

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

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2012/12/21

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 “discretionary” and “historic” ligatures.

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

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^{*}Current version: 0.167. Features of this package are subject to change without prior notice. The main text fonts used in the present user guide 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). In this document, both “common” and “discretionary” ligatures are enabled for these two fonts.

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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) beginning 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 typographic ligatures selectively for English language documents generally does not appear to be an enormously pressing 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 f-f, f-l, and f-i (and other such character pairs and triples) across morpheme boundaries. In German typography, the use of ligatures across morpheme boundaries is considered something to be avoided at (nearly) all cost, probably because ligatures that span morphemes have the potential to impair seriously the intelligibility of these words.¹ Words such as elffack and kopflos (containing ff- and fl-ligatures) simply look wrong to a German reader; they should be typeset as elffack 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 L^AT_EX package that (i) specifies a list of word patterns and entire words for which ligatures should be suppressed and (ii) systematically discovers all instances of these words in a document and applies the non-ligation rules automatically. 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 attempts to make it fairly easy for users to provide additional 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` (or `ft`) and `fft` ligatures. The latter two ligatures, while not provided by the Computer Modern font family, are available frequently in “oldstyle” or “Garamond” 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 `hd1ig`. 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*, *fjell*, *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 additional 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 *Hoefer Text* report having “only” discretionary ligatures, whereas *Junicode*, *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”.

³ If 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 `broadf` option; see [Section 6.2.1](#).
 - If the font you use for your document also provides “historic” and/or “discretionary” ligatures (e.g., `ct`, `st`, `sp`, *th*, *as*, *is*, *us*, etc.), you should also specify the `hdlig` option (in addition to the `english` option, of course) when loading the `selnolig` package.⁴
- 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 have no effect on the appearance of your document—unless you specify various `\nolig` macros on your own.

⁴If the `selnolig` package is loaded *after* the `fontspec` package, a macro is run to inquire if historic and/or discretionary ligatures are enabled; if the answer is yes, the `hdlig` option is enabled automatically.

2.2 Any hints on how to get started with Lua^ATeX?

The ligature suppression macros of the `selnolig` package *require* the use of the Lua^ATeX format. They will *not* work with pdf^LTeX or X^LTeX. One can load the `selnolig` package under either pdf^LTeX or X^LTeX, but then only the package’s hyphenation exception patterns will be loaded; the ligature suppression macros won’t be loaded because they are based on lua code. If it’s not run under Lua^ATeX, the `selnolig` package will issue a warning message to the effect that its ligature suppression macros won’t be running, but it will not terminate prematurely.

The requirement to use Lua^ATeX will likely force you to make some changes to the preambles of your existing ^LTeX 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^LTeX. Almost all documents that compile correctly under pdf^LTeX 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 `fontspec` package isn’t loaded by the time the `\begin{document}` statement is encountered, `selnolig` will terminate with an error message. It is recommended (but not required) that you load `selnolig` *after* `fontspec` and the latter package’s font- and ligature-related commands.

Of course, you’ll also need to use a T^EX distribution that includes a fairly recent version of Lua^ATeX. T^EXLive 2012, MacT^EX 2012, and MiK^TEX 2.9 all satisfy this requirement. The version of Lua^ATeX distributed with T^EXLive 2011 is probably sufficiently recent to meet the package’s requirements, but the version distributed with T^EXLive 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 T^EX 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 T^EX 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^LTeX 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 \LaTeX but are new to Lua \LaTeX . Another great resource for people who would like to become more familiar with Lua \LaTeX is [A Guide to Lua \$\LaTeX\$](#) , written by Manuel Pégourié-Gonnard.

2.3 Anything else I need to do or know?

For multilingual support, Lua \LaTeX 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 additional 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 \LaTeX natively supports the so-called UTF-8 input encoding. The `selnolig` package assumes that users make full use of this feature. In particular, if your document is in German, it is assumed that all vowels with diereses (Umlaute) are entered as `ä`, `ö`, and `ü` rather than 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`.⁵

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

Finally, all `babel`-style `"|` ligature-suppressing shortcut instructions should either be removed entirely or replaced with `\breaklig` instructions. On my Lua \LaTeX 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.⁶ Without their expertise in programming in Lua and interfacing the lua code with \LaTeX , 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 bugs, pointing out unclear passages in the user

⁵Strictly speaking, the use of the input characters with “built-in” diereses is required only 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).

⁶See 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>.

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 and other improvements. Steffen 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 detection patterns for linguistic adequacy and (relative) completeness. [Still to come: a brief summary of what Felix and Steffen have found, and a reference or two to their published work.] They wish to thank the Institut für Maschinelle Sprachverarbeitung at the Universität Stuttgart for granting them a license for the morphological analysis tool SMOR and, in particular, Helmut Schmid for his guidance and the *Web-as-Corpus kool ynitiative* (*WaCky*) for letting them use the SdeWaC corpus.⁷ They also thank Rajesh Bhatt (University of Massachusetts–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.⁸

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 " |` 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”.

⁷M. Baroni, 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): 209–226.

⁸All versions of `rmligs` are archived at <http://www.j3e.de/ispell/igerman98/dict/>. A slightly modified version of the `rmligs` package’s test file, now called `rmligs-testfile.tex`, is included among the ancillary files distributed with the `selnolig` package.

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-german-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-german-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.⁹

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

⁹The two “test” files also load the package `showhyphens` to indicate automatically all instances where `Lua®TeX` might insert hyphenation points.

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

instructs Lua¹⁰TeX 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.¹⁰

It is possible to use “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 instruction

```
\nolig{Auf1[aäeioöuü]}{Auf|1}
```

