

The selnolig package: Selective suppression of typographic ligatures^{*}

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Abstract

The selnolig package lets users suppress typographic ligatures based on predefined search patterns. The search patterns focus on ligatures deemed inappropriate because they span morpheme boundaries. For example, the word `shelfful`, which is mentioned in the `TeXbook` as a word for which the “ff” ligature might be inappropriate, is automatically typeset as `shelfful` rather than as `shelfful`.

For English and German language documents, the selnolig package provides ligature suppression macros for the “common” f-ligatures. These comprise not only the familiar `ff`, `fi`, `fl`, `ffi`, and `ffl` ligatures but also the `ft` and `fft` ligatures.

For English language documents, the package further provides ligature suppression macros for a number of so-called “discretionary” and “historic” ligatures.

The selnolig package requires the Lua^ATeX format provided by a reasonably modern TeX distribution such as TeXLive 2012, MacTeX 2012, or MiKTeX 2.9.

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^{*}Current version: 0.171b. Features of the selnolig package are subject to change without prior notice.

The main text fonts used in this document are “Garamond Premier Pro” (for the most part) and “EB Garamond” (for the passages involving the `fb`, `fh`, `fk`, `ffb`, `ffh`, `ffk`, and `fk` ligatures). Both “common” and “discretionary” typographic ligatures are enabled for these two fonts—and suppressed selectively using selnolig’s macros.

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I Introduction

The ability of T_EX and Friends to use typographic ligatures has long been cherished by its users. Indeed, the automated and transparent use of typographic ligatures by T_EX and Friends is often offered up as one of the reasons for using these programs to obtain high-quality typeset output.

However, even though the automatic use of typographic ligatures is highly desirable in general, there are words for which the use of certain typographic ligatures may not be appropriate. The T_EXbook observes, on p. 19, that the word “shelfful” may look better if it is typeset as “shelfful”, i.e., *without* the ff-ligature. Some other English-language words that would generally be considered to be good candidates for non-use of ligatures are cufflink and offload; compare their appearance with that of cufflink and offload. Observe that all of these words are composite: the first word component (or morpheme) ends in an “f” or “ff”, and the second component (morpheme) start with either an “f” (in the case of shelfful) or an “l” (in the cases of cufflink and offload). A [morpheme](#), briefly stated, is the smallest linguistic unit within a word that bears distinct meaning. Thus, the words shelfful and offload each contain two morphemes.

On the whole, though, the need to suppress ligatures selectively for English language documents does not appear to be an enormously pressing typographic concern, possibly because English doesn’t feature composite words that frequently. However, in other languages, such as German, composite words are much more common; in these languages, there is naturally a much greater potential for composite words to feature ff, fi, and fl and other such character pairs (and triples) across morpheme boundaries. In German typography, having a typographic ligature span a morpheme boundary is considered something to be avoided at (nearly) all cost, probably because ligatures that span morpheme boundaries have the potential to impair seriously the intelligibility of these words.¹ Words such as elffach and kopflos (containing ff- and fl-ligatures) simply look wrong to a German reader; they should be typeset as elffach and kopflos, respectively.

T_EX and Friends offer several methods for suppressing ligatures on a case-by-case basis.² However, these methods must be applied separately to each and every occurrence of all words that contain undesirable ligatures. As such, these methods are both time-intensive and tedious, and there’s a residual risk that some words for which ligatures should be suppressed will be overlooked in the editing process.

¹For German texts, I believe that the *Duden* provides authoritative backing for questions related to selective ligature suppression. For English texts, I’m actually not aware of a document issued by an official or quasi-official body that discourages the use of typographic ligatures across morpheme boundaries. If anybody can provide such a reference, I would be happy to list it.

²In L^AT_EX, there are three basic methods for suppressing ligature within a character pair: (i) insertion of an “empty atom”, {} between the characters, (ii) insertion of an explicit italic correction, \/, and (iii) insertion of an explicit “kern”, e.g., \kern0pt or \hspace{0pt}. The babel package, when used with the ngerman option, offers the “shortcut” macro “|” for this purpose. Note, though, that the first ligature suppression method, {}, does *not* work if the document is compiled with LuaL^AT_EX.

What has *not* been available so far is a \LaTeX package that (a) provides a list of word patterns and entire words for which ligatures should be suppressed and (b) systematically discovers all instances of these patterns in a document and applies the non-ligation rules automatically to all words for which one or more pattern matches are found. The `selnolig` package is meant to address this need. The package is currently set up to handle English and German language non-ligation issues by providing extensive lists of ligature suppression macros appropriate for the respective languages. Of course, no claim as to the completeness of either list is made—or can be made. The package therefore makes it straightforward for users to provide their supplemental ligature suppression rules to treat words not already covered by the package.³

For both English and German language documents, the `selnolig` package provides macros to suppress selectively the following f-ligatures: `ff`, `fi`, `fl`, `ffi`, and `ffl`—the “standard” f-ligatures that should be familiar to most users of Computer Modern fonts—as well as the `ft` and `fft` ligatures. The latter two ligatures, while not provided by the Computer Modern font family, are available frequently in “oldstyle” or “Garamde” font families.

For English language documents, the package’s default setting is to suppress f-ligatures for only a fairly basic set of words. However, if the package’s `broadf` option is set, additional f-ligatures can be suppressed, e.g., for words that contain the `fb`, `fh`, `fj`, and `fk` character pairs. The package also features an option called `hdlig`. If this option is set, the package will suppress selectively historic and discretionary ligatures, such as those for the `ct`, `st`, `sp`, `sk`, `th`, `et`, and `as` character pairs.

For German language documents, all instances of `fb`, `fh`, `fj`, and `fk` ligatures are suppressed globally; see [Section 6.5](#) for more details. However, exceptions are provided in order *not* to suppress these ligatures for selected words of *non-German* origin—such as `fjord`, `Prokofjew`, and `Kafka`. At this time, no macros for the selective suppression of historic and/or discretionary ligatures are provided for German language documents.

The `selnolig` package also provides supplemental hyphenation exception lists for both English and German language words. These words are generally composite and contain one more typographic ligatures that should be suppressed.

A remark on the classification of various forms of typographic ligatures: Among the ligature-rich OpenType fonts I’m familiar with that can be loaded via the commands of the `fontspec` package, there appears to be a near-complete lack of terminological standardization as to which typographic ligatures—beyond the so-called “common” ligatures (mainly f-ligatures)—are labelled “historic” and which ones are labelled “discretionary”. The fonts Latin Modern Roman, Garamond Premier Pro, and Hoefler Text report having “only” discretionary ligatures, whereas Junicod, Cardo, EB Garamond, and Palatino Linotype report featuring both historic and discretionary ligatures. Interestingly, none of these fonts report having ligatures classified as either “contextual” or “required”.

³If you discover such words, please email them to me so that I can augment and update the package’s ligature suppression rules accordingly. A suggested template for reporting such cases is provided in [Appendix E](#).

2 I’m in a hurry! How do I start using this package?

2.1 How do I load the selnolig package?

- If your document is in English and you want to suppress f-ligatures for a “basic” set of words and word patterns, you should load the package as follows:

```
\usepackage[english]{selnolig}
```

Synonymous options for english are UKenglish, british, USenglish, american, canadian, australian, and newzealand.

- If you want to load a broader set of f-ligature suppression rules than the set that’s enabled by default, be sure to also specify the option `broadf`; see [Section 6.2.1](#).
 - If you enable “historic” and/or “discretionary” ligatures (e.g., *ct*, *st*, *sp*, *th*, *as*, *is*, *us*, etc.) for your document’s text font (or fonts), you should also specify the option `hdlig`.
- If your document is written in German, load the package as follows:

```
\usepackage[ngerman]{selnolig}
```

Synonymous options are german, austrian, naustrian, swissgerman, and swiss.

- If you load the package *without* an explicit language option, i.e., as

```
\usepackage{selnolig}
```

but if one or more of the language options noted above are specified as options to the `\documentclass` instruction, L^AT_EX will pass these options on to the selnolig package.

- If no language options are set, either when the package is loaded or as options in the `\documentclass` instruction, loading the selnolig package will not affect the appearance of your document unless you specify various `\nolig` macros yourself.

2.2 Any hints on how to get started with LuaL^AT_EX?

The ligature suppression macros of the selnolig package, which invoke lua code to perform their job, *require* the use of the LuaL^AT_EX format. They will *not* work under either pdfL^AT_EX or X_YL^AT_EX. If the selnolig package is not run under LuaL^AT_EX, a warning message will be issued and only the package’s supplemental hyphenation rules will be available.

The requirement to use LuaL^AT_EX in order to make use of the ligature suppression macros will likely force you to make some changes to your existing L^AT_EX documents. Fortunately, the

required changes should be fairly minor and straightforward to implement because Lua^ATeX is, for the most part, a strict superset of pdf^ATeX. Almost all documents that compile correctly under pdf^ATeX should also compile correctly under Lua^ATeX, as long as some relatively minor changes are made. The two main required changes are: (i) don't load the `inputenc` and `fontenc` packages, and (ii) insert the instruction

```
\usepackage{fontspec}
```

in the preamble. If the `selnolig` package is run under Lua^ATeX but the `fontspec` package isn't loaded by the time the `\begin{document}` statement is encountered, `selnolig` will terminate with an error message.

Of course, you'll also need to use a TeX distribution that includes a fairly recent version of Lua^ATeX. TeXLive 2012, MacTeX 2012, and MiKTeX 2.9 all satisfy this requirement. The version of Lua^ATeX distributed with TeXLive 2011 is probably sufficiently recent as well, but the version distributed with TeXLive 2009 is almost certainly not.

If you use a command-line interface to compile your document named, say, `myfile.tex`, be sure to type

```
lualatex myfile
```

rather than `latex myfile` (or `pdflatex myfile`). If you use an editor with pull-down menus or buttons to invoke a suitable TeX compiler for your document, be sure to select LuaLaTeX.

The very first time one runs Lua^ATeX on a document with a new set of fonts, the compilation speed will likely be quite slow because Lua^ATeX has to build various cache files to store font-related information. Subsequent compilation runs should be much faster.

Depending on your TeX distribution, the default font family used by Lua^ATeX will be either Computer Modern or Latin Modern. If you wish to use a different font family, further instructions will be required. How to specify fonts and font families and set up various font-related options in Lua^ATeX are subjects that go far beyond the scope of this user guide. I urge you to become familiar with the [user guide](#) of the `fontspec` package to learn how to set a multitude of font-related options.

The answers to the questions [Frequently loaded packages: Differences between pdf^ATeX and Lua^ATeX?](#) and [Using LuaTeX as a replacement for pdfTeX](#), both posted to tex.stackexchange.com, provide some very useful information for people who are reasonably familiar with pdf^ATeX but are new to Lua^ATeX. Another great resource for people who would like to become more familiar with Lua^ATeX is [A Guide to Lua^ATeX](#), written by Manuel Pégourié-Gonnard.

2.3 Anything else I need to do or know?

For multilingual support, Lua^ATeX and the `selnolig` package work well with the `babel` package. If your document loads the `babel` package, be sure to load the `selnolig` package *after* the `babel`

package, so that the supplemental hyphenation patterns provided by the `selnolig` package won't get clobbered by `babel`'s hyphenation settings. The `selnolig` package is also compatible with the `hyphsubst` package (which, if used, should be loaded with a `\RequirePackage` statement *before* the `\documentclass` instruction).

Lua^LTEX natively supports the so-called UTF-8 input encoding scheme. The `selnolig` package assumes that users make full use of this feature. Nowadays, many modern TEX-aware editors support UTF-8 directly; legacy files, however, may use other input encoding systems. If your input files currently use a different input encoding scheme, such as `LATIN1`, you should consider changing them over to UTF-8. Several methods exist for changing a file's input encoding scheme. See the question [How to change a .tex file's input encoding system \(preferably to UTF-8\)?](#) and the associated answers on tex.stackexchange.com for some possibilities.

If your document is written in German, it is assumed that all vowels with diereses (Umlaute) are entered as `ä`, `ö`, `ü`, etc. rather than, say, as `\{"a}`, `\{"o}`, and `\{"u}` or, if you tend to use the `babel` “shortcuts”, as `"a`, `"o`, and `"u`. Likewise, it's assumed that you enter the “Eszett” (“Scharfes s”) character as `ß` rather than as `\ss`.⁴

It is also assumed that you use the triple-f (modern) spelling form for words such as `Schiff-fahrt`, `Stofffarbe`, `Angrifffläche`, and `grifffest`.

Finally, all `babel`-style `"|` ligature-suppressing shortcut instructions should either be removed entirely or replaced with `\breaklig` instructions. On my Lua^LTEX system (MacTeX 2012), whenever a `"|` command is encountered, a bad crash occurs that requires a reboot of the computer.

3 Acknowledgments and license

I owe a huge intellectual and programming debt to Patrick Gundlach and Taco Hoekwater, who responded kindly and generously with detailed computer code to various queries I posted to tex.stackexchange.com.⁵ Without their expertise in programming in Lua and interfacing the lua code with L^ATEX, this package would not exist. They certainly deserve most of the credit for the lua code used by the `selnolig` package.

Felix Lehmann (a linguist and expert in morphology, i.e., the study of morphemes) and Steffen Hildebrandt (computer scientist extraordinaire) served as patient and careful testers of several *early beta* versions of this package, uncovering and fixing bugs, pointing out unclear passages in the user guide, writing scripts to automate the discovery of syntactic errors in the package's `\nolig` and `\keeplig` instructions, and providing many excellent suggestions for important enhancements

⁴Strictly speaking, the use of the characters with “built-in” diereses is only required for the operations of the package's `\nolig` and `\keeplig` commands. However, if you're going to use the `selnolig` package, you may as well use `ä`, `ö`, and `ü` consistently throughout your document(s).

⁵See especially the questions <http://tex.stackexchange.com/q/48516/5001>, <http://tex.stackexchange.com/q/63005/5001>, and <http://tex.stackexchange.com/q/37443/5001>.

and other improvements. Steffen also provided crucial modifications to the package's lua code to make possible the `\keeplig` macro.

Even more importantly, Felix and Steffen created scripts to systematically and comprehensively test the package's German `\nolig` and `\keeplig` search patterns for linguistic adequacy and (relative) completeness. They began with a corpus of almost 850 million [!] words, which they marked up with information on the morphological constituents of each word. From this huge word list, they extracted a set of 462,000 unique word forms containing potential f-ligatures. According to their analysis, an early version of the `selnolig` package (ca. late October 2012) dealt correctly with 85 percent (394,000) of those word forms, while still generating 21,000 Type I errors and 48,000 Type II errors;⁶ 1,000 words contained more than one potential ligature, hence the difference.⁷ The detailed error lists they generated were critical in helping me refine—and occasionally completely revise—the package's search patterns, bringing the number of errors down drastically in the process.⁸ All major changes to the German language ligature suppression patterns are still being subjected to their testing algorithms to streamline the tasks of detecting what's left to improve and catching any newly introduced errors.

Felix and Steffen started the automated testing as their final project for the course *Introduction to Computational Linguistics* at the University of Massachusetts at Amherst in the fall of 2012.⁹ They wish to thank the Institut für Maschinelle Sprachverarbeitung at the Universität Stuttgart for granting them a license for the morphological analysis tool SMOR¹⁰ and, in particular, Helmut Schmid for his guidance. They also express their gratitude to the *Web-as-Corpus kool ynitiative* (*WaCky*) for letting them use the SDeWaC corpus,¹¹ as well as to Rajesh Bhatt (University of Massachusetts at Amherst), Miriam Butt (Universität Konstanz), and Sabine Schulte im Walde (Universität Stuttgart) for helping them find the right resources for their project.

The `rmligs` script lists hundreds of German language words for which various f-ligatures should be suppressed. I created many of the initial German language ligature suppression rules of the `selnolig` package to treat the words listed in the `rmligs` package.¹²

⁶In the context of the `selnolig` package, a Type I error is the failure to suppress a typographically inappropriate ligature, and a Type II error is the suppression of a ligature that is actually appropriate.

⁷However, they also discovered that a considerable part of these errors wasn't real but, rather, the result of typos in the corpus and/or of suspect morphological analysis.

⁸Steffen's creation of the `\keeplig` macro provided the means to eliminate, in one fell swoop, more than 10,000 [!] Type II errors generated by the package's earlier incorrect suppression of the fl-ligature in words containing the strings `Pflicht` and `pflicht`.

⁹Their [code](#) and [finals paper](#) are available online.

¹⁰Schmid, H., A. Fitschen, and U. Heid, 2004, "SMOR: A German Computational Morphology Covering Derivation, Composition, and Inflection", *Proceedings of the IVth International Conference on Language Resources and Evaluation (LREC)*, pp. 1263–1266, Lisbon, Portugal.

¹¹Baroni, M., S. Bernardini, A. Ferraresi, and E. Zanchetta, 2009, "The WaCky Wide Web: A Collection of Very Large Linguistically Processed Web-Crawled Corpora", *Language Resources and Evaluation*, 43 (3), pp. 209–226.

¹²All versions of `rmligs` are archived at <http://www.j3e.de/ispell/igerman98/dict/>.

Matthias Vogel very kindly informed me of a very useful and detailed set of macros, named [Ligatures-German](#), which he wrote for the WinEdt programmer's editor, to suppress f-ligatures by inserting the babel "l" shortcut macro in the appropriate spots. Matthias' regular-expression based macros and a file he sent me containing a very extensive list of German words that need one or more f-ligatures suppressed led me to thoroughly refine and extend the scope of the selnolig's ligature-suppressing commands for German words.

Barbara Beeton provided careful and incisive comments on an early version of this user guide and the English-language ligature suppression macros. Other contributors to [tex.stackexchange.com](#) and [comp.text.tex](#), too numerous to name individually, also helped guide and influence the genesis of this package. To all of you, I express my sincere thanks.

The website <http://www.morewords.com> provides very convenient methods for searching English language words that may contain cases of ligature collisions across morpheme boundaries. For German words, the site <http://corpora.informatik.uni-leipzig.de/?dict=de> provides a similar resource.

The entire selnolig package is placed under the terms of the L^AT_EX Project Public License, version 1.3 or later (<http://www.latex-project.org/lppl.txt>). It has the status "maintained".

4 Structure of the package

4.1 Components of the package

The selnolig package has the following components:

- The main "driver" file is called selnolig.sty. It loads several other files and sets up the package's main user macros, \nolig and \keeplig. These macros are explained in more detail in [Section 4.2](#) below.
- The package's user macros rely on lua code contained in the file selnolig.lua.
- Extensive lists of non-ligation rules for English and German language documents are provided in the files selnolig-english-patterns.sty and selnolig-english-patterns.sty.
- Supplemental hyphenation exception patterns, mostly for words that involve one or more ligatures that are to be suppressed, are contained in the files selnolig-english-hyphex.sty and selnolig-english-hyphex.sty.
- A user guide (the document you're reading right now); the source code of the user guide is available in the file selnolig.tex.

- Ancillary files: the files `selnolig-english-test.tex` and `selnolig-german-test.tex` load the `selnolig` package as well as either `selnolig-english-wordlist.tex` or `selnolig-german-wordlist.tex`. They serve to demonstrate the output of the `selnolig` package when run on lists of English or German words that are candidates for non-use of ligatures. The files `selnolig-english-test.pdf` and `selnolig-german-test.pdf` contain the results of compiling the test programs.¹³

4.2 The package’s user commands

The file `selnolig.sty` should be loaded with a `\usepackage` statement, generally with one or more options; see [Section 6](#) for a discussion of the available options. After setting up several Boolean switches to structure the processing of options, the package next loads the file `selnolig.lua`, which contains the package’s lua code.

The package then sets up several user macros which build on the lua code:

1. The main user macro is called `\nolig`. Each `\nolig` instruction takes two arguments: a search string and a string that indicates the insertion point for the non-ligation “whatsit”. For example, the macro

```
\nolig{lfful}{lf|ful}
```

instructs Lua[®]TeX to suppress automatically the `ff`-ligature in words such as “shelfful”, “bookshelfful”, and “selffulfilling”.

More than one ligature suppression point may be provided in the second argument of a `\nolig` instruction. For instance, one *could* specify `\nolig{Auflauform}{Auf|lauf|form}` to suppress both the `fl`- and the `ff`-ligature in this word. However, for added flexibility, the `selnolig` package actually uses two separate `\nolig` commands.

It is possible to use Lua-style wildcard characters in the search string, as long as these characters occur *after* the non-ligation point. For example, the file `selnolig-german-patterns.sty` employs the instructions

```
\nolig{Dorff[aäeiloöruü]}{Dorf|f}
\nolig{dorff[aäeiloöruü]}{dorf|f}
```

to search for words that contain the strings `Dorff` and `dorff` followed by a letter in the set `aäeiloöruü`.¹⁴ Incidentally, it is not absolutely necessary, in the second argument of the `\nolig` command, to provide any material *after* the vertical bar that indicates the non-ligation

¹³The two “test” files also load the package `showhyphens` to indicate automatically all instances where Lua[®]TeX might insert hyphenation points.

