\DDJ@{%
1419 \setbox0\hbox{D}\dimen@=.55\ht0
1420 \dimen@ii\expandafter\rem@pt\the\fontdimen\@ne\font\dimen@
1421 \advance\dimen@ii.15ex % correction for the dash position
1422 \advance\dimen@ii-.15\fontdimen7\font % correction for cmtt font
1423 \dimen\thr@@\expandafter\rem@pt\the\fontdimen7\font\dimen@
1424 \leavevmode\rlap{\raise\dimen@\hbox{\kern\dimen@ii\vbox{\crttic@}}}}
1425 %
1426 \DeclareTextCommand{\dj}{OT1}{\ddj@ d}
1427 \DeclareTextCommand{\DJ}{OT1}{\DDJ@ D}
```

Make sure that when an encoding other than OT1 or T1 is used these glyphs can still be typeset.

```
1428 \ProvideTextCommandDefault{\dj}{%
1429 \UseTextSymbol{OT1}{\dj}}
1430 \ProvideTextCommandDefault{\DJ}{%
1431 \UseTextSymbol{OT1}{\DJ}}
```

`\SS` For the T1 encoding `\SS` is defined and selects a specific glyph from the font, but for other encodings it is not available. Therefore we make it available here.

```
1432 \DeclareTextCommand{\SS}{OT1}{SS}
1433 \ProvideTextCommandDefault{\SS}{\UseTextSymbol{OT1}{SS}}
```

8.11.3 Shorthands for quotation marks

Shorthands are provided for a number of different quotation marks, which make them usable both outside and inside mathmode.

`\glq` The ‘german’ single quotes.

```
\grq
1434 \ProvideTextCommand{\glq}{OT1}{%
1435 \textormath{\quotesinglbase}{\mbox{\quotesinglbase}}}
1436 \ProvideTextCommand{\glq}{T1}{%
1437 \textormath{\quotesinglbase}{\mbox{\quotesinglbase}}}
1438 \ProvideTextCommandDefault{\glq}{\UseTextSymbol{OT1}\glq}
```

The definition of `\grq` depends on the fontencoding. With T1 encoding no extra kerning is needed.

```
1439 \ProvideTextCommand{\grq}{T1}{%
1440 \textormath{\textquoteleft}{\mbox{\textquoteleft}}}
1441 \ProvideTextCommand{\grq}{OT1}{%
1442 \save@sf@q{\kern-.0125em%
1443 \textormath{\textquoteleft}{\mbox{\textquoteleft}}}%
1444 \kern.07em\relax}}
1445 \ProvideTextCommandDefault{\grq}{\UseTextSymbol{OT1}\grq}
```

`\glqq` The ‘german’ double quotes.

```
\grqq
1446 \ProvideTextCommand{\glqq}{OT1}{%
1447 \textormath{\quotedblbase}{\mbox{\quotedblbase}}}
1448 \ProvideTextCommand{\glqq}{T1}{%
1449 \textormath{\quotedblbase}{\mbox{\quotedblbase}}}
1450 \ProvideTextCommandDefault{\glqq}{\UseTextSymbol{OT1}\glqq}
```

The definition of `\grqq` depends on the fontencoding. With T1 encoding no extra kerning is needed.

```
1451 \ProvideTextCommand{\grqq}{T1}{%
1452 \textormath{\textquotedblleft}{\mbox{\textquotedblleft}}}
1453 \ProvideTextCommand{\grqq}{OT1}{%
1454 \save@sf@q{\kern-.07em%
1455 \textormath{\textquotedblleft}{\mbox{\textquotedblleft}}}%
1456 \kern.07em\relax}}
1457 \ProvideTextCommandDefault{\grqq}{\UseTextSymbol{OT1}\grqq}
```

`\flq` The ‘french’ single guillemets.

```
\frq
1458 \ProvideTextCommand{\flq}{OT1}{%
1459 \textormath{\guilsinglleft}{\mbox{\guilsinglleft}}}
1460 \ProvideTextCommand{\flq}{T1}{%
1461 \textormath{\guilsinglleft}{\mbox{\guilsinglleft}}}
1462 \ProvideTextCommandDefault{\flq}{\UseTextSymbol{OT1}\flq}
1463 \ProvideTextCommand{\frq}{OT1}{%
1464 \textormath{\guilsinglright}{\mbox{\guilsinglright}}}
1465 \ProvideTextCommand{\frq}{T1}{%
1466 \textormath{\guilsinglright}{\mbox{\guilsinglright}}}
1467 \ProvideTextCommandDefault{\frq}{\UseTextSymbol{OT1}\frq}
```

```

\flqq The ‘french’ double guillemets.
\frqq 1468 \ProvideTextCommand{\flqq}{OT1}{%
1469 \textormath{\guillemotleft}{\mbox{\guillemotleft}}}
1470 \ProvideTextCommand{\flqq}{T1}{%
1471 \textormath{\guillemotleft}{\mbox{\guillemotleft}}}
1472 \ProvideTextCommandDefault{\flqq}{\UseTextSymbol{OT1}\flqq}
1473 \ProvideTextCommand{\frqq}{OT1}{%
1474 \textormath{\guillemotright}{\mbox{\guillemotright}}}
1475 \ProvideTextCommand{\frqq}{T1}{%
1476 \textormath{\guillemotright}{\mbox{\guillemotright}}}
1477 \ProvideTextCommandDefault{\frqq}{\UseTextSymbol{OT1}\frqq}

```

8.11.4 Umlauts and tremas

The command `\` needs to have a different effect for different languages. For German for instance, the ‘umlaut’ should be positioned lower than the default position for placing it over the letters a, o, u, A, O and U. When placed over an e, i, E or I it can retain its normal position. For Dutch the same glyph is always placed in the lower position.

`\umlauthigh` To be able to provide both positions of `\` we provide two commands to switch the
`\umlautlow` positioning, the default will be `\umlauthigh` (the normal positioning).

```

1478 \def\umlauthigh{%
1479 \def\bb@umlauta##1{\leavevmode\bgroup%
1480 \expandafter\accent\csname\fontencoding dqpos\endcsname
1481 ##1\bb@allowhyphens\egroup}%
1482 \let\bb@umlaute\bb@umlauta}
1483 \def\umlautlow{%
1484 \def\bb@umlauta{\protect\lower@umlaut}}
1485 \def\umlautelower{%
1486 \def\bb@umlaute{\protect\lower@umlaut}}
1487 \umlauthigh

```

`\lower@umlaut` The command `\lower@umlaut` is used to position the `\` closer to the letter. We want the umlaut character lowered, nearer to the letter. To do this we need an extra *⟨dimen⟩* register.

```

1488 \expandafter\ifx\csname U@D\endcsname\relax
1489 \csname newdimen\endcsname\U@D
1490 \fi

```

The following code fools \TeX 's `make_accent` procedure about the current x-height of the font to force another placement of the umlaut character. First we have to save the current x-height of the font, because we'll change this font dimension and this is always done globally.

Then we compute the new x-height in such a way that the umlaut character is lowered to the base character. The value of `.45ex` depends on the METAFONT parameters with which the fonts were built. (Just try out, which value will look best.) If the new x-height is too low, it is not changed. Finally we call the `\accent` primitive, reset the old x-height and insert the base character in the argument.

```

1491 \def\lower@umlaut#1{%
1492 \leavevmode\bgroup
1493 \U@D 1ex%
1494 {\setbox\z@\hbox{%
1495 \expandafter\char\csname\fontencoding dqpos\endcsname}%
1496 \dimen@ -.45ex\advance\dimen@\ht\z@
1497 \ifdim 1ex<\dimen@ \fontdimen5\font\dimen@ \fi}%

```



```

1498 \expandafter\accent\csname\f@encoding dqpos\endcsname
1499 \fontdimen5\font\U@D #1%
1500 \egroup}

```

For all vowels we declare `\` to be a composite command which uses `\bbl@umlauta` or `\bbl@umlaute` to position the umlaut character. We need to be sure that these definitions override the ones that are provided when the package `fontenc` with option `OT1` is used. Therefore these declarations are postponed until the beginning of the document. Note these definitions only apply to some languages, but `babel` sets them for *all* languages – you may want to redefine `\bbl@umlauta` and/or `\bbl@umlaute` for a language in the corresponding `ldf` (using the `babel` switching mechanism, of course).

```

1501 \AtBeginDocument{%
1502 \DeclareTextCompositeCommand{\"}{OT1}{a}{\bbl@umlauta{a}}%
1503 \DeclareTextCompositeCommand{\"}{OT1}{e}{\bbl@umlaute{e}}%
1504 \DeclareTextCompositeCommand{\"}{OT1}{i}{\bbl@umlaute{i}}%
1505 \DeclareTextCompositeCommand{\"}{OT1}{\i}{\bbl@umlaute{i}}%
1506 \DeclareTextCompositeCommand{\"}{OT1}{o}{\bbl@umlauta{o}}%
1507 \DeclareTextCompositeCommand{\"}{OT1}{u}{\bbl@umlauta{u}}%
1508 \DeclareTextCompositeCommand{\"}{OT1}{A}{\bbl@umlauta{A}}%
1509 \DeclareTextCompositeCommand{\"}{OT1}{E}{\bbl@umlaute{E}}%
1510 \DeclareTextCompositeCommand{\"}{OT1}{I}{\bbl@umlaute{I}}%
1511 \DeclareTextCompositeCommand{\"}{OT1}{O}{\bbl@umlauta{O}}%
1512 \DeclareTextCompositeCommand{\"}{OT1}{U}{\bbl@umlauta{U}}%
1513 }

```

Finally, the default is to use English as the main language.

```

1514 \ifx\l@english\undefined
1515 \chardef\l@english\z@
1516 \fi
1517 \main@language{english}

```

Now we load definition files for engines.

```

1518 \ifcase\bbl@engine\or
1519 \input luababel.def
1520 \or
1521 \input xebabel.def
1522 \fi

```

9 The kernel of Babel (`babel.def`, only \LaTeX)

9.1 The redefinition of the style commands

The rest of the code in this file can only be processed by \LaTeX , so we check the current format. If it is plain \TeX , processing should stop here. But, because of the need to limit the scope of the definition of `\format`, a macro that is used locally in the following `\if` statement, this comparison is done inside a group. To prevent \TeX from complaining about an unclosed group, the processing of the command `\endinput` is deferred until after the group is closed. This is accomplished by the command `\aftergroup`.

```

1523 {\def\format{lplain}
1524 \ifx\fmtname\format
1525 \else
1526 \def\format{LaTeX2e}
1527 \ifx\fmtname\format
1528 \else

```

```

1529 \aftergroup\endinput
1530 \fi
1531 \fi}

```

9.2 Creating languages

`\babelprovide` is a general purpose tool for creating languages. Currently it just creates the language infrastructure, but in the future it will be able to read data from ini files, as well as to create variants. Unlike the nil pseudo-language, captions are defined, but with a warning to invite the user to provide the real string.

```

1532 \newcommand\babelprovide[2][]{%
1533 \let\bbl@savelangname\languagename
1534 \def\languagename{#2}%
1535 \let\bbl@KVP@captions\@nil
1536 \let\bbl@KVP@import\@nil
1537 \let\bbl@KVP@main\@nil
1538 \let\bbl@KVP@hyphenrules\@nil
1539 \bbl@forkv{#1}{\bbl@csarg\def{KVP@##1}{##2}}% TODO - error handling
1540 \ifx\bbl@KVP@captions\@nil
1541 \let\bbl@KVP@captions\bbl@KVP@import
1542 \fi
1543 \bbl@ifunset{date#2}%
1544 {\bbl@provide@new{#2}}%
1545 {\bbl@ifblank{#1}%
1546 {\bbl@error
1547 {If you want to modify `#2' you must tell how in\\%
1548 the optional argument. Currently there are two\\%
1549 options: captions=lang-tag, hyphenrules=lang-list}%
1550 {Use this macro as documented}}}%
1551 {\bbl@provide@renew{#2}}}%
1552 \bbl@exp{\\babelensure[exclude=\\today]{#2}}%
1553 \let\languagename\bbl@savelangname}

```

Depending on whether or not the language exists, we define two macros.

```

1554 \def\bbl@provide@new#1{%
1555 \bbl@provide@hyphens{#1}%
1556 \@namedef{date#1}{}% marks lang exists - required by \StartBabelCommands
1557 \@namedef{extras#1}{}%
1558 \@namedef{noextras#1}{}%
1559 \StartBabelCommands*{#1}{captions}%
1560 \ifx\bbl@KVP@captions\@nil % and also if import, implicit
1561 \def\bbl@tempb##1{% elt for \bbl@captionslist
1562 \if##1\@empty\else
1563 \bbl@exp{%
1564 \\SetString\\##1{%
1565 \\bbl@nocaption{\bbl@stripslash##1}{\<#1\bbl@stripslash##1>}}%
1566 \expandafter\bbl@tempb
1567 \fi}%
1568 \expandafter\bbl@tempb\bbl@captionslist\@empty
1569 \else
1570 \bbl@read@ini{\bbl@KVP@captions}% Here all letters cat = 11
1571 \bbl@after@ini
1572 \bbl@savestrings
1573 \fi
1574 \StartBabelCommands*{#1}{date}%
1575 \ifx\bbl@KVP@import\@nil
1576 \bbl@exp{%
1577 \\SetString\\today{\\bbl@nocaption{today}{\<#1today>}}}%

```

```

1578 \else
1579 \bbl@savetoday
1580 \bbl@savedate
1581 \fi
1582 \EndBabelCommands
1583 \bbl@exp{%
1584 \def\<#1hyphenmins>{%
1585 {\bbl@ifunset{bbl@lfthm@#1}{2}{\@nameuse{bbl@lfthm@#1}}}%
1586 {\bbl@ifunset{bbl@rgthm@#1}{3}{\@nameuse{bbl@rgthm@#1}}}%
1587 \ifx\bbl@KVP@main\@nil\else
1588 \expandafter\main@language\expandafter{#1}%
1589 \fi}
1590 \def\bbl@provide@renew#1{%
1591 \bbl@provide@hyphens{#1}%
1592 \ifx\bbl@KVP@captions\@nil\else
1593 \StartBabelCommands*{#1}{captions}%
1594 \bbl@read@ini{\bbl@KVP@captions}% Here all letters cat = 11
1595 \bbl@after@ini
1596 \bbl@savestrings
1597 \EndBabelCommands
1598 \fi
1599 \ifx\bbl@KVP@import\@nil\else
1600 \StartBabelCommands*{#1}{date}%
1601 \bbl@savetoday
1602 \bbl@savedate
1603 \EndBabelCommands
1604 \fi}

```

The hyphenrules option is handled with an auxiliary macro.

```

1605 \def\bbl@provide@hyphens#1{%
1606 \let\bbl@tempa\relax
1607 \ifx\bbl@KVP@hyphenrules\@nil\else
1608 \bbl@replace\bbl@KVP@hyphenrules{ },{,}%
1609 \bbl@foreach\bbl@KVP@hyphenrules{%
1610 \ifx\bbl@tempa\relax % if not yet found
1611 \bbl@ifsamestring{##1}{+}%
1612 {\bbl@exp{\addlanguage\<l@##1>}}%
1613 }%
1614 \bbl@ifunset{l@##1}%
1615 }%
1616 {\bbl@exp{\let\bbl@tempa\<l@##1>}}%
1617 \fi}%
1618 \fi
1619 \ifx\bbl@tempa\relax % if no option or no language found
1620 \bbl@ifunset{l@#1}% no hyphenrules found - fallback
1621 {\bbl@exp{\adddialect\<l@#1>\language}}%
1622 }%
1623 \else
1624 \bbl@exp{\adddialect\<l@#1>\bbl@tempa}% found in opt list
1625 \fi}

```

The reader of ini files. There are 3 possible cases: a section name (in the form [...]), a comment (starting with ;) and a key/value pair. *TODO - Work in progress.*

```

1626 \def\bbl@read@ini#1{%
1627 \openin1=babel-#1.ini
1628 \ifeof1
1629 \bbl@error
1630 {There is no ini file for the requested language\%
1631 (#1). Perhaps you misspelled it or your installation\%

```

```

1632     is not complete.}%
1633     {Fix the name or reinstall babel.}%
1634 \else
1635   \let\bbl@section\@empty
1636   \let\bbl@savestrings\@empty
1637   \let\bbl@savetoday\@empty
1638   \let\bbl@savestate\@empty
1639   \let\bbl@inireader\bbl@iniskip
1640   \bbl@info{Importing data from babel-#1.ini for \language}%
1641   \loop
1642     \endlinechar\m@ne
1643     \readl to \bbl@line
1644     \endlinechar`\^^M
1645     \if T\ifeof\F\fi T\relax % Trick, because inside \loop
1646     \ifx\bbl@line\@empty\else
1647       \expandafter\bbl@iniline\bbl@line\bbl@iniline
1648     \fi
1649   \repeat
1650 \fi}
1651 \def\bbl@iniline#1\bbl@iniline{%
1652 \@ifnextchar[\bbl@inisec{\@ifnextchar;\bbl@iniskip\bbl@inireader}#1\@}% ]

```

The special cases for comment lines and sections are handled by the two following commands. In sections, we provide the possibility to take extra actions at the end or at the start (TODO - but note the last section is not ended). By default, key=val pairs are ignored.