to search for words that start with `Auf1` followed by a vowel.¹¹ Incidentally, it is not absolutely necessary, in the second argument of the `\nolig` command, to provide any material *after* the vertical bar. However, the readability of the `\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{ffa11}{f|fa11}`. This redundancy is there by design, because not all words that might fit the first pattern will also fit the second pattern, and vice versa. Building in some redundancy 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{<word-fragment>}
```

lets users override `\nolig` instructions, by specifying words and word fragments for which typographic ligatures should *not* be suppressed anywhere in the document. For a `\keeplig` macro to work properly, its argument should be a word (or word fragment) that includes as

¹⁰For instance, one *could* specify `\nolig{Auf1aufform}{Auf|1auf|form}` to suppress both the fl and the ff ligature in this word. As I note in [Section 7.2](#), the `selnolig` package actually uses two separate `\nolig` commands to treat the ligatures in `Auflaufform`.

¹¹This particular search string is used in order not to catch the abbreviated word “Aufl.,” which does *not* get its fl-ligature suppressed.

a subset words (or word fragments) treated by `\nolig` instructions. It is permissible to use lua-type wildcard characters in the argument of `\keeplig`.

Having the `\keeplig` macro is very useful because it allows us to specify simpler, i.e., less restrictive, `\nolig` instructions: Any Type-II errors that may arise from having a slightly-too-broad `\nolig` macro 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 the words *brieflich*, *tariflich*, *trefflich*, *hilfflich*, *verwerfflich*, *berufflich*, *sträfflich*, *höfflich*, *glimpflich*, *unerschöpflich*, *Lauflicht*, and *begrifflich*—and quite a few more words too. This macro is, unfortunately, 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 plethora of slightly more restrictive `\nolig` macros just to avoid including the *Pflicht*- and *pflicht*-words, the package provides the commands

```
\keeplig{Pflicht}  
\keeplig{pflicht}
```

to override the action of the `\nolig{flich}{f|lich}` instruction for words that contain these two word fragments. Recall that the argument of `\keeplig` is case-sensitive; hence, two `\keeplig` instructions are needed.

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 two `\keeplig` commands stated in the preceding paragraph are themselves a bit too broad because they also affect the typesetting of the composite word *Sumplicht* (swamp light), for which the fl-ligature *should* be suppressed. To address this case, the file `selnolig-german-patterns.sty` provides the macro

```
\nolig{Sumplicht}{Sumpf|licht}
```

Observe that we make use of the case sensitivity in the final `\nolig` instruction in order to avoid having it apply to words such as “*Visumplicht*” (visa requirement).

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*.¹²

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

¹²To 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” (Stammwörter) are joined together: rooftop/rooftop, newspaper/newspaper, Schilffeld/Schilffeld, Brieftaube/Brieftaube;
- between a prefix and main word: mißtrußt/mistrust, dißplay/display, aufleben/aufleben, auftun/auftun; and
- between a main word and a suffix: shelfful/shelfful, dwarflike/dwarflike, kopflos/kopflos, and Zöpflein/Zöpflein.

For German words, the following exceptions and adjustments apply:¹³

- 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: Schilfinsel, 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 words schweflig (sulfurous), teuflisch (devilish), and Verzweiflung (despair) have their fl-ligatures suppressed even though in each case the f and l characters belong to the same underlying morpheme, viz., Schwef(e)l, Teuf(e)l, and Zweifel(e)l. For these words, the morphemological suffixes are clearly -ig, -isch, and -ung, rather than -lig, -lisch, and -lung.

Nevertheless, usage for these and similar cases is *not* to employ the fl-ligature. To the best of my understanding, this convention may be based on the fact that these cases all involve the elision of the e character between the f and l characters of the associated morphemes. The non-use of the fl-ligature may thus represent a subtle (possibly very subtle) nod towards how the associated morphemes would be written *if* the e character weren’t being elided. The fact that the syllables within these words all happen to be divided between the f and l characters may be a coincidence rather than the primary reason for this typographical practice.

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

- If a word could *end* with an fl-ligature even though the f and l technically belong to different morphemes (say, because of an abbreviation that’s in effect), the fl-ligature *is* used. E.g., one writes Aufl. *with* an fl ligature. But, when spelled out, the word should be typeset as Auflage.

¹³These adjustments are culled from the rules stated in the *Duden* and various websites that have taken an interest in this subject.

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 might also seem to imply that the ft and ff ligatures may (should?!) be used if they occur at the very ends of words and word fragments—e.g., geschärft, Unbedarftheit, and erschafft—but that they should be suppressed when -f-te, -f-ten, -f-tes, etc. suffixes are involved—e.g., gestreifte, schlürftest, and rafften. I make this analogy because these suffixes all form syllables starting with a t. Note, though, my deliberate use of the locution “seem to imply” at the start of this paragraph: I have *not* encountered so far any kind of authoritative discussion of this particular typographical concern. For now, the selnolig package *does* break up the ft and ff ligatures if the words include suffixes that are syllables in their own right and start with “te”.

- Here's a separate case for which I have not yet found a clear rule. If a word's main 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 them as 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 thus *not* use the ft-ligature, i.e., to typeset them as saftig and luftig. For now, the selnolig package implements the former option. As already noted, however, I haven't found any clear references so far on how to treat this case. Guidance on this typographical issue would be much appreciated.

6 Package options, Additional ligature-related issues

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.¹⁴ The same goes for the `fl` (`ffl`) ligature in words that end in `f` (`ff`) followed by `-ly`.¹⁵ 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.

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.

¹⁴Examples of such words are *surfing*, *oafish*, *leafier*, *goofiest*, *fluffily*, and *goofiness*.

¹⁵Examples are *aloofly* and *gruffly*.

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 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.¹⁶ Among the words for which I’ve noticed hyphenation patterns that need to be fixed are (with `babel`’s incorrect hyphenation points) *Kau-f-in-dex*, *Lau-f-in-dex*, *Schif-fer-b-art*, *Schil-fin-sel*, and *Schil-f-feld*.

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`.¹⁷

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.

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

¹⁶As was already noted earlier, the `selnolig` package is also compatible with the `hyphsubst` package.

¹⁷I am obviously not trying to make it too easy to invoke this option ...

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. Software can't "know" on its own which one of the two possible meanings 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\keeplig{fl}aden` and `Wachs\breaklig tube`.

6.4 Providing additional ligature suppression patterns

As already noted, it's not possible to 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 by the rules set up by the package's files, it is straightforward to create one or more new non-ligation rules to deal with the cases you've discovered.

Suppose, say, that you're preparing a special edition of Thomas Mann's novel "Der Tod in Venedig"—using an "Antiqua" (Roman) font since fewer and fewer people nowadays can manage to read text set in a period-appropriated **blackletter** font with ease—and notice that the `selnolig` package does not appear to include a macro to suppress the unwanted `ffl`-ligature in the word "inbegriffleitend".¹⁸ To rectify 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 "Jugendtreffeiter" 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`, `Jugendtreffeiter`, and `Kunststoffleitung`.

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.¹⁹

¹⁸This word really does occur in the aforementioned novel!

¹⁹I 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.

For instance, suppose that you are typesetting a Turkish text, which features both a dotted (“normal”) and a dotless i. I understand that in Turkish typesetting practice, *no* fi and ffi ligatures should be employed, in order not to obscure which “i” character is being used. However, other f-ligatures may presumably be used without causing readability and intelligibility concerns. To address this need, one could issue the command

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

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}
```

In fact, these commands are provided automatically if the package’s `ngerman` option is set.²⁰ 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 Kaffka. 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

²⁰These four macros are also enabled if the `selnolig` package’s `english` and `broadf` options are set.

ligature for the last two characters of that triple.²¹ 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.²²

6.6.1 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 festiness?* or that of *Do fast festive fists foster festiness?*

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*.²³ For such

²¹To 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, T_EX 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*).