¹⁴These particular search strings are used so as not to suppress the `ff`-ligatures in words that *end* in either `Dorff` as `dorff`, such as the surnames `Dorff` and `Hausdorff`.

point. However, the readability of your `\nolig` instructions may suffer if you suppress that material.

If you examine the `\nolig` instructions provided in the files `selnolig-german-patterns.sty` and `selnolig-english-patterns.sty`, you'll notice quickly that there's some redundancy built into the package's ligature suppression rules. For instance, the need to suppress the `ff`-ligature in the German verb "auffallen" is catered to both by `\nolig{auff}{auf|f}` and by `\nolig{ffall}{f|fall}`. This redundancy is there by design, because not all words that might fit one pattern will also fit the other. Providing some redundancy of this type seems like a reasonable way to proceed.

The arguments of the `\nolig` command, as well as of the package's other user commands, are case-sensitive.

2. The macro

`\keeplig{<string>}`

lets users override `\nolig` instructions by specifying words and word fragments for which typographic ligatures should *not* be suppressed, globally. For a `\keeplig` macro to work properly, its argument must be a string that includes *as a subset* a string treated by a `\nolig` instruction.

Having the `\keeplig` macro is very useful because it allows us to specify simpler, i.e., less restrictive, `\nolig` instructions up front: Any Type-II errors that may arise from having `\nolig` macros that are slightly too broad can be addressed by providing judiciously chosen `\keeplig` macros.

To give an example: If the `ngerman` option is set, the package uses the macro

`\nolig{flich}{f|lich}`

to break up the `fl`-ligature in words such as `begrifflich`, `beruflich`, `brieflich`, `glimpflich`, `hilflich`, `höflich`, `käuflich`, `sträflich`, `tariflich`, `trefflich`, `unerschöpflich`, `verwerflich`, and `Lauflucht`—and quite a few more words that contain the suffix `-lich`. This `\nolig` macro is, however, a bit too broad because it also operates on words such as `Pflicht` and `verpflichten`, for which the `fl`-ligature should *not* be suppressed. Rather than provide a large number of slightly more restrictive `\nolig` macros just to avoid including the `Pflicht`- and `plicht`-words, the package provides the command

`\keeplig{pflicht}`

to override the action of the `\nolig{flich}{f|lich}` instruction for all words that contain the string `flicht`. In practice, the overwhelming majority of such words contains the longer strings “Pflicht” and “pflicht”. However, this instruction also serves to preserve the fl-ligature in some less frequently used words such as “anpflicht” and “verpflicht”.

Observe that the statement that a `\keeplig` command can undo the action of a `\nolig` command does not automatically imply that the ligature treated by the `\nolig` command will now be preserved. Why doesn’t this follow? It’s because, as mentioned above, *more than one* `\nolig` instruction can apply to a given word. Consider, for instance, the word `auflichten`, which is caught by the following three macros:

```
\nolig{auf1}{auf|1}
\nolig{flich}{f|lich}
\keeplig{pflicht}
```

Because the string `auf1` is *not* a subset of the string `flicht`, the `\keeplig{pflicht}` instruction does not undo the action of the `\nolig{auf1}{auf|1}` instruction. Hence, the word is typeset—correctly!—as `auflichten`, i.e., without an fl-ligature.

Just as it is possible to override the action of a `\nolig` command with a subsequent `\keeplig` command, it is also possible to override the action of a `\keeplig` macro with a more specific `\nolig` command. For instance, it turns out that the `\keeplig{pflicht}` instruction is itself a bit too broad as well because it affects the typesetting of the word `Sumpflight` (swamp light), for which the fl-ligature *should* in fact be suppressed. To address this case, the file `selnolig-german-patterns.sty` provides the macros

```
\nolig{Sumpflight}{Sumpf|licht}
\nolig{sumpflicht}{sumpf|licht}
```

Incidentally, it turns out that the second of these `\nolig` macros has to be associated with three more [!] `\keeplig` macros, to deal with words such `Visumpflight`, `Konsumpflicht`, and `Impressumpflight`. Nobody has ever claimed that the rules of German typography are simple, right?

3. The macro `\breaklig`, which doesn’t take an argument, is provided as a hopefully easy-to-remember version of the low-level \LaTeX command `\-\hspace{0pt}`. As its name suggests, you should insert this macro in places where you want to break up a ligature on an ad-hoc basis (and also wish to permit hyphenation to occur). For instance, to sup-

press the *sk* ligature in the word *groundskeeper* on a one-off basis, one might enter it as “`grounds\breaklig keeper`” to get *groundskeeper* rather than *groundskeeper*.¹⁵

Incidentally, the `selnolig` package does not provide a dedicated macro to override the action of a `\nolig` instruction on an ad hoc basis, i.e., to force the use of a typographic ligature on a one-off basis. The \LaTeX command `\mbox{}` already caters to this need.

The final few steps in the startup process depend on which language-related options are set:

- If *no* language-specific options are in effect, the loading process terminates. Users may still use the instructions `\nolig`, `\keeplig`, and `\breaklig`, but no lists of language-specific `\nolig` macros are loaded.
- If the `english` option (or one of its synonymous options) is set, the files `selnolig-english-patterns.sty` and `selnolig-english-hyphex.sty` are loaded. The former file contains a long list of `\nolig` macros adapted to English language typographic usage; [Appendix C](#) provides a complete listing of these macros. The latter file contains a list of hyphenation exceptions, mainly for words that contain one or more potential non-ligation points and for which \TeX ’s hyphenation algorithm either misses valid hyphenation points or selects invalid hyphenation points; see [Section 6.2.2](#) below.
- If the `ngerman` option (or one of its synonymous options) is set, the files `selnolig-german-patterns.sty` and `selnolig-german-hyphex.sty` are loaded. The former file contains ligature-suppressing instructions appropriate for German typographic usage; [Appendix D](#) lists its contents. The latter file provides additional hyphenation rules for German-language words.
- If the user specifies both the `english` and `ngerman` options (or some of their synonymous options), *both* language-specific style files will be loaded. Under normal circumstances, a user will probably want to load only one or the other set of language-specific files, but not both sets.

5 The `selnolig` package’s approach to breaking up ligatures

The `\nolig` macros provided in the files `selnolig-english-patterns.sty` (see [Appendix C](#)) and `selnolig-german-patterns.sty` (see [Appendix D](#)) are primarily designed to break up ligatures—mainly *f*-ligatures, but potentially other ligatures as well—across *morpheme* boundaries.

Issues of ligating character pairs and triples across morpheme boundaries can occur

¹⁵To suppress the *sk* ligature globally for this word, as well as for words such as *greenskeeper* and *miskeep*, one could issue the directive `\nolig{skeep}{s|keep}`. The `selnolig` package does so.

- if two independent or “main” words (stems, Stammwörter) are joined together: rooftop/rooftop, newspaper/newspaper, Schilffeld/Schilffeld, Brieftaube/Brieftaube;
- between a prefix and main word: mißtruß/mistrust, dißplay/display, aufleben/aufleben, aufzun/aufzun; and
- between a main word and a suffix: shelfful/shelfful, dwarflike/dwarflike, kopflos/kopflos, and Zöpflein/Zöpflein.

The general rule for all of these cases is to suppress typographic ligatures that cross such morpheme boundaries. For German words, the following exceptions and adjustments apply:¹⁶

- Should the combination of a main word and suffix give rise to an fi or ffi ligature, this ligature is *not* suppressed. Examples: streifig and affig. However, the fi and ffi ligatures *are* suppressed if two main words are joined together: Schilffinsel, Zupfinstrument, and Baustoffingenieur.
- For some cases potentially giving rise to an fl-ligature at the juncture of a main word (Stammwort) and a suffix, preference is conventionally given to “how the syllables are pronounced and how a word would be hyphenated” (according to the Duden), leading to a suppression of the fl-ligature. For instance, the fl-ligature is suppressed in schweflig (sulfurous), teuflisch (devilish), and Verzweiflung (despair) even though, in each case, the f and l characters belong to the same morphemes, viz., Schwef(e)l, Teuf(e)l, and Zweif(e)l. For these words, the suffixes are clearly -ig, -isch, and -ung rather than -lig, -lisch, and -lung. Nevertheless, the convention for these and similar cases is *not* to employ the fl-ligature.¹⁷

This convention may also be taken to govern the typesetting of words such as knifflig (tricky) and mufflig (grouchy), as well as that of the present tense/first person singular conjugational forms of verbs such as büffeln, löffeln, schaufeln, stiefeln, verteufeln, and zweifeln: they are typeset *without* the fl-ligature, i.e., as büffle, löffle, schaufle, stieffe, verteufle, and zweifle, respectively.

¹⁶These adjustments are culled from the rules stated in the *Duden* and various websites that have taken an interest in this subject.

¹⁷Morphologically speaking, the words Schwefel, Teufel, Würfel, and Zweifel do, in fact, contain two morphemes: a stem and the *derivational* morpheme e1: Schwef|e1, Teuf|e1, Würf|e1, and Zweif|e1. One could, thus, use this fact to motivate the suppression of the fl-ligature for words such as schweflig, teuflisch, würfle, and Verzweiflung: they each contain three or more morphemes: schwef|1|ig, teuf|1|isch, etc., and one would be applying the general rule that ligatures shouldn’t span morpheme boundaries. However, I believe it’s fair to say that most modern German speakers would barely be able to notice the e1 morpheme in Teufel (“tief”-el) and Würfel (“wurf”-el) and that they would be entirely unaware of its presence in Schwefel and Zweifel. At any rate, the typographical convention not to use the fl-ligature for these and similar words does *not* appear to be based on the fact that the f and l letters (originally) belong to different morphemes.

- If a word ends with an `fl` character pair (say, because of an abbreviation that’s in effect), the `fl` ligature *is* used even if the `f` and `l` characters belong to different morphemes. E.g., in the abbreviation “Aufl.,” the `fl` ligature is employed.

This convention further suggests that it’s permissible to use the `ffi`- and `ffl`-ligatures in abbreviated names such as `Steffi` and `Steffl` even though they do not involve a period.

- The convention mentioned in the preceding bullet point could also be taken to imply that `ft` and `fft` ligatures may be used *if* they occur at the very ends of words and word fragments that form syllables, as in `verschärft`, `gerafft`, and `Unbedarftheit`. Note that the “`t`” at the end of these words and word fragments represents an *inflexional* morpheme: it indicates a change in the tense of the underlying verb but does not change the word’s meaning entirely.
- Relatedly, should the `ft` and `fft` ligatures be broken up for words that contain suffixes such as `-f-te`, `-f-ten`, `-f-tes`, etc. (e.g., `gestreifte`, `schlürftest`, and `rafften`)? Because the suffixes are “merely” inflexional morphemes rather than either derivational morphemes or free morphemes, the `selnolig` package for now takes the approach of *not* breaking up the `ft` and `fft` ligatures in these cases. However, I must admit that I haven’t yet come across an authoritative discussion of this issue. I would be willing to change this setting, i.e., let the `ft` and `fft` ligatures be broken up, should someone be able to furnish a good argument (which may even be a reference to a typographic convention) that pertains to this issue.
- Here’s a separate case for which I have not yet found a clear rule. If a morpheme ends in “`ft`” (e.g., `Saft` and `Luft`) and is followed by a suffix that starts with an `i`, as in `saftig` and `luftig`, one could typeset these words either as `saftig` and `luftig` (because the `ft` character pair belongs to a single morpheme), *or* one could give preference to the way the words are hyphenated and pronounced and thus *not* use the `ft`-ligature, i.e., typeset them as `saftig` and `luftig`, respectively. For now, the `selnolig` package implements the former option. As already noted, though, I have not yet found an authoritative reference on how this case should be treated. Clear guidance on this typographical issue would be much appreciated.

6 Package options and additional ligature-related matters

6.1 Main language options

The `selnolig` package currently offers two main language-specific options:

- `english`; synonyms: `british`, `ukenglish`, `UKenglish`, `american`, `usenglish`, `USenglish`, `canadian`, `australian`, and `newzealand`.
- `ngerman`; synonyms: `german`, `austrian`, `naustrian`, `swiss`, and `swissgerman`.

These language options may be used either individually or jointly. Indeed, this package’s user guide was compiled with both the `english` and `ngerman` options set.

See [Appendices C and D](#) for the complete listings of the package’s English and German language ligature suppression rules.

6.2 Other package options

6.2.1 English language case: The `broadf` and `hdlig` options

The ligature suppression patterns listed in [Appendix C](#) for English language words are grouped into four parts. The first two parts concern the suppression of various f-ligatures. Part 1 provides a fairly limited, or “basic”, set of patterns that will always be executed, and Part 2 contains a broader set of ligation suppression rules that will be executed if the `broadf` option is specified.

For English-language documents, only a fairly small number of the f-ligature suppression rules is enabled by default, i.e., if the `broadf` option is not enabled. Eliminating *all* f-ligatures that cross morpheme boundaries simply does not appear to be a major concern in English-language typography. Whereas many (maybe even most?) people would agree that it is advisable not to use the `ffi`-ligature in words such as *chaffinch* and *wolffish*, and not to use the `ffl`-ligature in words such as *scofflaw* and *offload*, there appears to be far less of a perceived need to suppress the `fi` (`ffi`) ligature in the far more commonly occurring words that end in `f` (`ff`) followed by the `-ing`, `-ish`, `-ier`, `-iest`, `-ily`, and `-iness` particles.¹⁸ The same goes for the `fl` (`ffl`) ligature in words that end in `f` (`ff`) followed by `-ly`.¹⁹ That is why only a few f-ligature suppression macros are enabled by default if the `english` option is set. To enable the broader set of f-ligature suppression rules, users must set the `broadf` option explicitly.

My choices regarding which f-ligature suppression rules belong to the “basic-f” and “broadf” groups are almost entirely pragmatic. They are certainly not based on any overriding English-language typographic principles (which, possibly, don’t even exist for the case at hand). However, if anyone happens to have a strong view on whether either *fewer* or *more* f-ligature suppression macros should be included in the “basic” group—especially if you can provide references to such discussions in learned circles—I would love to hear from you.

Part 3 of the file `selnolig-english-patterns.sty`, which is enabled if the `hdlig` option is set, provides ligature suppression patterns for the “historic” (Adobe uses the term “quaint”) `ct`, `st`, and `sp` ligatures, in words such as *arctangent* (better than *arctangent*), *painstaking* (better than *painstaking*), and *display* (better than *display*). The `sp` ligature is also suppressed for words of Greek origin containing the `sph` character triple, such as *atmosphere* and *hemisphere*, because in these cases the `ph` character pair (which derives from the Greek letter ϕ , or φ) is pronounced like “f” and should not be obscured by a preceding `sp` ligature.

¹⁸Examples of such words are *surfing*, *oafish*, *leafier*, *goofiest*, *fluffily*, and *goofiness*.

¹⁹Examples are *aloofly* and *gruffly*.

Setting the `hdlig` option also enables ligature suppression rules for ligatures such as *th*, *at*, and *et*. These ligatures might occur in words such as *lighthouse* and *pothole*, *aromatherapy* and *albatross*, and *ninety* and *nonetheless*. Ligature suppression rules are provided for the following discretionary ligatures: *th*, *at*, *et*, *as*, *is*, *us*, *sk*, *ll*, and *fr*. Part 3 of [Appendix C](#) lists these rules.

Part 4 of this file, which is also processed if the `hdlig` option is set, deals with cases where one discretionary typographic literature, say *as*, pre-empts the use of a typographic ligature, say *st* or *sp*, in words such as *fast/fast* and *clasp/clasp*. Note that the issue being addressed in this part is not that of a ligature crossing a morpheme boundary but of the pre-emption of one typographic ligature by another ligature within the same morpheme. This issue is discussed in more detail in [Section 6.6](#).

6.2.2 Disabling the package’s supplementary hyphenation exception patterns

TeX’s hyphenation algorithms are widely acknowledged to be very good. However, for the English language case at least, it tends to miss quite a few permissible hyphenation points when dealing with words that end in *-f-ing*, *-ff-ing*, *-f-ier*, *-ff-ier*, *-f-iest*, *-f-less*, *-f-like*, etc. Hyphenation exception lists are provided in the files `selnolig-english-hyphex.sty` and `selnolig-german-hyphex.sty`, respectively, for English and German words.

The German-language hyphenation exception list is the shorter of the two. This is because it is assumed that writers of German-language documents use the `babel` package while setting the option `ngerman` option (or one of the related options); doing so also loads specialized hyphenation patterns suitable for German text.²⁰

It is possible to instruct `selnolig` *not* to load the package’s hyphenation exception lists. You may want to do so, say, if you must use UK-English hyphenation patterns and therefore mustn’t make use of the US-English hyphenation patterns provided by the package. (To the best of my knowledge, though, most of the hyphenation patterns indicated in `selnolig-english-hyphex.sty` are common to UK and US English.) To skip loading the additional hyphenation patterns when invoking the `selnolig` package, you should specify the option `noadditionalhyphenationpatterns`.²¹

As was already noted in [Section 2.3](#), if you use the `babel` package with, say, the `ngerman` option, be sure to load `selnolig` package *after* the `babel` package. That way, the `selnolig` package’s additional hyphenation exception patterns won’t be overridden by `babel`’s settings.

Incidentally, if the files `selnolig-english-hyphex.sty` and `selnolig-german-hyphex.sty` are located in a directory that’s in the search path of your TeX distribution, these packages may be loaded by users via the usual `\usepackage` statements without having to load the entire `selnolig` package.

²⁰As was already noted earlier, the `selnolig` package is also compatible with the `hyphsubst` package.

²¹I am obviously not trying to make it too easy to invoke this option ...

6.3 Composite words made up of two different sets of primitive words

More so in German than in English, there may be composite words which are made up of two different pairs of primitive words. For instance, the words `Saufladen` and `Wachstube` may be constructed as `Sauf-laden`/`Sau-fladen` and as `Wachs-tube`/`Wach-stube`, respectively. In one case, using the `fl` and `st` ligatures would be wrong; in the other, using the ligatures would help greatly in indicating the intended meaning of the composite words. For words such as the ones given above, software isn't—and won't be for a quite a while to come—smart enough to “know” on its own which possible meaning is intended. Writers, of course, can choose to insert explicit hyphen characters to indicate unambiguously the intended meaning.

It turns out that if the `ngerman` option is set and the `babel` package is loaded as well, the `selnolig` package will break up the `fl` ligature in `Saufladen` but not the `st` ligature in `Wachstube`, i.e., the words will be typeset as “Saufladen” and “Wachstube”, respectively. If that's not what you want, you'll need to mark up the words explicitly, say as follows: `Sau\mbox{f1}aden` and `Wachs\breaklig tube`.

A related case is that of the word `Chefinnenleben`, which can be constructed as `Chefinnen-leben` (lives of female bosses) or as `Chef-innenleben` (inner life (or lives) of a boss): the particle “innen” could either be a suffix to “Chef” or a prefix to “Leben”. The macros of the `selnolig` package are set up, by default, *not* to break up the `fi` ligature in words such as `Chefin` and `Chefinnen`, in keeping with the rule that the `fi` ligature is permitted if the suffix starts with an “i”. In contrast, it will break up the `fi` ligature in the longer words `Chefinnenleben` and `Chefinnenräume`, as in these cases the assumption is that the `innen` particle acts as a prefix to the final part of the composite word. If that's *not* what you want, i.e., if you do mean to discuss various things pertaining to female bosses, be sure to use `\mbox{fi}` instructions where appropriate. Better yet, use hyphens and write the words in question either as `Chef-Innenleben` and `Chef-Innenräume` or as `Chefinnen-Leben` and `Chefinnen-Räume`, respectively.

6.4 How to provide additional ligature suppression patterns

As already noted, I do not claim that the non-ligation search-and-insert patterns set up in `selnolig-english-patterns.sty` and `selnolig-german-patterns.sty` are complete or, for that matter, ever will be entirely complete. If you come across words containing ligatures that ought to be suppressed but aren't caught, it is straightforward to create one or more new non-ligation rules to deal with the cases you've discovered.