```

1653 \def\bbl@iniskip#1\@{ }%      if starts with ;
1654 \def\bbl@inisec[#1]#2\@{ }%  if starts with opening bracket
1655 \@nameuse{bbl@secpost@bbl@section}% ends previous section
1656 \def\bbl@section{#1}%
1657 \@nameuse{bbl@secpre@bbl@section}% starts current section
1658 \bbl@ifunset{bbl@secline#1}%
1659   {\let\bbl@inireader\bbl@iniskip}%
1660   {\bbl@exp{\let\\bbl@inireader\<bbl@secline#1>}}}

```

Reads a key=val line and stores the trimmed val in \bbl@kv@<section>.<key>.

```

1661 \def\bbl@inikv#1=#2\@{ }%    key=value
1662 \bbl@trim@def\bbl@tempa{#1}%
1663 \bbl@trim\toks@{#2}%
1664 \bbl@csarg\edef{kv@bbl@section.\bbl@tempa}{\the\toks@}

```

The previous assignments are local, so we need to export them. If the value is empty, we can provide a default value.

```

1665 \def\bbl@exportkey#1#2#3{%
1666 \bbl@ifunset{bbl@kv#2}%
1667   {\bbl@csarg\gdef{#1@language}{#3}}%
1668   {\expandafter\ifx\csname bbl@kv#2\endcsname\@empty
1669     \bbl@csarg\gdef{#1@language}{#3}}%
1670   \else
1671     \bbl@exp{\global\let\<bbl@#1@language>\<bbl@kv#2>}%
1672   \fi}}

```

Key-value pairs are treated differently depending on the section in the ini file. The following macros are the readers for identification and typography.

```

1673 \let\bbl@secline@identification\bbl@inikv
1674 \def\bbl@secpost@identification{%
1675 \bbl@exportkey{lname}{identification.name.english}{ }%
1676 \bbl@exportkey{lbcpr}{identification.tag.bcp47}{ }%
1677 \bbl@exportkey{lotf}{identification.tag.opentype}{dflt}%

```

```

1678 \bbl@exportkey{sname}{identification.script.name}{}%
1679 \bbl@exportkey{sbcpr}{identification.script.tag.bcp47}{}%
1680 \bbl@exportkey{sotf}{identification.script.tag.opentype}{DFLT}}
1681 \let\bbl@secline@typography\bbl@inikv
1682 \def\bbl@after@ini{%
1683 \bbl@exportkey{lftm}{typography.lefthyphenmin}{2}%
1684 \bbl@exportkey{rgtm}{typography.righthyphenmin}{3}%
1685 \def\bbl@tempa{0.9}%
1686 \bbl@csarg\ifx{@kv@identification.version}\bbl@tempa
1687 \bbl@warning{%
1688 The '\language' date format may not be suitable\\%
1689 for proper typesetting, and therefore it very likely will\\%
1690 change in a future release. Reported}%
1691 \fi
1692 \bbl@tglobal\bbl@savetoday
1693 \bbl@tglobal\bbl@savestate}

```

Now captions and captions.licr, depending on the engine. And also for dates. They rely on a few auxiliary macros.

```

1694 \ifcase\bbl@engine
1695 \bbl@csarg\def{secline@captions.licr}#1=#2@@{%
1696 \bbl@ini@captions@aux{#1}{#2}}
1697 \bbl@csarg\def{secline@date.gregorian}#1=#2@@{% for defaults
1698 \bbl@ini@dategreg#1...\relax{#2}}
1699 \bbl@csarg\def{secline@date.gregorian.licr}#1=#2@@{% override
1700 \bbl@ini@dategreg#1...\relax{#2}}
1701 \else
1702 \def\bbl@secline@captions#1=#2@@{%
1703 \bbl@ini@captions@aux{#1}{#2}}
1704 \bbl@csarg\def{secline@date.gregorian}#1=#2@@{%
1705 \bbl@ini@dategreg#1...\relax{#2}}
1706 \fi

```

The auxiliary macro for captions define \<caption>name.

```

1707 \def\bbl@ini@captions@aux#1#2{%
1708 \bbl@trim@def\bbl@tempa{#1}%
1709 \bbl@ifblank{#2}%
1710 {\bbl@exp{%
1711 \toks@{\bbl@nocaption{\bbl@tempa}\<\language\bbl@tempa name>}}}%
1712 {\bbl@trim\toks@{#2}}}%
1713 \bbl@exp{%
1714 \bbl@add\bbl@savestrings{%
1715 \SetString\<\bbl@tempa name>{\the\toks@}}}}

```

But dates are more complex. The full date format is stores in date.gregorian, so we must read it in non-Unicode engines, too.

```

1716 \bbl@csarg\def{secpredate.gregorian.licr}{%
1717 \ifcase\bbl@engine\let\bbl@savestate@empty\fi}
1718 \def\bbl@ini@dategreg#1.#2.#3.#4\relax#5{% TODO - ignore with 'captions'
1719 \bbl@trim@def\bbl@tempa{#1.#2}%
1720 \bbl@ifsamestring{\bbl@tempa}{months.wide}%
1721 {\bbl@trim@def\bbl@tempa{#3}%
1722 \bbl@trim\toks@{#5}%
1723 \bbl@exp{%
1724 \bbl@add\bbl@savestate{%
1725 \SetString\<month\romannumeral\bbl@tempa name>{\the\toks@}}}}%
1726 {\bbl@ifsamestring{\bbl@tempa}{date.long}}%
1727 {\bbl@trim@def\bbl@toreplace{#5}%
1728 \bbl@TG@@date}

```

```

1729 \global\bb1@csarg\let{date@\languagenam}\bb1@toreplace
1730 \bb1@exp{%
1731 \gdef<\languagenam date>####1####2####3{%
1732 \<bb1@ensure@\languagenam>{%
1733 \<bb1@date@\languagenam>{####1}{####2}{####3}}}%
1734 \\bb1@add\\bb1@savetoday{%
1735 \\SetString\\today{%
1736 \<\languagenam date>{\year}{\month}{\day}}}}}%
1737 {}

```

Dates will require some macros for the basic formatting. They may be redefined by language, so “semi-public” names (camel case) are used. Oddly enough, the CLDR places particles like “de” inconsistently in either in the date or in the month name.

```

1738 \newcommand\BabelDateSpace{\nobreakspace{}}
1739 \newcommand\BabelDateDot{.\@}
1740 \newcommand\BabelDated[1]{\number#1}
1741 \newcommand\BabelDatedd[1]{\ifnum#1<10 0\fi\number#1}
1742 \newcommand\BabelDateM[1]{\number#1}
1743 \newcommand\BabelDateMM[1]{\ifnum#1<10 0\fi\number#1}
1744 \newcommand\BabelDateMMM[1]{%
1745 \csname month\romannumeral\month name\endcsname}}%
1746 \newcommand\BabelDatey[1]{\number#1}%
1747 \newcommand\BabelDateyy[1]{%
1748 \ifnum#1<10 0\number#1 %
1749 \else\ifnum#1<100 \number#1 %
1750 \else\ifnum#1<1000 \expandafter@gobble\number#1 %
1751 \else\ifnum#1<10000 \expandafter@gobbletwo\number#1 %
1752 \else
1753 \bb1@error
1754 {Currently two-digit years are restricted to the\
1755 range 0-9999.}%
1756 {There is little you can do. Sorry.}%
1757 \fi\fi\fi\fi}}
1758 \newcommand\BabelDateyyyy[1]{\number#1}
1759 \def\bb1@replace@finish@iii#1{%
1760 \bb1@exp{\def\#1####1####2####3\the\toks@}}
1761 \def\bb1@TG@@date{%
1762 \bb1@replace\bb1@toreplace{[ ]}{\BabelDateSpace}}%
1763 \bb1@replace\bb1@toreplace{[. ]}{\BabelDateDot}}%
1764 \bb1@replace\bb1@toreplace{[d]}{\BabelDated{####3}}%
1765 \bb1@replace\bb1@toreplace{[dd]}{\BabelDatedd{####3}}%
1766 \bb1@replace\bb1@toreplace{[M]}{\BabelDateM{####2}}%
1767 \bb1@replace\bb1@toreplace{[MM]}{\BabelDateMM{####2}}%
1768 \bb1@replace\bb1@toreplace{[MMM]}{\BabelDateMMM{####2}}%
1769 \bb1@replace\bb1@toreplace{[y]}{\BabelDatey{####1}}%
1770 \bb1@replace\bb1@toreplace{[yy]}{\BabelDateyy{####1}}%
1771 \bb1@replace\bb1@toreplace{[yyyy]}{\BabelDateyyyy{####1}}%
1772 % Note after \bb1@replace \toks@ contains the resulting string.
1773 % TODO - Using this implicit behavior doesn't seem a good idea.
1774 \bb1@replace@finish@iii\bb1@toreplace}

```

9.3 Cross referencing macros

The \LaTeX book states:

The key argument is any sequence of letters, digits, and punctuation symbols; upper- and lowercase letters are regarded as different.

When the above quote should still be true when a document is typeset in a language that has active characters, special care has to be taken of the category codes of these characters when they appear in an argument of the cross referencing macros. When a cross referencing command processes its argument, all tokens in this argument should be character tokens with category ‘letter’ or ‘other’.

The only way to accomplish this in most cases is to use the trick described in the *T_EXbook* [1] (Appendix D, page 382). The primitive `\meaning` applied to a token expands to the current meaning of this token. For example, `\meaning\A` with `\A` defined as `\def\A#1{\B}` expands to the characters `‘macro:#1->\B’` with all category codes set to ‘other’ or ‘space’.

`\newlabel` The macro `\label` writes a line with a `\newlabel` command into the `.aux` file to define labels.

```
1775 %\bbl@redefine\newlabel#1#2{%
1776 % \@safe@activestru\org@newlabel{#1}{#2}\@safe@activesfalse}
```

`\@newl@bel` We need to change the definition of the L^AT_EX-internal macro `\@newl@bel`. This is needed because we need to make sure that shorthand characters expand to their non-active version.

The following package options control which macros are to be redefined.

```
1777 <<{*More package options}>> ≡
1778 \DeclareOption{safe=none}{\let\bbl@opt@safe\empty}
1779 \DeclareOption{safe=bib}{\def\bbl@opt@safe{B}}
1780 \DeclareOption{safe=ref}{\def\bbl@opt@safe{R}}
1781 <</More package options>>
```

First we open a new group to keep the changed setting of `\protect` local and then we set the `@safe@actives` switch to true to make sure that any shorthand that appears in any of the arguments immediately expands to its non-active self.

```
1782 \ifx\bbl@opt@safe\empty\else
1783 \def\@newl@bel#1#2#3{%
1784   {\@safe@activestru
1785     \bbl@ifunset{#1@#2}%
1786     \relax
1787     {\gdef\@multiplelabels{%
1788       \@latex@warning@no@line{There were multiply-defined labels}}%
1789       \@latex@warning@no@line{Label `#2' multiply defined}}%
1790     \global\@namedef{#1@#2}{#3}}}
```

`\@testdef` An internal L^AT_EX macro used to test if the labels that have been written on the `.aux` file have changed. It is called by the `\enddocument` macro. This macro needs to be completely rewritten, using `\meaning`. The reason for this is that in some cases the expansion of `\#1@#2` contains the same characters as the `#3`; but the character codes differ. Therefore L^AT_EX keeps reporting that the labels may have changed.

```
1791 \CheckCommand*\@testdef[3]{%
1792   \def\reserved@a{#3}%
1793   \expandafter\ifx\csname#1@#2\endcsname\reserved@a
1794   \else
1795     \@tempwatru
1796   \fi}
```

Now that we made sure that `\@testdef` still has the same definition we can rewrite it. First we make the shorthands ‘safe’.

```
1797 \def\@testdef#1#2#3{%
1798   \@safe@activestru
```

Then we use `\bbl@tempa` as an ‘alias’ for the macro that contains the label which is being checked.

```
1799 \expandafter\let\expandafter\bbl@tempa\csname #1@#2\endcsname
```

Then we define `\bbl@tempb` just as `\@newl@bel` does it.

```
1800 \def\bbl@tempb{#3}%
1801 \@safe@activesfalse
```

When the label is defined we replace the definition of `\bbl@tempa` by its meaning.

```
1802 \ifx\bbl@tempa\relax
1803 \else
1804 \edef\bbl@tempa{\expandafter\strip@prefix\meaning\bbl@tempa}%
1805 \fi
```

We do the same for `\bbl@tempb`.

```
1806 \edef\bbl@tempb{\expandafter\strip@prefix\meaning\bbl@tempb}%
```

If the label didn’t change, `\bbl@tempa` and `\bbl@tempb` should be identical macros.

```
1807 \ifx\bbl@tempa\bbl@tempb
1808 \else
1809 \@tempswatruue
1810 \fi}
1811 \fi
```

`\ref` `\pageref` The same holds for the macro `\ref` that references a label and `\pageref` to reference a page. So we redefine `\ref` and `\pageref`. While we change these macros, we make them robust as well (if they weren’t already) to prevent problems if they should become expanded at the wrong moment.

```
1812 \@expandtwoargs\in@{R}\bbl@opt@safe
1813 \ifin@
1814 \bbl@redefineroobust\ref#1{%
1815 \@safe@activestruue\org@ref{#1}\@safe@activesfalse}
1816 \bbl@redefineroobust\pageref#1{%
1817 \@safe@activestruue\org@pageref{#1}\@safe@activesfalse}
1818 \else
1819 \let\org@ref\ref
1820 \let\org@pageref\pageref
1821 \fi
```

`\@citex` The macro used to cite from a bibliography, `\cite`, uses an internal macro, `\@citex`. It is this internal macro that picks up the argument(s), so we redefine this internal macro and leave `\cite` alone. The first argument is used for typesetting, so the shorthands need only be deactivated in the second argument.

```
1822 \@expandtwoargs\in@{B}\bbl@opt@safe
1823 \ifin@
1824 \bbl@redefine\@citex[#1]#2{%
1825 \@safe@activestruue\edef\@tempa{#2}\@safe@activesfalse
1826 \org@citex[#1]{\@tempa}}
```

Unfortunately, the packages `natbib` and `cite` need a different definition of `\@citex...` To begin with, `natbib` has a definition for `\@citex` with *three* arguments... We only know that a package is loaded when `\begin{document}` is executed, so we need to postpone the different redefinition.

```
1827 \AtBeginDocument{%
1828 \@ifpackageloaded{natbib}{%
```


Notice that we use `\def` here instead of `\bbl@redefine` because `\org@citex` is already defined and we don't want to overwrite that definition (it would result in parameter stack overflow because of a circular definition). (Recent versions of `natbib` change dynamically `\@citex`, so PR4087 doesn't seem fixable in a simple way. Just load `natbib` before.)

```
1829 \def\@citex[#1][#2]#3{%
1830   \@safe@activestruedef\@tempa{#3}\@safe@activesfalse
1831   \org@citex[#1][#2]{\@tempa}}%
1832   {}}
```

The package `cite` has a definition of `\@citex` where the shorthands need to be turned off in both arguments.

```
1833 \AtBeginDocument{%
1834   \@ifpackageloaded{cite}{%
1835     \def\@citex[#1]#2{%
1836       \@safe@activestruedef\org@citex[#1][#2]\@safe@activesfalse}%
1837     }}}
```

`\nocite` The macro `\nocite` which is used to instruct Bi \TeX to extract uncited references from the database.

```
1838 \bbl@redefine\nocite#1{%
1839   \@safe@activestruedef\org@nocite{#1}\@safe@activesfalse}
```

`\bibcite` The macro that is used in the `.aux` file to define citation labels. When packages such as `natbib` or `cite` are not loaded its second argument is used to typeset the citation label. In that case, this second argument can contain active characters but is used in an environment where `\@safe@activestruedef` is in effect. This switch needs to be reset inside the `\hbox` which contains the citation label. In order to determine during `.aux` file processing which definition of `\bibcite` is needed we define `\bibcite` in such a way that it redefines itself with the proper definition.

```
1840 \bbl@redefine\bibcite{%
```

We call `\bbl@cite@choice` to select the proper definition for `\bibcite`. This new definition is then activated.

```
1841   \bbl@cite@choice
1842   \bibcite}
```

`\bbl@bibcite` The macro `\bbl@bibcite` holds the definition of `\bibcite` needed when neither `natbib` nor `cite` is loaded.

```
1843 \def\bbl@bibcite#1#2{%
1844   \org@bibcite{#1}\@safe@activesfalse#2}}
```

`\bbl@cite@choice` The macro `\bbl@cite@choice` determines which definition of `\bibcite` is needed.

```
1845 \def\bbl@cite@choice{%
```

First we give `\bibcite` its default definition.

```
1846   \global\let\bibcite\bbl@bibcite
```

Then, when `natbib` is loaded we restore the original definition of `\bibcite`.

```
1847   \@ifpackageloaded{natbib}{\global\let\bibcite\org@bibcite}{}}
```

For `cite` we do the same.

```
1848   \@ifpackageloaded{cite}{\global\let\bibcite\org@bibcite}{}}
```

Make sure this only happens once.

```
1849   \global\let\bbl@cite@choice\relax}
```

When a document is run for the first time, no .aux file is available, and \bibcite will not yet be properly defined. In this case, this has to happen before the document starts.

```
1850 \AtBeginDocument{\bbl@cite@choice}
```

\@bibitem One of the two internal L^AT_EX macros called by \bibitem that write the citation label on the .aux file.