²²For the Garamond Premier Pro text font, I've discovered the following peculiar exception to the general rule that T_EX always gives precedence to a ligature for the first two characters of a character triple: for the character triple *fis* (as in *first* and *fish*), T_EX 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 *first* and *fish*; hence, they'll be rendered as *first* and *fish*, respectively. Note that if the `breadf` option was set, this setting implies that words such as *deafish*, *dwarfish*, *elfish*, *oafish*, *selfish*, *unselfish*, *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 `breadf` option is not in effect, the *fi* and *ffi* ligatures will automatically preempt the *is* ligature in these words.

²³This case was already noted in [Footnote 21](#), 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.

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:²⁴

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

6.6.2 Ligatures for *as*, *is*, and *us* that pre-empt an *st* 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 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 *cusps*. [Still need to figure out the following: Why isn't the *sp* lig shown in *clasp* and *lisp* in this list, even though the *as* and *is* lig are being used and hence can't be pre-empting the *sp* lig?!

6.6.3 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*.²⁵ Given the prevalence and 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 *boathook*, 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, fortunately, can be

²⁴Be 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.

²⁵A longer list of words for which the *at* ligature pre-empts the *th* ligature is given in the ancillary document `selnolig-english-test.pdf`.

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 hence the use of the *et* ligature would 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.²⁶

6.6.4 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*.²⁷ Because of the apparent paucity of such cases, I have decided for now not to provide specific ligature suppression rules to handle them.

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.²⁸ As such, the *et*-related ligature suppression rules already in place, which are set up 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.

²⁶Note 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.

²⁷It'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.

²⁸Examples are *betake*, *betatter*, *bristletail*, *caretaker*, *cheetah*, *detach*, *detail*, *detain*, *dovetail*, *foretaste*, *horsetail*, *pretake*, *pretax*, *retable*, *retack*, *retard*, *retarget*, *timetable*, *whitetail*, and *wiretap*. Incidentally, the author of the `selnolig` package has a slight preference for seeing his surname typeset as *Loretan* rather than as *Loretan*...

1. The `\nolig` search-and-nolig-whatsit-insertion patterns do not appear to work properly on the final word in the argument of a command (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 command’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` search-and-insert patterns 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—the 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 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” instruction, such as `\vphantom{x}`, also works.

I’m not sure if the following matter constitutes a bug or “just” 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 with more than one ligature suppression point are found. 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
```

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

Having the commands `\debugon` and `\debugoff` could be useful if you’re writing your own `\nolig` and `\keeplig` commands and discover some ligature suppression problems which occur only in a small subset of your document. By bracketing this subset with a pair of `\nolig` and `\keeplig` commands, you limit the writing of debugging-related information to the `.log` file, making the amount of information you’ll need to plow through hopefully be quite manageable.

7.3 Suspending and restarting the operation of `selnolig`’s macros

By default, `selnolig`’s macros are switched on if the package is loaded. If you want to suspend their operation at some point in the document, you may issue the command

```
\selnoligoff
```

Conversely, if `selnolig`’s macros need to be switched back on, you should issue the command

```
\selnoligon
```

Incidentally, encasing a `\selnoligoff` instruction inside a T_EX “group”—something that’s delimited by a pair of curly braces or by `\bgroup` and `\egroup` statements—will *not* switch `selnolig`’s macros back on after the end of the T_EX group is reached. This is because `selnolig`’s main lua function is implemented as a callback routine. Adding this lua function to and removing it from the callback list, which is what `\selnoligon` and `\selnoligoff` do, is not affected by T_EX groups. That’s why it’s necessary to issue a `\selnoligon` command to switch `selnolig`’s macros back on.

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 `selnolig-german-wordlist.tex` and `selnolig-english-wordlist.tex`.²⁹ 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 `selnolig-german-test.tex` and `selnolig-english-test.tex` are “driver programs” that load the `selnolig` package and then run it on the respective lists of German- and English-language words. To compile the driver programs, be sure to use Lua^AT_EX because they make use of the `selnolig` package.

²⁹I started the list of German language words with the examples provided by the `rmligs` script, but have come up with quite a few more words since then.

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{0.167}
\def\selnoligpackagedate{2012/12/21}

% 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}[2012/12/21]

\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 package's hyphenation    }
\typeout{ exception patterns will be loaded.      }
\typeout{=====}
\fi

```

```

% A couple of ancillary macros to check if various
% ligature features (specifically: liga, clig, rlig,
% hlig, and dlig) are available and/or enabled for
% the text font that's in use.
% These macros are courtesy of Clemens Niederberger; see
% also http://tex.stackexchange.com/a/82443/5001.
\ifluatex
  \ExplSyntaxOn
  \cs_new_eq:NN \IfFontFeatureExists \fontspec_if_feature:nTF

  \cs_new:Npn \mico_fontfeature_if_active:nTF #1
    { \tl_if_in:NnTF \l_fontspec_rawfeatures_sclist { #1 } }

  \cs_new_eq:NN \IfFontFeatureActive \mico_fontfeature_if_active:nTF
  \ExplSyntaxOff
\fi

```

```

% If the 'fontspec' package isn't loaded by the time
% LaTeX executes the '\begin{document}' directive,
% 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@hdligset\@hdligsetfalse
\DeclareOption{hdlig}{\@hdligsettrue}

% 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}

% Check if 'historic' and/or 'discretionary' ligatures
% are enabled; if yes, set '@hdligset' to 'true'.
% Perform this test only if fontspec is already loaded.

\ifluatex
  \@ifpackageloaded{fontspec}{%
    \IfFontFeatureActive{hlig}{\@hdligsettrue}{}
    \IfFontFeatureActive{dlig}{\@hdligsettrue}{}{}}
\fi