Suppose, say, that you need to prepare a special edition of Thomas Mann's novel “Der Tod in Venedig” and that you have chosen to use an “Antiqua” (Roman) font since fewer and fewer people nowadays can manage with ease to read text set in a period-appropriate **blackletter** font. During

these preparations, you might notice that the novel contains the word `inbegriffleitend`²² and that the `selnolig` package does not (yet) appear to include a macro to suppress the unwanted `ffl`-ligature for this word. To address this problem, while simultaneously creating a search pattern that will also catch cases of inappropriate `ffl`-ligatures in the (hopefully quite a bit more common) words `Jugendtreffleiter` and `Kunststoffleitung`, you could add the following `\nolig` macro to your document’s preamble:

```
\nolig{ffleit}{ff|leit}
```

With this macro in place, the words would now be typeset as `inbegriffleitend`, `Jugendtreffleiter`, and `Kunststoffleitung`.²³

6.5 How to use the `selnolig` package to suppress certain ligatures *globally*

The main purpose of the `selnolig` package is, obviously, to disable certain ligatures selectively. However, it can also be used to suppress ligation globally for selected character pairs.²⁴

For instance, suppose that you are typesetting a Turkish text. The Turkish alphabet features both a dotted and a dotless `i`, *viz.*, “`i`”; I understand that in Turkish typesetting practice, the `fi` and `ffi` ligatures should *never* be employed, in order not to create doubt regarding which “`i`” character follows the “`f`” character.²⁵ To address the need to suppress the `fi` and `ffi` ligatures globally (while, possibly, keeping all other `f`-ligatures in play), one could issue the command

```
\nolig{fi}{f|i}
```

in the preamble of the document.

Or, suppose that you have a font that provides ligatures for the `fb`, `fh`, `fj`, and `fk` character pairs (as well as, possibly, the `ffb`, `ffh`, `ffj`, and `ffk` character triples). If you wanted to suppress the four former `f`-ligatures globally (and also break up the latter ligatures as `ff-b`, `ff-h`, `ff-j`, and `ff-k`, respectively), you could do so by issuing the following commands:

```
\nolig{fb}{f|b}
\nolig{fh}{f|h}
\nolig{fj}{f|j}
\nolig{fk}{f|k}
```

²²This word really does occur in the aforementioned novel!

²³The file `selnolig-german-patterns.sty` provides the macro `\nolig{fleit}{f|leit}` to cover these and further words.

²⁴I first became aware of the potential need for such a feature after reading Frank Mittelbach’s posting, [Suppress certain ligatures generally](#), on tex.stackexchange.com.

²⁵The other `f`-ligatures—`ff`, `fl`, `ffl`, `ft`, and `fft`—may presumably be employed.

In fact, these commands are provided automatically if the package’s `ngerman` option is set.²⁶ This is done because I was unable to come up with a single instance of a *German* language word involving these character combinations that doesn’t also involve a morpheme boundary collision.

Of course, your document may contain some *non-German* language words as well, for which you would not necessarily want to suppress these ligatures. Suppose, say, that you need to typeset the name `Kafka` and do not wish to suppress the `fk`-ligature for this specific word. To override the global setting created by the `\nolig{fk}{f|k}` macro, you could write each instance of this word as `Ka\mbox{fk}a` to generate *Kafka* instead of *Kafka*. Alternatively—and this is the method implemented by the `selnolig` package—one may provide suitable `\keeplig` macros to preserve the `fk`-ligature in names such as *Kafka*, *Safka*, *Piefke*, *Potrafke*, *Sprafke*, *Shirafkan*, and *Tirafkan*.

Or, suppose the `selnolig` package’s `ngerman` option is enabled and your document features some words of *Nordic* origin containing the `fj` character pair, such as *Sognefjord* and *Dovrefjell*. Observe that because the `fj` character pair contained in these words does not span a morpheme boundary, the `fj`-ligature should not be broken up, i.e., the words should be typeset as *Sognefjord* and *Dovrefjell*, respectively. `\keeplig` macros are therefore provided for words containing the particles *fjord*, *fjör*, *fjell*, and *fjäll* as well as for names such as *Eefje*, *Sufjan*, *Prokofjew*, and *Astafjew*.

6.6 What if one ligature pre-empts a subsequent, more appropriate ligature?

If a font provides many discretionary ligatures, the likelihood increases that the use of a ligature for the first two characters of a *character triple* might pre-empt the use of a more appropriate ligature for the last two characters of that triple.²⁷ In this section, we examine the use of `\nolig` instructions to address this contingency, focusing on cases of *st*, *sp*, *th*, and *tz* character pairs being preceded by character pairs (for which the font provides ligatures) that end in *s* or *t*, respectively. This focus is dictated largely by the discretionary ligatures provided by the text font used for this user guide (Garamond Premier Pro). Other ligature-rich fonts may provide further possibilities for one ligature inappropriately pre-empting that for a trailing character pair.²⁸

²⁶These four macros are also enabled if the `selnolig` package’s `english` and `broadf` options are set.

²⁷To be sure, the issue of ligature pre-emption is not limited to “discretionary” ligatures; it can also occur with “common” `f`-ligatures. Suppose that a certain font provides `ff`, `fi`, and `fl` ligatures but no `ffi` and `ffl` ligatures, and consider how words containing `ffi` and `ffl` character triples will be typeset. Left to its own devices, `TeX` would let the leading `ff`-ligature pre-empt the trailing `fi`- and `fl`-ligatures, resulting in typographically incorrect outcomes for words such as *wolffish* (better: *wolffish*), *safflower* (*safflower*), *auffinden* (*auffinden*) and *Schaffleisch* (*Schaffleisch*).

²⁸For the Garamond Premier Pro text font, I’ve discovered the following peculiar exception to the general rule that `TeX` always gives precedence to a ligature for the first two characters of a character triple: for the character triple `fis` (as in *fist* and *fish*), `TeX` gives preference to the trailing *is* ligature over the preceding *fi* ligature, causing these words to be typeset as *fish* and *fist*, respectively. I can’t tell if this outcome is a conscious design feature or a bug.

For now, `selnolig` is set to override this behavior, i.e., to always give preference to the leading *fi* ligature over the trailing *is* ligature for words that contain the strings *fist* and *fish*; hence, they’ll be rendered as *fist* and *fish*, respectively. Note that if the `broadf` option was set, this setting implies that words such as *deafish*, *dwarfish*, *elfish*, *oafish*, *selfish*, *unselfish*,

Ligatures for *as*, *is*, and *us* that pre-empt an *st* ligature

Suppose that the text font in use provides ligatures for the *as*, *is*, and *us* character pairs as well as for the *st* character pair. By T_EX's rules for forming typographic ligatures, words that contain the character *triples* *ast*, *ist*, or *ust* will see the first two characters ligated, pre-empting the use of a typographic ligature for the trailing *st* character pair. There are three separate reasons why this outcome may not be desirable.

First, given the rather distinctive look of the *st* ligature, the word *stochastic* may look a bit odd if the *st* ligature is used only once—*stochastic*—simply because the *as* ligature pre-empts the second *st* ligature; readers may prefer the look of *stochastic*. Second, non-use of the *st*/*st* ligature may be undesirable if the same word occurs twice and in close visual proximity, once set in the upright font shape—for which there are no ligatures for the *as*, *is*, and *us* character pairs, and hence for which the issue of ligature pre-emption doesn't arise—and once in italics: *must* vs. *must*; readers may prefer the look of *must* vs. *must*. Taking this matter to a (slight?!) extreme: Do you prefer the look of *Do fast festive fists foster fustiness?* or that of *Do fast festive fists foster fustiness?*

Third, there may be cases where an *as* ligature not only pre-empts a subsequent *st* ligature but also spans a morpheme boundary, as in the words *infrastructure* and *seastrand*.²⁹ For such words, the *as* ligature should probably be suppressed in any case to increase the words' legibility: *infrastructure* and *seastrand*.

If the `hdlig` option is set, it is assumed that you prefer giving preference to the distinctive-looking *st* ligature over *as*, *is*, and *us* ligatures. The following commands are therefore provided:³⁰

```
\nolig{ast}{a|st}  
\nolig{ist}{i|st}  
\nolig{ust}{u|st}
```

Ligatures for *as*, *is*, and *us* that pre-empt an *sp* ligature

The same three reasons for not letting *as*, *is*, and *us* ligatures pre-empt an *st* ligature also apply to the case of the equally distinctive looking *sp* ligature. The `selnolig` package therefore provides

wolfish, *draffish*, *giraffish*, *gruffish*, *offish*, *raffish*, *sniffish*, *standoffish*, *stiffish*, and *toffish*, as well as the associated adverbs ending in *-ly*, will not feature an *is* ligature. Of course, if the `broadf` option is not in effect, the *fi* and *ffi* ligatures will automatically preempt the *is* ligature in these words.

²⁹This case was already noted in [Footnote 27](#), where two words are noted for which the *ff*-ligature, which might improperly pre-empt *fi*- and *fl*-ligatures, happens to span a morpheme boundary.

³⁰Be aware, though, that the second of these three commands, while correct for most words that contain the string *ist*, unnecessarily suppresses the *is* ligature for words where the *st* character pair crosses a morpheme boundary. Examples of this case are words that start with *dis-t...*—e.g., *distend*, *distribute*, *distrust*, *disturb*—or with *mis-t...*—e.g., *mistake*, *mistranslate*, *mistype*. (Note that the *st*/*st* ligature is already—and appropriately!—suppressed for these words.) At this time there are no plans to address this (overall minor?) problem.

macros to ensure the use of the trailing *ſp* ligature in words such as *claſp*, *haſp*, *hiſpanic*, *raſpberry*, *teaſpoon*, *waſp*, *criſp*, *liſp*, *whiſper*, *wiſpy*, and *cuſp*.

Ligatures for *at* and *et* that pre-empt a *th* ligature

Suppose that a font provides ligatures for the *at*, *et*, and *th* character pairs. By T_EX’s rules for forming ligatures, without ſpecial intervention the word `mathematics` will be typeset as *mathematics* rather than as *mathematics* because the *at* ligature pre-empts the *th* ligature. The same happens for words such as *bath*, *Kathryn*, and *pathology*. Given the commonness and the distinctive pronunciation of the *th* character pair in the English language, as well as the high frequency of this character pair in words of Greek origin (for which the Latin-alphabet *th* character pair derives from the Greek character *θ*, or *ϑ*), it seems undesirable to let the *at*-ligature pre-empt the *th* ligature for these words.

Fixing the *at*–*th* ligature pre-emption issue globally—e.g., via `\nolig{ath}{a|th}`—is not completely innocuous, because doing so will also suppress the *at* ligature for words such as *boat-hook*, for which the *th* ligature would ſpan a morpheme boundary and thus shouldn’t be employed anyway. For such words, then, there’s no need to suppress the *at* ligature. These cases can be dealt with by providing `\keeplig` macros that deliberately let the *at* ligature take precedence over the trailing *th* ligature.

Suppressing an *et* ligature in favor of a subsequent *th* ligature via `\nolig{eth}{e|th}` is almost universally correct, either because the *th* ligature *should* take precedence—as in the words *ethics*, *methane*, and *teeth*—or because the *et* ligature would cross a morpheme boundary and hence shouldn’t be used anyway, as in the words *forethought* and *rethink*. I say that it’s *almost* universally correct to do so because there are some words, such as *Beethoven*, *prophethood*, and *sweetheart*, for which the *th* ligature would be inappropriate anyway and for which the use of the *et* ligature would hence be unproblematic. To address this issue, `\keeplig` macros are provided for these words, deliberately letting the *et* ligature take precedence over the *th* ligature and resulting in them being typeset as *Beethoven*, *prophethood*, and *sweetheart*, respectively.³¹

Ligatures for *at* and *et* that pre-empt a *ta* ligature

There seem to be only very few words for which an *at* ligature might inappropriately pre-empt a more important *ta* ligature. One such word is *atap*, which may be more readable if it’s typeset as *atap* rather than as *atap*.³² Because of the apparent paucity of such cases, I have decided for now not to provide ſpecific ligature suppression rules to handle them.

³¹Note that this method works if the font being used provides *both* *et* and *th* ligatures. If the text font you employ provides only the *th* ligature but not the *et* ligature, these `\keeplig` macros should be disabled.

³²It’s not advisable, however, to ſpecify a macro such as `\nolig{atap}{a|tap}` to address this case, because of words such as *catapult* and *catacomb*, for which the use of the *at* ligature is presumably innocuous. Somebody please correct me if this assumption is not correct.

To the best of my (admittedly not exhaustive) knowledge, all words for which an *et* ligature might inappropriately pre-empt the use of a trailing *ta* ligature are words for which the *et* ligature crosses a morpheme boundary and hence probably shouldn't be used anyway. Examples are *betake*, *betatter*, *bristletail*, *caretaker*, *cheetah*, *detach*, *detail*, *detain*, *dovetail*, *foretaste*, *horsetail*, *pretake*, *pretax*, *retable*, *retack*, *retard*, *retarget*, *timetable*, *whitetail*, and *wiretap*.³³ As such, the *et*-related ligature suppression rules already in place to deal with morpheme boundary crossing cases should suffice to catch these cases as well.

7 Further issues

7.1 Known bugs

Remark: The bugs in the following list may turn out to be related, i.e., may be caused by a single bug in the package's lua code.

1. The `\nolig` directives do not appear to work properly on the final word in the argument of a T_EX macro (e.g., `\footnote{}` and `\section{}`), *unless* that word (including any trailing punctuation mark) is followed by one or more space characters before the closing curly brace of the macro's argument is encountered.

For instance, the *fl* ligature in *kopflos* is not broken up by either `\footnote{kopflos.}` or `\section{Kopflosigkeit}`. The package does work as expected if the commands are modified to `\footnote{kopflos. }` and `\section{Kopflosigkeit }`.

2. The `\nolig` macros also don't seem to work on words (including, if present, any trailing punctuation marks) that are followed *immediately* by a % (comment) character. The workaround is the same as for the preceding bug: be sure to leave one or more spaces between the word and the comment character.
3. If the content of an `\item` directive in an `itemize` or `enumerate` environment *ends* with a word (including an associated punctuation mark) that contains a ligature that should be suppressed —i.e., if it is followed immediately by another `\item` directive or an `\end{itemize}` or `\end{enumerate}` statement—ligature suppression again fails. The remedy in this circumstance is to leave a blank line between the end of one `\item`'s content and the next `\item` instruction or the `\end{itemize}` or `\end{enumerate}` instruction.
4. If the final word (again, possibly, with an associated punctuation character) in a sentence immediately *prior* to the start of an `enumerate`, `itemize`, or other such environment contains

³³Incidentally, the author of the `selnolig` package has a slight preference for seeing his surname typeset as *Loretan* rather than as *Loretan*...

a ligature that should be suppressed, the `\nolig` macro again will not work properly. The recommended remedy is to leave a blank line between that sentence and the start of the environment in question. Inserting an “invisible” item, such as `\vphantom{x}`, also works.

I’m not sure if the following matter constitutes a bug or “merely” a case of incompatibility between two packages. The `selnolig` package does not appear to interact well with the `ngerman` package; however, as was noted earlier, it interacts nicely with the `babel` package (with one or more of the `ngerman`, `german`, `austrian`, and `naustrian` options set). Unless someone can convince me that using the `ngerman` package is truly preferable to using the `babel` package with one of the available German language options, I probably won’t bother figuring out how to fix this incompatibility.

7.2 Writing ancillary information about the package’s activity to the `.log` file

By default, none of the inner workings of the `selnolig` package are written to the `.log` file. However, if you execute the command `\debugon`, detailed information about each pattern match that is encountered is written to the `.log` file. Incidentally, because of the built-in redundancy of some of the `\nolig` command, it is possible that more than one pattern match will be found for a given word. E.g., for the verb “auffahren”, two separate `\nolig` commands simultaneously apply, and the following lines are written to the `.log` file:

```
pattern match: auffahren - auff
pattern match: auffahren - ffahr
Do ligature suppression for: auffahren
Inserting noliga whatsit before glyph: f
```

It is also possible that words are found with more than one ligature suppression point. For example, if the word “Auflaufform”—which happens to have both an `fl`- and an `ff`-ligature that should be suppressed—is encountered, the following lines are written to the `.log` file; note that in this case, two separate `\nolig` commands “catch” the `fl` and `ff` ligatures:

```
pattern match: Auflaufform - fform
pattern match: Auflaufform - Aufl[aäeioöuü]
pattern match: Auflaufform - auff
pattern match: Auflaufform - flauf
Do ligature suppression for: Auflaufform
Inserting noliga whatsit before glyph: l
Inserting noliga whatsit before glyph: f
```

If *both* a `\nolig` and a `\keeplig` command apply to a word—as is the case for `fjord`, to which the macros `\nolig{fj}{f|j}` and `\keeplig{fjord}` apply—information along the following line is written to the `.log` file:

```
pattern match nolog and keeplig: fjord - fj - fjord
```

If more than one `\nolog` directive as well as a `\keeplig` instruction apply to a word, as is the case for the word `Streiflicht`, that information is written to the `.log` file as well:

```
pattern match nolog and keeplig: Streiflicht - flich - flicht
pattern match: Streiflicht - reifl
Do ligature suppression for: Streiflicht
```

To terminate or suspend the writing of the debugging-related information to the `.log` file, one may execute the command `\debugoff`.

7.3 Suspending and restarting the operation of `selnolog`'s macros

By default, `selnolog`'s macros are switched on (assuming, of course, that your document is compiled under `LuaATEX`). If you want to suspend their operation, you should issue the command

```
\selnologoff
```

at the desired point in your document. Conversely, if `selnolog`'s macros need to be switched back on, just issue the command

```
\selnologon
```

7.4 Lists of words fitting German and English language non-ligation patterns

Extensive lists of German and English language words for which one or more ligatures should be suppressed are provided in the files `selnolog-german-test.pdf` and `selnolog-english-test.pdf`. I started the list of German language words with the examples provided by the `rmligs` script; I've added quite a few more words to that list in the meantime. Thanks importantly to the work of Felix Lehmann and Steffen Hildebrand noted in [Section 3](#) above, the package's German language search patterns by now apply to a far larger group of words than the one provided in `selnolog-german-test.pdf`. Obviously, I can't and won't make a claim that either of these lists is complete. Suggestions for additional words are always welcome.

The files `selnolog-german-test.tex` and `selnolog-english-text.tex` are "driver programs" that load the `selnolog` package and then run it on the respective lists of German- and English-language words. To compile the driver programs, be sure to use `LuaATEX`.

Appendices

A The package's main style file: selnolig.sty

```
% !TeX root = selnolig.tex
% !TEX TS-program = lualatex

% This entire package is placed under the terms of the
% LaTeX Project Public License, version 1.3 or later
% (http://www.latex-project.org/lppl.txt).
% It has the status "maintained".
%
% Author: Mico Loretan (loretan dot mico at gmail dot com)

% Part 1: Preliminaries
% -----

\def\selnoligpackagename{selnolig}
\def\selnoligpackageversion{0.171b}
\def\selnoligpackagedate{2013/01/23}

% Announce who we are. Issue warning message if we're
% not running under LuaLaTeX, but don't exit entirely.

\typeout{=== Package \selnoligpackagename,
  Version \selnoligpackageversion,
  Date \selnoligpackagedate ===}
\ProvidesPackage{selnolig}[2013/01/22]

\RequirePackage{ifluatex}
\ifluatex
  \RequirePackage{luatexbase,luacode,expl3}
\else
  \typeout{ ===== }
  \typeout{      WARNING   WARNING   WARNING      }
  \typeout{ ----- }
  \typeout{ The ligature suppression macros of the }
  \typeout{ selnolig package *require* LuaLaTeX.   }
  \typeout{ Because you're NOT running this package }
```

```

\typeout{ under LuaLaTeX, ligature suppression    }
\typeout{ *cannot* be performed.                  }
\typeout{ If any language options have been      }
\typeout{ specified, the associated hyphenation   }
\typeout{ exception patterns will be loaded.      }
\typeout{=====}
\fi

```

```

% If the 'fontspec' package isn't loaded by the time
% the '\begin{document}' directive is encountered, issue
% an error message and exit.

```

```

\AtBeginDocument{%
\ifluatex
  \@ifpackageloaded{fontspec}{}{%
    \PackageError{selnolig}{%
      ===== \MessageBreak
      Error Alert      Error Alert      \MessageBreak
      ----- \MessageBreak
      The selnolig package *requires* the \MessageBreak
      'fontspec' package, but it hasn't been \MessageBreak
      loaded. Exiting now. \MessageBreak
      =====}
      {See section 2.2 of selnolig's user guide for more information.}
    }
  }
\fi
}

```

```

% Set up some fundamental Boolean variables, their
% default values, and define the user options.

```

```

% The main language options are 'english' and 'german'.
% We provide the option 'otherlang' option just in case
% a user wants to provide ligature suppression patterns
% for languages other than English and German.