```
1851 \bbl@redefine\@bibitem#1{%
1852   \@safe@activestrue\org@bibitem{#1}\@safe@activesfalse}
1853 \else
1854   \let\org@nocite\nocite
1855   \let\org@citex\citex
1856   \let\org@bibcite\bibcite
1857   \let\org@bibitem\@bibitem
1858 \fi
```

9.4 Marks

\markright Because the output routine is asynchronous, we must pass the current language attribute to the head lines, together with the text that is put into them. To achieve this we need to adapt the definition of \markright and \markboth somewhat. We check whether the argument is empty; if it is, we just make sure the scratch token register is empty. Next, we store the argument to \markright in the scratch token register. This way these commands will not be expanded later, and we make sure that the text is typeset using the correct language settings. While doing so, we make sure that active characters that may end up in the mark are not disabled by the output routine kicking in while \@safe@activestrue is in effect.

```
1859 \bbl@redefine\markright#1{%
1860   \bbl@ifblank{#1}%
1861   {\org@markright{}}%
1862   {\toks@{#1}%
1863    \bbl@exp{%
1864     \\org@markright{\\protect\\foreignlanguage{\language}%
1865      {\\protect\\bbl@restore@actives\the\toks@}}}}
```

\markboth The definition of \markboth is equivalent to that of \markright, except that we need two token registers. The documentclasses report and book define and set the headings for the page. While doing so they also store a copy of \markboth in \@mkboth. Therefore we need to check whether \@mkboth has already been set. If so we need to do that again with the new definition of \markboth.

```
1866 \ifx\@mkboth\markboth
1867   \def\bbl@tempc{\let\@mkboth\markboth}
1868 \else
1869   \def\bbl@tempc{}
1870 \fi
```

Now we can start the new definition of \markboth

```
1871 \bbl@redefine\markboth#1#2{%
1872   \protected@edef\bbl@tempb##1{%
1873     \protect\foreignlanguage{\language}{\protect\bbl@restore@actives##1}}%
1874   \bbl@ifblank{#1}%
1875     {\toks@{}}%
1876     {\toks@\expandafter{\bbl@tempb{#1}}}%
1877   \bbl@ifblank{#2}%
1878     {\@temptokena{}}%
1879     {\@temptokena\expandafter{\bbl@tempb{#2}}}%
1880   \bbl@exp{\\org@markboth{\the\toks@}{\the\@temptokena}}}
```

and copy it to \@mkboth if necessary.

```
1881 \bbl@tempc
```

9.5 Preventing clashes with other packages

9.5.1 ifthen

`\ifthenelse` Sometimes a document writer wants to create a special effect depending on the page a certain fragment of text appears on. This can be achieved by the following piece of code:

```
% \ifthenelse{\isodd{\pageref{some:label}}}{  
% {code for odd pages}  
% {code for even pages}  
%
```

In order for this to work the argument of `\isodd` needs to be fully expandable. With the above redefinition of `\pageref` it is not in the case of this example. To overcome that, we add some code to the definition of `\ifthenelse` to make things work.

The first thing we need to do is check if the package `ifthen` is loaded. This should be done at `\begin{document}` time.

```
1882 \@expandtwoargs\in@{R}\bbl@opt@safe  
1883 \ifin@  
1884 \AtBeginDocument{%  
1885   \@ifpackageloaded{ifthen}{%
```

Then we can redefine `\ifthenelse`:

```
1886   \bbl@redefine@long\ifthenelse#1#2#3{%
```

We want to revert the definition of `\pageref` and `\ref` to their original definition for the first argument of `\ifthenelse`, so we first need to store their current meanings.

```
1887   \let\bbl@temp@pref\pageref  
1888   \let\pageref\org@pageref  
1889   \let\bbl@temp@ref\ref  
1890   \let\ref\org@ref
```

Then we can set the `\@safe@actives` switch and call the original `\ifthenelse`. In order to be able to use shorthands in the second and third arguments of `\ifthenelse` the resetting of the switch *and* the definition of `\pageref` happens inside those arguments. When the package wasn't loaded we do nothing.

```
1891   \@safe@activestrue  
1892   \org@ifthenelse{#1}%  
1893     {\let\pageref\bbl@temp@pref  
1894      \let\ref\bbl@temp@ref  
1895      \@safe@activesfalse  
1896      #2}%  
1897     {\let\pageref\bbl@temp@pref  
1898      \let\ref\bbl@temp@ref  
1899      \@safe@activesfalse  
1900      #3}%  
1901   }%  
1902 }{}%  
1903 }
```

9.5.2 varioref

`\@@vpageref` When the package `varioref` is in use we need to modify its internal command
`\vrefpagenum` `\@@vpageref` in order to prevent problems when an active character ends up in the
`\Ref` argument of `\vref`.

```
1904 \AtBeginDocument{%
1905   \@ifpackageloaded{varioref}{%
1906     \bbl@redefine\@@vpageref#1[#2]#3{%
1907       \@safe@activestru
1908         \org@@@vpageref{#1}[#2]#3}%
1909     \@safe@activesfalse}%
```

The same needs to happen for `\vrefpagenum`.

```
1910   \bbl@redefine\vrefpagenum#1#2{%
1911     \@safe@activestru
1912       \org@vrefpagenum{#1}#2}%
1913     \@safe@activesfalse}%
```

The package `varioref` defines `\Ref` to be a robust command which uppercases the first character of the reference text. In order to be able to do that it needs to access the expandable form of `\ref`. So we employ a little trick here. We redefine the (internal) command `\Ref_` to call `\org@ref` instead of `\ref`. The disadvantage of this solution is that whenever the definition of `\Ref` changes, this definition needs to be updated as well.

```
1914   \expandafter\def\csname Ref \endcsname#1{%
1915     \protected@edef\@tempa{\org@ref{#1}}\expandafter\MakeUppercase\@tempa}
1916   }{}%
1917 }
1918 \fi
```

9.5.3 holine

`\holine` Delaying the activation of the shorthand characters has introduced a problem with the `holine` package. The reason is that it uses the `'` character which is made active by the french support in `babel`. Therefore we need to *reload* the package when the `'` is an active character.

So at `\begin{document}` we check whether `holine` is loaded.

```
1919 \AtEndOfPackage{%
1920   \AtBeginDocument{%
1921     \@ifpackageloaded{holine}%
```

Then we check whether the expansion of `\normal@char:` is not equal to `\relax`.

```
1922     {\expandafter\ifx\csname normal@char:string:\endcsname\relax
1923     \else
```

In that case we simply reload the package. Note that this happens *after* the category code of the `@`-sign has been changed to other, so we need to temporarily change it to letter again.

```
1924       \makeatletter
1925       \def\@currname{holine}\input{holine.sty}\makeatother
1926       \fi}%
1927     {}}}
```

9.5.4 hyperref

`\pdfstringdefDisableCommands` A number of interworking problems between `babel` and `hyperref` are tackled by `hyperref` itself. The following code was introduced to prevent some annoying warnings but it broke bookmarks. This was quickly fixed in `hyperref`, which essentially made it no-op. However, it will not be removed for the moment because `hyperref` is expecting it.

```
1928 \AtBeginDocument{%
1929   \ifx\pdfstringdefDisableCommands\@undefined\else
1930     \pdfstringdefDisableCommands{\languageshorthands{system}}%
1931   \fi}
```

9.5.5 fancyhdr

`\FOREIGNLANGUAGE` The package `fancyhdr` treats the running head and foot lines somewhat differently as the standard classes. A symptom of this is that the command `\foreignlanguage` which `babel` adds to the marks can end up inside the argument of `\MakeUppercase`. To prevent unexpected results we need to define `\FOREIGNLANGUAGE` here.

```
1932 \DeclareRobustCommand{\FOREIGNLANGUAGE}[1]{%
1933   \lowercase{\foreignlanguage{#1}}}
```

`\substitutefontfamily` The command `\substitutefontfamily` creates an `.fd` file on the fly. The first argument is an encoding mnemonic, the second and third arguments are font family names.

```
1934 \def\substitutefontfamily#1#2#3{%
1935   \lowercase{\immediate\openout15=#1#2.fd\relax}%
1936   \immediate\write15{%
1937     \string\ProvidesFile{#1#2.fd}%
1938     [\the\year/\two@digits{\the\month}/\two@digits{\the\day}
1939     \space generated font description file]^^J
1940     \string\DeclareFontFamily{#1}{#2}{ }^^J
1941     \string\DeclareFontShape{#1}{#2}{m}{n}{<->ssub * #3/m/n}{ }^^J
1942     \string\DeclareFontShape{#1}{#2}{m}{it}{<->ssub * #3/m/it}{ }^^J
1943     \string\DeclareFontShape{#1}{#2}{m}{sl}{<->ssub * #3/m/sl}{ }^^J
1944     \string\DeclareFontShape{#1}{#2}{m}{sc}{<->ssub * #3/m/sc}{ }^^J
1945     \string\DeclareFontShape{#1}{#2}{b}{n}{<->ssub * #3/bx/n}{ }^^J
1946     \string\DeclareFontShape{#1}{#2}{b}{it}{<->ssub * #3/bx/it}{ }^^J
1947     \string\DeclareFontShape{#1}{#2}{b}{sl}{<->ssub * #3/bx/sl}{ }^^J
1948     \string\DeclareFontShape{#1}{#2}{b}{sc}{<->ssub * #3/bx/sc}{ }^^J
1949   }%
1950   \closeout15
1951 }
```

This command should only be used in the preamble of a document.

```
1952 \@onlypreamble\substitutefontfamily
```

9.6 Encoding and fonts

Because documents may use non-ASCII font encodings, we make sure that the logos of $\text{T}_{\text{E}}\text{X}$ and $\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$ always come out in the right encoding. There is a list of non-ASCII encodings. Unfortunately, `fontenc` deletes its package options, so we must guess which encodings has been loaded by traversing `\@filelist` to search for `(enc)enc.def`. If a non-ASCII has been loaded, we define versions of `\TeX` and `\LaTeX` for them using `\ensureascii`. The default ASCII encoding is set, too (in reverse order): the “main” encoding (when the document begins), the last loaded, or OT1.

`\ensureascii`

```
1953 \newcommand\BabelNonASCII{LGR,X2,OT2,OT3,OT6,LHE,LWN,LMA,LMC,LMS,LMU,}
1954 \let\org@TeX\TeX
1955 \let\org@LaTeX\LaTeX
1956 \let\ensureascii\@firstofone
1957 \AtBeginDocument{%
1958   \in@false
1959   \bbl@foreach\BabelNonASCII{% is there a non-ascii enc?
1960     \ifin@else
1961       \lowercase{\@expandtwoargs\in@{,#1enc.def,}{,\@filelist,}}%
1962     \fi}%
1963   \ifin@ % if a non-ascii has been loaded
1964     \def\ensureascii#1{\fontencoding{OT1}\selectfont#1}%
1965     \DeclareTextCommandDefault{\TeX}{\org@TeX}%
1966     \DeclareTextCommandDefault{\LaTeX}{\org@LaTeX}%
1967     \def\bbl@tempb#1\@{\uppercase{\bbl@tempc#1}ENC.DEF\@empty\@@}%
1968     \def\bbl@tempc#1ENC.DEF#2\@{\%
1969       \ifx\@empty#2\else
1970         \bbl@ifunset{T#1}%
1971         }%
1972       {\@expandtwoargs\in@{,#1,}{,\BabelNonASCII,}%
1973       \ifin@
1974         \DeclareTextCommand{\TeX}{#1}{\ensureascii{\org@TeX}}%
1975         \DeclareTextCommand{\LaTeX}{#1}{\ensureascii{\org@LaTeX}}%
1976       \else
1977         \def\ensureascii##1{\fontencoding{#1}\selectfont##1}%
1978       \fi}%
1979     \fi}%
1980   \bbl@foreach\@filelist{\bbl@tempb#1\@@}% TODO - @@ de mas??
1981   \@expandtwoargs\in@{,\cf@encoding,}{,\BabelNonASCII,}%
1982   \ifin@else
1983     \edef\ensureascii#1{%
1984       \noexpand\fontencoding{\cf@encoding}\noexpand\selectfont#1}%
1985   \fi
1986 \fi}
```

Now comes the old deprecated stuff (with a little change in 3.9l, for fontspec). The first thing we need to do is to determine, at `\begin{document}`, which latin fontencoding to use.

`\latinencoding` When text is being typeset in an encoding other than ‘latin’ (OT1 or T1), it would be nice to still have Roman numerals come out in the Latin encoding. So we first assume that the current encoding at the end of processing the package is the Latin encoding.

```
1987 \AtEndOfPackage{\edef\latinencoding{\cf@encoding}}
```

But this might be overruled with a later loading of the package fontenc. Therefore we check at the execution of `\begin{document}` whether it was loaded with the T1 option. The normal way to do this (using `\ifpackageloaded`) is disabled for this package. Now we have to revert to parsing the internal macro `\@filelist` which contains all the filenames loaded.

```
1988 \AtBeginDocument{%
1989   \ifpackageloaded{fontspec}%
1990     {\xdef\latinencoding{%
1991       \ifx\UTFencname\@undefined
1992         EU\ifcase\bbl@engine\or2\or1\fi
1993       \else
1994         \UTFencname
```

```

1995     \fi}}%
1996     {\gdef\latinencoding{OT1}%
1997     \ifx\cf@encoding\bbt@t@one
1998     \xdef\latinencoding{\bbt@t@one}%
1999     \else
2000     \@ifl@aded{def}{t1enc}{\xdef\latinencoding{\bbt@t@one}}}%
2001     \fi}}

```

`\latintext` Then we can define the command `\latintext` which is a declarative switch to a latin font-encoding. Usage of this macro is deprecated.

```

2002 \DeclareRobustCommand{\latintext}{%
2003   \fontencoding{\latinencoding}\selectfont
2004   \def\encodingdefault{\latinencoding}}

```

`\textlatin` This command takes an argument which is then typeset using the requested font encoding. In order to avoid many encoding switches it operates in a local scope.

```

2005 \ifx\@undefined\DeclareTextFontCommand
2006   \DeclareRobustCommand{\textlatin}[1]{\leavevmode{\latintext #1}}
2007 \else
2008   \DeclareTextFontCommand{\textlatin}{\latintext}
2009 \fi

```

9.7 Basic bidi support

Work in progress. This code is currently placed here for practical reasons.

- `pdftex` provides a minimal support for bidi text, and it must be done by hand. Vertical typesetting is not possible.
- `XeTeX` fares somewhat better, thanks to the font engine and a few additional tools. However, very little is done at the paragraph level.
- `LuaTeX` could provide the most complete solution, as we can manipulate almost freely the node list, the generated lines, and so on, but bidi text does not work out of the box and some development is necessary. It also provides tools to properly set left-to-right and right-to-left page layouts. As `LuaTeX-ja` shows, vertical typesetting is possible.

```

2010 \def\bbt@trtscripts{%
2011   ,Arabic,Imperial Aramaic,Avestan,Cypriot,Hatran,Hebrew,%
2012   Old Hungarian,Old Hungarian,Lydian,Mandaean,Manichaean,%
2013   Manichaean,Meroitic Cursive,Meroitic,Old North Arabian,%
2014   Nabataean,N'Ko,Orkhon,Palmyrene,Inscriptional Pahlavi,%
2015   Psalter Pahlavi,Phoenician,Inscriptional Parthian,Samaritan,%
2016   Old South Arabian,Syriac,Thaana,}%
2017 \def\bbt@ensuredir{%
2018   \@expandtwoargs
2019   \in@{\csname bbl@script@\languagenamendcsname}{\bbt@trtscripts}%
2020   \ifin@
2021     \bbt@setdirs\@ne
2022   \else
2023     \bbt@setdirs\z@
2024   \fi}
2025 \def\bbt@setdirs#1{% TODO - math
2026   \ifcase\bbt@select@type % TODO - strictly, not the right test
2027     \bbt@pagedir{#1}%
2028     \bbt@bodydir{#1}%
2029     \bbt@pardir{#1}%

```

```

2030 \fi
2031 \bbl@textdir{#1}}
2032 \ifcase\bbl@engine
2033 \or
2034 \AddBabelHook{babel-bidi}{afterextras}{\bbl@ensuredir}
2035 \DisableBabelHook{babel-bidi}
2036 \def\bbl@getluadir#1{%
2037   \directlua{
2038     if tex.#lmdir == 'TLT' then
2039       tex.sprint('0')
2040     elseif tex.#lmdir == 'TRT' then
2041       tex.sprint('1')
2042     end}}
2043 \def\bbl@setdir#1#2#3{% l=text/par.. 2=\textdir.. 3=0 lr/1 rL
2044   \ifcase#3\relax
2045     \ifcase\bbl@getluadir{#1}\relax\else
2046       #2 TLT\relax
2047     \fi
2048   \else
2049     \ifcase\bbl@getluadir{#1}\relax
2050       #2 TRT\relax
2051     \fi
2052   \fi}
2053 \def\bbl@textdir{\bbl@setdir{text}\textdir}% TODO - ?\linedir
2054 \def\bbl@pardir{\bbl@setdir{par}\pardir}
2055 \def\bbl@bodydir{\bbl@setdir{body}\bodydir}
2056 \def\bbl@pagedir{\bbl@setdir{page}\pagedir}
2057 \def\bbl@dirparastext{\pardir\the\textdir\relax}%   %%%
2058 \or
2059 \AddBabelHook{babel-bidi}{afterextras}{\bbl@ensuredir}
2060 \DisableBabelHook{babel-bidi}
2061 \newcount\bbl@dirlevel
2062 \chardef\bbl@thetextdir\z@
2063 \chardef\bbl@thepardir\z@
2064 \def\bbl@textdir#1{%
2065   \ifcase#1\relax
2066     \chardef\bbl@thetextdir\z@
2067     \bbl@textdir@i\beginL\endL
2068   \else
2069     \chardef\bbl@thetextdir@ne
2070     \bbl@textdir@i\beginR\endR
2071   \fi}
2072 \def\bbl@textdir@i#1#2{%
2073   \ifhmode
2074     \ifnum\currentgrouplevel>\z@
2075       \ifnum\currentgrouplevel=\bbl@dirlevel
2076         \bbl@error{Multiple bidi settings inside a group}%
2077         {I'll insert a new group, but expect wrong results.}%
2078         \bgroup\aftergroup#2\aftergroup\egroup
2079       \else
2080         \ifcase\currentgroup\or % 0 bottom
2081           \aftergroup#2% 1 simple {}
2082         \or
2083           \bgroup\aftergroup#2\aftergroup\egroup % 2 hbox
2084         \or
2085           \bgroup\aftergroup#2\aftergroup\egroup % 3 adj hbox
2086         \or\or\or % vbox vtop align
2087         \or
2088           \bgroup\aftergroup#2\aftergroup\egroup % 7 noalign

```



```

2089     \or\or\or\or\or\or % output math disc insert vcent mathchoice
2090     \or
2091     \aftergroup#2% 14 \begingroup
2092     \else
2093     \bgroup\aftergroup#2\aftergroup\egroup % 15 adj
2094     \fi
2095     \fi
2096     \bbl@dirlevel\currentgrouplevel
2097     \fi
2098     #1%
2099     \fi}
2100 \def\bbl@pardir#1{\chardef\bbl@thepardir#1\relax}
2101 \let\bbl@bodydir@gobble
2102 \let\bbl@pagedir@gobble
2103 \def\bbl@dirparastext{\chardef\bbl@thepardir\bbl@thetextdir}

```

The following command is executed only if there is a right-to-left script (once). It activates the `\everypar` hack for xetex, to properly handle the par direction. Note text and par dirs are decoupled.

