Use this document as a template

Example and documentation of the kaobook class

Customise this page according to your needs

Federico Marotta *

April 6, 2020

An Awesome Publisher

* A LaTeX lover

The kaobook class

Disclaimer
You can edit this page to suit your needs. For instance, here we have a no copyright statement, a colophon and some other information. This page is based on the corresponding page of Ken Arroyo Ohori's thesis, with minimal changes.

Colophon
This document was typeset with the help of KOMA-Script and LaTeX using the kaobook class.
The source code of this book is available at:
https://github.com/fmarotta/kaobook
(You are welcome to contribute!)

Publisher
First printed in May 2019 by An Awesome Publisher

The harmony of the world is made manifest in Form and Number, and the heart and soul and all the poetry of Natural Philosophy are embodied in the concept of mathematical beauty.

– D'Arcy Wentworth Thompson

Contents

List of Figures

List of Tables

Introduction 1

1.1 The Main Ideas

Many modern printed textbooks have adopted a layout with prominent margins where small figures, tables, remarks and just about everything else can be displayed. Arguably, this layout helps to organise the discussion by separating the main text from the ancillary material, which at the same time is very close to the point in the text where it is referenced.

This document does not aim to be an apology of wide margins, for there are many better suited authors for this task; the purpose of all these words is just to fill the space so that the reader can see how a book written with the kaobook class looks like. Meanwhile, I shall also try to illustrate the features of the class.

The main ideas behind kaobook come from this blog post, and actually the name of the class is dedicated to the author of the post, Ken Arroyo Ohori, which has kindly allowed me to create a class based on his thesis. Therefore, if you want to know more reasons to prefer a 1.5-column layout for your books, be sure to read his blog post.

Another source of inspiration, as you may have noticed, is the Tufte-Latex Class. The fact that the design is similar is due to the fact that it is very difficult to improve something wich is already so good. However, I like to think that this class is more flexible than Tufte-Latex. For instance, I have tried to use only standard packages and to implement as little as possible from scratch;[1] therefore, it should be pretty easy to customise anything, provided that you read the documentation of the package that provides that feature.

1: This also means that understanding and contributing to the class development is made easier. Indeed, many things still need to be improved, so if you are interested, check out the repository on github!

In this book I shall illustrate the main features of the class and provide information about how to use and change things. Let us get started.

1.2 What This Class Does

The `kaobook` class focuses more about the document structure than about the style. Indeed, it is a well-known LaTeX principle that structure and style should be separated as much as possible (see also Section **??**). This means that this class will only provide commands, environments and in general, the opportunity to do things, which the user may or may not use. Actually, some stylistic matters are embedded in the class, but the user is able to customise them with ease.

The main features are the following:

Page Layout The text width is reduced to improve readability and make space for the margins, where any sort of elements can be displayed.

Chapter Headings As opposed to Tufte-Latex, we provide a variety of chapter headings among which to choose; examples will be seen in later chapters.

Page Headers They span the whole page, margins included, and, in twoside mode, display alternatively the chapter and the section name.[2]

Matters The commands `\frontmatter`, `\mainmatter` and `\backmatter` have been redefined in order to have automatically wide margins in the main matter, and narrow margins in the front and back matters. However, the page style can be changed at any moment, even in the middle of the document.

Margin text We provide commands `\sidenote` and `\marginnote` to put text in the margins.[3]

Margin figs/tabs A couple of useful environments is `marginfigure` and `margintable`, which, not surprisingly, allow you to put figures and tables in the margins (*cfr.* Figure **??**).

Margin toc Finally, since we have wide margins, why don't add a little table of contents in them? See `\margintoc` for that.

Hyperref `hyperref` is loaded and by default we try to add bookmarks in a sensible way; in particular, the bookmarks levels are automatically reset at `\appendix` and `\backmatter`. Moreover, we also provide a small package to ease the hyperreferencing of other parts of the text.

Bibliography We want the reader to be able to know what has been cited without having to go to the end of the document every time, so citations go in the margins as well as at the end, as in Tufte-Latex. Unlike that class, however, you are free to customise the citations as you wish.

The order of the title pages, table of contents and preface can be easily changed, as in any LaTeX document. In addition, the class is based on KOMA-Script's `scrbook`, therefore it inherits all the goodies of that.