```

```

\newif\if@english\@englishfalse
\newif\if@german\@germanfalse
\newif\if@otherlang\@otherlangfalse

```

```

\DeclareOption{english}{\@englishtrue}
% synonymous options:
\DeclareOption{usenglish}{\@englishtrue}
\DeclareOption{ukenglish}{\@englishtrue}
\DeclareOption{USenglish}{\@englishtrue}
\DeclareOption{UKenglish}{\@englishtrue}
\DeclareOption{american}{\@englishtrue}
\DeclareOption{british}{\@englishtrue}
\DeclareOption{canadian}{\@englishtrue}
\DeclareOption{australian}{\@englishtrue}
\DeclareOption{newzealand}{\@englishtrue}

\DeclareOption{ngerman}{\@germantrue}
% synonymous options:
\DeclareOption{german}{\@germantrue}
\DeclareOption{austrian}{\@germantrue}
\DeclareOption{naustrian}{\@germantrue}
\DeclareOption{swiss}{\@germantrue}
\DeclareOption{swissgerman}{\@germantrue}

\DeclareOption{otherlang}{\@otherlangtrue}
% synonymous option:
\DeclareOption{otherlanguage}{\@otherlangtrue}

% For English, the default is to load only a fairly basic
% set of non-ligation rules pertaining to f-ligatures.
% Among them are the "standard five" (ff, fi, fl, ffi,
% and ffl) ligatures as well as the ft ligature.
%
% Two options to override this "basic" setting:
% - broadf Many more non-ligation rules for f-ligatures,
%           incl. fb, fh, fj, and fk character pairs.
% - hdlig Additional ligature suppression rules for
%           'historic' and/or 'discretionary' ligatures,
%           e.g., ct, sp, st, sk, th, as, is, us, fr,
%           ll, et, at, and ta.

\newif\if@broadfset\@broadfsetfalse
\DeclareOption{broadf}{\@broadfsettrue}

```

```

\newif\if@heligset\@heligsetfalse
\DeclareOption{helig}{\@heligsettrue}

% The package also provides hyphenation exception
% patterns for English and German language words.
% Loading these patterns is enabled by default. This
% can be disabled by providing the option
% 'noadditionalhyphenationpatterns'.

\newif\if@addlhyph\@addlhyphtrue
\DeclareOption{noadditionalhyphenationpatterns}{\@addlhyphfalse}

% The 'basic' option automatically sets the preceding Booleans
% to 'false', even if historic and/or rare ligatures are enabled

\DeclareOption{basic}{\@broadfsetfalse\@heligsetfalse}

% Last but not least, an option to set all Boolean
% variables (other than '@addlhyph') to 'true'
% simultaneously.

\DeclareOption{all}{%
  \@englishttrue \@broadfsettrue \@heligsettrue
  \@germantrue \@otherlangtrue}

% Finally, process all options
\ProcessOptions\relax

% Part 2: Load the lua code and set up the user macros
% -----

\ifluatex
  % Load the lua code contained in 'selnolig.lua'.
  \directlua{ require("selnolig.lua") }

  % Commands to switch selnolig's routines on and off

```



```

\newcommand\selnoligon{
  \directlua{ enablesefnolig() }
}

\newcommand\selnoligoff{
  \directlua{ disablesefnolig() }
}

% By default, sefnolig's macros are switched on
\selnoligon

% Record operations of sefnolig package to the log
% file: Enabled via '\debugon' command

\newcommand\debugon{%
  \directlua{ debug=true }
}

\newcommand\debugoff{%
  \directlua{ debug=false }
}

% The main user macro is called '\nolig':
\newcommand\nolig[2]{
  \directlua{
    suppress_liga( "\luatexluaescapestring{#1}",
                  "\luatexluaescapestring{#2}" )
  }
}

% A second user macro allows global overriding of
% rules set up by '\nolig':
\newcommand\keeplig[1]{
  \directlua{
    always_keep_liga( "\luatexluaescapestring{#1}" )
  }
}

\else
% If *not* running under LuaLaTeX, provide dummy
% definitions for package's user macros.

```

```

\newcommand{\nolig}[2]{}
\newcommand{\keeplig}[1]{}
\let\selnoligon\relax
\let\selnoligoff\relax
\let\debugon\relax
\let\debugoff\relax
\fi

```

```

% A third user macro: '\breaklig'. This is hopefully
% easier to remember than having to type "\- \hspace{0pt}"
\newcommand\breaklig{\-{\hspace{0pt}}}

```

```

% Part 3: What to do if the 'english' option is set
% -----

```

```

\if@english
  % load English-language ligature suppression rules
  \ifluatex
    \RequirePackage{selnolig-english-patterns}
  \fi

  % load additional hyphenation exception patterns
  \if@addlhyph
    \RequirePackage{selnolig-english-hyphex}
  \fi
\fi

```

```

% Part 4: What to do if the 'ngerman' option is set
% -----

```

```

\if@german
  % load German-language ligature suppression rules
  \ifluatex
    \RequirePackage{selnolig-german-patterns}
  \fi

  % load additional hyphenation exception patterns

```

```

\if@addlhyph
  \RequirePackage{selnolig-german-hyphe}
\fi

\fi

% Part 5: What to do if 'otherlang' option is set
% -----

\if@otherlang
  % currently nothing included
\fi

```

B The package's lua code: selnolig.lua

```
-- lua code for the selnolig package, to be loaded
-- with an instruction such as
-- \directlua{ require("selnolig.lua") }
-- from a (Lua)LaTeX .sty file.
--
-- Author: Mico Loretan (loretan dot mico at gmail dot com)
-- (with crucial contributions of Taco Hoekwater,
-- Patrick Gundlach, and Steffen Hildebrandt)
-- Date: 2013/01/22
--
-- The entire selnolig package is placed under the terms
-- of the LaTeX Project Public License, version 1.3 or
-- later. (http://www.latex-project.org/lppl.txt).
-- It has the status "maintained".

local glyph = node.id('glyph')
local glue = node.id("glue")
local whatsit = node.id("whatsit")
local userdefined

for n,v in pairs(node.whatsits()) do
  if v == 'user_defined' then userdefined = n end
end

local identifier = 123456 -- any unique identifier
local noliga={}
local keepliga={} -- String -> Boolean
debug=false

function debug_info(s)
  if debug then
    texio.write_nl(s)
  end
end

local blocknode = node.new(whatsit, userdefined)
blocknode.type = 100
blocknode.user_id = identifier
```

```

local prefix_length = function(word, byte)
    return unicode.utf8.len( string.sub(word,0,byte) )
end

-- Problem: string.find and unicode.utf8.find return
-- the byte-position at which the pattern is found
-- instead of the character-position. Fix this by
-- providing a dedicated string search function.

local unicode_find = function(s, pattern, position)
    -- Start by correcting the incoming position
    if position ~= nil then
        debug_info("Position: "..position)
        sub = string.sub(s, 1, position)
        position=position+string.len(sub) - unicode.utf8.len(sub)
        debug_info("Corrected position: "..position)
    end
    -- Now execute find and fix it accordingly
    byte_pos = unicode.utf8.find(s, pattern, position)
    if byte_pos ~= nil then
        -- "convert" byte_pos to "unicode_pos"
        return unicode.utf8.len( string.sub(s, 1, byte_pos) )
    else
        return nil
    end
end

function process_ligatures(nodes,tail)
    local s={}
    local current_node=nodes
    local build_liga_table = function(strlen,t)
        local p={}
        for i = 1, strlen do
            p[i]=0
        end
        for k,v in pairs(t) do
            -- debug_info("Match: "..v[3])
            local c= unicode_find(noliga[v[3]],"|")
            local correction=1
            while c~=nil do

```

```

        --debug_info("Position "..(v[1]+c))
        p[v[1]+c-correction] = 1
        c = unicode_find(noliga[v[3]], "|", c+1)
        correction = correction+1
    end
end
--debug_info("Liga table: "..table.concat(p, ""))
return p
end
local apply_ligatures=function(head,ligatures)
    local i=1
    local hh=head
    local last=node.tail(head)
    for curr in node.traverse_id(glyph,head) do
        if ligatures[i]==1 then
            debug_info("Inserting noliga whatsit before glyph: "..unicode.utf8.char(curr.char))
            node.insert_before(hh,curr, node.copy(blocknode))
            hh=curr
        end
        last=curr
        if i==#ligatures then
            --debug_info("Leave node list on position: "..i)
            break
        end
        i=i+1
    end
    if(last~=nil) then
        -- debug_info("Last char: "..unicode.utf8.char(last.char))
    end
end
for t in node.traverse(nodes) do
    if t.id==glyph then
        --s[#s+1]=string.lower(unicode.utf8.char(t.char))
        s[#s+1]=unicode.utf8.char(t.char)
    elseif t.id== glue then
        local f=string.gsub(table.concat(s,""),"[\\?!\\,\\.]+","")
        local throwliga={}
        for k,v in pairs(noliga) do
            local count=1
            local match = string.find(f,k)
            while match do

```

```

count=match
keep=false
debug_k1=""
for k1,v1 in pairs(keepliga) do
    if v1 and string.find(f,k1) and string.find(k1,k) then
        debug_k1=k1
        keep=true
        break
    end
end
if not keep then
    debug_info("pattern match: "..f.." - "..k)
    local n = match + string.len(k) - 1
    table.insert(throwliga,{prefix_length(f,match),n,k})
else
    debug_info("pattern match nolog and keeplig: "..f.." - "..k.." - "..debug_k1)
end
match= string.find(f,k,count+1)
end
end
if #throwliga==0 then
    -- debug_info("No ligature suppression for: "..f)
else
    debug_info("Do ligature suppression for: "..f)
    local ligabreaks = build_liga_table(f:len(),throwliga)
    apply_ligatures(current_node,ligabreaks)
end
s = {}
current_node = t
end
end
end -- end of function process_ligatures(nodes,tail)

function suppress_liga(s,t)
    nologia[s] = t
end

function always_keep_liga(s)
    keepliga[s] = true
end

```



```

function drop_special_nodes (nodes,tail)
  for t in node.traverse(nodes) do
    if t.id == whatsit and t.subtype == userdefined and t.user_id == identifier
    then
      node.remove(nodes,t)
      node.free(t)
    end
  end
end

function enableeslnolig()
  luatexbase.add_to_callback( "ligaturing",
    process_ligatures, "Suppress ligatures", 1 )
end

function disableeslnolig()
  luatexbase.remove_from_callback( "ligaturing",
    "Suppress ligatures" )
end

```

C English-language ligature suppression patterns: selnolig-english-patterns.sty

```

% !TeX root = selnolig.tex
% !TEX TS-program = lualatex

\ProvidesPackage{selnolig-english-patterns}%
[2013/01/22]

% This entire package is placed under the
% terms of the LaTeX Project Public License,
% version 1.3 or later
% (http://www.latex-project.org/lppl.txt).
% It has the status "maintained".
%
% Author: Mico Loretan
% (loretan dot mico at gmail dot com)

% Part 1: "Basic" f-ligature patterns
% =====

% (a) ff -> f-f

\nolig{lfful}{lf|ful}
% shelfful bookshelffuls -- TeXBook, p. 19

% (b) fi -> f-i
% no cases in 'basic' group

% (c) fl -> f-l

\nolig{fless}{f|less}
% beefless leafless ...
% Also: cuffless stuffless

\nolig{flike}{f|like}
% dwarflike elflike ...
% Also: rufflike clifflike

\nolig{flife}{f|life}
% halflife shelflife

\nolig{flive}{f|live}
% halflives shelflives

\nolig{fline}{f|line}
% halflife roofline offline

\nolig{leaflet}{leaf|let}
\nolig{Leaflet}{Leaf|let}
% leaflet(-s, -ed) leafleting
% leafletting leafletted
% leafleteer(s)

\nolig{pdflatex}{pdf|latex}
\nolig{Pdflatex}{Pdf|latex}
% better to write 'pdf\LaTeX', right?

% (d) ffi -> ff-i

\nolig{faffian}{faff|ian}
% Pfaffian
% (must avoid picking up 'affianced')

\nolig{lffian}{lff|ian}
% Wolffian Wulffian

```

```

% (e) ff1 -> ff-1

\nolig{fflaw}{ff|law}
% scofflaw scofflaws

\nolig{fflink}{ff|link}
% cufflink cufflinks

\nolig{ffload}{ff|load}
% offload offloads offloaded

% (f) ffi -> f-fi

\nolig{haffinch}{haf|finch}
% chaffinch(es)

\nolig{lffish}{lf|fish}
% wolffish

% (g) ff1 -> f-fl

\nolig{afflower}{af|flower}
% safflower

% (h) ft -> f-t

\nolig{ieftain}{ief|tain}
\nolig{alftime}{alf|time}
\nolig{alftone}{alf|tone}
\nolig{ooftop}{oof|top}
\nolig{ooftree}{oof|tree}
% chieftain halftime halftone
% rooftop rooftree

\nolig{ifth}{if|th}
% fifth(s)
\nolig{elfth}{elf|th}
% twelfth(s)
% (Obscuring the 'th' pair with an
% 'ft' ligature just looks weird!)

\nolig{lftr}{lf|tr}
% wolftrap calftrap

\nolig{eaftr}{eaf|tr}
% leaftrap (gutters, pools ...)

\nolig{fftr}{ff|tr}
% offtrack

% Part 2: Additional f-ligature suppression
% patterns if 'broad' option is set.
% =====

\if@broadfset

% (a) ff -> f-f
% no cases in 'broad' group

% (b) fi -> f-i

\nolig{elfin}{elf|in}
\nolig{Elfin}{Elf|in}

\nolig{afing}{af|ing}
% chafing leafing loafing sheafing
% strafing vouchsafing

```

<code>\nolig{eefing}{eef ing}</code>	<code>\nolig{oafish}{oaf ish}</code>
% beefing reefing	<code>\nolig{serfish}{serf ish}</code>
	<code>\nolig{wolfish}{wolf ish}</code>
<code>\nolig{iefing}{ief ing}</code>	<code>\nolig{Deafish}{Deaf ish}</code>
% briefing debriefing	<code>\nolig{Dwarfish}{Dwarf ish}</code>
	<code>\nolig{Elfish}{Elf ish}</code>
<code>\nolig{ifing}{if ing}</code>	<code>\nolig{Oafish}{Oaf ish}</code>
% coifing fifing jackknifing knifing	<code>\nolig{Serfish}{Serf ish}</code>
% midwifing waifing wifing	<code>\nolig{Wolfish}{Wolf ish}</code>
<code>\nolig{oofing}{oof ing}</code>	<code>\nolig{beefier}{beef ier}</code>
% goofing hoofing roofing ...	<code>\nolig{comfier}{comf ier}</code>
	<code>\nolig{goofier}{goof ier}</code>
<code>\nolig{lfing}{lf ing}</code>	<code>\nolig{gulfier}{gulf ier}</code>
% golfing rolfing ...	<code>\nolig{leafier}{leaf ier}</code>
	<code>\nolig{reefier}{reef ier}</code>
<code>\nolig{arfing}{arf ing}</code>	<code>\nolig{surfier}{surf ier}</code>
% barfing bedwarfing dwarfing...	<code>\nolig{turfier}{turf ier}</code>
<code>\nolig{serfing}{serf ing}</code>	<code>\nolig{Beefier}{Beef ier}</code>
<code>\nolig{Serfing}{Serf ing}</code>	<code>\nolig{Comfier}{Comf ier}</code>
<code>\nolig{kerfing}{kerf ing}</code>	<code>\nolig{Goofier}{Goof ier}</code>
<code>\nolig{Kerfing}{Kerf ing}</code>	<code>\nolig{Gulfier}{Gulf ier}</code>
% Don't specify 'erfing' search string	<code>\nolig{Leafier}{Leaf ier}</code>
% b/c of 'butterfinger'	<code>\nolig{Reefier}{Reef ier}</code>
	<code>\nolig{Surfier}{Surf ier}</code>
<code>\nolig{urfing}{urf ing}</code>	<code>\nolig{Turfier}{Turf ier}</code>
% (wind-) surfing turfing	% (Mustn't perform 'fier -> f-ier'
	% substitution because of words
<code>\nolig{rfism}{rf ism}</code>	% such as pacifier, reifier, etc.)
% dwarfism	
<code>\nolig{rfist}{rf ist}</code>	<code>\nolig{afiest}{af iest}</code>
% dwarfist	<code>\nolig{efiest}{ef iest}</code>
	<code>\nolig{lfiest}{lf iest}</code>
<code>\nolig{deafish}{deaf ish}</code>	<code>\nolig{mfiest}{mf iest}</code>
<code>\nolig{dwarfish}{dwarf ish}</code>	<code>\nolig{ofiest}{of iest}</code>
<code>\nolig{elfish}{elf ish}</code>	<code>\nolig{rfiest}{rf iest}</code>
% elfish selfish unselfish, etc.	

```

% leafiest beefiest reefiest ...
% (Mustn't do 'fiest -> f-iest'
%   subst. b/c of 'fiesta')

\keeplig{amselfish}
\keeplig{stelfink}

\nolig{fily}{f|ily}
% beefily goofily
% This rule also catches the
%   ffily -> ff-ily case:
% daffily fluffily gruffily ...

\nolig{oofiness}{oof|iness}
% goofiness
% (Mustn't do 'finess -> f-iness'
% substitution b/c of 'finesse')

% (c) fl -> f-l

\nolig{aloofly}{aloof|ly}
\nolig{briefly}{brief|ly}
\nolig{chiefly}{chief|ly}
\nolig{deafly}{deaf|ly}
\nolig{liefly}{lief|ly}

\nolig{Aloofly}{Aloof|ly}
\nolig{Briefly}{Brief|ly}
\nolig{Chiefly}{Chief|ly}
\nolig{Deafly}{Deaf|ly}
\nolig{Liefly}{Lief|ly}
% (Mustn't perform 'fly -> f-ly' subst.
% b/c of 'fly' 'butterfly' ...)

% (d) ffi -> ff-i

\nolig{affish}{aff|ish}
\nolig{offish}{off|ish}
\nolig{iffish}{iff|ish}
\nolig{uffish}{uff|ish}
% draffish offish sniffish gruffish

\nolig{ffing}{ff|ing}
% baffing biffing bluffing...

\nolig{ffier}{ff|ier}
% buffier chaffier ...

%\nolig{ffily}{ff|ily}
% Caught by 'fily -> f-ily' rule

\nolig{ffiness}{ff|iness}
% fluffiness huffiness ...

\nolig{waffie}{waff|ie}
\nolig{Waffie}{Waff|ie}

\nolig{ffies}{ff|ies}
% baffies biffies jiffies stuffies ...
% buffiest chaffiest ...

% (e) ff1 -> ff-l

\nolig{ffly}{ff|ly}
% bluffly gruffly ruffly ...

% (f) ffi -> f-fi
% nothing additional in 'broad' group

% (g) ff1 -> f-fl
% nothing additional in 'broad' group

```

```

% -----

% (h) ft -> f-t
\if@hdligset

\nolig{ifteen}{if|teen}
% fifteen fifteens fifteenth

\nolig{fifti}{fif|ti}
\nolig{Fifti}{Fif|ti}
% fifties fiftieth fiftieths

\nolig{fifty}{fif|ty}
\nolig{Fifty}{Fif|ty}
% fifty fiftyish

% (i) fb, fh, fj, and fk ligatures

% suppress these ligatures globally, but make
% exceptions for Kafka, fjord, and fjell
\nolig{fb}{f|b}
\nolig{fh}{f|h}
\nolig{fj}{f|j}
\nolig{fk}{f|k}

\keeplig{Kafka}
\keeplig{fjord}
\keeplig{fjell}

\fi % end of \if@broadfset block

% Part 3: Discretionary ligatures crossing
% morpheme boundaries
% st, ct, sp,
% th, at, et, as, is, us, ta, ll, sk

% -----

\nolig{osstalk}{oss|talk}
% crosstalk
\nolig{gstai}{gs|tai}
% dogstail
\nolig{nstak}{ns|tak}
% painstaker painstaking
\nolig{stight}{s|tight}
% gastight
\nolig{stooth}{s|tooth}
% houndstooth
\nolig{steeth}{s|teeth}
% houndsteeth

%% dis-t... words
\nolig{dista}{dis|ta}
\nolig{Dista}{Dis|ta}
% distant distasteful
\nolig{distem}{dis|tem}
\nolig{Distem}{Dis|tem}
% distemperate
\nolig{disten}{dis|ten}
\nolig{Disten}{Dis|ten}
% distended
\nolig{distil}{dis|til}
\nolig{Distil}{Dis|til}
% distil distillation
\nolig{distin}{dis|tin}
\nolig{Distin}{Dis|tin}
% distinct distinguish
\nolig{disto}{dis|to}
\nolig{Disto}{Dis|to}