```

```
% The 'basic' option automatically sets the preceding
% Booleans to 'false', even if historic and/or
% discretionary ligatures were enabled by 'fontspec'
```

```
\DeclareOption{basic}{\@broadfsetfalse\@hdligsetfalse}
```

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

```
\DeclareOption{all}{%
  \@englishtrue \@broadfsettrue \@hdligsettrue
  \@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{ enableselnolig() }
  }

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

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

  % Record operations of selnolig 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-hyphex}
  \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: 2012/12/21
--
-- 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 keeplog: "..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)
    nolog[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}%
[2012/12/21]

% 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) ffl -> ff-l

\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) ffl -> 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{sthol}{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{l}{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 antispeculative
\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}%
[2012/12/21]

% 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)

% 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{Briefff}{Brief|f}

\nolig{brieff}{brief|f}
% Brief-f... (viele Fälle!)
\nolig{Cheff}{Chef|f}
\nolig{cheff[aäeioöruü]}{chef|f}
% Cheffahrer Cheffront ...
\nolig{Dorfff[aäeiloöruü]}{Dorf|f}
\nolig{dorfff[aäeiloöruü]}{dorf|f}
% (viele Fälle!)
\nolig{Hanff}{Hanf|f}
\nolig{hanff}{hanf|f}
% Hanffasern Hanffeld
\nolig{Huffach}{Huf|fach}
\nolig{huffach}{huf|fach}
% Huffachmann huffachmässig
\nolig{Golff}{Golf|f}
\nolig{golff}{golf|f}
% (viele Fälle!)
\nolig{Kampff}{Kampf|f}
\nolig{kampff}{kampf|f}
% kampffertig Kampffigur
% Kampffuchs Kampffüse
\nolig{Kopff[aäeiloöruü]}{Kopf|f}
\nolig{kopff[aäeiloöruü]}{kopf|f}
% (viele Fälle!)
\nolig{Pff}{Pfψf}
\nolig{pff}{pfψf}
% (viele Fälle!)
\nolig{Schilff}{Schilf|f}
\nolig{schilff}{schilf|f}
% Schilffeld Schilfflöte Schilffloß
```

<code>\nolig{Schlaffenst}{Schlaf fenst}</code>	<code>% auffährt lauffähig</code>
<code>% Schlaffenster</code>	<code>\nolig{ffahn}{f fahn}</code>
<code>% (Can't be abbreviated further without</code>	<code>% Totenkopffahne Dorffahne Wahlkampffahnen</code>
<code>% creating lots of Type-II errors.)</code>	<code>\nolig{ffahr}{f fahr}</code>
<code>\nolig{Senff}{Senf f}</code>	<code>% Schifffahrt Schleiffahrt Tariffahrplan</code>
<code>\nolig{senff}{senf f}</code>	<code>\nolig{ffall}{f fall}</code>
<code>% Senffabrik senffleck</code>	<code>% Anruffallen auffallen Straffall</code>
<code>\nolig{Tariff}{Tarif f}</code>	<code>% Tariffalle Streiffall Staffall</code>
<code>\nolig{tariff}{tarif f}</code>	<code>\keeplig{offallee}</code>
<code>% (viele Fälle!)</code>	<code>% Oppenhoffallee</code>
<code>\nolig{Tieff}{Tief f}</code>	
<code>\nolig{tieff}{tief f}</code>	<code>\nolig{ffäll}{f fäll}</code>
<code>% (viele Fälle!)</code>	<code>% straffällig unauffällig</code>
	<code>\nolig{ffält}{f fält}</code>
<code>\nolig{auff}{auf f}</code>	<code>% fünffältig</code>
<code>\nolig{Auf}{Auf f}</code>	<code>\nolig{ffant}{f fant}</code>
<code>% Hundreds (thousands?) or words that start</code>	<code>% Schleiffantasie</code>
<code>% with or contain auf-, Auf-f-, Kauf-f-,</code>	<code>\nolig{ffami}{f fami}</code>
<code>% and Lauf-f-.</code>	<code>% Zwölffamilienhäuser</code>
<code>% We do need to provide a few \keeplig</code>	<code>\nolig{ffarb}{f farb}</code>
<code>% macros to deal with some surnames and</code>	<code>% Zwölffarbenmaschine zwölfarbig</code>
<code>% some words of French origin.</code>	<code>\nolig{ffärb}{f färb}</code>
<code>\keeplig{Stauffach} % Stauffacher</code>	<code>% Kopffärbung</code>
<code>\keeplig{Stauffer}</code>	
<code>\keeplig{chauffier}</code>	<code>\nolig{ffeinde}{f feinde}</code>
<code>\keeplig{Chauffier}</code>	<code>% -feinde</code>
<code>\keeplig{chauffeur}</code>	<code>\nolig{ffeindl}{f feindl}</code>
<code>\keeplig{Chauffeur}</code>	<code>% -feindlich</code>
	<code>\nolig{ffeindsch}{f feindsch}</code>
<code>\nolig{affris}{af fris}</code>	<code>% -feindschaft</code>
<code>% Schlaffrisur</code>	<code>\nolig{ffeld}{f feld}</code>
	<code>% Prüffeld Schilffeld Kampffeld</code>
<code>\nolig{ffabri}{f fabri}</code>	<code>\keeplig{ffeldien} % Schnüffeldienst</code>
<code>% Strumpffabrik</code>	<code>\keeplig{offeldru} % Kartoffeldruck</code>
<code>\nolig{ffäch}{f fäch}</code>	
<code>% Briefeffächer</code>	<code>\nolig{ffestl}{f festl}</code>
<code>\nolig{ffäh}{f fäh}</code>	<code>% Straffestlegung</code>
<code>% hoffähig kampffähig</code>	<code>\nolig{ffestsp}{f festsp}</code>

