#### A FANCY UNIVERSITY

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# tufte-style-thesis, a Tufte-styled Lass for theses

Actually more of a mix between Edward Tufte and Robert Bringhurst

Doctoral thesis

February 19, 2022

Supervisor Cosupervisor Jury members their name also their name jury 1

jury 2

their job also their job

jobs









# Abstract

Basically a thesis (book?) class for Tufte lovers like myself. I am aware that tufte-latex already exists but I just wanted to create my own thing.

# Acknowledgements

shoutouts to my man Tufte.

## **Contents**

```
Abstract 5
    Acknowledgements 7
1 Notes on the design 17
    1.1 Document layout 17
    1.2 Page layout 18
    1.3 Headers, lists, and other content-organizing features 18
    1.4 Fonts and paragraph typography 19
    1.5 Ideas behind the design 19
    I HOW TO USE THIS CLASS
2 Getting started 23
    2.1 On Linux 23
    2.2 On Windows 23
    2.3 On Overleaf 23
3 Using this class 25
    3.1 Packages already loaded 25
    3.2 The big margin 25
    3.3 Full width text 26
    3.4 The skeleton 26
    3.5 Floats 27
    3.6 The titlepage 36
    3.7 Compilation 36
    APPENDIX
A Some additional stuff 39
```

# List of Figures

Figure 3.1	1919 map of the Finistère in French Brittany. This figure is in the main text column, with a caption in the margin aligned with
	the top of the image. For images narrower than the text width,
	they will be outer-aligned so that they remain just next their
	caption. 28
Figure 3.2	The most common sea boat knots. This image can be displayed
	rather small, so it fits in the margin. The caption is displayed
	below. 28
Figure 3.3	The US census map from data collected in 2010 - www.ecpmlangues
	u-strasbg.fr This is a wide figure, stretching from the inner-
	most to the outermost margin. 29
Figure 3.4	The Mandelbrot set with different depths of iteration. This cap-
	tion is not in the margin but in the main text area. It can some-
	times be useful with really really long captions. 31

# List of Tables

Table 3.1	The elementary particles included in the standard model. This
	is a table with a \sidecaption. 32
Table 3.2	Major, minor and perfect music intervals. ST. stands for semi-
	tones. This table is in the margin. 32

# List of Listings

Listing 1	Hello world in C. This is a captioned code snippet. 34
Listing 2	A source code snippet of 29jm's stunningly amazing SnowflakeOS.
	This is a numbered code snippet that goes through several pages. 34
TODO #1	
List of figu (peut être p	res: mettre les numéros de page sur une colonne dédiée à droite oas en fait)
-	TODO #2
métadonné	es PDF

# **1** Notes on the design

This class is my personal mix of different book design influences: mainly the works of Edward R. Tufte, hown for the big margin and the plentiness of sidenotes and sidecaptions. The margins are however not as prominent as in Tufte's works, the main text takes a bit more space, more like in Robert Bringhurt's typographer's bible. So it is a bit of a mix of Tufte and Bringhurst, with some of my own choices for other design features, as we will see through this chapter.

## 1.1 Document layout

While tufte-style-thesis is a class for typesetting theses, the general layout is pretty much the same as in a regular book. A book is traditionally divided into three major sections: the front matter, the main matter and the back matter.

The *front matter* is for all the stuff that comes before the main content: the preface, the acknowledgements, table of contents (TOC) and list of various types. The pages are most widely printed in roman numerals for this part. However, I personally find it confusing and a bit useless so the page numbering system is simplified for the whole book: arabic numerals starting from the very first page of the document.<sup>3</sup> The frontmatter still remains relevant because chapters are unnumbered, and ETEX conveniently places them in the TOC.

The *main matter* is, as its name suggests, for the main content. Here everything is normal, arabic page numbering, normally numbered chapters. At the end of the mainmatter there are usually appendices, especially for scientific and technical textbooks; for me, an appendix seems necessary in a thesis to put big figures, tables, and content that can be referred to in the main text but are too intrusive to put in the heart of the document. Chapters in the appendix are numbered with a letter to distinguish them from the main content. The main matter can also be cut in a couple of parts.<sup>4</sup>

The *back matter* is the end of the book, usually for the references part and index or glossary. Chapter numbering is turned off. At the very end, a colophon<sup>5</sup> can be put to state information about the printer, publisher and stuff like that.