```

2104 \def\bbl@xebidipar{%
2105   \let\bbl@xebidipar\relax
2106   \TeXeTstate@ne
2107   \def\bbl@xeeverypar{%
2108     \ifcase\bbl@thepardir\else
2109       {\setbox\z@\lastbox\beginR\box\z@}%
2110     \fi
2111     \ifcase\bbl@thetextdir\else\beginR\fi}%
2112   \let\bbl@severypar\everypar
2113   \newtoks\everypar
2114   \everypar=\bbl@severypar
2115   \bbl@severypar{\bbl@xeeverypar\the\everypar}}
2116 \fi

```

9.8 Local Language Configuration

`\loadlocalcfg` At some sites it may be necessary to add site-specific actions to a language definition file. This can be done by creating a file with the same name as the language definition file, but with the extension `.cfg`. For instance the file `norsk.cfg` will be loaded when the language definition file `norsk.ldf` is loaded. For plain-based formats we don't want to override the definition of `\loadlocalcfg` from `plain.def`.

```

2117 \ifx\loadlocalcfg\undefined
2118   \@ifpackagewith{babel}{noconfigs}%
2119   {\let\loadlocalcfg@gobble}%
2120   {\def\loadlocalcfg#1{%
2121     \InputIfFileExists{#1.cfg}%
2122     {\typeout{*****^^J%
2123               * Local config file #1.cfg used^^J%
2124               *}}%
2125     \@empty}}
2126 \fi

```

Just to be compatible with L^AT_EX 2.09 we add a few more lines of code:

```

2127 \ifx\@unexpandable@protect\undefined
2128   \def\@unexpandable@protect{\noexpand\protect\noexpand}
2129   \long\def\protected@write#1#2#3{%
2130     \begingroup
2131     \let\thepage\relax

```

```

2132     #2%
2133     \let\protect\@unexpandable@protect
2134     \edef\reserved@a{\write#1{#3}}%
2135     \reserved@a
2136     \endgroup
2137     \if@nbreak\ifvmode\nobreak\fi\fi}
2138 \fi
2139 </core>

```

10 Multiple languages (switch.def)

Plain T_EX version 3.0 provides the primitive `\language` that is used to store the current language. When used with a pre-3.0 version this function has to be implemented by allocating a counter.

```

2140 (*kernel)
2141 <<Make sure ProvidesFile is defined>>
2142 \ProvidesFile{switch.def}[<<date>> <<version>> Babel switching mechanism]
2143 <<Load macros for plain if not LaTeX>>
2144 <<Define core switching macros>>

```

`\adddialect` The macro `\adddialect` can be used to add the name of a dialect or variant language, for which an already defined hyphenation table can be used.

```

2145 \def\bb@version{<<version>>}
2146 \def\bb@date{<<date>>}
2147 \def\adddialect#1#2{%
2148   \global\chardef#1#2\relax
2149   \bb@usehooks{adddialect}{{#1}{#2}}%
2150   \wlog{\string#1 = a dialect from \string\language#2}}

```

`\bb@iflanguage` executes code only if the language `l@` exists. Otherwise raises and error.

The argument of `\bb@fixname` has to be a macro name, as it may get “fixed” if casing (lc/uc) is wrong. It’s intended to fix a long-standing bug when `\foreignlanguage` and the like appear in a `\MakeXXXcase`. However, a lowercase form is not imposed to improve backward compatibility (perhaps you defined a language named MYLANG, but unfortunately mixed case names cannot be trapped). Note `l@` is encapsulated, so that its case does not change.

```

2151 \def\bb@fixname#1{%
2152   \begingroup
2153   \def\bb@tempe{l@}%
2154   \edef\bb@tempd{\noexpand\@ifundefined{\noexpand\bb@tempe#1}}%
2155   \bb@tempd
2156     {\lowercase\expandafter{\bb@tempd}%
2157     {\uppercase\expandafter{\bb@tempd}%
2158     \@empty
2159     {\edef\bb@tempd{\def\noexpand#1{#1}}%
2160     \uppercase\expandafter{\bb@tempd}}}%
2161     {\edef\bb@tempd{\def\noexpand#1{#1}}%
2162     \lowercase\expandafter{\bb@tempd}}}%
2163   \@empty
2164   \edef\bb@tempd{\endgroup\def\noexpand#1{#1}}%
2165   \bb@tempd}
2166 \def\bb@iflanguage#1{%
2167   \@ifundefined{l@#1}{\@nolanerr{#1}\@gobble}\@firstofone}

```

`\iflanguage` Users might want to test (in a private package for instance) which language is currently active. For this we provide a test macro, `\iflanguage`, that has three arguments. It checks whether the first argument is a known language. If so, it compares the first argument with the value of `\language`. Then, depending on the result of the comparison, it executes either the second or the third argument.

```
2168 \def\iflanguage#1{%
2169   \bbl@iflanguage{#1}{%
2170     \ifnum\csname l@#1\endcsname=\language
2171       \expandafter\@firstoftwo
2172     \else
2173       \expandafter\@secondoftwo
2174     \fi}}
```

10.1 Selecting the language

`\selectlanguage` The macro `\selectlanguage` checks whether the language is already defined before it performs its actual task, which is to update `\language` and activate language-specific definitions.

To allow the call of `\selectlanguage` either with a control sequence name or with a simple string as argument, we have to use a trick to delete the optional escape character.

To convert a control sequence to a string, we use the `\string` primitive. Next we have to look at the first character of this string and compare it with the escape character. Because this escape character can be changed by setting the internal integer `\escapechar` to a character number, we have to compare this number with the character of the string. To do this we have to use \TeX 's backquote notation to specify the character as a number.

If the first character of the `\string`'ed argument is the current escape character, the comparison has stripped this character and the rest in the 'then' part consists of the rest of the control sequence name. Otherwise we know that either the argument is not a control sequence or `\escapechar` is set to a value outside of the character range 0–255.

If the user gives an empty argument, we provide a default argument for `\string`. This argument should expand to nothing.

```
2175 \let\bbl@select@type\z@
2176 \edef\selectlanguage{%
2177   \noexpand\protect
2178   \expandafter\noexpand\csname selectlanguage \endcsname}
```

Because the command `\selectlanguage` could be used in a moving argument it expands to `\protect\selectlanguage_`. Therefore, we have to make sure that a macro `\protect` exists. If it doesn't it is `\let` to `\relax`.

```
2179 \ifx@undefined\protect\let\protect\relax\fi
```

As \LaTeX 2.09 writes to files *expanded* whereas \LaTeX 2_ε takes care *not* to expand the arguments of `\write` statements we need to be a bit clever about the way we add information to `.aux` files. Therefore we introduce the macro `\xstring` which should expand to the right amount of `\string`'s.

```
2180 \ifx\documentclass\undefined
2181   \def\xstring{\string\string\string}
2182 \else
2183   \let\xstring\string
2184 \fi
```

Since version 3.5 `babel` writes entries to the auxiliary files in order to typeset table of contents etc. in the correct language environment.

`\bbl@pop@language` *But* when the language change happens *inside* a group the end of the group doesn't write anything to the auxiliary files. Therefore we need T_EX's `aftergroup` mechanism to help us. The command `\aftergroup` stores the token immediately following it to be executed when the current group is closed. So we define a temporary control sequence `\bbl@pop@language` to be executed at the end of the group. It calls `\bbl@set@language` with the name of the current language as its argument.

`\bbl@language@stack` The previous solution works for one level of nesting groups, but as soon as more levels are used it is no longer adequate. For that case we need to keep track of the nested languages using a stack mechanism. This stack is called `\bbl@language@stack` and initially empty.

```
2185 \def\bbl@language@stack{}
```

When using a stack we need a mechanism to push an element on the stack and to retrieve the information afterwards.

`\bbl@push@language` The stack is simply a list of languagenames, separated with a '+' sign; the push
`\bbl@pop@language` function can be simple:

```
2186 \def\bbl@push@language{%
```

```
2187 \xdef\bbl@language@stack{\languagename+\bbl@language@stack}}
```

Retrieving information from the stack is a little bit less simple, as we need to remove the element from the stack while storing it in the macro `\languagename`. For this we first define a helper function.

`\bbl@pop@lang` This macro stores its first element (which is delimited by the '+'-sign) in `\languagename` and stores the rest of the string (delimited by '-') in its third argument.

```
2188 \def\bbl@pop@lang#1+#2-#3{%
```

```
2189 \edef\languagename{#1}\xdef#3{#2}}
```

The reason for the somewhat weird arrangement of arguments to the helper function is the fact it is called in the following way. This means that before `\bbl@pop@lang` is executed T_EX first *expands* the stack, stored in `\bbl@language@stack`. The result of that is that the argument string of `\bbl@pop@lang` contains one or more language names, each followed by a '+'-sign (zero language names won't occur as this macro will only be called after something has been pushed on the stack) followed by the '-'-sign and finally the reference to the stack.

```
2190 \def\bbl@pop@language{%
```

```
2191 \expandafter\bbl@pop@lang\bbl@language@stack-\bbl@language@stack
```

```
2192 \expandafter\bbl@set@language\expandafter{\languagename}}
```

Once the name of the previous language is retrieved from the stack, it is fed to `\bbl@set@language` to do the actual work of switching everything that needs switching.

```
2193 \expandafter\def\csname selectlanguage \endcsname#1{%
```

```
2194 \ifnum\bbl@hymapsel=\@cclv\let\bbl@hymapsel\tw@\fi
```

```
2195 \bbl@push@language
```

```
2196 \aftergroup\bbl@pop@language
```

```
2197 \bbl@set@language{#1}}
```

`\bbl@set@language` The macro `\bbl@set@language` takes care of switching the language environment *and* of writing entries on the auxiliary files. For historical reasons, language names can be either language of `\language`. To catch either form a trick is used, but

unfortunately as a side effect the catcodes of letters in `\language` are not well defined. The list of auxiliary files can be extended by redefining `\BabelContentsFiles`, but make sure they are loaded inside a group (as `aux`, `toc`, `lof`, and `lot` do) or the last language of the document will remain active afterwards. We also write a command to change the current language in the auxiliary files.

```

2198 \def\BabelContentsFiles{toc,lof,lot}
2199 \def\bbl@set@language#1{%
2200   \edef\language#1%
2201   \ifnum\escapechar=\expandafter`\string#1\@empty
2202     \else\string#1\@empty\fi}%
2203 \select@language{\language}%
2204 \expandafter\ifx\csname date\language\endcsname\relax\else
2205   \if@filesw
2206     \protected@write@auxout{}\string\select@language{\language}}%
2207   \bbl@foreach\BabelContentsFiles{%
2208     \addtocontents{##1}{\xstring\select@language{\language}}}%
2209   \bbl@usehooks{write}{}%
2210   \fi
2211 \fi}
2212 \def\select@language#1{%
2213   \ifnum\bbl@hymapsel=@cclv\chardef\bbl@hymapsel4\relax\fi
2214   \edef\language#1%
2215   \bbl@fixname\language
2216   \bbl@iflanguage\language{%
2217     \expandafter\ifx\csname date\language\endcsname\relax
2218       \bbl@error
2219         {Unknown language `#1'. Either you have%%
2220          misspelled its name, it has not been installed,%%
2221          or you requested it in a previous run. Fix its name,%%
2222          install it or just rerun the file, respectively}%
2223         {You may proceed, but expect wrong results}%
2224     \else
2225       \let\bbl@select@type\z@
2226       \expandafter\bbl@switch\expandafter{\language}%
2227     \fi}}

```

A bit of optimization. Select in heads/foots the language only if necessary. The real thing is in `babel.def`.

```

2228 \let\select@language@x\select@language

```

First, check if the user asks for a known language. If so, update the value of `\language` and call `\originalTeX` to bring \TeX in a certain pre-defined state. The name of the language is stored in the control sequence `\language`. Then we have to *redefine* `\originalTeX` to compensate for the things that have been activated. To save memory space for the macro definition of `\originalTeX`, we construct the control sequence name for the `\noextras<lang>` command at definition time by expanding the `\csname` primitive.

Now activate the language-specific definitions. This is done by constructing the names of three macros by concatenating three words with the argument of `\selectlanguage`, and calling these macros.

The switching of the values of `\leftthyphenmin` and `\rightthyphenmin` is somewhat different. First we save their current values, then we check if `\<lang>hyphenmins` is defined. If it is not, we set default values (2 and 3), otherwise the values in `\<lang>hyphenmins` will be used.

```

2229 \def\bbl@switch#1{%
2230   \originalTeX
2231   \expandafter\def\expandafter\originalTeX\expandafter{%

```

```

2232 \csname noextras#1\endcsname
2233 \let\originalTeX\empty
2234 \babel@beginsave}%
2235 \bbl@usehooks{afterreset}{}%
2236 \languageshorthands{none}%
2237 \ifcase\bbl@select@type
2238 \csname captions#1\endcsname\relax
2239 \csname date#1\endcsname\relax
2240 \fi
2241 \bbl@usehooks{beforeextras}{}%
2242 \csname extras#1\endcsname\relax
2243 \bbl@usehooks{afterextras}{}%
2244 \ifcase\bbl@opt@hyphenmap\or
2245 \def\BabelLower##1##2{\lccode##1=##2\relax}%
2246 \ifnum\bbl@hymapsel>4\else
2247 \csname\languagename @bbl@hyphenmap\endcsname
2248 \fi
2249 \chardef\bbl@opt@hyphenmap\z@
2250 \else
2251 \ifnum\bbl@hymapsel>\bbl@opt@hyphenmap\else
2252 \csname\languagename @bbl@hyphenmap\endcsname
2253 \fi
2254 \fi
2255 \global\let\bbl@hymapsel\@cclv
2256 \bbl@patterns{#1}%
2257 \babel@savevariable\lefthyphenmin
2258 \babel@savevariable\righthyphenmin
2259 \expandafter\ifx\csname #1hyphenmins\endcsname\relax
2260 \set@hyphenmins\tw@\thr@\relax
2261 \else
2262 \expandafter\expandafter\expandafter\set@hyphenmins
2263 \csname #1hyphenmins\endcsname\relax
2264 \fi}

```

`otherlanguage` The `otherlanguage` environment can be used as an alternative to using the `\selectlanguage` declarative command. When you are typesetting a document which mixes left-to-right and right-to-left typesetting you have to use this environment in order to let things work as you expect them to. The `\ignorespaces` command is necessary to hide the environment when it is entered in horizontal mode.

```

2265 \long\def\otherlanguage#1{%
2266 \ifnum\bbl@hymapsel=\@cclv\let\bbl@hymapsel\thr@\fi
2267 \csname selectlanguage \endcsname{#1}%
2268 \ignorespaces}

```

The `\endotherlanguage` part of the environment tries to hide itself when it is called in horizontal mode.

```

2269 \long\def\endotherlanguage{%
2270 \global\@ignoretrue\ignorespaces}

```

`otherlanguage*` The `otherlanguage` environment is meant to be used when a large part of text from a different language needs to be typeset, but without changing the translation of words such as ‘figure’. This environment makes use of `\foreign@language`.

```

2271 \expandafter\def\csname otherlanguage*\endcsname#1{%
2272 \ifnum\bbl@hymapsel=\@cclv\chardef\bbl@hymapsel4\relax\fi
2273 \foreign@language{#1}}

```

At the end of the environment we need to switch off the extra definitions. The grouping mechanism of the environment will take care of resetting the correct hyphenation rules and “extras”.

