

Lua $\TeX$  is the newest  $\TeX$  engine that supports Unicode and OpenType fonts. As with X $\TeX$ , Lua $\TeX$  extends the  $\TeX$  `\font` primitive to allow the use of modern outline fonts.

These are the forms of the font command that are used for OS installed fonts:

```
% these fonts are in my Fonts folder
\font\goudy="Sorts Mill Goudy:+lnum" at 10pt
\font\goudyit="Sorts Mill Goudy Italic:+lnum" at 10pt
```

or:

```
% another version for OS fonts
% this version uses the font file name
% the .otf or .ttf suffix seems to be optional
\font\goudy="[GoudyStM.otf]:+lnum" at 10pt
\font\goudyit="[GoudyStM-Italic.otf]:+lnum" at 10pt
```

You can use braces instead of double quotes if you want:

```
\font\goudy={GoudyStM.otf:+lnum} at 10pt
```

This form is used for fonts included with your  $\TeX$  distribution:

```
% these fonts are in my TeX Live folders
\font\jun=Junicode.ttf at 10pt
\font\juni=Junicode-Italic.ttf at 10pt
```

From anywhere on your system:

```
% from a folder 'myfonts' on a USB stick
\font\goudy="[H:/myfonts/GoudyStM.otf]" at 10pt
```

OpenType tags are separated from the font name by a colon and from each other by semicolons or commas if there are more than one. Lua $\TeX$  does not have `mapping=tex-text` to allow the use of traditional  $\TeX$  mark up for quote marks and dashes. If you want typographic quote marks and dashes when you are using a Unicode font you will have to enter them in the input file. (But the old mark up still works in Computer Modern: ‘ ’ “ ”, —, —.)

# Examples of OpenType features in LuaTeX

EB Garamond

Numerals: 1234567890 1234567890 1234567890 1234567890

Fractions:  $\frac{1}{4}$   $\frac{1}{2}$   $\frac{3}{4}$   $\frac{3}{8}$   $\frac{5}{8}$   $\frac{27}{64}$

CAPS AND SMALL CAPS (smcp) SMALL CAPS (c2sc)

Ligatures: ff ffi ffl fi fl

Historical: ct ft species fs ffa ffi ffl fi fl [Th]

Superscripts, subscripts, ordinals, scientific inferiors:

<sup>0123456789+-=()</sup><sub>0123456789+-=()</sub> 1<sup>st</sup> 2<sup>nd</sup> 3<sup>rd</sup> CO<sub>2</sub> H<sub>2</sub>SO<sub>4</sub>

Swash Italics: *ABCDEFGHIJKLMN O P Q R S T U V W X Y Z*

Sorts Mill Goudy

Numerals: 1234567890 1234567890

Fractions:  $\frac{1}{4}$   $\frac{1}{2}$   $\frac{3}{4}$   $\frac{3}{8}$   $\frac{5}{8}$   $\frac{27}{64}$   $\frac{1}{72.27}$

CAPS AND SMALL CAPS (smcp) SMALL CAPS (c2sc)

Ligatures: ff ffi ffl fi fl

Superscripts, subscripts, scientific inferiors: <sup>0123456789</sup><sub>+ -= ()</sub><sub>n</sub>

<sup>0123456789</sup><sub>+ -= ()</sub> H<sub>2</sub>O

## Hyphenation

Some German, to test hyphenation.

Entweder mußte der Brunnen sehr tief sein, oder sie fiel sehr langsam; denn sie hatte Zeit genug, sich beim Fallen umzusehen und sich zu wundern, was nun wohl geschehen würde. Zuerst versuchte sie hinunter zu sehen, um zu wissen wohin sie käme, aber es war zu dunkel etwas zu erkennen. Da besah sie die Wände des Brunnens und bemerkte, daß sie mit Küchenschränken und Bücherbrettern bedeckt waren; hier und da

erblickte sie Landkarten und Bilder, an Haken aufgehängt. Sie nahm im Vorbeifallen von einem der Bretter ein Töpfchen mit der Aufschrift: »Eingemachte Apfelsinen«, aber zu ihrem großen Verdruß war es leer. Sie wollte es nicht fallen lassen, aus Furcht Jemand unter sich zu tödten; und es gelang ihr, es in einen andern Schrank, an dem sie vorbeikam, zu schieben.

## PDF Stuff

PDF specific commands like `\pdfcatalog`, `\pdfinfo` used to be the same as those in pdf<sub>TEX</sub>. As of Lua<sub>TEX</sub> version 0.85 this is no longer the case. Here are the new forms of some commands given beside the old forms:

pdf <sub>TEX</sub> & Lua <sub>TEX</sub> < v. 0.85	Lua <sub>TEX</sub> ≥ v. 0.85
<code>\pdfoutline</code>	<code>\pdfextension outline</code>
<code>\pdfdest</code>	<code>\pdfextension dest</code>
<code>\pdfinfo</code>	<code>\pdfextension info</code>
<code>\pdfcatalog</code>	<code>\pdfextension catalog</code>
<code>\pdfprotrudecharacters</code>	<code>\protrudecharacters</code>
<code>\pdfadjustspacing</code>	<code>\adjustspacing</code>
<code>\pdfpagewidth</code>	<code>\pagewidth</code>
<code>\pdfpageheight</code>	<code>\pageheight</code>

See section 2.2 of the Lua<sub>TEX</sub> [manual](#) for more details.