To sum this up, the structure of a document typeset with tufte-style-thesis is something like this:

- titlepage;
- front matter (dedication, abstract, acknowledgements, table of contents, list of figures, etc);
- main matter (main content organized in numbered chapters, an appendix with letter chapters);
- back matter (references, index, glossary, colophon).

- 1 [1] E. R. Tufte, *The Visual Display of Quantitative Information*, 2001, [2] E. R. Tufte, *Beautiful Evidence*, 2006, [3] E. R. Tufte, *Envisioning Information*, 1990, [4] E. R. Tufte, *Visual Explanations*, 1997.
- 2 [5] R. Bringhurst, *The Elements of Typographic Style*,

3 Tufte and Bringhurst do full arabic in their work too, so I consider it legit.

- 4 I like, for instance, to put the appendix in a dedicated part.
- 5 <sup>[6]</sup> J. Carter and N. Barker, *ABC for Book collectors*, 2004.

18 NOTES ON THE DESIGN

This is how Later books work, and how I advise to structure a document using this class. All of this is under a single page numbering system, arabics starting right from the titlepage. Eventually, this is a really heavy layout, see how the first chapter of content starts at page 18. So do not use this class unless you have a hefty content to fit all these organizing features.

## 1.2 Page layout

Maybe the most distinctive aspect of this class is its page layout with its big margin to put sidenotes and captions. However this is not original at all: plenty<sup>6</sup> of other LTEX classes for books and theses do it just like me, and almost always better<sup>7</sup> I just wanted to do my own thing here, mixing what I personally like the most in these layout types, to better learn LTEX and to really internalize this kind of design. At the end of the day it may be a more Bringhursty than Tuftey kind of look, but hey, I won't change the name of this whole thing now.

So, as you might have started to notice, the main feature of this thing is the margin, with the sidenotes, side references, and as you will discover, side captions and everything. It has three main advantages for me:<sup>8</sup>

- it makes the main text area narrower, therefore easier to read as the line changes become smoother, sidenotes are also friendlier than footnotes;
- it makes the design breathe with plenty of potential white space (when the margins are not too crowded);
- it organizes the content: non-prosaic elements are on the side, separated from the main text area which becomes less cluttered.

  So this is more intended for people who like "flavoured" text: people who likes notes, parentheses, asides, *etc.* It is also more suited for topics needing lots of pictures, tables, and diagrams: a novel would look terrible with this kind of lavout.

Another small detail on the sidenotes, the flag of a note is in superscript in the text, but the note itself is introduced by a number in full size: this is in superscript ... <sup>9</sup> This is again one of Bringhurst's advices.

## 1.3 Headers, lists, and other content-organizing features

The principle here is to give structuring elements which are as unobtrusive as possible, while remaining clear and easy to follow. For example, the bold headers of vanilla LaTeX have been changed for more subtle italic ones. Chapters titles have been simplified to their essential parts –a number and a title– and put as high as possible: it is completely useless to me to start a new chapter at the middle of a page. Though, some of space is left after the title to let it breathe a little bit; this is a feature of Tufte's books.

The TOC, and the other lists as well as the index and references section are thought to be that way: friendly and unobtrusive. For example, in the TOC, the traditional dotted lines between a heading and its corresponding folio<sup>11</sup> is useless and unfriendly: why have the reader to follow a line with their eyes instead of just placing the page number next to the heading? So I adapted the

6 tufte-latex: https://www.ctan.org/pkg/ tufte-latex,

classicthesis: https://www.ctan.org/pkg/ classicthesis,...

7 Or in a way cleaner LTFX.

8 These advantages can be seen as drawbacks for others: less space for the actually important content, irregular and somewhat unconventional design which can be harder to handle.

9 ... whereas this is in normal size.

- 10 Bringhurst roasts this kind of chapters in his Elements: "In modern books, where the titles are shorter and the margins have been eaten by inflationary pressure, a third of the page somewhat lies vacant just to celebrate the fact that the chapter begins".
- 11 Just flexin, folio is a fancy term for saying "page number".

TOC to make it both expressive and light/minimalistic.<sup>12</sup> It does not support deeper headings than the section, because I think nobody looks for such detail in the table of contents.

12 I find Tufte- and Bringhurst-style Tocs too empty, at least for a thesis.

## 1.4 Fonts and paragraph typography

This class has three fonts.