```
2274 \expandafter\let\csname endotherlanguage*\endcsname\relax
```

`\foreignlanguage` The `\foreignlanguage` command is another substitute for the `\selectlanguage` command. This command takes two arguments, the first argument is the name of the language to use for typesetting the text specified in the second argument. Unlike `\selectlanguage` this command doesn't switch *everything*, it only switches the hyphenation rules and the extra definitions for the language specified. It does this within a group and assumes the `\extras⟨lang⟩` command doesn't make any `\global` changes. The coding is very similar to part of `\selectlanguage`. `\bbl@beforeforeign` is a trick to fix a bug in bidi texts. `\foreignlanguage` is supposed to be a 'text' command, and therefore it must emit a `\leavevmode`, but it does not, and therefore the indent is placed on the opposite margin. For backward compatibility, however, it is done only if a right-to-left script is requested; otherwise, it is no-op.

(3.11) `\foreignlanguage*` is a temporary, experimental macro for a few lines with a different script direction, while preserving the paragraph format (thank the braces around `\par`, things like `\hangindent` are not reset). Do not use it in production, because its semantics and its syntax may change (and very likely will, or even it could be removed altogether). Currently it enters in vmode and then selects the language (which in turn sets the paragraph direction).

(3.11) Also experimental are the hook `foreign` and `foreign*`. With them you can redefine `\BabelText` which by default does nothing. Its behaviour is not well defined yet. So, use it in horizontal mode only if you do not want surprises. In other words, at the beginning of a paragraph `\foreignlanguage` enters into hmode with the surrounding lang, and with `\foreignlanguage*` with the new lang.

```
2275 \let\bbl@beforeforeign\@empty
2276 \edef\foreignlanguage{%
2277   \noexpand\protect
2278   \expandafter\noexpand\csname foreignlanguage \endcsname}
2279 \expandafter\def\csname foreignlanguage \endcsname{%
2280   \@ifstar\bbl@foreign@s\bbl@foreign@x}
2281 \def\bbl@foreign@x#1#2{%
2282   \begingroup
2283     \let\BabelText\@firstofone
2284     \bbl@beforeforeign
2285     \foreign@language{#1}%
2286     \bbl@usehooks{foreign}{}%
2287     \BabelText{#2}% Now in horizontal mode!
2288   \endgroup}
2289 \def\bbl@foreign@s#1#2% TODO - \shapemode, \@setpar, ?\@@par
2290 \begingroup
2291   {\par}%
2292   \let\BabelText\@firstofone
2293   \foreign@language{#1}%
2294   \bbl@usehooks{foreign*}{}%
2295   \bbl@dirparastext
2296   \BabelText{#2}% Still in vertical mode!
2297   {\par}%
2298 \endgroup}
```

`\foreign@language` This macro does the work for `\foreignlanguage` and the `otherlanguage*` environment. First we need to store the name of the language and check that it is a known language. Then it just calls `bbl@switch`.

```

2299 \def\foreign@language#1{%
2300 \edef\languagename{#1}%
2301 \bbl@fixname\languagename
2302 \bbl@iflanguage\languagename{%
2303 \expandafter\ifx\csname date\languagename\endcsname\relax
2304 \bbl@warning
2305 {Unknown language `#1'. Either you have\\%
2306 misspelled its name, it has not been installed,\\%
2307 or you requested it in a previous run. Fix its name,\\%
2308 install it or just rerun the file, respectively.\\%
2309 I'll proceed, but expect wrong results.\\%
2310 Reported}%
2311 \fi
2312 \let\bbl@select@type@ne
2313 \expandafter\bbl@switch\expandafter{\languagename}}

```

`\bbl@patterns` This macro selects the hyphenation patterns by changing the `\language` register. If special hyphenation patterns are available specifically for the current font encoding, use them instead of the default.

It also sets hyphenation exceptions, but only once, because they are global (here language `\lccode's` has been set, too). `\bbl@hyphenation@` is set to relax until the very first `\babelhyphenation`, so do nothing with this value. If the exceptions for a language (by its number, not its name, so that `:ENC` is taken into account) has been set, then use `\hyphenation` with both global and language exceptions and empty the latter to mark they must not be set again.

```

2314 \let\bbl@hyphlist@empty
2315 \let\bbl@hyphenation@relax
2316 \let\bbl@pttnlist@empty
2317 \let\bbl@patterns@relax
2318 \let\bbl@hymapsel=\@cclv
2319 \def\bbl@patterns#1{%
2320 \language=\expandafter\ifx\csname l@#1:\f@encoding\endcsname\relax
2321 \csname l@#1\endcsname
2322 \edef\bbl@tempa{#1}%
2323 \else
2324 \csname l@#1:\f@encoding\endcsname
2325 \edef\bbl@tempa{#1:\f@encoding}%
2326 \fi
2327 \@expandtwoargs\bbl@usehooks{patterns}{{#1}{\bbl@tempa}}%
2328 \@ifundefined{bbl@hyphenation@}{% Can be \relax!
2329 \begingroup
2330 \@expandtwoargs\in@{,\number\language,}{,\bbl@hyphlist}%
2331 \ifin@else
2332 \@expandtwoargs\bbl@usehooks{hyphenation}{{#1}{\bbl@tempa}}%
2333 \hyphenation{%
2334 \bbl@hyphenation@
2335 \@ifundefined{bbl@hyphenation@#1}%
2336 \@empty
2337 {\space\csname bbl@hyphenation@#1\endcsname}}%
2338 \xdef\bbl@hyphlist{\bbl@hyphlist\number\language,}%
2339 \fi
2340 \endgroup}}

```

`hyphenrules` The environment `hyphenrules` can be used to select *just* the hyphenation rules. This environment does *not* change `\languagename` and when the hyphenation rules specified were not loaded it has no effect. Note however, `\lccode's` and font encodings are not set at all, so in most cases you should use `otherlanguage*`.


```

2341 \def\hyphenrules#1{%
2342   \edef\language#1}%
2343   \bbl@fixname\language
2344   \bbl@iflanguage\language{%
2345     \expandafter\bbl@patterns\expandafter{\language}%
2346     \languageshorthands{none}%
2347     \expandafter\ifx\csname\language hyphenmins\endcsname\relax
2348       \set@hyphenmins\tw@\thr@\relax
2349     \else
2350       \expandafter\expandafter\expandafter\set@hyphenmins
2351       \csname\language hyphenmins\endcsname\relax
2352     \fi}}
2353 \let\endhyphenrules\@empty

```

`\providehyphenmins` The macro `\providehyphenmins` should be used in the language definition files to provide a *default* setting for the hyphenation parameters `\lefthyphenmin` and `\righthyphenmin`. If the macro `\(lang)hyphenmins` is already defined this command has no effect.

```

2354 \def\providehyphenmins#1#2{%
2355   \expandafter\ifx\csname #1hyphenmins\endcsname\relax
2356     \@namedef{#1hyphenmins}{#2}%
2357   \fi}

```

`\set@hyphenmins` This macro sets the values of `\lefthyphenmin` and `\righthyphenmin`. It expects two values as its argument.

```

2358 \def\set@hyphenmins#1#2{%
2359   \lefthyphenmin#1\relax
2360   \righthyphenmin#2\relax}

```

`\ProvidesLanguage` The identification code for each file is something that was introduced in \LaTeX 2_ϵ . When the command `\ProvidesFile` does not exist, a dummy definition is provided temporarily. For use in the language definition file the command `\ProvidesLanguage` is defined by `babel`. Depending on the format, ie, on if the former is defined, we use a similar definition or not.

```

2361 \ifx\ProvidesFile\@undefined
2362   \def\ProvidesLanguage#1[#2 #3 #4]{%
2363     \wlog{Language: #1 #4 #3 <#2>}%
2364     }
2365 \else
2366   \def\ProvidesLanguage#1{%
2367     \begingroup
2368     \catcode\ 10 %
2369     \@makeother\/%
2370     \@ifnextchar[%]
2371       {\@provideslanguage{#1}}{\@provideslanguage{#1}[]}
2372   \def\@provideslanguage#1[#2]{%
2373     \wlog{Language: #1 #2}%
2374     \expandafter\xdef\csname ver@#1.ldf\endcsname{#2}%
2375     \endgroup}
2376 \fi

```

`\LdfInit` This macro is defined in two versions. The first version is to be part of the ‘kernel’ of `babel`, ie. the part that is loaded in the format; the second version is defined in `babel.def`. The version in the format just checks the category code of the ampersand and then loads `babel.def`.

The category code of the ampersand is restored and the macro calls itself again with the new definition from `babel.def`

```
2377 \def\LdfInit{%
2378   \chardef\atcatcode=\catcode` \@
2379   \catcode`\@=11\relax
2380   \input babel.def\relax
2381   \catcode`\@=\atcatcode \let\atcatcode\relax
2382   \LdfInit}
```

`\originalTeX` The macro `\originalTeX` should be known to \TeX at this moment. As it has to be expandable we `\let` it to `\@empty` instead of `\relax`.

```
2383 \ifx\originalTeX\@undefined\let\originalTeX\@empty\fi
```

Because this part of the code can be included in a format, we make sure that the macro which initialises the save mechanism, `\babel@beginsave`, is not considered to be undefined.

```
2384 \ifx\babel@beginsave\@undefined\let\babel@beginsave\relax\fi
```

A few macro names are reserved for future releases of `babel`, which will use the concept of ‘locale’:

```
2385 \providecommand\setlocale{%
2386   \bbl@error
2387   {Not yet available}%
2388   {Find an armchair, sit down and wait}}
2389 \let\uselocale\setlocale
2390 \let\locale\setlocale
2391 \let\selectlocale\setlocale
2392 \let\textlocale\setlocale
2393 \let\textlanguage\setlocale
2394 \let\languagetext\setlocale
```

10.2 Errors

`\@nolanerr` The `babel` package will signal an error when a documents tries to select a language that hasn’t been defined earlier. When a user selects a language for which no hyphenation patterns were loaded into the format he will be given a warning about that fact. We revert to the patterns for `\language=0` in that case. In most formats that will be (US)english, but it might also be empty.

`\@noopterr` When the package was loaded without options not everything will work as expected. An error message is issued in that case. When the format knows about `\PackageError` it must be $\LaTeX 2_{\epsilon}$, so we can safely use its error handling interface. Otherwise we’ll have to ‘keep it simple’.

```
2395 \edef\bbl@nulllanguage{\string\language=0}
2396 \ifx\PackageError\@undefined
2397   \def\bbl@error#1#2{%
2398     \begingroup
2399       \newlinechar=``^J
2400       \def\{^J(babel) }%
2401       \errhelp{#2}\errmessage{\{#1}%
2402     \endgroup}
2403   \def\bbl@warning#1{%
2404     \begingroup
2405       \newlinechar=``^J
2406       \def\{^J(babel) }%
2407     \message{\{#1}%
```

```

2408 \endgroup}
2409 \def\bbbl@info#1{%
2410 \begingroup
2411 \newlinechar=`^^J
2412 \def\^^J{%
2413 \wlog{#1}%
2414 \endgroup}
2415 \else
2416 \def\bbbl@error#1#2{%
2417 \begingroup
2418 \def\{\MessageBreak}%
2419 \PackageError{babel}{#1}{#2}%
2420 \endgroup}
2421 \def\bbbl@warning#1{%
2422 \begingroup
2423 \def\{\MessageBreak}%
2424 \PackageWarning{babel}{#1}%
2425 \endgroup}
2426 \def\bbbl@info#1{%
2427 \begingroup
2428 \def\{\MessageBreak}%
2429 \PackageInfo{babel}{#1}%
2430 \endgroup}
2431 \fi
2432 \@ifpackagewith{babel}{silent}
2433 {\let\bbbl@info@gobble
2434 \let\bbbl@warning@gobble}
2435 {}
2436 \def\bbbl@nocaption#1#2{% 1: text to be printed 2: caption macro \langXname
2437 \gdef#2{\textbf{#1?}}%
2438 #2%
2439 \bbbl@warning{%
2440 \string#2 not set. Please, define%%
2441 it in the preamble with something like:%%
2442 \string\renewcommand\string#2{..}%%
2443 Reported}}
2444 \def\@nolanerr#1{%
2445 \bbbl@error
2446 {You haven't defined the language #1\space yet}%
2447 {Your command will be ignored, type <return> to proceed}}
2448 \def\@nopatterns#1{%
2449 \bbbl@warning
2450 {No hyphenation patterns were preloaded for%%
2451 the language `#1' into the format.%%
2452 Please, configure your TeX system to add them and%%
2453 rebuild the format. Now I will use the patterns%%
2454 preloaded for \bbbl@nulllanguage\space instead}}
2455 \let\bbbl@usehooks@gobbletwo
2456 </kernel>

```

11 Loading hyphenation patterns

The following code is meant to be read by \LaTeX because it should instruct \TeX to read hyphenation patterns. To this end the `docstrip` option `patterns` can be used to include this code in the file `hyphen.cfg`. Code is written with lower level macros. `toks8` stores info to be shown when the program is run.

We want to add a message to the message \LaTeX 2.09 puts in the `\everyjob` register.

This could be done by the following code:

```
% \let\orgeveryjob\everyjob
% \def\everyjob#1{%
%   \orgeveryjob{#1}%
%   \orgeveryjob\expandafter{\the\orgeveryjob\immediate\write16{%
%     hyphenation patterns for \the\loaded@patterns loaded.}}%
%   \let\everyjob\orgeveryjob\let\orgeveryjob\@undefined}
%
```

The code above redefines the control sequence `\everyjob` in order to be able to add something to the current contents of the register. This is necessary because the processing of hyphenation patterns happens long before \LaTeX fills the register. There are some problems with this approach though.

- When someone wants to use several hyphenation patterns with $\SL\TeX$ the above scheme won't work. The reason is that $\SL\TeX$ overwrites the contents of the `\everyjob` register with its own message.
- Plain \TeX does not use the `\everyjob` register so the message would not be displayed.

To circumvent this a 'dirty trick' can be used. As this code is only processed when creating a new format file there is one command that is sure to be used, `\dump`. Therefore the original `\dump` is saved in `\orig@dump` and a new definition is supplied. To make sure that \LaTeX 2.09 executes the `\@begindocumenthook` we would want to alter `\begin{document}`, but as this done too often already, we add the new code at the front of `\@preamblecmds`. But we can only do that after it has been defined, so we add this piece of code to `\dump`.

This new definition starts by adding an instruction to write a message on the terminal and in the transcript file to inform the user of the preloaded hyphenation patterns.

Then everything is restored to the old situation and the format is dumped.

```
2457 (*patterns)
2458 <<Make sure ProvidesFile is defined>>
2459 \ProvidesFile{hyphen.cfg}[\langle date \rangle \langle version \rangle Babel hyphens]
2460 \xdef\bbbl@format{\jobname}
2461 \ifx\AtBeginDocument\@undefined
2462   \def\@empty{}
2463   \let\orig@dump\dump
2464   \def\dump{%
2465     \ifx\@ztryfc\@undefined
2466       \else
2467         \toks0=\expandafter{\@preamblecmds}%
2468         \edef\@preamblecmds{\noexpand\@begindocumenthook\the\toks0}%
2469         \def\@begindocumenthook{}%
2470       \fi
2471       \let\dump\orig@dump\let\orig@dump\@undefined\dump}
2472 \fi
2473 <<Define core switching macros>>
2474 \toks8{Babel <<@version@>> and hyphenation patterns for }%
```

`\process@line` Each line in the file `language.dat` is processed by `\process@line` after it is read. The first thing this macro does is to check whether the line starts with `=`. When the first token of a line is an `=`, the macro `\process@synonym` is called; otherwise the macro `\process@language` will continue.

```
2475 \def\process@line#1#2 #3 #4 {%
2476   \ifx=#1%
```

```

2477 \process@synonym{#2}%
2478 \else
2479 \process@language{#1#2}{#3}{#4}%
2480 \fi
2481 \ignorespaces}

```

`\process@synonym` This macro takes care of the lines which start with an =. It needs an empty token register to begin with. `\bbl@languages` is also set to empty.

```

2482 \toks@{}
2483 \def\bbl@languages{}

```

When no languages have been loaded yet, the name following the = will be a synonym for hyphenation register 0. So, it is stored in a token register and executed when the first pattern file has been processed. (The `\relax` just helps to the `\if` below catching synonyms without a language.)
 Otherwise the name will be a synonym for the language loaded last.
 We also need to copy the hyphenmin parameters for the synonym.