2: This is another departure from Tufte's design.

3: Sidenotes (like this!) ar marginnotes are not

Figure 1.1: The Mona Lisa. `https://commons.wikimedia.org/wiki/File:Mona_Lisa,_by_Leonardo_da_Vinci,_from_C2RMF_retouched.jpg`

1.3 What This Class Does Not Do

As anticipated, further customisation of the book is left to the user. Indeed, every book may have sidenotes, margin figures and so on, but each book will have its own fonts, toc style, special environments and so on. For this reason, in addition to the class, we provide only sensible defaults, but if these features are not needed, they can be left out. These special packages are located in the `style` directory, which is organised as follows:

kao.sty This package contains the most important definitions of macros and specifications of page layout. It is the heart of the `kaobook`.

kaobiblio.sty Contains commands to add citations and customise the bibliography.

packages.sty Loads additional packages to decorate the writing with special contents (for instance, the `listing` package is loaded here as it is not required in every book). There are also defined some useful commands to print the same words always in the same way, *e.g.* latin words in italics or `packages` in verbatim.

kaorefs.sty Some useful commands to manage labeling and referencing, again to ensure that the same elements are referenced always in a consistent way.

environments.sty Provides special environments, like boxes. Both simple and complex environments are available; by complex we mean that they are endowed with a counter, floating and can be put in a special table of contents.[4]

theorems.sty The style of mathematical environments. Acutally, there are two such packages: one is for plain theorems, *i.e.* the theorems are printed in plain text; the other uses `mdframed` to draw a box around theorems. You can plug the most appropriate style into its document.

4: See Chapter **??** f

In the rest of the book, I shall assume that the reader is not a novice in the use of LaTeX, and refer to the documentation of the packages used in this class for things that are already explained there. Moreover, I assume that the reader is willing to make minor edits to the provided packages for styles, environments and commands, if he or she does not like the default settings.

The audacious users might feel tempted to edit some of these packages. I'd be immensely happy if they sent me examples of what they have been able to do!

1.4 How to Use This Class

Either if you are using the template from latextemplates, or if you cloned the GitHub repository, there are infinite ways to use the `kaobook` class in practice. To get started, find the `main.tex` file which I used to write this book, and edit it; this will probably involve a lot of text-deleting, copying-and-pasting, and rewriting.

To compile the document, assuming that its name is `main.tex`, you will have to run the following sequence of commands:

```
pdflatex main # Compile template
makeindex main.nlo -s nomencl.ist -o main.nls # Compile nomenclature
makeindex main # Compile index
biber main # Compile bibliography
makeglossaries main # Compile glossary
pdflatex main # Compile template again
pdflatex main # Compile template again
```

You may need to compile the template some more times in order for some errors to disappear. For any support requests, please ask a question on `tex.stackexchange.org` with the tag 'kaobook', open an issue on GitHub, or contact the author via e-mail.

Class Options, Commands and Environments

2 Class Options

In this chapter I will describe the most common options used, both the ones inherited from `scrbook` and the `kao`-specific ones. Options passed to the class modifies its default behaviour; beware though that some options may lead to unexpected results. . .

2.1 `KOMA` Options

The `kaobook` class is based on `scrbook`, therefore it understands all of the options you would normally pass to that class. If you have a lot of patience, you can read the KOMA-Script guide.[1] Actually, the reading of such guide is suggested as it is very instructive.

1: The guide can be downloaded from `https://ctan.org/pkg/koma-script?lang=en`.

Every KOMA-Script option you pass to the class when you load it is automatically activated. In addition, in `kaobook` some options have modified default values. For instance, the font size is 9.5pt and the paragraphs are separated by space,[2] not marked by indentation.

2: To be prec
a line worth
is 'half'.

2.2 `kao` Options

In the future I plan to add more options to set the paragraph formatting (justified or ragged) and the position of the margins (inner or outer in twoside mode, left or right in oneside mode).[3]

3: As of now, paragraphs are justified, formatted with `\singlespacing` (from the `setspace` package) and `\frenchspacing`.

I take this opportunity to renew the call for help: everyone is encouraged to add features or reimplement existing ones, and to send me the results. You can find the GitHub repository at `https://github.com/fmarotta/kaobook`.