The main text is typeset with a version of Linux Libertine, <sup>13</sup> with enhanced math support. Here it is in **bold** and *italic*.

Sans serif text, like in the titlepage, part titles and page headers (not chapter/section titles, but small reminders at the very top of the pages) are in sans serif Gill Sans, actually Gillius, a version of Gill Sans for Later. Here it is in **bold** and *italics*. Gill Sans is a humanist sans-serif typeface, which I find both elegant and minimalistic. It is less harsh than grotesk fonts like Helvetica or Arial.

Mono text, for code listings, is Droid Sans Mono. It is smoother to my taste than the default courier-like font. Here it is in *italics* (unfortunately it does not support bold –yet).

The prose is organized in paragraphs indented at the first line, as it is classically seen. The first paragraph that comes after a heading, however, is not indented. The text is by default not justified on the right like in Tufte's books. Apparently it makes the lines easier to recognize and follow with the eyes; I do not find this irregularity unpleasing. But *do not worry*, it can be fully justfied really easily. The property of the paragraphs indented at the first line, as it is classically easily and it is classically easily. The paragraphs indented at the first line, as it is classically easily seen.

For true microtypography, when the text is fully justified (like this one), the dashes, commas, points and other stuff slightly protrude in the margin to make it seem more justified than it really is. <sup>16</sup> For flush left text, the typesetting algorithm has also been upgraded from standard Lagarance. The line length and space width variance, and hyphenating as less as possible. Also, the spaces between small caps increase a little bit, as well as they can be increased for full caps text.

# 1.5 Ideas behind the design

These are just some thoughts I gathered that I find interesting to consider when making designs, closely or remotely.

As Antoine de Saint-Exupéry once wrote: <sup>17</sup> "Perfection has been reached not when there is nothing left to add, but when there is nothing left to take away". To me, this means that minimalism is a key aspect of document design. The features and the layout must let the true content express itself: a good typography is completely transparent. That is why the design is dependent of the content: a novel and a math textbook will have completely different designs.

However, this whole Tufte-style design is far from transparent. It is easily recognizable, and people will notice the somewhat unusual design statements. Paul Rand said, <sup>18</sup> "The public is more familiar with bad design than good design. It is in effect, conditioned to prefer bad design, because that is what it lives with. The new becomes threatening, the old reassuring". Edgar Tufte completely

13 <sup>[7]</sup>, Libertine Fonts – Libre multilingual font family.

- 14 It is again an advice from Bringhurst: "The simplest way to start any block of prose is to start from the margin, flush left [...]."
- 15 I hope people have not been bummed out at by not seeing the right-justfication.
- 16 Paradoxically, it seems more justified than when it is truly justified. See by yourself: put a ruler (or the side of the window on the right side of the text and see how the comma slightly protrudes).

17 <sup>[8]</sup> A. de Saint-Exupéry, *Terre des Hommes*, 1939.

18 Yeah, I lazily picked the two citations on the first page of the tufte-style book class showcase. Though, I find Paul Rand's a bit condescending, like, "people know nothing about good design".

20 NOTES ON THE DESIGN

re-thought the way to display scatterplots, curves and axes, boxplots and histograms, but most people are not used to see this optimized representation, so is it a better design if most people have to give some extra effort to adapt to it?

Then, good design must be a cultural thing. To aim perfection, one must make a blend between innovation and tradition, to be percieved as smooth as possible for the majority of people.

So, yeah, I really don't know what to think. I find –actually I hope that sidenotes and margins benefit to the reading comfort instead of ruinig it. It makes more sense when there are figures, tables and heavier stuff, but hopefully it remains relevant for prose with notes.

# $$\operatorname{\textsc{PART}}$\ {\ \mbox{I}}$$ HOW TO USE THIS CLASS

# **2** Getting started

- 2.1 On Linux
- 2.2 On Windows
- 2.3 On Overleaf

#### Using this class 3

#### Packages already loaded 3.1

Here are some of the already loaded packages, so there is no need to re-include them in your document:

 geometry emptypage fullwidth sidenotes caption fontenc libertinus libertinust1math

gillius

 droidsansmono ragged2e titlesec titletoc tocloft

 fancyhdr graphicx microtype amsfonts

 amsmath etoolbox

xcolor

booktabs

enumitem

hyperref

 mathtools · changepage physics placeins xparse mdframed xpatch tabularx biblatex

listings

#### The big margin 3.2

There is a big margin, so feel free to use it as much as possible! This chapter will cover the usage of sidenotes, side references, and other ways to use the margin.2

The general layout is done using the geometry<sup>3</sup> package, and all the margin stuff relies on the sidenotes<sup>4</sup> package, so check its documentation:

http://www.ctan.org/pkg/sidenotes

for more in-depth information.