```

2484 \def\process@synonym#1{%
2485 \ifnum\last@language=\m@ne
2486 \toks@\expandafter{\the\toks@\relax\process@synonym{#1}}%
2487 \else
2488 \expandafter\chardef\csname l@#1\endcsname\last@language
2489 \wlog{\string\l@#1=\string\language\the\last@language}%
2490 \expandafter\let\csname #1hyphenmins\expandafter\endcsname
2491 \csname\language\name hyphenmins\endcsname
2492 \let\bbl@elt\relax
2493 \edef\bbl@languages{\bbl@languages\bbl@elt{#1}{\the\last@language}{}}}%
2494 \fi}

```

`\process@language` The macro `\process@language` is used to process a non-empty line from the ‘configuration file’. It has three arguments, each delimited by white space. The first argument is the ‘name’ of a language; the second is the name of the file that contains the patterns. The optional third argument is the name of a file containing hyphenation exceptions.

The first thing to do is call `\addlanguage` to allocate a pattern register and to make that register ‘active’. Then the ‘name’ of the language that will be loaded now is added to the token register `\toks8`. and finally the pattern file is read.

For some hyphenation patterns it is needed to load them with a specific font encoding selected. This can be specified in the file `language.dat` by adding for instance ‘:T1’ to the name of the language. The macro `\bbl@get@enc` extracts the font encoding from the language name and stores it in `\bbl@hyph@enc`. The latter can be used in hyphenation files if you need to set a behaviour depending on the given encoding (it is set to empty if no encoding is given).

Pattern files may contain assignments to `\lefthyphenmin` and `\righthyphenmin`. \TeX does not keep track of these assignments. Therefore we try to detect such assignments and store them in the `\langle lang \rangle hyphenmins` macro. When no assignments were made we provide a default setting.

Some pattern files contain changes to the `\lccode` en `\uccode` arrays. Such changes should remain local to the language; therefore we process the pattern file in a group; the `\patterns` command acts globally so its effect will be remembered. Then we globally store the settings of `\lefthyphenmin` and `\righthyphenmin` and close the group.

When the hyphenation patterns have been processed we need to see if a file with hyphenation exceptions needs to be read. This is the case when the third argument is not empty and when it does not contain a space token. (Note however there is no need to save hyphenation exceptions into the format.)

`\bbl@languages` saves a snapshot of the loaded languages in the form `\bbl@elt{<language-name>}{<number>}{<patterns-file>}{<exceptions-file>}`. Note the last 2 arguments are empty in ‘dialects’ defined in `language.dat` with `=`. Note also the language name can have encoding info.

Finally, if the counter `\language` is equal to zero we execute the synonyms stored.

```

2495 \def\process@language#1#2#3{%
2496   \expandafter\addlanguage\csname l@#1\endcsname
2497   \expandafter\language\csname l@#1\endcsname
2498   \edef\languagename{#1}%
2499   \bbl@hook@everylanguage{#1}%
2500   \bbl@get@enc#1:\@@@
2501   \begingroup
2502     \lefthyphenmin\m@ne
2503     \bbl@hook@loadpatterns{#2}%
2504     \ifnum\lefthyphenmin=\m@ne
2505       \else
2506         \expandafter\xdef\csname #1hyphenmins\endcsname{%
2507           \the\lefthyphenmin\the\righthyphenmin}%
2508         \fi
2509     \endgroup
2510   \def\bbl@tempa{#3}%
2511   \ifx\bbl@tempa\@empty\else
2512     \bbl@hook@loadexceptions{#3}%
2513   \fi
2514   \let\bbl@elt\relax
2515   \edef\bbl@languages{%
2516     \bbl@languages\bbl@elt{#1}{\the\language}{#2}{\bbl@tempa}}%
2517   \ifnum\the\language=\z@
2518     \expandafter\ifx\csname #1hyphenmins\endcsname\relax
2519       \set@hyphenmins\tw@\thr@@\relax
2520     \else
2521       \expandafter\expandafter\expandafter\set@hyphenmins
2522         \csname #1hyphenmins\endcsname
2523     \fi
2524     \the\toks@
2525     \toks@{}%
2526   \fi}

```

`\bbl@get@enc` The macro `\bbl@get@enc` extracts the font encoding from the language name and `\bbl@hyph@enc` stores it in `\bbl@hyph@enc`. It uses delimited arguments to achieve this.

```

2527 \def\bbl@get@enc#1:#2:#3\@@@\def\bbl@hyph@enc{#2}}

```

Now, hooks are defined. For efficiency reasons, they are dealt here in a special way. Besides `luatex`, format specific configuration files are taken into account.

```

2528 \def\bbl@hook@everylanguage#1{}
2529 \def\bbl@hook@loadpatterns#1{\input #1\relax}
2530 \let\bbl@hook@loadexceptions\bbl@hook@loadpatterns
2531 \let\bbl@hook@loadkernel\bbl@hook@loadpatterns
2532 \begingroup
2533   \def\AddBabelHook#1#2{%
2534     \expandafter\ifx\csname bbl@hook@#2\endcsname\relax
2535       \def\next{\toks1}%
2536     \else
2537       \def\next{\expandafter\gdef\csname bbl@hook@#2\endcsname###1}%
2538     \fi
2539     \next}
2540   \ifx\directlua\@undefined

```

```

2541 \ifx\XeTeXinputencoding\@undefined\else
2542 \input xebabel.def
2543 \fi
2544 \else
2545 \input luababel.def
2546 \fi
2547 \openin1 = babel-\bbl@format.cfg
2548 \ifeof1
2549 \else
2550 \input babel-\bbl@format.cfg\relax
2551 \fi
2552 \closein1
2553 \endgroup
2554 \bbl@hook@loadkernel{switch.def}

```

`\readconfigfile` The configuration file can now be opened for reading.

```
2555 \openin1 = language.dat
```

See if the file exists, if not, use the default hyphenation file `hyphen.tex`. The user will be informed about this.

```

2556 \def\languagename{english}%
2557 \ifeof1
2558 \message{I couldn't find the file language.dat,\space
2559         I will try the file hyphen.tex}
2560 \input hyphen.tex\relax
2561 \chardef\l@english\z@
2562 \else

```

Pattern registers are allocated using count register `\last@language`. Its initial value is 0. The definition of the macro `\newlanguage` is such that it first increments the count register and then defines the language. In order to have the first patterns loaded in pattern register number 0 we initialize `\last@language` with the value `-1`.

```
2563 \last@language@m@ne
```

We now read lines from the file until the end is found

```
2564 \loop
```

While reading from the input, it is useful to switch off recognition of the end-of-line character. This saves us stripping off spaces from the contents of the control sequence.

```

2565 \endlinechar@m@ne
2566 \read1 to \bbl@line
2567 \endlinechar`\^^M

```

If the file has reached its end, exit from the loop here. If not, empty lines are skipped. Add 3 space characters to the end of `\bbl@line`. This is needed to be able to recognize the arguments of `\process@line` later on. The default language should be the very first one.

```

2568 \if T\ifeof1F\fi T\relax
2569 \ifx\bbl@line\@empty\else
2570 \edef\bbl@line{\bbl@line\space\space\space}%
2571 \expandafter\process@line\bbl@line\relax
2572 \fi
2573 \repeat

```

Check for the end of the file. We must reverse the test for `\ifeof` without `\else`. Then reactivate the default patterns.

```
2574 \begingroup
```

```

2575 \def\bbl@elt#1#2#3#4{%
2576 \global\language=#2\relax
2577 \gdef\language#1}%
2578 \def\bbl@elt##1##2##3##4{}}%
2579 \bbl@languages
2580 \endgroup
2581 \fi

```

and close the configuration file.

```
2582 \closein1
```

We add a message about the fact that babel is loaded in the format and with which language patterns to the `\everyjob` register.

```

2583 \if/\the\toks@\else
2584 \errhelp{language.dat loads no language, only synonyms}
2585 \errmessage{Orphan language synonym}
2586 \fi
2587 \advance\last@language\@ne
2588 \edef\bbl@tempa{%
2589 \everyjob{%
2590 \the\everyjob
2591 \ifx\typeout\@undefined
2592 \immediate\write16%
2593 \else
2594 \noexpand\typeout
2595 \fi
2596 {\the\toks8 \the\last@language\space language(s) loaded.}}
2597 \advance\last@language\m@ne
2598 \bbl@tempa

```

Also remove some macros from memory and raise an error if `\toks@` is not empty. Finally load `switch.def`, but the latter is not required and the line inputting it may be commented out.

```

2599 \let\bbl@line\@undefined
2600 \let\process@line\@undefined
2601 \let\process@synonym\@undefined
2602 \let\process@language\@undefined
2603 \let\bbl@get@enc\@undefined
2604 \let\bbl@hyph@enc\@undefined
2605 \let\bbl@tempa\@undefined
2606 \let\bbl@hook@loadkernel\@undefined
2607 \let\bbl@hook@everylanguage\@undefined
2608 \let\bbl@hook@loadpatterns\@undefined
2609 \let\bbl@hook@loadexceptions\@undefined
2610 </patterns>

```

Here the code for `iniTeX` ends.

12 Tentative font handling with `fontspec`

A general solution is far from trivial:

- `\addfontfeature` only sets it for the current family and it's not very efficient, and
- `\defaultfontfeatures` requires to redefine the font (and the options are not "orthogonal").


```

2611 <<(*Font selection)>> ≡
2612 \newcommand\babelFSstore[2][]{%
2613   \bbl@ifblank{#1}%
2614   {\bbl@csarg\def{script@#2}{Latin}}%
2615   {\bbl@csarg\def{script@#2}{#1}}%
2616   \@expandtwoargs % TODO should go to the ini loaders
2617   \in@{\csname bbl@script@#2\endcsname}{\bbl@trtscripts}%
2618   \ifin@
2619     \let\bbl@beforeforeign\leavevmode
2620     \EnableBabelHook{babel-bidi}%
2621     \@nameuse{bbl@xebidipar}%
2622   \fi
2623   \bbl@foreach{#2}{%
2624     \bbl@FSstore{##1}{rm}\rmdefault\bbl@save@rmdefault
2625     \bbl@FSstore{##1}{sf}\sfdefault\bbl@save@sfdefault
2626     \bbl@FSstore{##1}{tt}\ttdefault\bbl@save@ttdefault}}
2627 \def\bbl@FSstore#1#2#3#4{%
2628   \bbl@csarg\edef{#2default#1}{#3}%
2629   \expandafter\addto\csname extras#1\endcsname{%
2630     \let#4#3%
2631     \ifx#3\f@family
2632       \edef#3{\csname bbl@#2default#1\endcsname}%
2633       \fontfamily{#3}\selectfont
2634     \else
2635       \edef#3{\csname bbl@#2default#1\endcsname}%
2636     \fi}%
2637   \expandafter\addto\csname noextras#1\endcsname{%
2638     \ifx#3\f@family
2639       \fontfamily{#4}\selectfont
2640     \fi
2641     \let#3#4}}
2642 \let\bbl@langfeatures\@empty
2643 \def\babelFSfeatures{% make sure \fontspec is redefined once
2644   \let\bbl@ori@fontspec\fontspec
2645   \renewcommand\fontspec[1][]{%
2646     \bbl@ori@fontspec[\bbl@langfeatures##1]}
2647   \let\babelFSfeatures\bbl@FSfeatures
2648   \babelFSfeatures}
2649 \def\bbl@FSfeatures#1#2{%
2650   \expandafter\addto\csname extras#1\endcsname{%
2651     \babel@save\bbl@langfeatures
2652     \edef\bbl@langfeatures{#2,}}
2653 <</Font selection>>

```

13 Hooks for XeTeX and LuaTeX

13.1 XeTeX

Unfortunately, the current encoding cannot be retrieved and therefore it is reset always to utf8, which seems a sensible default.

L^AT_EX sets many “codes” just before loading hyphen.cfg. That is not a problem in luatex, but in xetex they must be reset to the proper value. Most of the work is done in xe(la)tex.ini, so here we just “undo” some of the changes done by L^AT_EX. Anyway, for consistency LuaT_EX also resets the catcodes.

```

2654 <<(*Restore Unicode catcodes before loading patterns)>> ≡
2655 \begingroup
2656   % Reset chars "80-"C0 to category "other", no case mapping:

```

```

2657 \catcode \@=11 \count@=128
2658 \loop\ifnum\count@<192
2659 \global\uccode\count@=0 \global\lccode\count@=0
2660 \global\catcode\count@=12 \global\sfcodes\count@=1000
2661 \advance\count@ by 1 \repeat
2662 % Other:
2663 \def\0 ##1 {%
2664 \global\uccode"##1=0 \global\lccode"##1=0
2665 \global\catcode"##1=12 \global\sfcodes"##1=1000 }%
2666 % Letter:
2667 \def\L ##1 ##2 ##3 {\global\catcode"##1=11
2668 \global\uccode"##1="##2
2669 \global\lccode"##1="##3
2670 % Uppercase letters have sfcodes=999:
2671 \ifnum"##1="##3 \else \global\sfcodes"##1=999 \fi }%
2672 % Letter without case mappings:
2673 \def\l ##1 {\L ##1 ##1 ##1 }%
2674 \l 00AA
2675 \L 00B5 039C 00B5
2676 \l 00BA
2677 \O 00D7
2678 \l 00DF
2679 \O 00F7
2680 \L 00FF 0178 00FF
2681 \endgroup
2682 \input #1\relax
2683 <</Restore Unicode catcodes before loading patterns>>

```

Now, the code.

```

2684 < *xetex >
2685 \def\BabelStringsDefault{unicode}
2686 \let\xebbl@stop\relax
2687 \AddBabelHook{xetex}{encodedcommands}{%
2688 \def\bbl@tempa{#1}%
2689 \ifx\bbl@tempa\@empty
2690 \XeTeXinputencoding"bytes"%
2691 \else
2692 \XeTeXinputencoding"#1"%
2693 \fi
2694 \def\xebbl@stop{\XeTeXinputencoding"utf8"}}
2695 \AddBabelHook{xetex}{stopcommands}{%
2696 \xebbl@stop
2697 \let\xebbl@stop\relax}
2698 \AddBabelHook{xetex}{loadkernel}{%
2699 <<Restore Unicode catcodes before loading patterns>>}
2700 <<Font selection>>
2701 </xetex >

```

13.2 LuaTeX

The new loader for luatex is based solely on `language.dat`, which is read on the fly. The code shouldn't be executed when the format is build, so we check if `\AddBabelHook` is defined. Then comes a modified version of the loader in `hyphen.cfg` (without the `hyphenmins` stuff, which is under the direct control of `babel`).

The names `\l@<language>` are defined and take some value from the beginning because all `ldf` files assume this for the corresponding language to be considered valid, but patterns are not loaded (except the first one). This is done later, when the

language is first selected (which usually means when the `ldf` finishes). If a language has been loaded, `\bbl@hyphendata@<num>` exists (with the names of the files read). The default setup preloads the first language into the format. This is intended mainly for ‘english’, so that it’s available without further intervention from the user. To avoid duplicating it, the following rule applies: if the “0th” language and the first language in `language.dat` have the same name then just ignore the latter. If there are new synonymous, they are added, but note if the language patterns have not been preloaded they won’t at run time.

Other preloaded languages could be read twice, if they has been preloaded into the format. This is not optimal, but it shouldn’t happen very often – with `luatex` patterns are best loaded when the document is typeset, and the “0th” language is preloaded just for backwards compatibility.

As of 1.1b, `lua(e)tex` is taken into account. Formerly, loading of patterns on the fly didn’t work in this format, but with the new loader it does. Unfortunately, the format is not based on `babel`, and data could be duplicated, because languages are reassigned above those in the format (nothing serious, anyway). Note even with this format `language.dat` is used (under the principle of a single source), instead of `language.def`.

Of course, there is room for improvements, like tools to read and reassign languages, which would require modifying the language list, and better error handling.

We need catcode tables, but no format (targeted by `babel`) provide a command to allocate them (although there are packages like `ctablestack`). For the moment, a dangerous approach is used – just allocate a high random number and cross the fingers. To complicate things, `etex.sty` changes the way languages are allocated.