% Hoffestspiele Dorffestspiel	\nolig{ffrank}{f frank}
\nolig{ffetz}{f fetz}	% Fünffrankenstück
% Brieffetzen Stofffetzen	\nolig{ffried}{f fried}
\nolig{ffeue}{f feue}	% Dorffrieden Dorffrieden
% Dorfffeuerwehr Torfffeuer Laufffeuer	\nolig{ffrist}{f frist}
\nolig{ffirm}{f firm}	% Prüffrist Ablauffrist
% Brieffirmen Tariffirmen	\nolig{ffrosch}{f frosch}
\keeplig{affirm}	% Pfeiffrosch
\keeplig{Affirm}	\nolig{ffrösch}{f frösch}
	% Pfeiffrösche
\nolig{ffolg}{f folg}	
% Impffolgen	\nolig{ffund}{f fund}
\nolig{ffond}{f fond}	% Brückenkopffundament
% Tariffondslösung	\keeplig{iffund}
\nolig{fförd}{f förd}	% diffundieren
% ruffördernd kreislauffördernd schlaffördernd	\nolig{fführ}{f führ}
\nolig{fform}{f form}	% Kampfführung aufführen
% Kopfform Gugelhupfform aufformen	\nolig{ffunk}{f funk}
\nolig{fförm}{f förm}	% Brieffunktion Abruffunktion
% reifförmig schweifförmig	\nolig{ffürst}{f fürst}
\nolig{fforsch}{f forsch}	
% Schlafforschung Impfforschung	\nolig{haffell}{haf fell}
	% Schaffell (Vorsicht: Staffellauf...)
\nolig{ffracht}{f fracht}	
% Dampffrachter	\nolig{iffront}{if front}
\nolig{ffrag}{f frag}	% Tariffront
% Streiffragen	
\nolig{ffrau}{f frau}	\nolig{lffach}{lf fach}
% Hoffrau Kauffrau	% elffach zwölffach
\nolig{ffregat}{f fregat}	
% Kampffregatte Dampffregatte	\nolig{nffach}{nf fach}
\nolig{ffrei}{f frei}	% fünffach
% tariffrei Schlaffrei	
\nolig{ffreq}{f freq}	\nolig{offront}{of front}
% Schlaffrequenz	% Hoffront
\nolig{ffreu}{f freu}	\nolig{opffris}{opf fris}
% Straffreude Brieffreund	% Topffrisur Zopffrisur

<code>\nolig{pffach}{pf fach}</code>	% Pfürnhalt Pfürnstitution Prüfintervall
% Strumpffach	<code>\nolig{chafi}{chaf i}</code> % Schaf-i...
<code>\nolig{pffest}{pf fest}</code>	% Schafimperium Schafinnereien
% Klopffestigkeit tropffester	<code>\nolig{chlafi}{chlaf i}</code> % Schlaf-i-...
<code>\nolig{pffels}{pf fels}</code>	% Schlafiglu schlafinduzierend
% Hirschkopffelsen	
<code>\nolig{pffont}{pf font}</code>	<code>\nolig{fimp}{f imp}</code>
% Dampffontäne	% Torfimporte Kaufimpuls
<code>\nolig{pffront}{pf }</code>	<code>\nolig{findex}{f index}</code>
% Kampffront	% Kaufindex Pfandbriefindex
<code>\nolig{pffüh}{pf füh}</code>	<code>\nolig{finfo}{f info}</code>
% Kampfführung	% Tarifinformation Telefoninformation
<code>\nolig{pffüll}{pf füll}</code>	<code>\nolig{fingenieur}{f ingenieur}</code>
% Dampffüllung	% Prüffingenieur Kaufingenieur
	<code>\nolig{finsel}{f insel}</code>
<code>\nolig{rafford}{raf ford}</code>	% Schafinsel Schilfininsel
% Strafforderung	<code>\nolig{finstru}{f instru}</code>
<code>\nolig{rifford}{rif ford}</code>	% Zupfinstrumente Schleifinstrument
% Tarifforderung	% Greifinstrument
% take care not to catch "Clifford"...	<code>\nolig{finsuff}{f insuff}</code>
	% Kreislaufinsuffizienz
<code>\nolig{üffach}{üf fach}</code>	<code>\nolig{fintrig}{f intrig}</code>
% Prüffach	% Briefintrige Hofintrige
% 2. fi -> f-i	<code>\nolig{pfindu}{pf indu}</code>
% -----	% Strumpfindustrie
	<code>\nolig{pfindu}{pf indu}</code>
<code>\nolig{Chefi}{Chef i}</code>	% Wahlkampfinstitution
<code>\nolig{chefi}{chef i}</code>	
% Chefideologe Chefindianer Chefinformatiker	<code>\nolig{ufindi}{uf indi}</code>
<code>\nolig{Kampf}{Kampf i}</code>	% Kaufindices Laufindizes
<code>\nolig{kampf}{kampf i}</code>	% Vorlaufindikatoren
% Kampfideologie Kampfinstrument	<code>\nolig{ufinter}{uf inter}</code>
<code>\nolig{Dorfi}{Dorf i}</code>	% Kaufinteresse
<code>\nolig{dorfi}{dorf i}</code>	<code>\nolig{ufiss}{uf iss}</code>
% Dorfidylle Dorfinformation Dorfinstitute	% aufisst
<code>\nolig{rüfi}{rűf i}</code>	

% 3. fl -> f-1

% -----

\nolig{aufl}{auf|l}

\nolig{Aufl[aäeioöuü]}{Auf|l}

% Hundreds (thousands?) of words ...

% Mustn't do \nolig{Aufl}{Auf|l} b/c

% of "Aufl." (abbrev. *with* ligature!)

\keeplig{bauflä} % Anbaufläche

\keeplig{Bauflä} % Anbaufläche

\keeplig{hauf Flug} % Schauflug

\keeplig{hauf lüg} % Schauflüge

\keeplig{nauf lut} % Donauflut

\keeplig{lauflüg} % Blauflügel (Libelle)

\nolig{Chef l}{Chef|l}

\nolig{chef l}{chef|l}

% Cheflieferant -limousine -lobbyist -los

\keeplig{schef flock} % Ascheflocken...

\nolig{Dorf l}{Dorf|l}

\nolig{dorf l}{dorf|l}

% Dorf Laden Dorf Lage Dorfleitplan

\nolig{Huf latt}{Huf|latt}

\nolig{huf latt}{huf|latt}

% Huf lattich huf lattichartig

\nolig{Kampf l}{Kampf|l}

\nolig{kampf l}{kampf|l}

% Kampf lärm Kampf luftschiff

\nolig{Kopf l[aäeioöuü]}{Kopf|l}

\nolig{kopf l[aäeioöuü]}{kopf|l}

\nolig{Köpf l[aäeioöuü]}{Köpf|l}

\nolig{köpf l[aäeioöuü]}{köpf|l}

% Dutzende (Hunderte?) von Worten...