#### Sidenotes

To put a sidenote in the margin, use

```
\sidenote[<number>][<offset>]{<sidenote text>}
```

- <number> is an optional parameter for the sidenote number. For example, \ sidenote[29100][]{The sidenote.} does this. 29100
- · <offset> is an offset length (in pt, px, en, em...) to vertically offset the sidenote. A positive value will have it go down, a negative go up.

LATEX natively allows to put unformatted content in the margin with the command \marginpar{<your content>}, but I advise not to use it, as it puts raw fullsize text in the margin, and does not blend well with the overall design. Instead, use

1 Actually to your needs, if you do not have a natural usage of notes, maybe do not use this class.

By the way, see how sidenote numbers reset on new chapters: we're back on num-

- 2 For float captions, see chap-
- 3 [9] H. Umeki, "The geometry package," 2020.
- 4 [10] A. Thomas, "The sidenotes package," 2020.

29100 The sidenote.

This is unformatted margin text, in fullsize.

This is just some unnumbered piece of text in the margin, but with the formatting done right.

```
\sidetext{<your text>}
```

This will format the margin text to match the sidenotes style.

#### Side references

5 [11] A. Einstein, Zur allgemeinen relativitätstheorie, 1915.

The margin is also handy to put bibliographic references:<sup>5</sup> the reader can read them directly instead of going all through the document to find the right entry in the references section. But don't worry, each reference displayed in the margin is labelled with a number and appears in a dedicated bibliography section. All in all, a side reference is displayed in the margin in a shortened form, and then again in the bibliography in the full form.

To cite a paper, use

```
\sidecite{<reference label>}
```

### 3.3 Full width text

It may be handy to have the text span the whole page width, like this paragraph. Use the environment \ begin{wide}...\end{wide} to do this. It should manage page breaks properly, but it is not optimal: no not use it for too long (like for ten pages), the behavior tends to go a little wild. The behavior of \sidenote, \ marginpar and \sidecite is not supported in the wide environment.

Also, for floating environments, full width figures and tables will be covered in the chapter 3.5, so do not use the wide environments with figures or tables (actually tables are fine, but there are specific environments for them to be in full width).

## 3.4 The skeleton

The structure of a LATEX book is as follows:

```
% preamble
\begin{document}

\maketitle % titlepage

\frontmatter % unnumbered preliminary chapters
\chapter{}
\tableofcontents

\mainmatter % main content: numbered chapters
\part{part}
\chapter{content}

\chapter{content}
\therefore
\text{appendix % letter numbered chapters}
```

FLOATS 27

```
\chapter{appendix 1}
\chapter{appendix 2}
\backmatter % everything else: references, indexes, glossaries, etc.
\printbibliography
\printindex
\end{document}
```

#### The new \maketitle

The \maketitle macro has been slightly pimped up. It now displays a custom titlepage —like the one on this very document, as well as a copyright tag, a dedication word and a colophon.

#### 3.5 Floats

The integration of floats with the Tufte layout is handled with the sidenotes package, loaded with the class definition. The following paragraphs show how to basically use the macros, and for more information, see the package documentation at https://www.ctan.org/pkg/sidenotes.

#### **Figures**

Edward Tufte's designs are known to be really tight when it comes to including images with text. The main pet peeve I had with one-column designs is when I included a small figure in the document, it had to visually break the text and generate large unpleasing blank spaces. Also, more often than not, the text width was too much for the images, resulting in huge one-liner captions for very small figures.

The 1.5-column design fixes this by putting all captions in the margins, as well as small enough figures, which tidies the document a lot.