One consequence of the change in PDF-specific commands in v. 0.85 is that when I originally wrote this document I couldn't get Navigator to write PDF bookmarks. Eventually I found a workaround in this [example](#) of PDF bookmarks in Lua<sub>TEX</sub> that I found online:

```
\ifnum\luatexversion>84
\def\pdfinfo{\pdfextension info}
\def\pdfcatalog{\pdfextension catalog}
\def\pdfdest{\pdfextension dest}
\def\pdfoutline{\pdfextension outline}
\def\pdfobj{\pdfextension obj}
\def\pdflastobj{\numexpr\pdffeedback lastobj\relax}
\def\pdfnames{\pdfextension names}
\fi
```

## Microtypography

0. The default: no protrusion, no expansion.

We thrive in information||thick worlds because of our marvelous and everyday capacity to select, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeon-hole, pick over, sort, integrate, blend, inspect, filter, lump, skip, smooth, chunk, average, approximate, cluster, aggregate, outline, summarize, itemize, review, dip into, flip through, browse, glance into, leaf through, skim, refine, enumerate, glean, synopsisize, winnow the wheat from the chaff and separate the sheep from the goats.

1. The same text with `\protrudechars` and `\adjustspacing` both set to 1.

We thrive in information||thick worlds because of our marvelous and everyday capacity to select, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeon-hole, pick over, sort, integrate, blend, inspect, filter, lump, skip, smooth, chunk, average, approximate, cluster, aggregate, outline, summarize, itemize, review, dip into, flip through, browse, glance into, leaf through, skim, refine, enumerate, glean, synopsisize, winnow the wheat from the chaff and separate the sheep from the goats.

When `\protrudechars` and `\adjustspacing` are set to 1, the protrusion and expansion are applied after  $\text{\TeX}$ 's normal paragraph breaking routines have broken the paragraph into lines. The linebreaking here is the same as in example 0.

2. Protrusion and expansion with `\protrudechars` and `\adjustspacing` both set to 2.

We thrive in information|thick hole, pick over, sort, integrate, worlds because of our marvelous blend, inspect, filter, lump, skip, and everyday capacity to select, smooth, chunk, average, approximate, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeon- goats.

When `\protrudechars` and `\adjustspacing` are set to 2 the changes caused by protrusion and expansion are taken into account *while* the paragraph is being built. Consequently the line breaking in this example is different to that in examples 0 and 1.

The microtypography examples are taken from an [article](#) by Hans Hagen.

LuaTeX has `extend` and `slant` options similar to those in XeTeX:  
*An oblique introduction to an extended example.*

## Letterspacing

LuaTeX has a `letterspace` font feature similar to the one in XeTeX:

```
\font\goudy1s="[GoudyStM.otf]:+lnum;letterspace=6" at 12pt
```

“Anyone who would letterspace lowercase would steal sheep.”

– F.W. GOUDY

You could use this for short pieces of letterspaced capitals or small capitals, e.g. in headings or in page headers.

LuaTeX has also inherited the `\letterspacefont` command from pdfTeX:

```
\font\normalfont=myfont at 12pt  
\letterspacefont\lsfont\normalfont 100
```

The numbers are thousandths of an em. This can be used with the  $\TeX$  `cmcsc10` font to make a letterspaced smallcap font:

```
\font\sc=cmcsc10
\letterspacefont\scls\sc 25
```

CAPS AND SMALL CAPS.

But if I try to make a letterspaced OpenType font with the pdf $\TeX$  markup it does not work:

Caps and Small Caps

`\letterspacefont` seems to disable the `smcp` tag (or `c2sc` or any other OpenType tag). Use the `letterspace` font feature with the `smcp` or `c2sc` OpenType tag instead.

Another way of letterspacing text would be to use the `soul`\* package. You can use the `\sodef` macro to set the spacing that you prefer:

```
\sodef<cmd>{\font}{<inter-letter space>}{<inner space>} {<outer space>}
```

e.g.

```
\sodef\goudyscls{\goudysc}{.1em}{.5em plus .25em}{.5em plus .1em minus .1em}
```

ONCE UPON A TIME there were three bears.

This package also enables underlining, ~~striking through~~, and **high-lighting**.

Actually you can use the `letterspace` font feature to set longer text if you want:

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

If I try to set paragraphs like this with `letterspace` in  $X_{\Gamma}\TeX$  I

---

\* `'space_out_underline'`

always get overfull lines. The spacing in ‘officia’ seems wrong though. The other two methods break the ligature.

The same thing done with `\letterspacefont`:

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

And set using `soul`:

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

You can also use negative values in the three methods to squeeze letters closer together.