\nolig{Prüf l}{Prüf|l}

\nolig{P~~r~~ü~~f~~ l}{P~~r~~f~~ü~~|l}

% P~~r~~ü~~f~~labor P~~r~~f~~ü~~äst P~~r~~f~~ü~~ampe

\nolig{Schaf l}{Schaf|l}

\nolig{schaf l}{schaf|l}

% Schafleder Schaf laus Schafleber

\nolig{Tarif l}{Tarif|l}

\nolig{tarif l}{tarif|l}

% lots and lots of words...

\nolig{af lied}{af|lied}

% Schlaf lied

\nolig{af los}{af|los}

% straf los schlaf los

\nolig{af lück}{af|lück}

% Straflücke

\nolig{ampf lin}{ampf|lin}

% krampf lindernd

\nolig{äuf le}{äuf|le}

% Häuflein träu fle

\nolig{euf le}{euf|le}

% verteu fle

\nolig{flage}{f|lage}

% Rohstoff lager Straflager Auflage

\keeplig{siflage}

% Persiflage -persiflage

\nolig{flähm}{f|lähm}

% Kehlkopf lähmung

\nolig{fland}{f|land}

% Hof land Kaufland Sumpfland Tiefland

% Straflandesgericht Dorf landwirtschaft

\keeplig{flandern} % Ostflandern

\keeplig{flandrisch}

\nolig{fländ}{f|länd}

% hof ländlich Sumpfländer Tiefländer

\nolig{fläng}{f|läng}

% Straflänge Rumpflänge Lauflänge

\nolig{flauf}{f|lauf}

% schief laufen Auf lauf Brief lauf

\nolig{fläuf}{f|läuf}

% schiefläuft Hofläufer Strafläufe
 % Prüfläufe Aufläufe Tiefläufer
 \nolig{flaun}{f|laun}
 % Kauflaune Wurflaune Kampf-laune

 \nolig{fleb}{f|leb}
 % Hofleben Kopfleben Druckkopflebensdauer
 \keeplig{huffleb}
 % shuffleboard
 \nolig{flehr}{f|lehr}
 % Dorflehrer Eislauflehrerin
 \nolig{flein}{f|lein}
 % Laufleine Scherflein Wölflein
 % Köpflein Zöpflein
 \nolig{fleist}{f|leist}
 % Dampfleistung Knopfleiste
 % Kopfleiste Auswurfleistung
 % Griffleiste Stoffleiste
 \nolig{fleit}{f|leit}
 % Dampfleitung Hofleitung Bauhofleiter
 % Kaufleitung Notrufleitung aufleiten
 % inbegriffleitend Kraftstoffleitung
 \keeplig{Kaltefleiter} % a surname...
 \nolig{fler}{f|ler}
 % Freiberufler Schaufler
 % Löffler Büffler Schnüffler
 \nolig{fleut}{f|leut}
 % Hofleute

 \nolig{flich}{f|lich}
 % tariflich reiflich unbegreiflich
 % glimpflich schimpflich behilflich
 % brieflich verwerflich
 % sträflich gräfllich markgräfllich
 % beruflich nebenberuflich
 % käuflich unverkäuflich
 % höflich bischöflich
 % unerschöpfllich dörflich

% vortrefflich begrifflich
 %% Vorsicht mit Pflicht and pflicht...
 \keeplig{Pflicht}
 \keeplig{pflicht}
 %% Noch mehr Vorsicht mit Sumpfpflicht...
 \nolig{Sumpfpflicht}{Sumpf|licht}

 \nolig{flig}{f|lig}
 % schweflig würflig knifflig mufflig
 \nolig{flief}{f|lief}
 % schief-lief Hoflieferant
 \nolig{flinde}{f|linde}
 % Dorflinde Wolflinde Ziegelhoflinde
 \nolig{fling}{f|ling}
 % Prüfling Fünfling Sträfling Täufling
 \nolig{flini}{f|lini}
 % Wurflinie Straflinie Rumpflinie
 \nolig{flisch}{f|lisch}
 % teuflisch Tüpfelscheißer
 \nolig{flist}{f|list}
 % Prüfliste Rufliste Kaufliste
 \nolig{fliter}{f|liter}
 % Hofliteratur Fünflitermotor

 \nolig{flöff}{f|löff}
 % Tief-löffelbagger auflöffeln
 % Schöpflöffel
 \nolig{flohn}{f|lohn}
 % Tariflohn Tieflohnland
 \nolig{flöhn}{f|löhn}
 % Tariflöhne
 \nolig{flok}{f|lok}
 % Dampflokomotive
 \nolig{flösch}{f|lösch}
 % Hoflöschmaschine

 \nolig{flung}{f|lung}
 % Verzweiflungsakt Verteufung

<code>\nolig{flust}{f lust}</code>	% Topflappen Kopflaus kopflastig
% Kampflust Impflust kauflustig Rauflust	<code>\keeplig{opflanz}</code>
	% Kakaopflanzen Indigopflanzen
<code>\nolig{iefl}{ief l}</code>	<code>\keeplig{opflaster}</code>
% Tieflage Tieflager Tieflieger	% Kinopflaster
% schieflachen schieflaufen schiefliegen	<code>\nolig{öpfle}{öpf le}</code>
% schieflief brieflich	% köpfle tröpfle Knöpfe
% stiefler	<code>\nolig{orflad}{orf lad}</code>
% Briefleistung Brieflesen Brieflaufzeiten	% Dorfladen
<code>\keeplig{iefluss}</code>	
<code>\keeplig{ieflüss}</code>	<code>\nolig{pflaut}{pf laut}</code>
% Energiefluss Energieflüsse Batterieflüssigkeit	% Kehlkopflaut
<code>\keeplig{iefläch}</code>	<code>\nolig{pfleu}{pf leu}</code>
% Karosseriefläche Deponiefläche	% Natriumdampfleuchten Kopfleuchte
<code>\keeplig{ieflosk}</code>	<code>\nolig{pflied}{pf lied}</code>
% Melodiefloskel	% Kampflied
<code>\keeplig{ieflut}</code>	<code>\nolig{pfloch}{pf loch}</code>
% Euphorieflut Nostalgieflut	% Knopfloch
<code>\keeplig{ieflaute}</code>	<code>\nolig{pflöch}{pf löch}</code>
% Chemieflaute	% Knopflöcher
<code>\keeplig{ieflügel}</code>	<code>\nolig{pfl[oö]s}{pf l}</code>
% Akademiefügel Jalousiefügel	% kampflos kopflos
<code>\nolig{gipfle}{gipf le}</code>	% krampflösend Hüftkopflösung
% gipfle	<code>\nolig{pflöwe}{pf löwe}</code>
<code>\nolig{ipflig}{ipf lig}</code>	% Goldkopflöwenäffchen
% zweigipflig fünfzipflig	% Schwarzkopflöwenäffchen
<code>\nolig{lflos}{lf los}</code>	<code>\nolig{rfläd}{rf läd}</code>
% hilflos	% Dorfläden Surfläden
<code>\nolig{oflad}{of lad}</code>	<code>\nolig{tafle}{taf le}</code>
% Biohofladen	% tafle
<code>\nolig{ofläd}{of läd}</code>	
% Biohofläden	<code>\nolig{uflaut}{uf laut}</code>
<code>\nolig{oflück}{of lück}</code>	% Ruflaute Ruflautstärke
% Vorhoflücke	<code>\nolig{ufleu}{uf leu}</code>
	% Kaufleute aufleuchten
<code>\nolig{opfla}{opf la}</code>	<code>\nolig{urflad}{urf lad}</code>