```

2702 (*luatex)
2703 \ifx\AddBabelHook\undefined
2704 \begingroup
2705 \toks@{}
2706 \count@% 0=start, 1=0th, 2=normal
2707 \def\bbl@process@line#1#2 #3 #4 {%
2708   \ifx=#1%
2709     \bbl@process@synonym{#2}%
2710   \else
2711     \bbl@process@language{#1#2}{#3}{#4}%
2712   \fi
2713   \ignorespaces}
2714 \def\bbl@manylang{%
2715   \ifnum\bbl@last>\@ne
2716     \bbl@info{Non-standard hyphenation setup}%
2717   \fi
2718   \let\bbl@manylang\relax}
2719 \def\bbl@process@language#1#2#3{%
2720   \ifcase\count@
2721     \@ifundefined{zth@#1}{\count@\tw@}{\count@\@ne}%
2722   \or
2723     \count@\tw@
2724   \fi
2725   \ifnum\count@=\tw@
2726     \expandafter\addlanguage\csname l@#1\endcsname
2727     \language\allocationnumber
2728     \chardef\bbl@last\allocationnumber
2729     \bbl@manylang
2730     \let\bbl@elt\relax
2731     \xdef\bbl@languages{%
2732       \bbl@languages\bbl@elt{#1}{\the\language}{#2}{#3}}%

```

```

2733 \fi
2734 \the\toks@
2735 \toks@{}}
2736 \def\bbbl@process@synonym@aux#1#2{%
2737 \global\expandafter\chardef\csname l@#1\endcsname#2\relax
2738 \let\bbbl@elt\relax
2739 \xdef\bbbl@languages{%
2740 \bbbl@languages\bbbl@elt{#1}{#2}{}}}%
2741 \def\bbbl@process@synonym#1{%
2742 \ifcase\count@
2743 \toks@\expandafter{\the\toks@\relax\bbbl@process@synonym{#1}}%
2744 \or
2745 \@ifundefined{zth@#1}{\bbbl@process@synonym@aux{#1}{0}}}%
2746 \else
2747 \bbbl@process@synonym@aux{#1}{\the\bbbl@last}%
2748 \fi}
2749 \ifx\bbbl@languages\undefined % Just a (sensible?) guess
2750 \chardef\l@english\z@
2751 \chardef\l@USenglish\z@
2752 \chardef\bbbl@last\z@
2753 \global\@namedef{bbbl@hyphendata@0}{{hyphen.tex}}
2754 \gdef\bbbl@languages{%
2755 \bbbl@elt{english}{0}{hyphen.tex}}%
2756 \bbbl@elt{USenglish}{0}{}}
2757 \else
2758 \global\let\bbbl@languages@format\bbbl@languages
2759 \def\bbbl@elt#1#2#3#4{% Remove all except language 0
2760 \ifnum#2>\z@\else
2761 \noexpand\bbbl@elt{#1}{#2}{#3}{#4}%
2762 \fi}%
2763 \xdef\bbbl@languages{\bbbl@languages}%
2764 \fi
2765 \def\bbbl@elt#1#2#3#4{\@namedef{zth@#1}} % Define flags
2766 \bbbl@languages
2767 \openin1=language.dat
2768 \ifeof1
2769 \bbbl@warning{I couldn't find language.dat. No additional\\%
2770 patterns loaded. Reported}%
2771 \else
2772 \loop
2773 \endlinechar\m@ne
2774 \read1 to \bbbl@line
2775 \endlinechar\^^M
2776 \if T\ifeof1F\fi T\relax
2777 \ifx\bbbl@line\@empty\else
2778 \edef\bbbl@line{\bbbl@line\space\space\space}%
2779 \expandafter\bbbl@process@line\bbbl@line\relax
2780 \fi
2781 \repeat
2782 \fi
2783 \endgroup
2784 \def\bbbl@get@enc#1:#2:#3\@@@{\def\bbbl@hyph@enc{#2}}
2785 \ifx\babelcatcodetablenum\undefined
2786 \def\babelcatcodetablenum{5211}
2787 \fi
2788 \def\bbbl@luapatterns#1#2{%
2789 \bbbl@get@enc#1:.\@@@
2790 \setbox\z@\hbox\bgroup
2791 \begingroup

```

```

2792 \ifx\catcodetable\@undefined
2793 \let\savecatcodetable\luatexsavecatcodetable
2794 \let\initcatcodetable\luatexinitcatcodetable
2795 \let\catcodetable\luatexcatcodetable
2796 \fi
2797 \savecatcodetable\babelcatcodetablenum\relax
2798 \initcatcodetable\numexpr\babelcatcodetablenum+1\relax
2799 \catcodetable\numexpr\babelcatcodetablenum+1\relax
2800 \catcode`\#=6 \catcode`\$=3 \catcode`\&=4 \catcode`\^=7
2801 \catcode`\_ =8 \catcode`\{=1 \catcode`\}=2 \catcode`\~=13
2802 \catcode`\@=11 \catcode`\^^I=10 \catcode`\^^J=12
2803 \catcode`\<=12 \catcode`\>=12 \catcode`\*=12 \catcode`\.=12
2804 \catcode`\-=12 \catcode`\/=12 \catcode`\[=12 \catcode`\]=12
2805 \catcode`\`=12 \catcode`\'=12 \catcode`\`=12
2806 \input #1\relax
2807 \catcodetable\babelcatcodetablenum\relax
2808 \endgroup
2809 \def\bbl@tempa{#2}%
2810 \ifx\bbl@tempa\@empty\else
2811 \input #2\relax
2812 \fi
2813 \egroup}%
2814 \def\bbl@patterns@lua#1{%
2815 \language=\expandafter\ifx\csname l@#1:\f@encoding\endcsname\relax
2816 \csname l@#1\endcsname
2817 \edef\bbl@tempa{#1}%
2818 \else
2819 \csname l@#1:\f@encoding\endcsname
2820 \edef\bbl@tempa{#1:\f@encoding}%
2821 \fi\relax
2822 \@namedef{lu@texhyphen@loaded@the\language}{}% Temp
2823 \@ifundefined{bbl@hyphendata@the\language}%
2824 {\def\bbl@elt##1##2##3##4{%
2825 \ifnum##2=\csname l@\bbl@tempa\endcsname % #2=spanish, dutch:OT1...
2826 \def\bbl@tempb{##3}%
2827 \ifx\bbl@tempb\@empty\else % if not a synonymous
2828 \def\bbl@tempc{{##3}{##4}}%
2829 \fi
2830 \bbl@csarg\xdef{hyphendata@##2}{\bbl@tempc}%
2831 \fi}%
2832 \bbl@languages
2833 \@ifundefined{bbl@hyphendata@the\language}%
2834 {\bbl@info{No hyphenation patterns were set for\\%
2835 language '\bbl@tempa'. Reported}}%
2836 {\expandafter\expandafter\expandafter\bbl@luapatterns
2837 \csname bbl@hyphendata@the\language\endcsname}}}}
2838 \endinput\fi
2839 \begingroup
2840 \catcode`\%=12
2841 \catcode`\'=12
2842 \catcode`\`=12
2843 \catcode`\:=12
2844 \directlua{
2845 Babel = {}
2846 function Babel.bytes(line)
2847 return line:gsub(".",
2848 function (chr) return unicode.utf8.char(string.byte(chr)) end)
2849 end
2850 function Babel.begin_process_input()

```

```

2851   if luatexbase and luatexbase.add_to_callback then
2852       luatexbase.add_to_callback('process_input_buffer',
2853                               Babel.bytes, 'Babel.bytes')
2854   else
2855       Babel.callback = callback.find('process_input_buffer')
2856       callback.register('process_input_buffer', Babel.bytes)
2857   end
2858 end
2859 function Babel.end_process_input ()
2860   if luatexbase and luatexbase.remove_from_callback then
2861       luatexbase.remove_from_callback('process_input_buffer', 'Babel.bytes')
2862   else
2863       callback.register('process_input_buffer', Babel.callback)
2864   end
2865 end
2866 function Babel.addpatterns(pp, lg)
2867   local lg = lang.new(lg)
2868   local pats = lang.patterns(lg) or ''
2869   lang.clear_patterns(lg)
2870   for p in pp:gmatch('[^%s]+') do
2871       ss = ''
2872       for i in string.utfcharacters(p:gsub('%d', '')) do
2873           ss = ss .. '%d?' .. i
2874       end
2875       ss = ss:gsub('^%d%?%.', '%%.') .. '%d?'
2876       ss = ss:gsub('%.%d%?$', '%%.')
2877       pats, n = pats:gsub('%s' .. ss .. '%s', ' ' .. p .. ' ')
2878       if n == 0 then
2879           tex.sprint(
2880               [[\string\csname\space bbl@info\endcsname{New pattern: }]]
2881               .. p .. [[]])
2882           pats = pats .. ' ' .. p
2883       else
2884           tex.sprint(
2885               [[\string\csname\space bbl@info\endcsname{Renew pattern: }]]
2886               .. p .. [[]])
2887       end
2888   end
2889   lang.patterns(lg, pats)
2890 end
2891 }
2892 \endgroup
2893 \def\BabelStringsDefault{unicode}
2894 \let\luabbl@stop\relax
2895 \AddBabelHook{luatex}{encodedcommands}{%
2896   \def\bbl@tempa{utf8}\def\bbl@tempb{#1}%
2897   \ifx\bbl@tempa\bbl@tempb\else
2898     \directlua{Babel.begin_process_input()}%
2899   \def\luabbl@stop{%
2900     \directlua{Babel.end_process_input()}}%
2901   \fi}%
2902 \AddBabelHook{luatex}{stopcommands}{%
2903   \luabbl@stop
2904   \let\luabbl@stop\relax}
2905 \AddBabelHook{luatex}{patterns}{%
2906   \@ifundefined{bbl@hyphendata@the\language}%
2907   {\def\bbl@elt##1##2##3##4{%
2908     \ifnum##2=\csname l@##2\endcsname % #2=spanish, dutch:OT1...
2909     \def\bbl@tempb{##3}%

```

```

2910     \ifx\bbbl@tempb\@empty\else % if not a synonymous
2911     \def\bbbl@tempc{##3}##4}%
2912     \fi
2913     \bbbl@csarg\xdef{hyphendata@##2}{\bbbl@tempc}%
2914     \fi}%
2915 \bbbl@languages
2916 \@ifundefined{bbbl@hyphendata@the\language}%
2917   {\bbbl@info{No hyphenation patterns were set for\%
2918     language '#2'. Reported}}%
2919   {\expandafter\expandafter\expandafter\bbbl@luapatterns
2920     \csname bbbl@hyphendata@the\language\endcsname}}}%
2921 \@ifundefined{bbbl@patterns@}{}%
2922 \begingroup
2923   \@expandtwoargs\in@{,\number\language,}{,\bbbl@pttnlist}%
2924   \ifin@else
2925     \ifx\bbbl@patterns@\@empty\else
2926       \directlua{ Babel.addpatterns(
2927         [[\bbbl@patterns@]], \number\language) }%
2928     \fi
2929     \@ifundefined{bbbl@patterns@#1}%
2930     \@empty
2931     {\directlua{ Babel.addpatterns(
2932       [[\space\csname bbbl@patterns@#1\endcsname]],
2933       \number\language) }}%
2934     \xdef\bbbl@pttnlist{\bbbl@pttnlist\number\language,}%
2935   \fi
2936 \endgroup}}
2937 \AddBabelHook{luatex}{everylanguage}{%
2938   \def\process@language##1##2##3{%
2939     \def\process@line####1####2 ####3 ####4 {}}%
2940 \AddBabelHook{luatex}{loadpatterns}{%
2941   \input #1\relax
2942   \expandafter\gdef\csname bbbl@hyphendata@the\language\endcsname
2943     {##1}{}}%
2944 \AddBabelHook{luatex}{loadexceptions}{%
2945   \input #1\relax
2946   \def\bbbl@tempb##1##2{##1}{##1}%
2947   \expandafter\xdef\csname bbbl@hyphendata@the\language\endcsname
2948     {\expandafter\expandafter\expandafter\bbbl@tempb
2949     \csname bbbl@hyphendata@the\language\endcsname}}%

```

\babelpatterns This macro adds patterns. Two macros are used to store them: \bbbl@patterns@ for the global ones and \bbbl@patterns@<lang> for language ones. We make sure there is a space between words when multiple commands are used.

```

2950 \@onlypreamble\babelpatterns
2951 \AtEndOfPackage{%
2952   \newcommand\babelpatterns[2][\@empty]{%
2953     \ifx\bbbl@patterns@\relax
2954       \let\bbbl@patterns@\@empty
2955     \fi
2956     \ifx\bbbl@pttnlist@\@empty\else
2957       \bbbl@warning{%
2958         You must not intermingle \string\selectlanguage\space and\%
2959         \string\babelpatterns\space or some patterns will not\%
2960         be taken into account. Reported}%
2961       \fi
2962       \ifx@\@empty#1%
2963         \protected@edef\bbbl@patterns@{\bbbl@patterns@\space#2}%

```

```

2964 \else
2965 \edef\bbl@tempb{\zap@space#1 \@empty}%
2966 \bbl@for\bbl@tempa\bbl@tempb{%
2967 \bbl@fixname\bbl@tempa
2968 \bbl@iflanguage\bbl@tempa{%
2969 \bbl@csarg\protected@edef{patterns@\bbl@tempa}{%
2970 \@ifundefined{bbl@patterns@\bbl@tempa}%
2971 \@empty
2972 {\csname bbl@patterns@\bbl@tempa\endcsname\space}%
2973 #2}}}%
2974 \fi}}

```

Common stuff.

```

2975 \AddBabelHook{luatex}{loadkernel}{%
2976 <<Restore Unicode catcodes before loading patterns>>}
2977 <<Font selection>>
2978 </luatex>

```

14 The ‘nil’ language

This ‘language’ does nothing, except setting the hyphenation patterns to nohyphenation.

For this language currently no special definitions are needed or available.

The macro `\LdfInit` takes care of preventing that this file is loaded more than once, checking the category code of the `@` sign, etc.

```

2979 (*nil)
2980 \ProvidesLanguage{nil}[<<date>> <<version>> Nil language]
2981 \LdfInit{nil}{datenil}

```

When this file is read as an option, i.e. by the `\usepackage` command, nil could be an ‘unknown’ language in which case we have to make it known.

```

2982 \ifx\l@nohyphenation\@undefined
2983 \@nopatterns{nil}
2984 \adddialect\l@nil0
2985 \else
2986 \let\l@nil\l@nohyphenation
2987 \fi

```

This macro is used to store the values of the hyphenation parameters `\lefthyphenmin` and `\righthyphenmin`.

```

2988 \providehyphenmins{\CurrentOption}{\m@ne\m@ne}

```

The next step consists of defining commands to switch to (and from) the ‘nil’ language.

```

\captionnil
\datenil 2989 \let\captionnil\@empty
2990 \let\datenil\@empty

```

The macro `\ldf@finish` takes care of looking for a configuration file, setting the main language to be switched on at `\begin{document}` and resetting the category code of `@` to its original value.

```

2991 \ldf@finish{nil}
2992 </nil>

```


15 Support for Plain T_EX (plain.def)

15.1 Not renaming hyphen.tex

As Don Knuth has declared that the filename `hyphen.tex` may only be used to designate *his* version of the american English hyphenation patterns, a new solution has to be found in order to be able to load hyphenation patterns for other languages in a plain-based T_EX-format. When asked he responded:

That file name is “sacred”, and if anybody changes it they will cause severe upward/downward compatibility headaches.

People can have a file `locallyhyphen.tex` or whatever they like, but they mustn't diddle with `hyphen.tex` (or `plain.tex` except to preload additional fonts).

The files `bplain.tex` and `blplain.tex` can be used as replacement wrappers around `plain.tex` and `lplain.tex` to achieve the desired effect, based on the `babel` package. If you load each of them with `iniTEX`, you will get a file called either `bplain.fmt` or `blplain.fmt`, which you can use as replacements for `plain.fmt` and `lplain.fmt`.

As these files are going to be read as the first thing `iniTEX` sees, we need to set some category codes just to be able to change the definition of `\input`

```
2993 (*bplain | blplain)
2994 \catcode`\{=1 % left brace is begin-group character
2995 \catcode`\}=2 % right brace is end-group character
2996 \catcode`\#=6 % hash mark is macro parameter character
```

Now let's see if a file called `hyphen.cfg` can be found somewhere on T_EX's input path by trying to open it for reading...

```
2997 \openin 0 hyphen.cfg
```

If the file wasn't found the following test turns out true.

```
2998 \ifeof0
2999 \else
```

When `hyphen.cfg` could be opened we make sure that *it* will be read instead of the file `hyphen.tex` which should (according to Don Knuth's ruling) contain the american English hyphenation patterns and nothing else.

We do this by first saving the original meaning of `\input` (and I use a one letter control sequence for that so as not to waste multi-letter control sequence on this in the format).

```
3000 \let\input
```

Then `\input` is defined to forget about its argument and load `hyphen.cfg` instead.

```
3001 \def\input #1 {%
3002   \let\input\input
3003   \input #1
}
```

Once that's done the original meaning of `\input` can be restored and the definition of `\input` can be forgotten.

```
3004 \let\input\input
3005 }
3006 \fi
3007 </bplain | blplain>
```

Now that we have made sure that `hyphen.cfg` will be loaded at the right moment it is time to load `plain.tex`.

```
3008 (bplain)\input plain.tex
3009 (blplain)\input lplain.tex
```

Finally we change the contents of `\fmtname` to indicate that this is *not* the plain format, but a format based on plain with the `babel` package preloaded.

```
3010 (bplain)\def\fmtname{babel-plain}
3011 (blplain)\def\fmtname{babel-lplain}
```

When you are using a different format, based on `plain.tex` you can make a copy of `blplain.tex`, rename it and replace `plain.tex` with the name of your format file.

15.2 Emulating some L^AT_EX features

The following code duplicates or emulates parts of L^AT_EX 2_ε that are needed for `babel`.

```
3012 (*plain)
3013 \def\@empty{}
3014 \def\loadlocalcfg#1{%
3015   \openin0#1.cfg
3016   \ifeof0
3017     \closein0
3018   \else
3019     \closein0
3020     {\immediate\write16{*****}%
3021      \immediate\write16{* Local config file #1.cfg used}%
3022      \immediate\write16{*}%
3023     }
3024   \input #1.cfg\relax
3025   \fi
3026   \@endofldf}
```

15.3 General tools

A number of L^AT_EX macro's that are needed later on.