```

% distort distortion	\nolig{mistru}{mis tru}
\nolig{distr}{dis tr}	\nolig{Mistru}{Mis tru}
\nolig{Distr}{Dis tr}	% mistrust mistruth
% distract distribution distrust	\nolig{istrys}{is trys}
\nolig{distu}{dis tu}	% mistryst
\nolig{Distu}{Dis tu}	\nolig{mistu}{mis tu}
% disturb	\nolig{Mistu}{Mis tu}
	% mistune Mistutor
%% mis-t... words	\nolig{istyp}{is typ}
\nolig{mista}{mis ta}	% mistype
\nolig{Mista}{Mis ta}	
% mistake mistaken mistaught unmistakable	\nolig{aastricht}{aas tricht}
\nolig{mistea}{mis tea}	% Maastricht
\nolig{Mistea}{Mis tea}	
% misteach	\nolig{esthet}{es thet}
\nolig{istend}{is tend}	\nolig{aesthet}{aes thet}
% mistend distend	\nolig{Esthet}{Es thet}
\nolig{isterm}{is term}	\nolig{Aesthet}{Aes thet}
% misterm misterms	% aesthetic esthetic unesthetic
\nolig{isth}{is th}	
% misthink misthought misthrew misthrow	% (B) ct -> c-t
% isthmus calisthenic	% -----
\nolig{istime}{is time}	
% mistime mistimed	\nolig{rctan}{rc tan}
\nolig{istitl}{is titl}	% arctangent
% mistitle	\nolig{rctat}{rc tat}
\nolig{istook}{is took}	% coarctation
% mistook	
\nolig{istouc}{is touc}	% (C) sp -> s-p
% mistouch	% -----
\nolig{mistrac}{mis trac}	
\nolig{Mistrac}{Mis trac}	\nolig{othesp}{othes p}
% Mistrace	% clothespin clothespress
\nolig{mistran}{mis tran}	\nolig{speople}{s people}
\nolig{Mistran}{Mis tran}	% business- congress- crafts-
% Mistranscribe Mistranslate	% dis- news- sales- spokes-
\nolig{istrea}{is trea}	% towns- trades- tribes- people
% mistreat mistreatment	\nolig{sperson}{s person}

% business- congress- crafts- drafts-	\nolig{risprud}{ris prud}
% news- sales- spokes- person	% jurisprudence
\nolig{espas}{es pas}	\nolig{spiec}{s piec}
% trespass trespassing	% crosspiece frontispiece
\nolig{isplat}{is plat}	
% cisplatin	\nolig{ewspa}{ews pa}
	% newspaper
\nolig{disp}{dis p}	\nolig{ewspr}{ews pr}
\nolig{Disp}{Dis p}	% newsprint
% disparage disparaging ...	
	% (D) th -> t-h
\nolig{misp}{mis p}	% -----
\nolig{Misp}{Mis p}	
% misplace misperception misprint	\nolig{eethov}{eet hov}
	% Beethoven
\nolig{susp}{sus p}	\nolig{thook}{t hook}
\nolig{Susp}{Sus p}	% boathook meathook pothook
% suspend suspension suspicious	\nolig{thouse}{t house}
\nolig{sph}{s ph} % 'ph' from Greek 'phi'!	% boathouse cathouse courthouse ...
% atmosphere biosphere hemisphere	\nolig{othol}{ot hol}
% spherical asphodel phosphorous phosphate	% foothold knothole potholder ...
% blaspheme blasphemy	\nolig{lthol}{lt hol}
	% bolthole
\nolig{transpa}{trans pa}	\nolig{sthoh}{st hol}
% transparent transpacific	% posthole pesthole
\nolig{transpe}{trans pe}	\nolig{rathol}{rat hol}
% transpersonal	\nolig{Rathol}{Rat hol}
\nolig{transpie}{trans pie}	% rathole
% transpierce	\nolig{arthog}{art hog}
\nolig{transpl}{trans pl}	% warthog
% transplant	\nolig{stha}{st ha}
\nolig{transpol}{trans pol}	% firsthand postharvest posthaste
% transpolar	\nolig{thawk}{t hawk}
\nolig{transpor}{trans por}	% nighthawk
% transport transportation	\nolig{horth}{hort h}
\nolig{transpos}{trans pos}	% shorthair shorthand shorthorn
% transpose transposon	\nolig{arthei}{art hei}
	% apartheid antiapartheid

\nolig{thead}{t head}	% -----
% bolthead cathead fathead ...	
\nolig{therd}{t herd}	\nolig{lbatr}{lba tr}
% goatherd neatherd	% albatross
\nolig{theap}{t heap}	\nolig{atroop}{a troop}
% dustheap	% paratrooper
\nolig{theart}{t heart}	\nolig{eatra}{ea tra}
% fainthearted sweetheart ...	% seatrain seatransport
\nolig{uthear}{ut hear}	
% outhear outheard	% (F) et -> e-t
\nolig{thill}{t hill}	% -----
% anthill foothill	
\nolig{thood}{t hood}	\nolig{ninet}{nine t}
% adulthood knighthood ...	\nolig{Ninet}{Nine t}
\nolig{thunt}{t hunt}	% ninetieth ninetieths ninety nineteen nineties
% pothunt outhunt	
\nolig{orthol}{ort hol}	\nolig{ametag}{ame tag}
% porthole	% nametag
\nolig{sthum}{st hum}	\nolig{betat}{be tat}
% posthumous	\nolig{Betat}{Be tat}
\nolig{uthau}{ut hau}	% betatter beta
% outhaul	\nolig{betr}{be tr}
\nolig{uthit}{ut hit}	\nolig{Betr}{Be tr}
% outhit	% betray betroth
\nolig{uthom}{ut hom}	
% outhomer	\nolig{deta}{de ta}
\nolig{uthow}{ut how}	% detach detain detail
% outhowl	\nolig{etect}{e tect}
\nolig{uthum}{ut hum}	% detect undetectable detective
% outhumor	\nolig{detent}{de tent}
\nolig{uthust}{ut hust}	\nolig{Detent}{De tent}
% outhustle	% detent detention
\nolig{tthour}{tt hour}	\nolig{detest}{de test}
% watthour kilowatthour	\nolig{Detest}{De test}
\nolig{sthm}{s thm}	% detest
% asthma isthmus	\nolig{detr}{de tr}
	\nolig{Detr}{De tr}
% (E) at -> a-t	% detract detrain detriment detritus

\molig{etail}{e|tail}
% bristletail detail dovetail horsetail
\molig{etah}{e|tah}
% cheetah chetah
\molig{etak}{e|tak}
% betake retake caretaker
\molig{etax}{e|tax}
% betax
\molig{eteach}{e|teach}
% reteach
\molig{etell}{e|tell}
% foretell fortunetelling
\molig{eterg}{e|terg}
% detergent
\molig{eterio}{e|terio}
% deteriorate
\molig{eterm}{e|term}
% determent determinant preterm
\molig{etext}{e|text}
% pretext retext teletext
\molig{etick}{e|tick}
% bluetick detick
\molig{etide}{e|tide}
% betide yuletide
\molig{etigh}{e|tigh}
% retighten
\molig{etime}{e|time}
% betime lifetime peacetime sometime
\molig{etrain}{e|train}
% detrain drivetrain housetrain retrain
\molig{etrap}{e|trap}
% firetrap livetrapp mousetrap
\molig{etree}{e|tree}
% axletree saddletree shoetree

\molig{imetable}{ime|table}
% timetable

\molig{reteen}{re|teen}
% preteen
\molig{retend}{re|tend}
% pretend
\molig{retenc}{re|tenc}
% pretence
\molig{retens}{re|tens}
% pretense pretension
\molig{retent}{re|tent}
\molig{Retent}{Re|tent}
% pretentious retention retentive
\molig{retest}{re|test}
\molig{Retest}{Re|test}
% pretest retest

\molig{reta}{re|ta}
\molig{Reta}{Re|ta}
% retag retape retake
% foretaste caretaker
% pretaste pretape pretaxretain
% retain retake retaliate retard
% retarget retaste wiretap
\keeplig{pretable} % interpretable
\keeplig{cretar} % secretary
\molig{retie}{re|tie}
\molig{Retie}{Re|tie}
% retie entireties sureties
\molig{retil}{re|til}
\molig{Retil}{Re|til}
% retile
\molig{retim}{re|tim}
\molig{Retim}{Re|tim}
% retime beforetime
\molig{retint}{re|tint}
\molig{Retint}{Re|tint}
% retint
\molig{retir}{re|tir}

<code>\nolig{Retir}{Re tir}</code>	
% retire retiring	% (G) as -> a-s
<code>\nolig{retitl}{re titl}</code>	% -----
<code>\nolig{Retitl}{Re titl}</code>	
% retitle pretitling	<code>\nolig{eastran}{ea stran}</code>
<code>\nolig{retra}{re tra}</code>	% seastrand
<code>\nolig{Retra}{Re tra}</code>	<code>\nolig{aspore}{a spore}</code>
% retrace retrack retract retrans retransmit	% diaspora megaspore tetraspore
<code>\nolig{retre}{re tre}</code>	<code>\nolig{aseps}{a seps}</code>
<code>\nolig{Retre}{Re tre}</code>	% asepsis
% pretreat retread retreat retrench	<code>\nolig{asept}{a sept}</code>
<code>\nolig{retri}{re tri}</code>	% aseptic aseptically
<code>\nolig{Retri}{Re tri}</code>	<code>\nolig{asund}{a sund}</code>
% pretrim pretrial retrieve retribution	<code>\nolig{Asund}{A sund}</code>
% retries retrim	% asunder
<code>\nolig{retu}{re tu}</code>	<code>\nolig{aspec}{a spec}</code>
<code>\nolig{Retu}{Re tu}</code>	<code>\nolig{Aspec}{A spec}</code>
% return retune unreturnable	% aspect infraspecific intraspecies
	% intraspecific
<code>\nolig{uetooth}{ue tooth}</code>	<code>\nolig{infras}{infra s}</code>
% bluetooth	<code>\nolig{Infras}{Infra s}</code>
	% infrastructure infraspecific
<code>\nolig{deter}{de ter}</code>	<code>\nolig{megast}{mega st}</code>
<code>\nolig{Deter}{De ter}</code>	<code>\nolig{Megast}{Mega st}</code>
% deter determine deteriorate undeterred	% megastructure megastar
<code>\nolig{ceties}{ce ties}</code>	<code>\nolig{megasp}{mega sp}</code>
% niceties	<code>\nolig{Megasp}{Mega sp}</code>
<code>\nolig{feties}{fe ties}</code>	% megaspores megascopic
% safeties unsafeties biosafeties	<code>\nolig{aspoon}{a spoon}</code>
	% teaspoon
<code>\nolig{fety}{fe ty}</code>	
% safety	% how to do 'asea'?
<code>\nolig{lety}{le ty}</code>	
% subtlety teletype teletypewriter	% (H) is -> i-s
<code>\nolig{rety}{re ty}</code>	% -----
% surety entirety retype pretype	
<code>\nolig{etyp}{e typ}</code>	% (a) not across morpheme boundaries
% archetype archetypal retype pretype	% (The following may be a bug in fontspec)

```

\nolig{fish}{fi|sh}
\nolig{fist}{fi|st}
\nolig{Fist}{Fi|st}

% (b) across morpheme boundaries

%% Mustn't do global \nolig{antis}{anti|s}
%% because of words such as sycophantism,
%% vigilantism, and mantissa.

\nolig{antisa}{anti|sa}
\nolig{Antisa}{Anti|sa}
% antisag antisatellite
\nolig{antisc}{anti|sc}
\nolig{Antisc}{Anti|sc}
% antiscience
\nolig{antise}{anti|se}
\nolig{Antise}{Anti|se}
% antisecrecy antisense antiseptic
\nolig{antisha}{anti|sha}
\nolig{Antisha}{Anti|sha}
% antishark antiship antishock
\nolig{antishi}{anti|shi}
\nolig{Antishi}{Anti|shi}
% antishark antiship antishock
\nolig{antisho}{anti|sh}
\nolig{Antisho}{Anti|sh}
% antishark antiship antishock
\nolig{antisk}{anti|sk}
\nolig{Antisk}{Anti|sk}
% antiskid
\nolig{antisl}{anti|sl}
\nolig{Antisl}{Anti|sl}
% antislavery antislip
\nolig{antismo}{anti|smo}
\nolig{Antismo}{Anti|smo}
% antismog antismoke

\nolig{antismu}{anti|smu}
\nolig{Antismu}{Anti|smu}
% antismuggling antismut
\nolig{antisn}{anti|sn}
\nolig{Antisn}{Anti|sn}
% antisnob
\nolig{antiso}{anti|so}
\nolig{Antiso}{Anti|so}
% antisocial antisolar
\nolig{antisp}{anti|sp}
\nolig{Antisp}{Anti|sp}
% antispasmodic antispesulative
\nolig{antist}{anti|st}
\nolig{Antist}{Anti|st}
% antistatic antistick antistress
\nolig{antisu}{anti|su}
\nolig{Antisu}{Anti|su}
% antisubmarine antisubversion
\nolig{antisyl}{anti|sy}
\nolig{Antisy}{Anti|sy}
% antisymmetric antisymphilitics

\nolig{multis}{multi|s}
\nolig{Multis}{Multi|s}
% multiscreen multisense multisensory
% multiservice multisided multisite
% multisize multiskilled multisource
% multispecies multispectral multispeed
% multisport multistage multistate
% multistemmed multistep multistoried
% multistory multistranded multisyllabic
% multisystem

\nolig{isph}{i|sph}
% hemisphere planisphere hemispheric

% (I) us -> u-s
% -----

```

<pre> %% (no examples yet) % (J) sk -> s-k % (available in EB Garamond font) % ----- \nolig{skeep}{s keep} % greenskeeper groundskeeper miskeep \nolig{iskai}{is kai} % triskaidekaphobia \nolig{thsk}{ths k} % rathskeller \nolig{misk}{mis k} \nolig{Misk}{Mis k} % miskeep miskept miskick misknow % (K) ll -> l-l % ----- \nolig{llike}{l like} % animallike soullike \nolig{lless}{l less} % soulless tailless % (L) fr -> f-r % ----- \nolig{oofr}{oof r} % proofread proofroom proofrock % Part 4: Disabling one discretionary % ligature so that a subsequent, more % important one doesn't get pre-empted </pre>	<pre> % ----- % (i) as, is, and us preceding st % \nolig{ast}{a st} \nolig{ust}{u st} \nolig{ist}{i st} % (ii) as, is, and us preceding sp % \nolig{aspar}{a spar} \nolig{Aspar}{A spar} % asparagus Caspar aspartame asparkle \nolig{asper}{a sper} \nolig{Asper}{A sper} % aspersion Casper Jasper exasperate \nolig{aspir}{a spir} \nolig{Aspir}{A spir} % aspire aspirator aspirin \nolig{gasp}{ga sp} \nolig{Gasp}{Ga sp} % gasp \nolig{hasp}{ha sp} \nolig{Hasp}{Ha sp} % hasp \nolig{lasp}{la sp} % clasp unclasp beclasp enclasp \nolig{rasp}{ra sp} \nolig{Rasp}{Ra sp} % grasp rasp raspberry \nolig{wasp}{wa sp} \nolig{Wasp}{Wa sp} % wasp waspish \nolig{risp}{ri sp} % crisp </pre>
---	--

```

\nolig{ispani}{i|spani}
% hispanic
\nolig{lisp}{li|sp}
\nolig{Lisp}{Li|sp}
% lisp lispig
\nolig{whisp}{whi|sp}
\nolig{Whisp}{Whi|sp}
% whisper
\nolig{wisp}{wi|sp}
\nolig{Wisp}{Wi|sp}
% wisp

\nolig{cusp}{cu|sp}
\nolig{Cusp}{Cu|sp}
% cusp bicuspid tricuspid
\nolig{ausp}{au|sp}
\nolig{Ausp}{Au|sp}
% auspicious inauspicious

% (iii) at and et preceding th
% .....

%% If you have 'at' and 'et' ligatures as
%% well as the 'th' ligature -- and want
%% the 'th' ligature to take precedence,
%% make sure the following macros are
%% active (i.e., not commented out).

\nolig{ath}{a|th}
\nolig{eth}{e|th}

% The preceding instructions are a bit too

% broad as they also suppress the at ligature
% for words such as boathook, flathead,
% etc., and the 'et' ligature in words such as
% Beethoven, prophethood, and sweetheart.
% To address these cases, we provide \keeplig
% macros:

\keeplig{oathook} % boathook
\keeplig{eathook} % meathook
\keeplig{athouse} % bathouse boathouse cathouse
\keeplig{rathole} % rathole
\keeplig{Rathole}
\keeplig{athead} % cathead fathead flathead meathead
\keeplig{atherd} % goatherd neatherd
\keeplig{eatheart} % greathearted

\keeplig{Beethoven}
\keeplig{ophethood}
\keeplig{eetheart}

% (iv) at and et preceding ta
% .....

\nolig{Loretan}{Lore|tan} % :-)

% All other cases seem to involve 'at'
% or 'et' crossing a ligature boundary.
% As such, these cases should be dealt
% with in Part 3 of this file.

\fi %% end of \@ifhdligset

```

D German-language ligature suppression patterns: selnolig-german-patterns.sty

Introductory note: To accommodate the practice of Swiss-German writers of not using the “ß” character (and using “ss” in its place), all search-and-insert strings that contain an “ß” character are duplicated with equivalent search-and-insert strings containing “ss”.

```
% !TeX root = selnolig.tex
% !TEX TS-program = lualatex

\ProvidesPackage{selnolig-german-patterns}%
[2013/01/22]

% This entire package is placed under the
% terms of the LaTeX Project Public License,
% version 1.3 or later
% (http://www.latex-project.org/lppl.txt).
% It has the status "maintained".
%
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% (loretan dot mico at gmail dot com)

% A note on the organization of the \nolig
% macros in this file: They are grouped by
% the f-ligature being suppressed: ff -> f-f;
% fi -> f-i, fl -> f-l, etc. Within each of
% these sections, the \nolig commands are
% listed first for word-beginnings and
% second by word-interior search strings,
% alphabetically within each group.

% 1. ff -> f-f
% -----

\nolig{Auff[aeiloruyäöü]}{Auf|f}

\nolig{auff[aeiloruyäöü]}{auf|f}
% Hundreds (thousands?!) of words that start
% with or contain [aA]uff-, [kK]auff-, [lL]auf-
% and don't end with "ff".
% We must provide a few \keeplig macros,
% though, to deal with some surnames and
% some words of French origin.
\keeplig{Lauffen}
\keeplig{Stauffach} % Stauffacher
\keeplig{Stauffen} % Stauffenbergattentat
\keeplig{Stauffer}
\keeplig{Stauffisch}
\keeplig{stauffisch}

\keeplig{chauffier}
\keeplig{Chauffier}
\keeplig{chauffeur}
\keeplig{Chauffeur}
\keeplig{chauffement} % Echauffement

\nolig{Briefff}{Brief|f}
\nolig{briefff}{brief|f}
% Brief-f... (viele Fälle!)
\nolig{Cheff}{Chef|f}
\nolig{cheff[aäeiloöruü]}{chef|f}
% Chefffahrer Cheffront ...
\keeplig{cheffekt} % Lacheffekt Wischeffekt
\keeplig{Scheffel}
\keeplig{scheffel} % scheffeln
\keeplig{cheffizi} % hocheffizient
```