% Surfladen
 \nolig{ürfle}{ürf|le}
 % würfle Würflein

 \nolig{wafle}{waf|le}
 % schwafle
 \nolig{wefle}{wef|le}
 % schwefle
 \nolig{weifle}{weif|le}
 % bezweifle verzweifle

% 4. ffi -> f-fi
 % -----

\nolig{affind}{af|find}
 % Straffindung

 \nolig{ffieb}{f|fieB}
 % Sumpffieber Wahlkampfieber
 \nolig{ffigu}{ffigu}
 % Streiffigur
 \nolig{ffilm}{f|film}
 % Werwolffilm
 \nolig{ffinan}{f|finan}
 % Hoffinanz Kauffinanzierung
 \nolig{ffisch}{f|fisch}
 % Kampffisch Wolffisch

\nolig{ff[uü]ß}{f|f}
 \nolig{ff[uü]ss}{f|f}
 % Grieffuß Greiffüße
 % Grieffuss Greiffüsse

\nolig{hoffing}{hof|fing}
 % Bischoffinger

\nolig{iffind}{if|find}
 % Tariffindung
 \nolig{iffing}{if|fing}
 % Greiffinger

 \nolig{lffing}{lf|fing}
 % Zwölffingerdarm

 \nolig{nffing}{nf|fing}
 % fünffingrig Fünffingergebirge

% 5. ffi -> ff-i
 % -----

\nolig{Schiffi}{Schiff|i}
 % Schiffinstandsetzung Luftschiffidee

 \nolig{Stoffi}{Stoff|i}
 \nolig{stoffi}{stoff|i}
 % Rohstoffindustrieller Rohstoffimporte
 % Baustoffingenieur Kunststoffingenieur
 % Kohlenstoffisotope
 \keeplig{stoffiz}
 % Geheimdienstoffiziere
 \keeplig{stoffig}
 % permit ffi ligature for -ig suffix...

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

\nolig{Griff1}{Griff|1}
 \nolig{griff1}{griff|1}
 % Griff1ängen Griff1aschen Griff1eiste
 % grifflos angriff1ustig

`\nolig{Hofflü}{Hof|flü}`
`\nolig{hofflü}{hof|flü}`
 % Hofflügel
`\nolig{Offline}{Off|line}`
`\nolig{offline}{off|line}`
 % offline, Offline
`\nolig{Pfiff1}{Pfiff|1}`
 % Pfiff1aute
`\nolig{Schiff1}{Schiff|1}`
`\nolig{schiff1}{schiff|1}`
 % Schiff1ache Schiff1ladung Schiff1linie
`\nolig{Stoff1}{Stoff|1}`
`\nolig{stoff1}{stoff|1}`
 % lots of words...
`\nolig{Treff1}{Treff|1}`
`\nolig{treff1}{treff|1}`
 % Treff1okal

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

`\nolig{effle}{eff|le}`
 % scheffle
`\keeplig{effler}` % some surnames:
 % Loeffler Schaeffler Scheffler

`\nolig{fflamp}{ff|lamp}`
 % Kompaktleuchtstofflampe
`\nolig{ffland}{ff|land}`
 % Iffland Riff1andschaft
`\nolig{fflast}{ff|last}`
 % Rohstofflastigkeit Treibstofflaster
`\nolig{fflieb}{ff|lieb}`
 % riff1iebend
`\nolig{ffloch}{ff|loch}`
 % Suffloch Griffloch Sauerstoffloch
`\nolig{fflöch}{ff|löch}`
 % Sufflöcher Griff1löcher

`\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{uffl[aä]d}{uff|1}`
 % Suffladen Suffläden
`\nolig{üffle}{üff|le}`
 % schnüffle büffle trüffle
`\nolig{ufflon}{uff|lon}`
 % Mufflon

 % 7. ffl -> f-fl
 % -----

`\nolig{Cheff1}{Chef|f1}`
`\nolig{cheff1[aäioöruü]}{chef|f1}`
 % Cheff1ugleiter

`\nolig{ffläch}{f|fläch}`

% Lauffläche Kampfflächen	
% Zwölfflächner (dodecahedron)	\nolig{nfflach}{nf flach}
\nolig{fflatt}{f flatt}	% Fünfflach
% aufflattern	
\nolig{ffflasch}{f flasch}	\nolig{pffl}{pf fl}
% Wegwerfflasche	% Sumpffläche Sturzkampfflieger
\nolig{fflech}{f flech}	% Totenkopfflagge Impfflüssigkeit
% aufflechten	\keeplig{Knoepffl} % Knoepffler
\nolig{ffleck}{f fleck}	
% Fünffleck	
\nolig{fffleisch}{f fleisch}	
% Schafffleisch Kopffleisch	% 8. ft -> f-t
\nolig{fflex}{f flex}	% -----
% Tarifflexibilität	
\nolig{fflimm}{f flimm}	%% experimental
% Vorhofflimmern	\nolig{ftig}{f tig}
\nolig{ffl[uü]ch}{f fl}	\nolig{ftung}{f tung}
% Tariffucht Werwolffluch	
% Tariffüchtling	\nolig{Auft}{Auf t}
\nolig{fflug}{f flug}	\nolig{auft[aäehioöruü]}{auf t}
% Tiefflug Kampfflugzeug Cheffflugleiter	% (viele viele Fälle)
\nolig{fflüg}{f flüg}	
% Tiefflüge	\nolig{Brieft}{Brief t}
\nolig{fflüs}{f flüs}	\nolig{brieft}{brief t}
% Schleifflüssigkeit	% Brieftasche Brieftaube
\nolig{fflut}{f flut}	\nolig{Cheft}{Chef t}
% Brieffluten	\nolig{cheft}{chef t}
	% Cheftheoretiker Cheftrainer
\nolig{iefflieg}{ief flieg}	\nolig{Dorft}{Dorf t}
% tieffliegend	\nolig{dorft}{dorf t}
\nolig{iefflog}{ief flog}	% Dorftrottel Dorftratsch Dorftümpel
% tiefflog	\nolig{Hoft}{Hof t}
	\nolig{hoft[aäehioöruü]}{hof t}
\nolig{iffleck}{if fleck}	% Hoftor Klosterhoftor
% Schleifflecklein	\nolig{Prüft}{Prüf t}
	% Prüftechnik Prüfteam
\nolig{lfflach}{lf flach}	\nolig{prüfth}{prüf th}
% Zwölfflach	% Prüftheorie