To put a graphics in the text like in the figure 3.1, use<sup>6</sup>

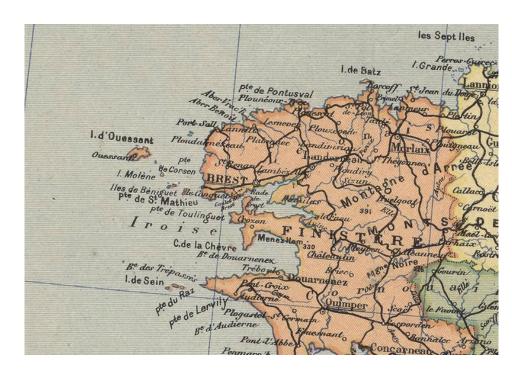
```
\begin{figure}
  \sidecaption{<caption>\label{<label>}} % put this on top
  % \label HAS to be inside the \sidecaption
  \includegraphics[]{<>} % or tikz or anything
\end{figure}
```

To put a figure in the margin like the figure 3.2, use

```
\begin{marginfigure}
  \includegraphics[]{<>} % or tikz or anything
  \caption{<caption>\label{<label>}}
\end{figure}
```

6 The \label has to be inside the \sidecaption command, otherwise references with \ref won't work.

Figure 3.1. 1919 map of the Finistère in French Brittany. This figure is in the main text column, with a caption in the margin aligned with the top of the image. For images narrower than the text width, they will be outer-aligned so that they remain just next their caption.



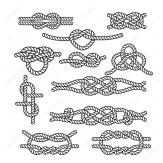
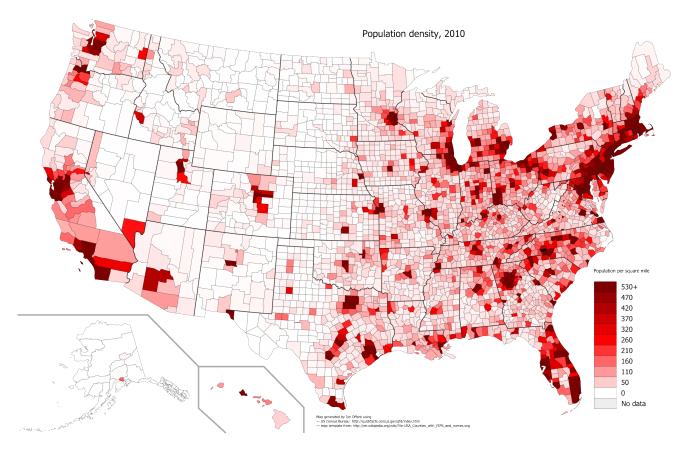


Figure 3.2. The most common sea boat knots. This image can be displayed rather small, so it fits in the margin. The caption is displayed below.

For wide figures like the figure 3.3, use

```
\begin{figure*}
  \includegraphics[]{<>} % or tikz or anything
  \sidecaption{<caption>\label{<label>}}
\end{figure*}
```

FLOATS 29



#### Shortcuts

I find typing figure environments repetitive for long (even short) documents, so I made the following macro for figures with \sidecaptions:

```
\textfig[<optional width>]{<file path>}{<caption>}{<label>}
```

The <optional width> is a number between zero and one wich determines the image width relative to the text width. The default value is 1, like on the figure 3.1.

The same macros are provided for images in the magins and wide images, respectively shown in figures 3.2 and 3.3.

```
% figure in the margin
\marginfig[<optional width>]{<file path>}{<caption>}{<label>}
% wide figure
\widefig[<optional width>]{<file path>}{<caption>}{<label>}
```

If for any reason a figure caption has to be put in the main text block, just use the regular figure environment. The following shortcut macros will also do. The result of \plainfig is shown in figure 3.4.

Figure 3.3. The US census map from data collected in 2010 – www.ecpmlangues. u-strasbg.fr
This is a wide figure, stretching from the innermost to the outermost margin.

% plain figure with textwidth
\plainfig[<optional width>]{<file path>}{<caption>}{<label>}
% plain figure with full width
\plainwidefig[<optional width>]{<file path>}{<caption>}{<label>}

FLOATS 31

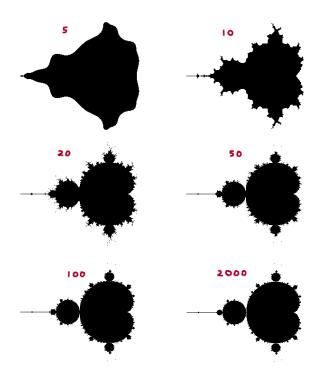


Figure 3.4. The Mandelbrot set with different depths of iteration. This caption is not in the margin but in the main text area. It can sometimes be useful with really really long captions. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

#### Tables

Table environments work the same as figures, as is is shown in tables 3.1 and ??.