\keeplig{cheff�} % Scheff� (a statistician)	\nolig{Pr�ff}{Pr�f f}
\nolig{Dampff}{Dampf f}	\nolig{pr�ff}{pr�f f}
\nolig{dampff}{dampf f}	% (viele F�lle!)
% (viele F�lle!)	\nolig{Ruffach}{Ruf fach}
\nolig{Dorff[a�eilo�ru�]}{Dorf f}	% Ruffach
\nolig{dorff[a�eilo�ru�]}{dorf f}	\nolig{ruffach}{ruf fach}
% (viele F�lle!)	% Hausnotruffachberater beruflichlichen
\nolig{Hanff}{Hanf f}	\nolig{Rumpff}{Rumpf f}
\nolig{hanff}{hanf f}	% Rumpffassung
% Hanffasern Hanffeld	\nolig{Schaffang}{Schaf fang}
\nolig{Hoff[a�ilo�ru�]}{Hof f}	\nolig{Schaffarm}{Schaf farm}
% (viele F�lle!)	\nolig{Schaffell}{Schaf fell}
\keeplig{Hoffacker}	
\keeplig{Hoffart}	
\keeplig{Hoff�rt} % Hoff�rtigkeit	\nolig{Schilff}{Schilf f}
\keeplig{Hoffricht} % Hoffrichter	\nolig{schilff}{schilf f}
\keeplig{Hoffranz} % Hoffranzen (?)	% Schilffeld Schilffl�te Schilfflo�
	\nolig{Senff}{Senf f}
\nolig{Golff}{Golf f}	\nolig{senffa}{senf fa}
\nolig{golff}{golf f}	% Senffabrik senffarbig Senffleck
% (viele F�lle!)	\nolig{Sumpff}{Sumpf f}
\nolig{Hoffern}{Hof fern}	\nolig{sumpff}{sumpf f}
\nolig{hoffern}{hof fern}	% (viele F�lle!)
% Hofferne hofferne	\nolig{Tariff}{Tarif f}
\nolig{Impff}{Impf f}	\nolig{tariff}{tarif f}
% Impffurcht Impffortbildung	% (viele F�lle!)
\nolig{Kampff}{Kampf f}	\nolig{Tieff}{Tief f}
\nolig{kampff}{kampf f}	\nolig{tieff}{tief f}
% kampffertig Kampffigur	% (viele F�lle!)
% Kampffuchs Kampff�chse	\keeplig{tieffekt} % Multieffekt Konfettieffekt
\nolig{Kopff[a�eo�ru�]}{Kopf f}	\keeplig{tieffiz} % Antieffizienz
\nolig{kopff[a�eo�ru�]}{kopf f}	
% (viele F�lle!)	\nolig{eiffest}{eif fest}
% [kK]opffi -> caught by pffi rule	% reiffest
% [kK]opffl -> caught by pffl rule	
\nolig{Klopff}{Klopf f}	\nolig{ffabrik}{f fabrik}
\nolig{klopff}{klopf f}	% Strumpffabrik
% Schenkelklopfrohsinn klopfrei	\nolig{ffacet}{f facet}

% Relieffacetten
 \nolig{ffachl}{f|fachl}
 % berufsfachlich golfsfachlich
 \nolig{ffachm}{f|fachm}
 % Huffachmann Wahlkampfachmann
 % Golfsfachmesse Fünffachmord
 \nolig{ffäch}{f|fäch}
 % Briefffächer Einwurffächer fünffächrig
 \nolig{ffaden}{f|faden}
 % Einzelknopffaden Knüpfaden
 \nolig{ffäd}{f|fäd}
 % Einzelknopffäden Tropffäden
 \nolig{ffähig}{f|fähig}
 % hoffähig kampffähig lauffähig
 \nolig{ffahn}{f|fahn}
 % Totenkopffahne Dorffahne Wahlkampfahnen
 \nolig{ffahr}{f|fahrr}
 % Schiffsfahrt Schleiffahrt Tariffahrplan
 \nolig{ffähr}{f|fährr}
 % Dampfahrdienst
 \nolig{ffaktor}{f|faktor}
 % Hoffaktor Schlupffaktoren
 \nolig{ffakult}{f|fakult}
 % Rumpffakultät
 \nolig{ffall}{f|fall}
 % Anruffalle auffallen Straffall
 % Tariffalle Streiffall Maulwurffalle
 \keeplig{ffallee} % Oppenhoffallee
 \keeplig{ffallerg} % Duftstoffallergie
 \nolig{ffäll}{f|fäll}
 % straffällig unauffällig
 \nolig{ffalt}{f|falt}
 % Fünffaltigkeit Dickkopffalter
 \keeplig{iffalt} % Segelschiffalter
 \keeplig{offalt} % Kraftstoffalternativen
 \nolig{ffält}{f|fält}
 % fünffältig
 \nolig{ffami}{f|fami}

% Zwölffamilienhäuser
 \keeplig{Diffami} % Diffamierung
 \keeplig{diffami} % diffamierend
 \nolig{ffanat}{f|fanat}
 % Schärffanatiker
 %%\nolig{ffanlag}{f|fanlage}
 %% % Wolffanlage (?)
 \nolig{ffans}{f|fans}
 % Waldhoffans
 \keeplig{riffans} % Griffansätze
 \keeplig{toffans} % Sprengstofffansschlag
 \nolig{ffanta}{f|fanta}
 % Schlaffantasie Straffantasie
 \nolig{ffarb}{f|farb}
 % Zwölffarbenmaschine zwölfarbig
 \keeplig{ffarbeit}
 \nolig{ffärb}{f|färb}
 % Kopffärbung
 \nolig{ffaschi}{f|faschi}
 % Schulhoffaschismus
 \nolig{ffassad}{f|fassad}
 % Innenhoffassade
 \nolig{ffäul}{f|fäul}
 % Sumpffäulnis
 \nolig{ffecht}{f|fecht}
 % Klopffechter
 \nolig{ffeder}{f|feder}
 % -f-feder...
 \nolig{ffedr}{f|fedr}
 % zwölfedrig
 \nolig{ffehl}{f|fehl}
 % Schärffehler
 \nolig{ffeier}{f|feier}
 % Hoffeierlichkeiten
 \nolig{ffeind[els]}{f|feind}
 % -f-feinde -f-feindlich -f-feindschaft
 \keeplig{ffeindealer} % Koffeindealer

\nolig{ffeld}{f feld}	\nolig{ffestl}{f festl}
% Prüffeld Schilffeld Kampffeld	% Straffestlegung
\keeplig{Büffeld} % Büffeldecke	\nolig{ffests}{f fests}
\keeplig{büffeld}	% Straffestsetzung
\keeplig{ffeldenk} % Scheffeldenkmal	% Hoffestspiele Dorffestspiel
\keeplig{Iffeld} % Iffeldorf	\nolig{ffett}{f fett}
\keeplig{Löffeld} % Löffeldüngung	% Huffett Rumpffett Scharffetter
\keeplig{löffeld}	\keeplig{Buffett} % Buffettheke
\keeplig{Müffeld} % Müffeldoktor	\keeplig{Büffett}
\keeplig{müffeld}	\keeplig{buffett}
\keeplig{nüffeld} % Schnüffeldienst -droge	\keeplig{büffett} % Obstbüffett
\keeplig{taffeld} % Staffeldach -diplomatie	\nolig{ffetz}{f fetz}
\keeplig{toffeld} % Kartoffelbruck -dieb	% Brieffetzen Stofffetzen
\keeplig{Trüffeld} % Trüffelduft -dorf	\keeplig{Buffetz} % Buffetzeit
\keeplig{trüffeld}	\keeplig{Büffetz} % Büffetzusammenstellung
\keeplig{Waffeld} % Waffelduft	\nolig{ffeud}{f feud}
\keeplig{waffeld}	% Kasernenhoffeudalismus
	\nolig{ffue}{f feue}
\nolig{ffell}{f fell}	% Dorfffeuerwehr Torfffeuer Lauffeuer
% Werwolffell Schaffell	\nolig{ffilet}{f filet}
\keeplig{ffelleck} % Waffelleckereien	% Meerwolffilet
\keeplig{ffellinde}% Scheffellinde	\nolig{ffindung}{f findung}
\keeplig{Muffellä} % Muffellämmer	% Beruffindungsprozess
\keeplig{öffell} % Löffellamm Kochlöffellängen	\nolig{ffirm}{f firm}
\keeplig{taffell} % Staffellauf -läufer	% Brieffirmen Tariffirmen
\keeplig{toffell} % Kartoffellager -liebhaber	\keeplig{affirm}
% Pantoffellarve Kunststoffelle	\keeplig{Affirm}
\keeplig{üffell} % Büffelleber -leder -leib	
% Trüffelleidenschaft	\nolig{ffolg}{f folg}
% Schnüffellust	% Impffolgen
\nolig{ffeile}{f feile}	\nolig{ffoli}{f foli}
% Prüffeile	% Relieffolien
\nolig{ffenster}{f fenster}	\nolig{ffolter}{f folter}
% Hinterhoffenster Schlaf- Tarif-	% Tropffolter
\nolig{fferien}{f ferien}	\keeplig{Affoltern} % town near Zurich
% Reiterhofferien Bauernhofferien	\nolig{ffond}{f fond}
\nolig{ffertig}{f fertig}	% Tariffondslösung
% schlaffertig	\nolig{fforder}{f forder}

% Tarifforderung Strafforderung	\keeplig{ffraup} % Stoffraupe
\nolig{fförder}{f förder}	
% ruffördernd kreislauffördernd schlaffördernd	\nolig{ffreak}{f freak}
\nolig{fforell}{f forell}	% Surffreak
% Werfforellen	\keeplig{toffreak} % Schadstoffreaktionen
\nolig{fform}{f form}	\nolig{ffregat}{f fregat}
% Kopfform Gugelhupfform aufformen	% Kampffregatte Dampffregatte
\nolig{fförm}{f förm}	\nolig{ffrei}{f frei}
% reifförmig schweifförmig	% tariffrei Schlaffrei
\nolig{fforsch}{f forsch}	\keeplig{chiffrei} % Schiffreise
% Schlafforschung Impfforschung	\keeplig{toffrei} % stoffrein sauerstoffreich
\nolig{fforen}{f foren}	\keeplig{uffreis} % Puffreis
% Abrufforen	\nolig{ffremd}{f fremd}
\nolig{fforu}{f foru}	% hoffremd
% Schlafforum	\nolig{ffreq}{f freq}
\nolig{ffoto}{f foto}	% Schlaffrequenz
% Schlaffotogalerie	\nolig{ffreu}{f freu}
\nolig{fföt}{f föt}	% Straffreude Brieffreund
% Wolffötus	
	\nolig{ffrisch}{f frisch}
\nolig{ffracht}{f fracht}	% Schaffrischkäse zapffrisch
% Dampfvrachter	\nolig{ffried}{f fried}
\nolig{ffrag}{f frag}	% Dorffrieden Dorffrieden
% Streiffragen	\nolig{ffries}{f fries}
\keeplig{Suffrage} % Suffragette	% Relieffries
\keeplig{suffrage}	\keeplig{toffries} % Rohstoffriese
\nolig{ffrak}{f frak}	\nolig{ffrist}{f frist}
% Rumpffraktion	% Prüffrist Ablauffrist
\keeplig{toffrak} % Flüssigstoffrakete	\nolig{ffrisur}{f frisur}
\nolig{ffrank}{f frank}	% Schlaffrisur Topffrisur Zopffrisur
% Fünffrankenstück	
\nolig{ffräs}{f fräs}	\nolig{ffront}{f front}
% Baumstumpffräse	% Hoffront Kampffront
\nolig{ffrau}{f frau}	\keeplig{affront}
% Hoffrau Kauffrau	\keeplig{Affront}
\keeplig{ffraum} % Sprengstoffraub	\nolig{ffrosch}{f frosch}
\keeplig{ffraub} % Treffraum	% Pfeiffrosch
\keeplig{ffrausch} % Klebstofffrausch	\nolig{ffrösch}{f frösch}

% Pfeiffrösche	% Schneckenhoffete
\nolig{ffrucht}{f frucht}	
% Rumtopffrucht	\nolig{lffach}{lf fach}
\nolig{ffrucht}{f frucht}	% elffach zwölffach
% Rumtopffrüchte	
	\nolig{pffach}{pf fach}
\nolig{ffund}{f fund}	% Strumpffach
% Brückenkopffundament	\nolig{pffest}{pf fest}
\keeplig{iffund} % diffundieren	% Klopffestigkeit tropffester
\keeplig{tofund} % stoffundurchlässig	\nolig{pffels}{pf fels}
\nolig{fführ}{f führ}	% Hirschkopffelsen
% Kampfführung aufführen	\nolig{pffont}{pf font}
\nolig{ffunk}{f funk}	% Dampffontäne
% Brieffunktion Abruffunktion	\nolig{pffüh}{pf füh}
\nolig{ffühl}{f füh1}	% Kampfführung
% Scharffühler	
\nolig{ffüll}{f füll}	\nolig{reiffern}{reif fern}
% Prüffüllgut Dampfzufüllung	% reiffern
\nolig{ffürst}{f fürst}	\nolig{rffan}{rf fan}
% -f-fürst	% Surffan
\nolig{ffuß}{f fuß}	\nolig{rffeel}{rf feel}
\nolig{ffuss}{f fuss}	% Surffeeing
\nolig{ffüß}{f füß}	\nolig{rffest}{rf fest}
\nolig{ffüss}{f füss}	% Surffest
% Greiffuß Greiffüße	\nolig{rffinn}{rf finn}
\keeplig{iffuss} % Diffusschall -strahlung	% Surffinne
\nolig{ffutter}{f futter}	\nolig{rffleck}{rf fleck}
% Prüffutter	% Schorfflecken
\nolig{ffütter}{f fütter}	
% Abruffütterung	\nolig{ünff}{ünf f}
	% fünfflügelig Fünfflach fünfflammig
\nolig{hoffan}{hof fan}	% fünffleckige fünffingrig fünffarbig
% Waldhoffan	
\nolig{hoffersch}{hof fersch}	\nolig{wurff[aäehiloöruü]}{wurf f}
% Talhofferschen	% Einwurffehler Auswurfach Hammerwurffinale
\nolig{hoffest}{hof fest}	
% Pfarrhoffest Hinterhoffest	
\nolig{hoffete}{hof fete}	% 2. fi -> f-i

% -----	\nolig{laufi}{lauf i}
\nolig{Aufi}{Auf i}	% Laufidol Kreislaufinsuffizienz
\nolig{aufisst}{auf isst}	\keeplig{Laufig}
	\nolig{rüfi}{rüg i}
	% Prüfinhalt Prüfinstitution Prüfintervall
\nolig{Brieffi}{Brief i}	\nolig{Rumpfi}{Rumpf i}
\nolig{briefi}{brief i}	\nolig{rumpfi}{rumpf i}
% Briefidiom Briefinhalt Pfandbriefinhaber	% Rumpfitalien Strumpfindustrie
	\keeplig{rumpfig}
\nolig{Chefi}{Chef i}	
\nolig{chefi}{chef i}	\nolig{chafi}{chaf i} % Schaf-i...
% Chefideologe Chefindianer Chefinformatiker	% Schafimperium Schafinnereien
\keeplig{Chefin} % Chefin Chefinnen	\keeplig{schafigu} % Maharadschafigur
\nolig{Chefin[a-mo-z]}{Chef in}	\nolig{chlafi}{chlaf i} % Schlaf-i-...
% Chefinder -indianer -inspektor -inquisitor	% Schlafiglu schlafinduzierend
\keeplig{chefin}	\keeplig{chlafitt} % Schlafittchen
\nolig{chefind}{chef ind}	
\keeplig{chefibel} % Recherchefibel	\nolig{Strafi}{Straf i}
\keeplig{chefiebe} % Recherchefieber	\nolig{strafi}{straf i}
\keeplig{chefigur} % Nietzschefigur	% strafisolierend Strafinstanz
\keeplig{chefilm} % Rachefilm	\nolig{Tarifi}{Tarif i}
\keeplig{chefili} % Wäschefiliale	\nolig{tarifi}{tarif i}
\keeplig{chefirm} % Geldwäschefirma	% (viele Fälle!)
\keeplig{chefisch} % Wäschefische	\keeplig{Tarifier} % Tarifierung
	\keeplig{tarifier} % tarifierbar
\nolig{Dorfi}{Dorf i}	\nolig{Tiefinn}{Tief inn}
\nolig{dorfi}{dorf i}	\nolig{tiefinn}{tief inn}
% Dorfidylle -information -institute	% tiefinnen -innerste -innig -innerste
\nolig{Hofi}{Hof i}	
% (viele Fälle!)	\nolig{fidee}{f idee}
\keeplig{Hofier} % Hofieren	% Kopfidee Luftschiffidee
\nolig{Kampfi}{Kampf i}	\nolig{fideol}{f ideol}
\nolig{kampfi}{kampf i}	% Tiefideologie
% Kampfideologie Kampfinstrument	\nolig{fidentif}{f identif}
\nolig{Kaufi}{Kauf i}	% Stoffidentifizierung
\nolig{kaufi}{kauf i}	\nolig{fidentit}{f identit}
% Kaufidee kaufinteressiert Kaufimpuls	% Steppenwolfidentität Berufidentität
\nolig{Laufi}{Lauf i}	\nolig{fidol}{f idol}

% Golfidol	\nolig{finfus}{f infus}
\nolig{fidyll}{f idyll}	% Tropfinfusion
% Bauernhofidyll	\nolig{fingenieur}{f ingenieur}
\nolig{figel}{f igel}	% Prüfingenieur Kaufingenieur
% Köpfigel Stoffigel	\nolig{finhab}{f inhab}
\keeplig{figelehrt} % Sufigelehrter	% Hofinhaber
\nolig{fikone}{f ikone}	\nolig{finhalat}{f inhalat}
% Laufikone	% Kamilledampfinhalationen
\nolig{fillus}{f illus}	\nolig{finhalt}{f inhalt}
% Sumpfillusion	% Begrifffinhalte Kropfinhalt
\nolig{fimman}{f imman}	\keeplig{Delfinhalt} % Delfinhaltung
% ablaufimmanente	\keeplig{raffinhalt} % Paraffinhaltige
\nolig{fimmob}{f immob}	\nolig{finitia}{f initia}
% Kaufhofimmobilie	% Korallenriffinitiative
\nolig{fimmun}{f immun}	\nolig{finjekt}{f injekt}
% Strafirmunität	% Dampf injektionsverfahren
\nolig{fimp}{f imp}	\nolig{finkont}{f inkont}
% Torfimporte Kaufimpuls aufimpft	% Ueberlaufinkontinenz
	\keeplig{Delfinkont} % Delfinkontakt
\nolig{findex}{f index}	\nolig{finnenaus}{f innenaus}
% Kaufindex Pfandbriefindex	% Schiffinnenausbau
\nolig{findikat}{f indikat}	\nolig{finnenohr}{f innenohr}
% Impfindikation	% Schafinnenohr
\nolig{findiv}{f indiv}	\nolig{finnenfl}{f innenfl}
% Hofindividualität	% Hofinnenflächen
\nolig{findiz}{f indiz}	\nolig{finnenl}{f innenl}
% Tarifindizes	% Hofinnenleben
\nolig{findust}{f indust}	\nolig{finnenraum}{f innenraum}
% Golfindustrie	% Kopfinnenraum
\nolig{finfekt}{f infekt}	\nolig{finnenräum}{f innenräum}
% Dampfinfektion	% Schlafinnenräumen
\nolig{finfiz}{f infiz}	\nolig{finnens}{f innens}
% Laufinfizierte	% Rumpfinnenseite
\nolig{finfo}{f info}	\nolig{finner}{f inner}
% Tariffinformation Telefoninformation	% tiefinnerlich Kopfinneres
\keeplig{Delfinfo} % Delfinforscher -foto	\nolig{finnig}{f innig}
\nolig{finfra}{f infra}	
% Hofinfrastruktur	