\nolig{Schlaft}{Schlaf t}	% Stofftradition Stofftrennung
\nolig{schlaft[aäehioöruüy]}{schlaf t}	% Kunststofftube Stoffturnschuhe
% Schlaftablette -teddy -tee -temperatur	% Stofftäschchen
\nolig{Schilft}{Schilf t}	% Auspufftöpfe Kunststofftöpfe
\nolig{schilft[aäehioöruüy]}{schilf t}	% Kunststofftüten
% Schilfteich Schilftanz	
\nolig{Straft}{Straf t}	\nolig{ftag}{f tag}
\nolig{straft[aäehioöruüy]}{straf t}	% Tauftag Fünftagewoche
% (viele Fälle)	\nolig{ftanz}{f tanz}
	% Kampftanz Schilftanz
	\nolig{ftax}{f tax}
\nolig{eiftr}{eif tr}	% Ruftaxi
% Eingreiftruppe Nadelstreifträger	\nolig{ftheor}{f theor}
	% Golftheorie Kampftheorien Auflauftheorien
\nolig{fte}{f te}	\nolig{ftod}{f tod}
% schleifte reifte seifte prüfte überprüfte	% Hanftod
% schaffte hoffte klaffte verpuffte	\nolig{fton}{f ton}
% vertiefte verbriefte Brieftext	% Pfeifton Zwölftonmusik Rufton
% Hälfte elfte elftens zwölfte	\nolig{ftrain}{f train}
% Fünfte fünfter	% Lauftrainer
% kämpfte schimpfte schrumpfte schöpfen	\nolig{ftrunk}{f trunk}
% durfte bedurfte surfte dürfte schlürfte	% schlaftrunken
% schärfte verschärfte	\nolig{ftyp}{f typ}
% abgestufte getaufte häufte unbedarfte	% Schifftyp Stofftyp waldorftypisch
% Schilfteich Dorfteich	\nolig{ftyr}{f tyr}
\keeplig{Delfter}	% Dorftyrann Hoftyrann
\keeplig{Dufte}	
\keeplig{duftemp} % duftempfindlich	\nolig{iefta}{ief ta}
\keeplig{Haft} % Haftentlassung	% Tieftaucher Brieftasche Brieftaube
\keeplig{haftentl} % haftentlassen	\nolig{iefto}{ief to}
\keeplig{Krafte}	% Stieftochter Tiefton
\keeplig{kunfter} % Unterkunftersuchung	\nolig{ieftö}{ief tö}
\keeplig{Lufte} % Lufteinlass	% Stieftöchter tieftönend
\nolig{fft[aähioöruü]}{ff t}	\nolig{lfta}{lf ta}
% Stofftasche Sauerstofftank Stofftheorie	% elftausend zwölftausend Golftasche
% Stofftier Stofftiger Stofftisch Tuch	\nolig{lftä}{lf tä}
% Auspufftopf Kunststofftonne	% elftägig zwölftägig

<pre> \nolig{lfto}{lf to} % Zwölftonmusik Elftonner Golf tour \nolig{lftö}{lf tö} % zwölf tönend \nolig{nftause}{nf tause} % fünftausend Fünftausender \nolig{nftopf}{nf topf} % Senftopf \nolig{nftöpf}{nf töpf} % Senftöpfchen \nolig{nftü}{nf tü} % fünftürig Senftüte \keeplig{nftüb} % Vernunftüberlegung Zunftüberlieferung \nolig{pft[aähioöruü]}{pf t} % Wettkampftag Kampftaktik Kampftruppe % Kampftätigkeit Kampftänzer % wahlkampftauglich Wahlkampftöne % Schnupftabak Schnupftuch Schnupftücher % Schimpftiraden Mehrkampftitel Stapftiefe % Dampftopf Sumpftour Wettkampft rubel % Kopftreffer Kopftuch % Kopftücher Kopftüchlein % Herzklopf töne Zopfträger \nolig{rftr}{rf tr} % Wurftraining Surftrip Freiwurftreffer \nolig{rftu}{rf tu} % Wurf tuch \nolig{rftig}{rf tig} % dürftig bedürftig \nolig{uftas}{uf tas} </pre>	<pre> % Ruftaste Vorlauftaste Kauf tasche \keeplig{Gruftas} % Gruftas sein \nolig{urfta}{urf ta} % Wurftalent Auswurf taste Surftalent \keeplig{tdurfta} % Notdurftanlage \nolig{urfto}{urf to} % Freiwurftor Surftour % 9. fb -> f-b, fh -> f-h, fk -> f-k % ----- % Disable these ligatures globally. % I can't think of a single *German* word % 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. Use \keeplig % macros to treat these cases. \keeplig{Kafka} \keeplig{kafka} \keeplig{Piefke} \keeplig{Safka} \keeplig{Potrafke} \keeplig{Sprafke} \keeplig{Shirafkan} \keeplig{Tirafkan} \keeplig{Selfkant} </pre>
--	--

```

% 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.,
% Ísafjörður and Ísafjörður
\keeplig{Ísafjarðarbær} % city in Iceland
\keeplig{fjell} % Norwegian
\keeplig{fjäll} % Swedish (?)

\keeplig{Prokofjew}
\keeplig{Sufjan} % Stevens
\keeplig{Eefje} % Dutch first name
\keeplig{Astafjew}
% Russian 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 'fff1'
% ligatures into 'ff' and 'f1' 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, 2012/12/21

\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}
```