#### The Standard model of Elementary Particles.

Three generations of matter (fermions)			Interactions (bosons)	
I	II	III		
QUARKS			GAUGE	SCALAR
u up d down	c charm s strange LEPTONS	t top b bottom	g gluon γ photon Z boson	H higgs
$\mathbf{e}$ electron $\mathbf{v}_{\mathbf{e}}$ el. neutrino	$\mu$ muon $\nu_{\mu}$ mu. neutrino	$\tau$ tau $v_{\tau}$ tau neutrino	<b>W</b> boson	

```
\begin{table}[!htb]\small
           \sidecaption{The elementary particles included in the standard
          model. This is a table with a \texttt{\textbackslash sidecaption
          }.\label{tab:table-text}}
          \begin{tabular}{lllll}
                      \multicolumn{5}{l}{\textbf{The Standard model of Elementary
          Particles.}}\\
                      \toprule
                      \mbox{\mbox{\mbox{$\mbox{$}}}{1}{\text{\mbox{$\mbox{$}$}}}{\text{\mbox{$\mbox{$}$}}}{\text{\mbox{$\mbox{$}$}}}{\text{\mbox{$\mbox{$}$}}}{\text{\mbox{$\mbox{$}$}}}{\text{\mbox{$\mbox{$}$}}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}$}}{\text{\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mbox{$}\mb
           fermions)}} & \multicolumn{2}{l}{\textbf{Interactions (bosons)}}
                      I & II & III & & \\
                      \multicolumn{3}{c}{\textsc{quarks}} & \textsc{gauge} & \
           textsc{scalar} \\
                      \cmidrule(lr){1-3}\cmidrule(lr){4-4}\cmidrule(lr){5-5}
                      \textbf{u}^-up & \text{textbf}{c}^-charm & \text{textbf}{t}^-top & \
           textbf{g}~~gluon & \textbf{H}~~higgs \\
                      \textbf{d}~~down & \textbf{s}~~strange & \textbf{b}~~bottom
          & \textbf{\textgamma}~~photon & \\
                      //
                      \cmidrule(lr){1-3}
                      \textbf{e}~~electron & \textbf{\textmu}~~muon & \textbf{\
           texttau}~~tau & \textbf{W} boson & \\
                      \textbf{\textnu\textsubscript{e}}~~el. neutrino & \textbf{\
           textnu\textsubscript{\textmu}}~~mu. neutrino & \textbf{\textnu\
           textsubscript{\texttau}}~~tau neutrino & & \\
                      \bottomrule
           \end{tabular}
\end{table}
```

To produce tables in the margin like table 3.2, use the margintable environment like in the following.

**Table 3.1.** The elementary particles included in the standard model. This is a table with a \sidecaption.

**Table 3.2.** Major, minor and perfect music intervals. ST. stands for *semitones*. This table is in the margin.

ST.	Intervals
0	unison
1	minor second

FLOATS 33

```
\begin{margintable}[]\small
    \caption{Major, minor and perfect music intervals. ST. stands
    for \textit{semitones}. This table is in the margin. \label{tab:
    table-margin}}
    \begin{tabular}{ll}
        \toprule
        \textbf{ST.} & \textbf{Intervals} \\
        \midrule
        0 & unison \\
        1 & minor second \\
        2 & major second \\
        3 & minor third \\
        4 & major third \\
        5 & perfect fourth \\
       6 & aug. 4\textsuperscript{th} / dim. 5\textsuperscript{th}
    \\
        7 & perfect fifth \\
        8 & minor sixth \
        9 & major sixth \\
        10 & minor seventh \\
        11 & major seventh \\
        12 & octave \\
        \bottomrule
    \end{tabular}
\end{margintable}
```

#### Code

Code can be inserted, whether with simple code boxes or captioned snippets that look like the following.

```
int main(int argc, char *argv[]) {
   printf("Hello world!");
   return 0;
}
```

The box is a light gray hairline that helps make the code stick out just enough without distracting the eye too much. The code itself is syntax colored according to the used language. There are several environments for code boxes, explained below.