```
3027 \long\def\@firstofone#1{#1}
3028 \long\def\@firstoftwo#1#2{#1}
3029 \long\def\@secondoftwo#1#2{#2}
3030 \def\@nnil{\@nil}
3031 \def\@gobbletwo#1#2{}
3032 \def\@ifstar#1{\@ifnextchar *{\@firstoftwo{#1}}}
3033 \def\@star@or@long#1{%
3034   \@ifstar
3035   {\let\l@ngrel@x\relax#1}%
3036   {\let\l@ngrel@x\long#1}}
3037 \let\l@ngrel@x\relax
3038 \def\@car#1#2\@nil{#1}
3039 \def\@cdr#1#2\@nil{#2}
3040 \let\@typeset@protect\relax
3041 \let\protected@edef\edef
3042 \long\def\@gobble#1{}
3043 \edef\@backslashchar{\expandafter\@gobble\string\}
3044 \def\strip@prefix#1>{}
3045 \def\g@addto@macro#1#2{%
3046   \toks@\expandafter{#1#2}%
3047   \xdef#1{\the\toks@}}
3048 \def\@namedef#1{\expandafter\def\csname #1\endcsname}
3049 \def\@nameuse#1{\csname #1\endcsname}
3050 \def\@ifundefined#1{%
3051   \expandafter\ifx\csname#1\endcsname\relax
3052   \expandafter\@firstoftwo
```

```

3053 \else
3054   \expandafter\@secondoftwo
3055 \fi}
3056 \def\@expandtwoargs#1#2#3{%
3057   \edef\reserved@a{\noexpand#1{#2}{#3}}\reserved@a}
3058 \def\zap@space#1 #2{%
3059   #1%
3060   \ifx#2\@empty\else\expandafter\zap@space\fi
3061   #2}

```

$\LaTeX 2_\epsilon$ has the command `\@onlypreamble` which adds commands to a list of commands that are no longer needed after `\begin{document}`.

```

3062 \ifx\@preamblecmds\@undefined
3063   \def\@preamblecmds{}
3064 \fi
3065 \def\@onlypreamble#1{%
3066   \expandafter\gdef\expandafter\@preamblecmds\expandafter{%
3067     \@preamblecmds\do#1}}
3068 \@onlypreamble\@onlypreamble

```

Mimick \LaTeX 's `\AtBeginDocument`; for this to work the user needs to add `\begindocument` to his file.

```

3069 \def\begindocument{%
3070   \@begindocumenthook
3071   \global\let\@begindocumenthook\@undefined
3072   \def\do##1{\global\let##1\@undefined}%
3073   \@preamblecmds
3074   \global\let\do\noexpand}
3075 \ifx\@begindocumenthook\@undefined
3076   \def\@begindocumenthook{}
3077 \fi
3078 \@onlypreamble\@begindocumenthook
3079 \def\AtBeginDocument{\g@addto@macro\@begindocumenthook}

```

We also have to mimick \LaTeX 's `\AtEndOfPackage`. Our replacement macro is much simpler; it stores its argument in `\@endoflfd`.

```

3080 \def\AtEndOfPackage#1{\g@addto@macro\@endoflfd{#1}}
3081 \@onlypreamble\AtEndOfPackage
3082 \def\@endoflfd{}
3083 \@onlypreamble\@endoflfd
3084 \let\bbl@afterlang\@empty
3085 \chardef\bbl@opt@hyphenmap\z@

```

\LaTeX needs to be able to switch off writing to its auxiliary files; plain doesn't have them by default.

```

3086 \ifx\if@filesw\@undefined
3087   \expandafter\let\csname if@filesw\expandafter\endcsname
3088   \csname iffalse\endcsname
3089 \fi

```

Mimick \LaTeX 's commands to define control sequences.

```

3090 \def\newcommand{\@star@or@long\new@command}
3091 \def\new@command#1{%
3092   \@testopt{\@newcommand#1}0}
3093 \def\@newcommand#1[#2]{%
3094   \@ifnextchar [{\@xargdef#1[#2]}%
3095     {\@argdef#1[#2]}}
3096 \long\def\@argdef#1[#2]#3{%

```

```

3097 \@yargdef#1\@ne{#2}{#3}}
3098 \long\def\xargdef#1[#2][#3]#4{%
3099 \expandafter\def\expandafter#1\expandafter{%
3100 \expandafter\@protected@testopt\expandafter #1%
3101 \csname\string#1\expandafter\endcsname{#3}}%
3102 \expandafter\@yargdef \csname\string#1\endcsname
3103 \tw@{#2}{#4}}
3104 \long\def\@yargdef#1#2#3{%
3105 \@tempcnta#3\relax
3106 \advance \@tempcnta \@ne
3107 \let\@hash@\relax
3108 \edef\reserved@a{\ifx#2\tw@ [\@hash@1]\fi}%
3109 \@tempcntb #2%
3110 \@whilenum\@tempcntb <\@tempcnta
3111 \do{%
3112 \edef\reserved@a{\reserved@a\@hash@\the\@tempcntb}%
3113 \advance\@tempcntb \@ne}%
3114 \let\@hash@##%
3115 \l@ngrel@x\expandafter\def\expandafter#1\reserved@a}
3116 \def\providecommand{\@star@or@long\provide@command}
3117 \def\provide@command#1{%
3118 \begingroup
3119 \escapechar\m@ne\xdef\@gtempa{\string#1}%
3120 \endgroup
3121 \expandafter\ifundefined\@gtempa
3122 {\def\reserved@a{\new@command#1}}%
3123 {\let\reserved@a\relax
3124 \def\reserved@a{\new@command\reserved@a}}%
3125 \reserved@a}%
3126 \def\DeclareRobustCommand{\@star@or@long\declare@robustcommand}
3127 \def\declare@robustcommand#1{%
3128 \edef\reserved@a{\string#1}%
3129 \def\reserved@b{#1}%
3130 \edef\reserved@b{\expandafter\strip@prefix\meaning\reserved@b}%
3131 \edef#1{%
3132 \ifx\reserved@a\reserved@b
3133 \noexpand\x@protect
3134 \noexpand#1%
3135 \fi
3136 \noexpand\protect
3137 \expandafter\noexpand\csname\bbl@stripslash#1 \endcsname
3138 }%
3139 \expandafter\new@command\csname\bbl@stripslash#1 \endcsname
3140 }
3141 \def\x@protect#1{%
3142 \ifx\protect\@typeset@protect\else
3143 \@x@protect#1%
3144 \fi
3145 }
3146 \def\@x@protect#1\fi#2#3{%
3147 \fi\protect#1%
3148 }

```

The following little macro `\in@` is taken from `latex.ltx`; it checks whether its first argument is part of its second argument. It uses the boolean `\in@`; allocating a new boolean inside conditionally executed code is not possible, hence the construct with the temporary definition of `\bbl@tempa`.

```

3149 \def\bbl@tempa{\csname newif\endcsname\ifin@}

```

```

3150 \ifx\in@\undefined
3151 \def\in@#1#2{%
3152 \def\in@@##1##2##3\in@{%
3153 \ifx\in@@#2\in@false\else\in@true\fi}%
3154 \in@@#2#1\in@\in@@}
3155 \else
3156 \let\lbl@tempa\@empty
3157 \fi
3158 \lbl@tempa

```

\LaTeX has a macro to check whether a certain package was loaded with specific options. The command has two extra arguments which are code to be executed in either the true or false case. This is used to detect whether the document needs one of the accents to be activated (activegrave and activeacute). For plain \TeX we assume that the user wants them to be active by default. Therefore the only thing we do is execute the third argument (the code for the true case).

```

3159 \def\@ifpackagewith#1#2#3#4{#3}

```

The \LaTeX macro `\@ifl@aded` checks whether a file was loaded. This functionality is not needed for plain \TeX but we need the macro to be defined as a no-op.

```

3160 \def\@ifl@aded#1#2#3#4{}

```

For the following code we need to make sure that the commands `\newcommand` and `\providecommand` exist with some sensible definition. They are not fully equivalent to their $\LaTeX 2_\epsilon$ versions; just enough to make things work in plain \TeX environments.

```

3161 \ifx\@tempcnta\undefined
3162 \csname newcount\endcsname\@tempcnta\relax
3163 \fi
3164 \ifx\@tempcntb\undefined
3165 \csname newcount\endcsname\@tempcntb\relax
3166 \fi

```

To prevent wasting two counters in $\LaTeX 2.09$ (because counters with the same name are allocated later by it) we reset the counter that holds the next free counter (`\count10`).

```

3167 \ifx\bye\undefined
3168 \advance\count10 by -2\relax
3169 \fi
3170 \ifx\@ifnextchar\undefined
3171 \def\@ifnextchar#1#2#3{%
3172 \let\reserved@d=#1%
3173 \def\reserved@a{#2}\def\reserved@b{#3}%
3174 \futurelet\@let@token\@ifnch}
3175 \def\@ifnch{%
3176 \ifx\@let@token\@sptoken
3177 \let\reserved@c\@xifnch
3178 \else
3179 \ifx\@let@token\reserved@d
3180 \let\reserved@c\reserved@a
3181 \else
3182 \let\reserved@c\reserved@b
3183 \fi
3184 \fi
3185 \reserved@c}
3186 \def\{\let\@sptoken= } \: % this makes \@sptoken a space token
3187 \def\{\@xifnch} \expandafter\def\{\futurelet\@let@token\@ifnch}
3188 \fi

```

```

3189 \def\@testopt#1#2{%
3190   \ifnextchar[#{#1}{#1[#2]}}
3191 \def\@protected@testopt#1{%
3192   \ifx\protect\@typeset@protect
3193     \expandafter\@testopt
3194   \else
3195     \@x@protect#1%
3196   \fi}
3197 \long\def\@whilenum#1\do #2{\ifnum #1\relax #2\relax\@iwhilenum{#1\relax
3198   #2\relax}\fi}
3199 \long\def\@iwhilenum#1{\ifnum #1\expandafter\@iwhilenum
3200   \else\expandafter\@gobble\fi{#1}}

```

15.4 Encoding related macros

Code from `ltoutenc.dtx`, adapted for use in the plain \TeX environment.

```

3201 \def\DeclareTextCommand{%
3202   \@dec@text@cmd\providecommand
3203 }
3204 \def\ProvideTextCommand{%
3205   \@dec@text@cmd\providecommand
3206 }
3207 \def\DeclareTextSymbol#1#2#3{%
3208   \@dec@text@cmd\chardef#1{#2}#3\relax
3209 }
3210 \def\@dec@text@cmd#1#2#3{%
3211   \expandafter\def\expandafter#2%
3212     \expandafter{%
3213       \csname#3-cmd\expandafter\endcsname
3214       \expandafter#2%
3215       \csname#3\string#2\endcsname
3216     }%
3217 %   \let\@ifdefinable\@rc@ifdefinable
3218   \expandafter#1\csname#3\string#2\endcsname
3219 }
3220 \def\@current@cmd#1{%
3221   \ifx\protect\@typeset@protect\else
3222     \noexpand#1\expandafter\@gobble
3223   \fi
3224 }
3225 \def\@changed@cmd#1#2{%
3226   \ifx\protect\@typeset@protect
3227     \expandafter\ifx\csname\cf@encoding\string#1\endcsname\relax
3228       \expandafter\ifx\csname ?\string#1\endcsname\relax
3229         \expandafter\def\csname ?\string#1\endcsname{%
3230           \@changed@x@err{#1}%
3231         }%
3232       \fi
3233     \global\expandafter\let
3234       \csname\cf@encoding\string#1\expandafter\endcsname
3235       \csname ?\string#1\endcsname
3236     \fi
3237     \csname\cf@encoding\string#1%
3238     \expandafter\endcsname
3239   \else
3240     \noexpand#1%
3241   \fi
3242 }

```

```

3243 \def\@changed@x@err#1{%
3244   \errhelp{Your command will be ignored, type <return> to proceed}%
3245   \errmessage{Command \protect#1 undefined in encoding \cf@encoding}}
3246 \def\DeclareTextCommandDefault#1{%
3247   \DeclareTextCommand#1?%
3248 }
3249 \def\ProvideTextCommandDefault#1{%
3250   \ProvideTextCommand#1?%
3251 }
3252 \expandafter\let\csname OT1-cmd\endcsname\@current@cmd
3253 \expandafter\let\csname?-cmd\endcsname\@changed@cmd
3254 \def\DeclareTextAccent#1#2#3{%
3255   \DeclareTextCommand#1{#2}[1]{\accent#3 ##1}
3256 }
3257 \def\DeclareTextCompositeCommand#1#2#3#4{%
3258   \expandafter\let\expandafter\reserved@a\csname#2\string#1\endcsname
3259   \edef\reserved@b{\string##1}%
3260   \edef\reserved@c{%
3261     \expandafter\@strip@args\meaning\reserved@a:-\@strip@args}%
3262   \ifx\reserved@b\reserved@c
3263     \expandafter\expandafter\expandafter\ifx
3264       \expandafter\@car\reserved@a\relax\relax\@nil
3265       \@text@composite
3266     \else
3267       \edef\reserved@b##1{%
3268         \def\expandafter\noexpand
3269           \csname#2\string#1\endcsname###1{%
3270             \noexpand\@text@composite
3271               \expandafter\noexpand\csname#2\string#1\endcsname
3272               ###1\noexpand\@empty\noexpand\@text@composite
3273               {##1}%
3274             }%
3275           }%
3276       \expandafter\reserved@b\expandafter{\reserved@a{##1}}%
3277     \fi
3278     \expandafter\def\csname\expandafter\string\csname
3279       #2\endcsname\string#1-\string#3\endcsname{#4}
3280   \else
3281     \errhelp{Your command will be ignored, type <return> to proceed}%
3282     \errmessage{\string\DeclareTextCompositeCommand\space used on
3283       inappropriate command \protect#1}
3284   \fi
3285 }
3286 \def\@text@composite#1#2#3\@text@composite{%
3287   \expandafter\@text@composite@x
3288     \csname\string#1-\string#2\endcsname
3289 }
3290 \def\@text@composite@x#1#2{%
3291   \ifx#1\relax
3292     #2%
3293   \else
3294     #1%
3295   \fi
3296 }
3297 %
3298 \def\@strip@args#1:#2-#3\@strip@args{#2}
3299 \def\DeclareTextComposite#1#2#3#4{%
3300   \def\reserved@a{\DeclareTextCompositeCommand#1{#2}{#3}}%
3301   \bgroup

```

```

3302     \lccode\@=#4%
3303     \lowercase{%
3304     \egroup
3305     \reserved@a @%
3306     }%
3307 }
3308 %
3309 \def\UseTextSymbol#1#2{%
3310 %   \let\@curr@enc\cf@encoding
3311 %   \@use@text@encoding{#1}%
3312     #2%
3313 %   \@use@text@encoding\@curr@enc
3314 }
3315 \def\UseTextAccent#1#2#3{%
3316 %   \let\@curr@enc\cf@encoding
3317 %   \@use@text@encoding{#1}%
3318 %   #2{\@use@text@encoding\@curr@enc\selectfont#3}%
3319 %   \@use@text@encoding\@curr@enc
3320 }
3321 \def\@use@text@encoding#1{%
3322 %   \edef\f@encoding{#1}%
3323 %   \xdef\font@name{%
3324 %       \csname\curr@fontshape/\f@size\endcsname
3325 %   }%
3326 %   \pickup@font
3327 %   \font@name
3328 %   \@@enc@update
3329 }
3330 \def\DeclareTextSymbolDefault#1#2{%
3331     \DeclareTextCommandDefault#1{\UseTextSymbol{#2}#1}%
3332 }
3333 \def\DeclareTextAccentDefault#1#2{%
3334     \DeclareTextCommandDefault#1{\UseTextAccent{#2}#1}%
3335 }
3336 \def\cf@encoding{OT1}

```

Currently we only use the \LaTeX_ϵ method for accents for those that are known to be made active in *some* language definition file.

```

3337 \DeclareTextAccent{"}{OT1}{127}
3338 \DeclareTextAccent{'}{OT1}{19}
3339 \DeclareTextAccent{^}{OT1}{94}
3340 \DeclareTextAccent{\`}{OT1}{18}
3341 \DeclareTextAccent{\~}{OT1}{126}

```

The following control sequences are used in `babel.def` but are not defined for plain \TeX .

```

3342 \DeclareTextSymbol{\textquotedblleft}{OT1}{92}
3343 \DeclareTextSymbol{\textquotedblright}{OT1}{`\"}
3344 \DeclareTextSymbol{\textquoteleft}{OT1}{``}
3345 \DeclareTextSymbol{\textquoteright}{OT1}{``'}
3346 \DeclareTextSymbol{\i}{OT1}{16}
3347 \DeclareTextSymbol{\ss}{OT1}{25}

```

For a couple of languages we need the \LaTeX -control sequence `\scriptsize` to be available. Because plain \TeX doesn't have such a sophisticated font mechanism as \LaTeX has, we just `\let` it to `\sevenrm`.

```

3348 \ifx\scriptsize@undefined
3349     \let\scriptsize\sevenrm
3350 \fi

```


15.5 Babel options

The file `babel.def` expects some definitions made in the \LaTeX style file. So we must provide them at least some predefined values as well some tools to set them (even if not all options are available). There in no package options, and therefore and alternative mechanism is provided. For the moment, only `\babeloptionstrings` and `\babeloptionmath` are provided, which can be defined before loading `babel`. `\BabelModifiers` can be set too (but not sure it works).

```
3351 \let\bbl@opt@shorthands@annil
3352 \def\bbl@ifshorthand#1#2#3{#2}%
3353 \ifx\babeloptionstrings@undefined
3354   \let\bbl@opt@strings@annil
3355 \else
3356   \let\bbl@opt@strings\babeloptionstrings
3357 \fi
3358 \def\bbl@tempa{normal}
3359 \ifx\babeloptionmath\bbl@tempa
3360   \def\bbl@mathnormal{\noexpand\textormath}
3361 \fi
3362 \def\BabelStringsDefault{generic}
3363 \ifx\BabelModifiers@undefined\let\BabelModifiers\relax\fi
3364 \let\bbl@afterlang\relax
3365 \let\bbl@language@opts@empty
3366 \ifx@uclclist@undefined\let@uclclist@empty\fi
3367 \def\AfterBabelLanguage#1#2{}
3368 \
```

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