To Do

Implement the `justified` and `margin` options. To be consistent with the KOMA-Script style, they should accept a simple switch as a parameter, where the simple switch should be `true` or `false`, or one of the other standard values for simple switches supported by KOMA-Script. See the KOMA-Script documentation for further information.

The above box is an example of a `kaobox`, which will be discussed more thoroughly in Chapter **??** (**??**) on this page. Throughout the book I shall use these boxes to remarks what still needs to be done.

2.3 Other Things Worth Knowing

A bunch of packages are already loaded in the class because they are needed for the implementation. These include:

- etoolbox
- calc
- xifthen
- xkeyval
- xparse
- xstring

Many more packages are loaded, but they will be discussed in due time. Here, we will mention only one more set of packages, needed to change the paragraph formatting (recall that in the future there will be options to change this). In particular, the packages we load are:

- ragged2e
- setspace
- hyphenat
- microtype
- needspace
- xspace
- xcolor (with options `usenames,dvipsnames`)

Some of the above packages do not concern paragraph formatting, but we nevertheless grouped them with the others. By default, the main text is justified and formatted with singlespacing and frenchspacing; the margin text is the same, except that the font is a bit smaller.

As a last warning, please be aware that the `cleveref` package is not compatible with `kaobook`. You should use the commands discussed in Section **??** instead.

2.4 Document Structure

We provide optional arguments to the `\title` and `\author` commands so that you can insert short, plain text versions of this fields, which can be used, typically in the half-title or somewhere else in the front matter, through the commands `\@plaintitle` and `\@plainauthor`, respectively. The PDF properties `pdftitle` and `pdfauthor` are automatically set by hyperref to the plain values if present, otherwise to the normal values.[4]

4: We think that this is an important point so we remark it here. If you compile the document with pdflatex, the PDF metadata will be altered so that they match the plain title and author you have specified; if you did not specify them, the metadata will be set to the normal title and author.

There are defined two page layouts, `margin` and `wide`, and two page styles, `plain` and `fancy`. The layout basically concern the width of the margins, while the style refers to headers and footer; these issues will be discussed in Chapter **??** (**??**) on the current page.[5]

The commands `\frontmatter`, `\mainmatter`, and `\backmatter` have been redefined in order to automatically change page layout and style for these sections of the book. The front matter uses the `margin` layout and the `plain` page style. In the mainmatter the margins are wide and the headings are fancy. In the appendix the style and the layout do not change; however we use `\bookmarksetup{startatroot}` so that the

bookmarks of the chapters are on the root level (without this, they would be under the preceding part). In the backmatter the margins shrink again and we also reset the bookmarks root.

3 Margin Stuff

Sidenotes are a distinctive feature of all 1.5-column-layout books. Indeed, having wide margins means that some material can be displayed there. We use margins for all kind of stuff: sidenotes, marginnotes, small tables of contents, citations, and, why not?, special boxes and environments.

3.1 Sidenotes

Sidenotes are like footnotes, except that they go in the margin, where they are more readable. To insert a sidenote, just use the command `\sidenote{Text of the note}`. You can specify a mark[O] with `\sidenote[mark]{Text}`, but you can also specify an offset, which moves the sidenote upwards or downwards, so that the full syntax is:

O: This sidenote has a special mark, a big O!

```
\sidenote[mark][offset]{Text}
```

If you use an offset, you always have to add the brackets for the mark, but they can be empty.[1]

1: If you want to know more about the usage of the `\sidenote` command, read the documentation of the `sidenotes` package.

In `kaobook` we copied a feature from the `snotez` package: the possibility to specify a multiple of `\baselineskip` as an offset. For example, if you want to enter a sidenote with the normal mark and move it upwards one line, type:

```
\sidenote[][*-1]{Text of the sidenote.}
```

As we said, sidenotes are handled through the `sidenotes` package, which in turn relies on the `marginnote` package.

3.2 Marginnotes

This command is very similar to the previous one. You can create a marginnote with `\marginnote[offset]{Text}`, where the offset argument can be left out, or it can be a multiple of `\baselineskip`, *e.g.*

```
\marginnote[-12pt]{Text} or \marginnote[*-3]{Text}
```

To Do

A small thing that needs to be done is to renew the `\sidenote` command so that it takes only one optional argument, the offset. The special mark argument can go somewhere else. In other words, we want the syntax of `\sidenote` to resemble that of `\marginnote`.