For a simple code box with neither line numbering nor caption, the macro environment is the following.

For a code box *with* line numbering –still without a caption– use the following environment.

For captioned code snippets, the same environments exist, as shown as follows. For example, the listings ?? and 2 are respectively unnumbered and numbered code snippets.

```
\begin{snippet}{<language>}{<caption>}{<label>}
This code will be displayed in a captioned code box, without line numbering.
\end{snippet}
\begin{snippetnum}{<language>}{<caption>}{<label>}
This code will be displayed in a captioned code box, with line numbering.
\end{snippetnum}
```

Small pieces of code can be useful to put in flow of the text. This class provides a command to things like this: public int size() {}. Use the following to insert a piece of code in the text.

\inlinecode does not break at lines, so be careful, it can sometimes protrude on the right margin. If it is the case, go to a new line by inserting \\ just before \inlinecode.

The following chunk is an example snippet to show the look when the code is a bit heftier. See how the box breaks at the end of the page.

```
#include <kernel/multiboot2.h>
#include <kernel/sys.h>

static const char* tag_table[] = {
    "TAG_END",
    "TAG_CMDLINE",
    "<unknown>",
```

**Listing 1.** Hello world in C. This is a captioned code snippet.

This supports most of the classic languages. Here are some examples for the language option:

```
c,
c++,
python,
java,
latex...
```

If a specific language is not recognized, use the text option instead: it will display the code without syntax coloring.

**Listing 2.** A source code snippet of 29 jm's stunningly amazing SnowflakeOS. This is a numbered code snippet that goes through several pages.

FLOATS 35

```
8
        "TAG_MODULE",
        "TAG_MEM",
 9
10
        "TAG_BOOTDEV",
        "TAG_MEMMAP",
11
        "TAG_VBE",
12
        "TAG_FB",
13
        "<unknown>",
14
        "TAG_APM",
15
        "<unknown>",
16
        "<unknown>",
17
18
        "<unknown>"
19
        "TAG_RSDP1",
        "TAG_RSDP2",
20
21
   };
22
23 /* Prints the multiboot2 tags given by the bootloader.
24 */
void mb2_print_tags(mb2_t* boot) {
26
        if (boot->total_size <= sizeof(mb2_t)) {</pre>
27
            printke("no tags given");
28
            return;
29
        }
30
        mb2_tag_t* tag = boot->tags;
31
        mb2_tag_t* prev_tag = tag;
32
33
        do {
34
            const char* tag_name;
35
36
            if (tag->type < sizeof(tag_table) / sizeof(tag_table[0]))</pre>
37
         {
38
                tag_name = tag_table[tag->type];
            } else {
                tag_name = "<unknown>";
40
41
            }
42
            printk("%12s (%2d): %d bytes", tag_name, tag->type, tag->
43
        size);
44
45
            prev_tag = tag;
46
            tag = (mb2_tag_t*) ((uintptr_t) tag + align_to(tag->size,
         8));
        } while (prev_tag->type != MB2_TAG_END);
47
48 }
49
50 /* Returns the first multiboot2 tag of the requested type.
51 */
   mb2_tag_t* mb2_find_tag(mb2_t* boot, uint32_t tag_type) {
52
53
        mb2_tag_t* tag = boot->tags;
54
        mb2_tag_t* prev_tag = tag;
55
56
        do {
```

```
if (tag->type == tag_type) {
58
               return tag;
           }
59
60
61
           prev_tag = tag;
           tag = (mb2_tag_t*) ((uintptr_t) tag + align_to(tag->size,
62
       } while (prev_tag->type != MB2_TAG_END);
63
64
       return NULL;
65
66 }
```

- 3.6 The titlepage
- 3.7 Compilation



# **A** Some additional stuff

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40 SOME ADDITIONAL STUFF

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# Index

back matter, 17 Bringhurst, Robert, 17

de Saint-Exupéry, Antoine, 19 design, 19

Droid Sans Mono, 19

fonts, 19 front matter, 17

Gill Sans, 19

Linux Libertine, 19

main matter, 17

microtypography, 19

Rand, Paul, 19

sidenotes, 18

Tufte, Edward R., 17

# TO DO list

#1	List of figures: mettre les numéros de page sur une colonne dédiée à droit	te (peu	t être pa	s en fait)	1.5
#2	métadonnées PDF				1.5