% tiefinnige	% Feuerschiffinteressierte
\nolig{finnov}{f innov}	% Begriffinterpretationen
% Tariffinnovationen	% Strafinerventionen Rufintervalle
\nolig{finsass}{f insass}	\nolig{finton}{f inton}
% Raumschiffinsassen	% Tiefintonieren
\nolig{finsekt}{f insekt}	\nolig{fintrig}{f intrig}
% Laufinsekt	% Briefintrige Hofintrige
\nolig{finsel}{f insel}	\nolig{finvent}{f invent}
% Schafinsel Schilfinasel Sauinsel	% Laufinventar
\nolig{finserat}{f inserat}	\nolig{finvest}{f invest}
% Titelpkopfinserat	% Anlaufinvestition
\nolig{finsign}{f insign}	
% Knopfinsignien	\nolig{firis}{f iris}
\nolig{finspek}{f inspek}	% Sumpffiris
% Kirchhofinspektor	\nolig{fironi}{f ironi}
\nolig{finsta}{f insta}	% tiefironisch
% Kunstriffinstallateur	\nolig{firre}{f irre}
% Schiffinstandsetzung	% Dorfirre
% Strafinstanz rumpfinstabil	\nolig{firru}{f irru}
\nolig{finstinkt}{f instinkt}	% Werfirrung
% Zupfinstinkt	
\nolig{finstitu}{f institu}	\nolig{fisolat}{f isolat}
% Strafinstitutionen	% Strafisolator Schaumstoffisolation
\nolig{finstrum}{f instrum}	\nolig{fisolie}{f isolie}
% Zupfinstrumente Schleif- Greif-	% Griffisolierung
\nolig{finsuff}{f insuff}	
% Kreislaufinsuffizienz	\nolig{uffax}{uf fax}
\nolig{finszen}{f inszen}	% Notruffax Abruffax
% Kopffinszenierung	
\nolig{fintars}{f intars}	
% Griffintarsien	
\nolig{fintell}{f intell}	% 3. fl -> f-l
% Hofintellektueller	% -----
\nolig{fintegr}{f integr}	
% Tarifintegration	\nolig{Auf1[aeiouyääü]}{Auf 1}
\nolig{fintens}{f intens}	% Must avoid catching "Auf1.".
% eingriffintensiv	\nolig{auf1}{auf 1}
\nolig{finter}{f inter}	% Hundreds (thousands?!) of words, but allow

```

% for some exceptions:                                \keeplig{chefläche} % Bracheflächen ...
\keeplig{aufclair} % Tierschauclair
\keeplig{auffläche}% Schaufläche Grau- Stau-        \nolig{Dorfl}{Dorf|l}
                % Anbau- Kau- Niveau- Plateau\nolig{dorfl}{dorf|l}
\keeplig{auflieg1}% Tauflieg1ein                    % Dorfladen Dorflage Dorfleitplan
\keeplig{auflüssig} % Tauflüssigkeit                \keeplig{dorfliese} % Korridorfliesen
\keeplig{baufl} % Modellbauflieger Weinbauflecken \keeplig{dorflüg} % Condorflüge
\keeplig{Baufl} % Bauflaute                          \nolig{Fünfl}{Fünf|l}
\keeplig{blaufl}% blaufleckig blauflauschig        \nolig{fünfl}{fünf|l}
\keeplig{Blaufl}% Blauflügel (Libelle)             % fünflitrig Fünflochdüsen
\keeplig{fraufl}% Frauflüge                        \nolig{Golfl}{Golf|l}
\keeplig{Fraufl}                                    \nolig{golfl}{golf|l}
\keeplig{graufl}% Graufleckentest                  % viele Faelle
\keeplig{Graufl}                                    \nolig{Hanfl}{Hanf|l}
\keeplig{onauflo} % Donauflotte                    \nolig{hanfl}{hanf|l}
\keeplig{onauflu} % Donauflut Donaufluss           % Hanfladen Hanfland Hanflegalisierung
\keeplig{Moskaufl} % Moskauflug                   \nolig{Hofl}{Hof|l}
\keeplig{Schauflieg}% Schaufliegen                \nolig{hofl}{hof|l}
\keeplig{Schaufloß} % Schaufloßfahrten             % Hoflaborant Hoflieferant
\keeplig{schauflöß}                               \keeplig{hoflosk} % Echofloskeln
\keeplig{Schauflug}                               \nolig{Huflatt}{Huf|latt}
\keeplig{Schauflüg} % Schauflüge                  \nolig{huflatt}{huf|latt}
\keeplig{schauflieg}                              % Huflattich huflattichartig
\keeplig{schauflöß}                               \nolig{Hufled}{Huf|led}
\keeplig{schauflöß} % Wahrschauflöße              \nolig{hufled}{huf|led}
\keeplig{schauflug}                              % Huflederhautentzündung
\keeplig{schauflüg}                              \nolig{Impfl}{Impf|l}
                                                \nolig{impfl[ae]}{impf|l[ae]}
                                                % Impflegende Schimpflaute
\nolig{Briefl}{Brief|l}                          \keeplig{eimpflanz} % Keimpflanze
\nolig{briefl}{brief|l}                          \keeplig{impflege} % Heimpfleger
% lots and lots of words ...
\nolig{Chefl}{Chef|l}                            \nolig{Kopfl[äeioöuüy]}{Kopf|l}
\nolig{chefl}{chef|l}                            \nolig{kopfl[äeioöuüy]}{kopf|l}
% Cheflieferant -limousine -lobbyist -los        \nolig{Köpfl[aäioöuüy]}{Köpf|l}
\keeplig{achefl} % Rachefluch Einspracheflut      \nolig{köpfl[aäioöuüy]}{köpf|l}
\keeplig{ichefl} % Speichefluss                  % Dutzende (Hunderte?) von Worten...
\keeplig{schefl} % Ascheflocken Tuschefleck       % [kK]opfla -> caught by opfla rule
                                                % [kK]öpfle -> caught by öpfle rule

```


\keeplig{kopflaster} % Ökopflaster
\keeplig{kopfleg} % Risikopflege
\keeplig{kopflaum} % Schokopflaumen
\nolig{Pfeifl}{Pfeif|l}
\nolig{pfeifl}{pfeif|l}
% Pfeiflaute
\nolig{Prüfl}{Prüf|l}
\nolig{prüfl}{prüf|l}
% Prüflabor Prüflast Prüflampe
\nolig{Schaf1}{Schaf|l}
\nolig{schafl}{schaf|l}
% Schafleder Schaflaus Schafleber
\nolig{Schiefl}{Schief|l}
\nolig{schiefl}{schief|l}
% schieflachen Schieflage schieflaufen
\nolig{Schilfl}{Schilf|l}
\nolig{schilfl}{schilf|l}
% Schilflabyrinth Schilflieder
\nolig{Schlaf1}{Schlaf|l}
\nolig{schlaf1}{schlaf|l}
% lots and lots of words...
\nolig{Schleifl}{Schleif|l}
\nolig{schleifl}{schleif|l}
% Schleiflack Schleiflade
\nolig{Senfl}{Senf|l}
% Senfladen Senfliebhaber
\nolig{Steifl}{Steif|l}
\nolig{steifl}{steif|l}
% steiflippig
\nolig{Strafl}{Straf|l}
\nolig{strafl}{straf|l}
% lots and lots of words...
\nolig{Surfl}{Surf|l}
\nolig{surfl}{surf|l}
% Surflizenz Surflegende
\keeplig{surfleck} % Lasurfleck
\keeplig{surflüg} % Klausurflügel
\keeplig{surflüss} % Glasurflüssigkeit

\nolig{Tarifl}{Tarif|l}
\nolig{tarifl}{tarif|l}
% lots and lots of words...
\nolig{Stiefl}{Stief|l}
\nolig{Tiefl}{Tief|l}
\nolig{tiefl}{tief|l}
% Tieflager stieflich

\nolig{Topfl}{Topf|l}
\nolig{topfl}{topf|l}
% Topflappen Topflumpen
\keeplig{Topflagg} % Topflaggen
\keeplig{rtoppflicht} % porttoppflichtig
\keeplig{topfläch} % Biotopfläche
\keeplig{topfleg} % Autopflege
\keeplig{topflop} % Megatopflop
\keeplig{topflug} % Nonstopflug
\keeplig{topflüg} % Nonstopflüge

\nolig{Torfl}{Torf|l}
\nolig{torfl}{torf|l}
% Torflieferant Torfloch
\keeplig{Torflagge}
\keeplig{Torflügel}
\keeplig{Torflut}
\keeplig{torfläche} % Rotorfläche
\keeplig{torflasch} % Applikatorflasche
\keeplig{torflieg} % Motorfliegen
\keeplig{torflimm} % Monitorflimmern
\keeplig{torflitz} % Motorflitzer
\keeplig{torfloss} % Stabilisatorflossen
\keeplig{torflott} % Exploratorflotte
\keeplig{torfluch} % Auswärtstorfluch
\keeplig{torflug} % Simulatorflug
\keeplig{torflüg} % Motorflüge
\keeplig{torflüss} % Indikatorflüssigkeit

\nolig{Tropfl}{Tropf l}	\nolig{flabor}{f labor}
\nolig{tropfl}{tropf l}	% Edelsteinprüflabor
% Tropfleckagen	\nolig{flage}{f lage}
\keeplig{tropflug} % Elektropflug	% Rohstofflager Straflager Auflage
	\keeplig{siflage} % Persiflage
	\keeplig{ouflage} % Camouflage
\nolig{Wurfl}{Wurf l}	\nolig{flagun}{f lagun}
\nolig{wurfl}{wurf l}	% Riffflagune
% Wurfluke Abwurfluke Einwurfluke	\nolig{flähm}{f lähm}
\nolig{Würfl}{Würf l}	% Kehlkopflähmung
\nolig{würfl}{würf l}	\nolig{flamp}{f lamp}
% Würflung würfle	% Kompaktleuchtstofflampe Notruflampe
	\nolig{fland}{f land}
\nolig{aflied}{af lied}	% Hofland Kaufland Sumpfland Tiefland
% Schlaflied	% Straflandesgericht Dorflandwirtschaft
\nolig{aflos}{af los}	% Iffland Rifflandschaft
% straflos schlaflos	\keeplig{flandern} % Ostflandern
\keeplig{aflosk} % Propagandafloskel	\keeplig{flandrisch}
\keeplig{rafloss} % lyraflossig	\nolig{fländ}{f länd}
\nolig{aflück}{af lück}	% hofländlich Sumpfländer Tiefländer
% Straflücke	\nolig{fläng}{f läng}
\nolig{ampfl[aäou]}{ampf l}	% Straflänge Rumpflänge Lauflänge
% Dampflokomotive	\nolig{flapp}{f lapp}
% Kampfärm Kampfluftschiff	% Seiflappen Topflappen
\keeplig{ampfläch} % Campfläche	\nolig{flärm}{f lärm}
\keeplig{ampflanz} % Balsampflanzungen	% Auspufflärm
\keeplig{ampfleg} % Teampflege	\nolig{fflatter}{f flutter}
\nolig{arflad}{arf lad}	% Vorhofflattern aufflattert
% Zeichenbedarfladen	\nolig{flauf}{f lauf}
\nolig{arfläd}{arf läd}	% schieflaufen Auflauf Brieflauf
% Schulbedarfläden	\nolig{fläuf}{f läuf}
\nolig{äufle}{äuf le}	% schiefläuft Hofläufer Strafläufe
% Häuflein träufe	% Prüfläufe Aufläufe Tiefläufer
	\nolig{flaun}{f laun}
\nolig{eufle}{euf le}	% Kauflaune Wurflaune Kampflaune
% verteufle	
\keeplig{eufleiß} % treufleißig	\nolig{fleb}{f leb}
\keeplig{eufleiss} % treufleissig	% Hofleben Kopfleben Druckkopflebensdauer

\keeplig{huffleb} % shuffleboard	\keeplig{isumpflicht}
\nolig{flehn}{f lehn}	\keeplig{numpflicht}
% steiflehnig	\keeplig{ssumpflicht}
\nolig{flehr}{f lehr}	
% Dorflehrer Eislauflehrerin	\nolig{flieb}{f lieb}
\nolig{fleiden}{f leiden}	% freiberufliegend riffleibend
% Kropfleidende	\nolig{flig}{f lig}
\nolig{flein}{f lein}	% schweflig würflig knifflig mufflig
% Laufleine Scherflein Wölflein	% zweigipflig fünfzipflig
% Köpflein Zöpflein	\nolig{flief}{f lief}
\nolig{fleist}{f leist}	% schieflied Hoflieferant
% Dampfleistung Knopfleiste	\nolig{flinde}{f linde}
% Kopfleiste Auswurfleistung	% Dorflinde Wolflinde Ziegelhoflinde
% Griffleiste Stoffleiste	% krampflindernd
% Abstreifleiste	\nolig{fling}{f ling}
\nolig{fleit}{f leit}	% Prüfling Fünfling Sträfling Täufling
% Dampfleitung Hofleitung Bauhofleiter	\nolig{flini}{f lini}
% Kaufleitung Notrufleitung aufleiten	% Wurflinie Straflinie Rumpflinie
% inbegriffleitend Kraftstoffleitung	\nolig{flinse}{f linse}
\keeplig{Kaltefleiter} % a surname...	% Fünflinser Wegwerflinsen
\nolig{fлект}{f лект}{r}	\nolig{flisch}{f lisch}
% Schenkelklopflektüre	% teuflisch Tüpfelscheißer
\nolig{fler}{f ler}	\nolig{flist}{f list}
% Freiberufler Löffler Büffler Schnüffler	% Prüfliste Rufliste Kaufliste
\nolig{fleut}{f leut}	\nolig{fliter}{f liter}
% Hofleute	% Hofliteratur Fünflitermotor
\nolig{flieh}{f lieh}	\nolig{flizenz}{f lizenz}
% tariflich reiflich glimpflich ...	% Radfahrprüflizenz
% (many words!)	\nolig{flobby}{f lobby}
%% Vorsicht aber mit Pflicht und pflicht,	% Maulwurflobbyisten
%% sowie mit einflieht, verpflichtet, etc.:	\nolig{flöch}{f löch}
\keeplig{pflicht}	% Sturmwurflöcher Knopflöcher
%% Noch mehr Vorsicht mit Sumpflicht:	% Sufflöcher Griffllöcher
\nolig{Sumpflicht}{Sumpf licht}	\keeplig{flöchte}
\nolig{sumpflicht}{sumpf licht}	\nolig{flöff}{f löff}
\nolig{öpflicht}{öpf licht} % kröpflicht (?)	% Tieflöffelbagger auflöffeln
%% Aber: Visumpflicht Konsum- Impressum-	% Schöpflöffel

<code>\nolig{flohn}{f lohn}</code>	% hilflos
% Tariflohn Tieflohnland	<code>\keeplig{lfloss}</code>
<code>\keeplig{flohnetz}</code> % Wasserflohnetz	% Walflosse Kielflosse Paddelflossen
<code>\nolig{flöhn}{f löhn}</code>	<code>\keeplig{lflosk}</code>
% Tariflöhne	% Moralfloskel Sozialfloskeln Spielfloskel
<code>\nolig{flok}{f lok}</code>	
% Dampflokomotive	<code>\nolig{oflad}{of lad}</code>
<code>\nolig{flord}{f lord}</code>	% Biohofladen
% Wolflord	<code>\nolig{ofläd}{of läd}</code>
<code>\nolig{flösch}{f lösch}</code>	% Biohofläden
% Hoflöschmaschine	<code>\nolig{oflück}{of lück}</code>
<code>\nolig{flösu}{f lösu}</code>	% Vorhoflücke
% Schmierseiflösung	
	<code>\nolig{opfla}{opf la}</code>
<code>\nolig{fluft}{f luft}</code>	% Topflappen Kopflaus kopflastig
% Auspuffluft	<code>\keeplig{opflagg}</code>
<code>\nolig{flung}{f lung}</code>	<code>\keeplig{opflair}</code> % Popflair
% Verzweiflungsakt Verteuflung Stafflung	<code>\keeplig{opflanz}</code> % Topflanzen
<code>\nolig{flust}{f lust}</code>	<code>\keeplig{opflaum}</code> % Mangopflaumen
% Kampflust Impflust kauflustig Rauflust	
	% Kakaopflanzen Indigopflanzen
<code>\nolig{gipfle}{gipf le}</code>	<code>\keeplig{opflaster}</code>
% gipfle	% Kinopflaster
<code>\nolig{ipflig}{ipf lig}</code>	<code>\nolig{öpfle}{öpf le}</code>
% zweigipflig fünfzipflig	% köpfe tröpfe Knöpfe
	<code>\nolig{orflad}{orf lad}</code>
<code>\nolig{chopfl}{chopf l}</code>	% Dorfladen
% Schopflilie Schopflavendel	
<code>\nolig{lf lady}{lf lady}</code>	<code>\nolig{pflaut}{pf laut}</code>
% Goldlady	% Kehlkopflaut
<code>\nolig{lf land}{lf land}</code>	<code>\nolig{pfleier}{pf leier}</code>
% Altelfland Delfland	% Zupfleier
<code>\nolig{lf last}{lf last}</code>	<code>\nolig{pfleis}{pf leis}</code>
% Wolf last	% Knopfleise
	<code>\nolig{pfleu}{pf leu}</code>
<code>\nolig{lflos}{lf los}</code>	% Natriumdampfleuchten Kopfleuchte
	<code>\nolig{pflid}{pf lid}</code>

% Schlupflid	\keeplig{reiflasch}% Milchbreiflaschen
\nolig{pflied}{pf lied}	\keeplig{reiflock} % Breiflocken
% Kampflied	\keeplig{reifloh} % Büchereiflohmarkt
\nolig{pfloch}{pf loch}	\keeplig{reiflöhe} % Gießereiflöhe
% Knopfloch	\keeplig{reiflott} % Fischereiflotte
\nolig{pflöch}{pf löch}	\keeplig{reiflüge} % Dreiflügelaltar
% Knopflöcher	\keeplig{reiflügl} % dreiflüglig
\nolig{pflos}{pf los}	
% kampflos kopflos	\nolig{Ruflaut}{Ruf laut}
\keeplig{pfloss} % Pappflossen	\nolig{ruflaut}{ruf laut}
\nolig{pflös}{pf lös}	% Ruflaute ruflautstark
% krampflösend Hüftkopflösung	\nolig{Ruflos}{Ruf los}
\nolig{pflöwe}{pf löwe}	\nolig{ruflos}{ruf los}
% Goldkopflöwenäffchen	% ruflos beruflos
% Schwarzkopflöwenäffchen	
\nolig{pflup}{pf lup}	\nolig{tafle}{taf le}
% Kopflupe	% tafle
\nolig{pflux}{pf lux}	\keeplig{tafleck} % Zahnpastaflecken
% Hüftkopfluxation	\keeplig{taflege} % Regattataflegel
\nolig{rfläd}{rf läd}	\nolig{urflad}{urf lad}
% Dorfläden Surfläden	% Surfladen
\nolig{rflück}{rf lück}	\nolig{urfloch}{urf loch}
% Sturmwurflücken	% Balleinwurfloch
\nolig{rfluke}{rf luke}	
% Abwurfluke Einwurfluke	\nolig{wafle}{waf le}
	% schwafle
\nolig{reifl}{reif l}	\nolig{wefle}{wef le}
% Greiflippe Stegreiflieder Streiflacher	% schwefle
\keeplig{Breifl}	\nolig{weifle}{weif le}
\keeplig{breifl}	% bezweifle verzweifle
\keeplig{Dreifl}	\keeplig{weifleck} % zweifleckig
\keeplig{dreifl}	\nolig{werfl}{werf l}
\keeplig{Freifl}	% Wegwerflied
\keeplig{freifl}	\keeplig{chwerfl}
\keeplig{reifläch} % Freiflächen	% Schwerflugzeug schwerfließend
\keeplig{reiflagg} % Reedereiflagge	\keeplig{werflitz} % Powerflitzer
\keeplig{reiflamm} % dreiflammig	

	% Zwölffingerdarm
	\nolig{lffisch}{lf fisch}
	% Wolffisch
% 4. ffi -> f-fi	
% -----	
	\nolig{mpffisch}{mpf fisch}
	% Kampffisch
\nolig{affind}{af find}	
% Straffindung	\nolig{nffing}{nf fing}
\keeplig{araffind} % Paraffinduft	% fünffingrig Fünffingergebirge
\nolig{ffibel}{f fibel}	\nolig{pffi}{pf fi}
% Zwiebelknopffibeln	% topffit Kopffilm Wahlkampffinanzierung
\nolig{ffieb}{f fie}	% Schlangenkopffisch
% Sumpffieber Wahlkampfieber	
\nolig{ffigu}{f figu}	\nolig{reiffing}{reif fing}
% Streiffigur	% Greiffinger
\nolig{ffilm}{f film}	\nolig{rffinte}{rf finte}
% Werwolffilm	% Sprungwurffinte
\nolig{ffilter}{f filter}	
% Tropffilter Topffilter	
\nolig{ffinal}{f final}	
% Hammerwurffinale	% 5. ffi -> ff-i
\nolig{ffinte}{f finte}	% -----
% Sprungwurffinte	
\nolig{ffinanz}{f finanz}	\nolig{Stoffi}{Stoff i}
% Hoffinanz Kauffinanzierung	\nolig{stoffi}{stoff i}
\nolig{ffistel}{f fistel}	% Rohstoffindustrieller Rohstoffimporte
% Kropffistel	% Baustoffingenieur Kunststoffingenieur
\nolig{ffixier}{f fixier}	% Kohlenstoffisotope
% Dampffixiergerät	\keeplig{stoffiz}
	% Geheimdienstoffiziere
\nolig{hoffing}{hof fing}	\keeplig{stoffig}
% Bischoffinger	% permit ffi ligature for -ig suffix...
\nolig{iffind}{if find}	\nolig{ffidee}{ff idee}
% Tariffindung	% Luftschiffidee
	\nolig{ffinnen}{ff innen}
\nolig{lffing}{lf fing}	% Schiffinnenraum Schiffinnenausbau

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% 6. ffl -> ff-l
% -----

\nolig{Griffl}{Griff|l}
\nolig{griffl}{griff|l}
% Griffhängen Griffflaschen Griffleiste
% grifflos angriffslustig
\nolig{Hofflü}{Hof|flü}
\nolig{hofflü}{hof|flü}
% Hofflügel
\nolig{Offline}{Off|line}
\nolig{offline}{off|line}
% offline, Offline
\nolig{Pfiffl}{Pfiff|l}
% Pfiffhute
\nolig{Scheffle}{Scheff|le}
\nolig{scheffle}{scheff|le}
% scheffle Geldscheffler
\nolig{Schiffl}{Schiff|l}
\nolig{schiffl}{schiff|l}
% Schifflache Schiffladung Schifflinie
\nolig{Stoffl}{Stoff|l}
\nolig{stoffl}{stoff|l}
% lots of words...
\nolig{Treffl}{Treff|l}
\nolig{treffl}{treff|l}
% Trefflokal

\nolig{afflu}{aff|lu}
% Gafflust

\nolig{fflack}{ff|lack}
% Auspufflack
\nolig{fflamell}{ff|lamell}
% Rafflamellen
\nolig{ffland}{ff|land}

% Iffland Rifflandschaft
\nolig{fflast}{ff|last}
% Rohstofflastigkeit Treibstofflaster
\nolig{fflatsch}{ff|latsch}
% Riffhatschern
\nolig{fflieb}{ff|lieb}
% riffhliebend
\nolig{ffloch}{ff|loch}
% Suffloch Griffloch Sauerstoffloch
\nolig{fflöch}{ff|löch}
% Sufflöcher Grifflöcher
\nolig{fflos}{ff|los}
% auspufflos
\nolig{fflung}{ff|lung}
% Stafflung

\nolig{ifflo}{iff|lo}
% Schifflogbuch grifflos Griffloch

\nolig{offlad}{off|lad}
% Sprengstoffladung
\nolig{öffle}{öff|le}
% löffle
%%\nolig{offleck}{off|leck}
%% % Treibstoffleck
%%\nolig{offlief}{off|lief}
%% % Brennstofflieferungen
\nolig{offlo}{off|lo}
% wirkstofflos Sauerstoffloch
% offload

\nolig{taffle}{taff|le}
% staffle

\nolig{ufflad}{uff|lad}
% Suffladen
\nolig{uffläd}{uff|läd}
% Suffläden

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\nolig{luffleck}{luff leck}	% Schleifflüssigkeit}
% Bluffleck	\nolig{fflut}{f flut}
\nolig{üffle}{üff le}	% Brieffluten
% schnüffle büffle trüffle	
\nolig{ufflon}{uff lon}	\nolig{iefflieg}{ief flieg}
% Mufflon	% tieffliegend
	\nolig{iefflog}{ief flog}
	% tiefflog
	\nolig{iefflüg}{ief flüg}
	% Tiefflüge
% 7. ffl -> f-fl	
% -----	
	%%% XXXXXXXXXX
\nolig{ffläch}{f fläch}	
% Laufläche Kampfflächen	\nolig{eiffleck}{eif fleck}
% Zwölfflächner (dodecahedron)	% Schleifflecklein
%%\nolig{fflatt}{f flatt}	
%% % aufflattern	\nolig{fflüg}{f flüg}
\nolig{fflech}{f flech}	% Streifflüge zwölfzügelig
% aufflechten	\nolig{fflut}{f flut}
\nolig{fffleisch}{f fleisch}	% Brieffluten Rückrufflut Anrufflut
% Schafffleisch Kopffleisch	
\nolig{ffflexib}{f flexib}	\nolig{lfflach}{lf flach}
% Tarifflexibilität	% Zwölfflach
\nolig{fflies}{f flies}	\nolig{lffläch}{lf fläch}
% Relieffliesen	% Zwölfflächner zwölfblächig
\nolig{fflimm}{f flimm}	
% Vorhofflimmern	\nolig{pffl}{pf fl}
\nolig{ffluch}{f fluch}	% Sumpffläche Sturzkampfflieger
% Tariffucht Werwolffluch	% Totenkopfflagge Impfflüssigkeit
\nolig{ffluch}{f fluch}	\keeplig{Knoepffl} % Knoepffler
% Tarifflüchtling	
\nolig{ffflug}{f flug}	\nolig{rfflad}{rf flad}
% Tiefflug Kampfflugzeug Cheffflugleiter	% Torffladen
\nolig{fflur}{f flur}	\nolig{rfflasch}{rf flasch}
% Klosterhofflur	% Wegwerfflasche
\nolig{ffluss}{f flus}	
% Prüffluss	\nolig{ufflot}{uff lot}
\nolig{fflüs}{f flüs}	

% Sufflot	% golftä -> caught by lftä rule
	% golftö -> caught be lftö rule
\nolig{wurf1}{wurf 1}	
% Freiwurflinie Maulwurflobbyist Abwurfplast	\nolig{Hanft}{Hanf t}
	% Hanftaler Hanftau
	\nolig{Hoft}{Hof t}
	\nolig{hoft[aähioöruü]}{hof t}
% 8. ft -> f-t	% Hoftor Klosterhoftor
% -----	% hofte -> caught by fte rule
	\nolig{Prüft}{Prüf t}
%%\nolig{ftig}{f tig}	% Prüftechnik Prüfteam
%% % dürftig bedürftig	\nolig{prüft[aähioöruü]}{prüf t}
%%\nolig{ftung}{f tung}	% Prüftheorie
%% % Haftung Stiftung	%%\nolig{prüfte}{prüf te}
\nolig{Auf}{Auf t}	%%\nolig{Schaft}{Schaf t}
\nolig{auft[aähioöruü]}{auf t}	%%\nolig{schaft[aäehioöruü]}{schaf t}
% (viele viele Fälle)	% -tor -tal -
%%\nolig{aufte}{auf te}	\nolig{Schlaft}{Schlaf t}
%% % kaufte kauftest raufte	\nolig{schlaft[aähioöruü]}{schlaf t}
	% Schlaftablette
\nolig{Brief}{Brief t}	\nolig{Schilft}{Schilf t}
\nolig{brief}{brief t}	\nolig{schilft[hiruü]}{schilf t}
% Brieftasche Brieftaube	% Schilfteich Schlilftümpel
\nolig{Cheft}{Chef t}	% schilftä -> caught by lftä rule
\nolig{cheft[a-z]}{chef t}	% schilfte -> caught by lfte rule
% Cheftheoretiker Cheftrainer	% schilfto -> caught by lfto rule
\nolig{Dorft}{Dorf t}	% schilftö -> caught by lftö rule
\nolig{dorft}{dorf t}	\nolig{Senft}{Senf t}
% Dorftrottelt -tratsch -tümpel	% Senftube
\nolig{Fünft[a-zäöü]}{Fünf t} % Fünftagewoche ..	\nolig{Straft}{Straf t}
\nolig{fünft[a-zäöü]}{fünf t} % fünfens...	\nolig{straft[aähioöruü]}{straf t}
	% (viele Fälle)
\nolig{Golft}{Golf t}	\keeplig{straftheit} % Unbestraftheit
% Golfträume -turnier -typ -talent	% strafte -> caught be fte rule
\nolig{golft[hiruü]}{golf t}	\nolig{Surft}{Surf t}
% golfta -> caught by lfta rule	% Surfthema Surftipp
% golfto -> caught be lfto rule	\nolig{Tarift}{Tarif t}

\nolig{tarift}{tarif t}	%% \keeplig{ftepoch}
% Tarifthemen Tariftabelle	%% \keeplig{ftersuch}% Unterkunftersuchung
\nolig{Tieft}{Tief t}	
% Tieftänzer -träumen -tresor -tunnel	\nolig{Elfte}{Elf te}
\nolig{Torft}{Torf t}	\nolig{elfte}{elf te}
\nolig{torft}{torf t}	% elfte elftens
% Torftabletten Torftaucher Torftoilette	\nolig{ölfte}{ölf te}
\nolig{Wurft}{Wurf t}	% zwölfte zwölftens
\nolig{wurft}{wurf t}	
% Wurftalent Wurftaler	\nolig{fft[aähioöruü]}{ff t}
	% Stofftasche Sauerstofftank Stofftheorie
	% Stofftier Stofftiger Stofftisch Tuch
%%\nolig{fte}{f te}	% Auspufftopf Kunststofftonne
%% % schleifte reifte seifte prüfte überprüfte	% Stofftradition Stofftrennung
%% % schaffte hoffte klaffte verpuffte	% Kunststofftube Stoffturnschuhe
%% % vertiefte verbriefte Brieftext	% Stofftäschchen
%% % elfte elftens zwölfte	% Auspufftöpfe Kunststofftöpfe
%% % Fünfte fünfter	% Kunststofftüten
%% % kämpfte schimpfte schrumpfte schöpfen	
%% % durfte bedurfte surfte dürfte schlürfte	%% %% fte -> caught by fte rule
%% % schärfte verschärfte	%% \keeplig{fftheit}% Bekifftheit
%% % abgestufte getaufte häufte unbedarfte	
%% % Schilfteich Dorfteich	
%% \keeplig{Delfte}	
%% \keeplig{Dufte}	\nolig{aftee}{af tee}
%% \keeplig{Hafte} % Haftentlassung	% Schlaftee
%% \keeplig{Krafte} % Kraftersatz	
%% \keeplig{krafte}	\nolig{eiftie}{eif tie}
%% \keeplig{Lufte} % Lufteinlass	% Greiftiefe Steiftier
%% \keeplig{lufte} % Freilufteislauffläche	\nolig{eiftit}{eif tit}
%% \keeplig{Lüfte} % Lüftend	% Eingreiftitel
%% \keeplig{lüfte} % lüften	\nolig{eiftr}{eif tr}
%% \keeplig{älfte} % Hälfte %%%	% Eingreiftruppe Nadelstreifträger
%% \keeplig{schaft} % many words...	
%% \keeplig{Hüftex} % Hüftexartikuliert	\nolig{ftabell}{f tabell}
%% \keeplig{hüftex}	% Ruftabelle
%% \keeplig{ftempf} % duftempfindlich	\nolig{ftafel}{f tafel}
%% \keeplig{ftentl} % haftentlassen	% Pfeiftafel

<code>\nolig{ftag}{f tag}</code>	% Stegreiftheater
% Tauftag Fünftagewoche	<code>\nolig{fthem}{f them}</code>
<code>\nolig{ftalsg}{f talsg}</code>	% Wolfthema
% schaftalsgründig	<code>\nolig{ftheor}{f theor}</code>
<code>\nolig{ftanz}{f tanz}</code>	% -f-theorie -f-theorien
% Kampftanz Schilftanz	<code>\nolig{ftherap}{f therap}</code>
<code>\nolig{ftänz}{f tänz}</code>	% Impftherapie Schröpftherapeut
% Tieftänzer	<code>\nolig{ftick}{f tick}</code>
<code>\nolig{ftari}{f tari}</code>	% Rückruftickets Diskuswurfticket
% Anruftarif	<code>\nolig{ftier}{f tier}</code>
<code>\nolig{ftarn}{f tarn}</code>	% Wegwerftier Huftier inhaftiert
% Wegwerftarnungen	<code>\nolig{ftipp}{f tipp}</code>
<code>\nolig{ftasse}{f tasse}</code>	% Surftipp
% Schürftasse	<code>\nolig{ftirad}{f tirad}</code>
<code>\keeplig{ftassel}</code> % Gruftasseln	% Schimpftirade
<code>\nolig{ftatb}{f tatb}</code>	<code>\nolig{ftisch}{f tisch}</code>
% Straftatbestände	% Schleiftisch
<code>\nolig{ftaten}{f taten}</code>	
% Kampftat Straftaten	<code>\nolig{ftod}{f tod}</code>
<code>\nolig{ftätig}{f tätig}</code>	% Hanftod
% Schürftätigkeit	<code>\nolig{fton}{f ton}</code>
<code>\nolig{ftauch}{f tauch}</code>	% Pfeifton Zwölftonmusik Rufton
% Beruftertaucher Kreislauf-Tauchgerät	<code>\nolig{ftön}{f tön}</code>
<code>\nolig{ftaugl}{f taugl}</code>	% Pfeiftöne Ruftöne
% pruftauglich	<code>\nolig{ftool}{f tool}</code>
<code>\nolig{ftaume}{f taume}</code>	% Prüftool
% Nachruftaumel	<code>\nolig{ftopf}{f topf}</code>
<code>\nolig{ftax}{f tax}</code>	% Schleiftopf Dampf- Auspuff- Schöpf-
% Ruftaxi	<code>\keeplig{ftopfer}</code> % Duftopfer Gift- Haft-
	<code>\nolig{ftorig}{f torig}</code>
<code>\nolig{ftedd}{f tedd}</code>	% schaftorig fünftorig
% Schlafteddy	<code>\nolig{ftour}{f tour}</code>
<code>\nolig{ftemp}{f temp}</code>	% Streiftour
% Schlaftemperatur	
<code>\nolig{fteich}{f teich}</code>	<code>\nolig{fttrad}{f trad}</code>
% Schilfteich Dorfteich	% Ruftraditionen
	<code>\nolig{ftrag}{f trag}</code>
<code>\nolig{ftheat}{f theat}</code>	% tieftragisch auftragsgerecht

\nolig{fträg}{f|träg}
 % Notrufträger
 \nolig{ftrain}{f|train}
 % Lauftrainer
 \nolig{ftränk}{f|tränk}
 % Rückruftränke
 \nolig{ftransp}{f|transp}
 % Hilfsttransport Schaftransport
 \nolig{fträum}{f|träum}
 % tiefträumend
 \nolig{ftrauri}{f|traurig}
 % tieftraurig
 \nolig{ftreff}{f|treff}
 % Notruftreffen
 \nolig{ftresor}{f|tresor}
 % Tieftresor
 \nolig{ftrick}{f|trick}
 % Rückruftricks
 \nolig{ftrieb}{f|trieb}
 % auftriebte schaftriebbig
 \nolig{ftrief}{f|trief}
 % tieftriefend
 \nolig{ftrift}{f|trift}
 % schaftriftig
 \nolig{ftritt}{f|tritt}
 % Huftritte
 \nolig{ftret}{f|tret}
 % Mieftreter
 \nolig{ftrott}{f|trott}
 % Stuftrottell

 \nolig{ftrüb}{f|trüb}
 % tieftrübe
 \nolig{ftrunk}{f|trunk}
 % schlaftrunken
 \nolig{ftrupp}{f|trupp}
 % Prüftruppe

\nolig{ftuch}{f|tuch}
 % Schnieftuch Kopftuch
 \nolig{ftüch}{f|tüch}
 % Schnieftücher
 \nolig{ftürk}{f|türk}
 % tieftürkis
 \nolig{fturm}{f|turm}
 % Wolfturm
 \nolig{ftürm}{f|türm}
 % Wolftürme

 \nolig{ftyp}{f|typ}
 % Schifftyp Stofftyp waldorftypisch
 \nolig{ftyr}{f|tyr}
 % Dorftyrann Hoftyrann
 \nolig{ftwist}{f|twist}
 % Kopftwister

 \nolig{iefta}{ief|ta}
 % Tieftaucher Brieftasche Brieftaube
 \nolig{iefto}{ief|to}
 % Stieftochter Tiefton
 \nolig{ieftö}{ief|tö}
 % Stieftöchter tieftönend
 \nolig{iefttra}{ief|tra}
 % Tieftraumphase

 \nolig{lfta}{lf|ta}
 % elftausend zwölftausend Golftasche
 \nolig{lftä}{lf|tä}
 % elftägig zwölftegig
 \nolig{lfto}{lf|to}
 % Zwölftonmusik Elftonner Golftour
 \nolig{lftö}{lf|tö}
 % zwölfönend
 \nolig{elieft}{elief|t}
 % Relieftäfelchen Relieftropfen Relieftürme

\nolig{nftause}{nf tause}	\nolig{raftüm}{raf tüm}
% fünftausend Fünftausender	% Markgraftümer
\nolig{nftä}{nf tä}	\nolig{rftherap}{rf therap}
% fünftägig	% Wurftherapie
\nolig{nftopf}{nf topf}	\nolig{rftr}{rf tr}
% Senftopf	% Wurftraining Surftrip Freiwurftreffer
\nolig{nftöpf}{nf töpf}	\keeplig{tdurftrö} % Notdurftröhre
% Senftöpfchen	\nolig{rftu}{rf tu}
\nolig{nftor}{nf tor}	% Wurftuch
% fünftorig	\nolig{uftas}{uf tas}
\keeplig{unftor}	% Ruftaste Vorlauftaste Kauftasche
% Zukunftorientiert Herkunftort	\keeplig{Duftas} % Duftaspekte
% Zunftort Zunftordnung	\keeplig{duftas}
\nolig{nfttr}{nf tr}	\keeplig{Gruftas} % Gruftassel
% fünftrimestrig	\keeplig{gruftas}
\keeplig{Brunftr} % Brunftrudel -revier	\keeplig{Luftas} % Luftasket
\nolig{nftü}{nf tü}	\keeplig{luftas}
% fünfturig Senftüte	\keeplig{uftassoz}
\keeplig{nftüb}	% Duftassoziationen Schuftassoziationen
% Vernunftüberlegung Zunftüberlieferung	%%\nolig{üftreib}{üf treib}
\nolig{nftübchen}{nf tübchen} % Senftübchen	%% % Beutelpüftrreiben
\nolig{pft[aähioöruüy]}{pf t}	\nolig{urfta}{urf ta}
% Wettkampftag -trubel	% Wurftalent Auswurfaste Surftalent
% Kampftaktik -truppe -tätigkeit -tänzer	\keeplig{tdurfta} % Notdurftanlage
% wahlkampfartig Wahlkampftöne	\nolig{urfto}{urf to}
% Schnupftabak -tuch -tücher -tüchlein	% Freiwurftor Surftour
% Schimpftiraden Mehrkampftitel Stapftiefe	
% Dampftopf Sumpftour Herzklopftöne	% 9. fb -> f-b, fh -> f-h, fk -> f-k
% Kopftreffer -tuch -tücher Zopfträger	% -----
\keeplig{pftheit}	
% Gedämpftheit Umkämpftheit	% Disable these ligatures globally.
\nolig{raftum}{raf tum}	% I can't think of a single *German* word
% Burggraftum	% for which these ligatures would not
	% cross a morpheme boundary.

```

\nolig{fb}{f|b}
\nolig{fh}{f|h}
\nolig{fk}{f|k}
% However, there are names of *non-German*
% origin for which the 'fk' ligature
% shouldn't be suppressed:
\keeplig{Kafka}
\keeplig{kafka}
\keeplig{Piefke}
\keeplig{Safka}
\keeplig{Potrafke}
\keeplig{Sprafke}
\keeplig{Shirafkan}
\keeplig{Tirafkan}
\keeplig{Selfkant}

% 10. fj -> f-j
% -----

% Suppress this ligature globally -- Words of
% German origin only seem to feature 'fj'
% across morpheme boundaries.

\nolig{fj}{f|j}
% aufjauchzen aufjaulen fünfjährig Kampfjet
% Strafjustizgebäude Dorfjugend Kopfjäger ...

% Once more, though, there are some words of
% *non-German* (e.g., Nordic and Slavic)

% origin for which the 'fj' ligature should
% not be suppressed. Use \keeplig macros to
% treat such cases.
\keeplig{fjord} % Norwegian
\keeplig{fjör} % Icelandic, e.g.,
% Isafjörður and Ísafjörður
\keeplig{Ísafjarðarbær} % city in Iceland
\keeplig{fjell} % Norwegian
\keeplig{fjall} % Swedish (?)
\keeplig{fjäll}
\keeplig{fjöll}

\keeplig{Prokofjew}
\keeplig{Sufjan} % Stevens
\keeplig{Eefje} % Dutch first name
\keeplig{Astafjew}
% Author (Wiktor) and soccer player (Maksim)

% 11. fff -> ff-f
% -----

% Just in case there's a font that
% features a triple-f ligature:

\nolig{fff}{ff|f}
% griffest Stofffarbe Schiffahrt

% This macro will also break up any 'fffl'
% ligatures into 'ff' and 'fl' parts.
% Examples: Sauerstoffflasche Stofffleck
% Schlifffläche Kunststoffflügel

```

E Reporting bugs and other issues with the selnolig package: A suggested template

```
% !TEX TS-program = lualatex
% selnolig-bugreport.tex, 2013/01/22

\documentclass{article}
\usepackage[margin=1in]{geometry}
\usepackage{fontspec}
% Choose a different font if desired:
\setmainfont{EB Garamond 12 Regular}

% Comment out the next instruction if you don't use babel;
% and set the language version that meets your needs.
\usepackage[ngerman]{babel}

% Choose either ngerman or english as the language option
\usepackage[ngerman]{selnolig}

\begin{document}
\paragraph*{Version of selnolig package used:}
\selnoligpackageversion, \selnoligpackagedate % defined in selnolig.sty

\subsection*{Type-I errors: Words for which ligatures are incorrectly not being suppressed}

List words here

\subsection*{Type-II errors: Words for which ligatures are suppressed incorrectly}

List words here

\subsection*{Other issues}

Examples: problems with user guide; problems caused by the package's lua code

(and, please, suggestions for bug fixes)
\end{document}
```