We load the packages `marginnote`, `marginfix` and `placeins`. Since `sidenotes` uses `marginnote`, what we said for marginnotes is also valid for sidenotes. Side- and margin- notes are shifted slightly upwards

(`\renewcommand{\marginnotevadjust}{3pt}`) in order to allineate them to the bottom of the line of text where the note is issued.

3.3 Footnotes

Even though they are not displayed in the margin, we will discuss about footnotes here, since sidenotes are mainly intended to be a replacement of them. Footnotes force the reader to constantly move from one area of the page to the other. Arguably, marginnotes solve this issue, so you should not use footnotes. Nevertheless, for completeness, we have left the standard command `\footnote`, just in case you want to put a footnote once in a while.*

3.4 Margintoc

Since we are talking about margins, we introduce here the `\margintoc` command, which allows one to put small table of contents in the margin. Like other commands we have discussed, `\margintoc` accepts a parameter for the vertical offset, like so: `\margintoc[offset]`.

The command can be used in any point of the document, but we think it makes sense to use it just at the beginning of chapters or parts. In this document I make use of a KOMA-Script feature and put it in the chapter preamble, with the following code:

```
\setchapterpreamble[u]{\margintoc}
\chapter{Chapter title}
```

The font used in the margintoc is the same as the one for the chapter entries in the main table of contents at the beginning of the document.

3.5 Marginlisting

On some occasions it may happen that you have a very short piece of code that doesn't look good in the body of the text because it breaks the flow of narration: for that occasions, you can use a `marginlisting`. The support for this feature is still limited, especially for the captions, but you can try the following code:

```
\begin{marginlisting}[-0.5cm]
\caption{My caption}
\vspace{0.2cm}
\begin{lstlisting}[language=Python,style=kaolstplain]
... code ...
\end{lstlisting}
\end{marginlisting}
```

```
print("Hello World!")
```

Unfortunately, the space between the caption and the listing must be adjusted manually; if you find a better way, please let me know.

Not only textual stuff can be displayed in the margin, but also figures. Those will be the focus of the next chapter.

* And this is how they look like. Notice that in the PDF file there is a back reference to the text; pretty cool, uh?

4 Figures and Tables

4.1 Normal Figures and Tables

Figures and tables can be inserted just like in any standard LaTeX document. The `graphicx` package is already loaded and configured in such a way that the figure width is equal to the textwidth and the height is adjusted in order to maintain the original aspect ratio. As you may have imagined, the captions will be positioned. . . well, in the margins. This is achieved with the help of the `floatrow` package.

Here is a picture of Mona Lisa (Figure **??**), as an example. The captions are formatted as the margin- and the side-notes; If you want to change something about captions you can use the command `\captsetup` from the `caption` package. Remember that if you want to reference a figure, the label must come *after* the caption!

Figure 4.1: It's Mona Lisa again. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

The credits for the image above the chapter title go to: Bushra Feroz — Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=68724647

While the format of the caption is managed by `caption`, its position is handled by the `floatrow` package. Achieving this result has been quite hard, but now I am pretty satisfied. In two-side mode, the captions are printed in the correct margin.

Tables can be inserted just as easily as figures, as exemplified by the following code:

Listing 4.1: Caption of a listing.

```
\begin{table}
\begin{tabular}{ c c c c }
    \toprule
    col1 & col2 & col3 & col 4 \\
    \midrule
    \multirow{3}{4em}{Multiple row} & cell2 & cell3 & cell4\\ &
    cell5 & cell6 & cell7 \\ &
    cell8 & cell9 & cell10 \\
    \multirow{3}{4em}{Multiple row} & cell2 & cell3 & cell4 \\ &
    cell5 & cell6 & cell7 \\ &
    cell8 & cell9 & cell10 \\
    \bottomrule
\end{tabular}
\end{table}
```

which results in the useless Table **??**.

Table 4.1: A useless table.

col1	col2	col3	col 4
Multiple row	cell2	cell3	cell4
	cell5	cell6	cell7
	cell8	cell9	cell10
Multiple row	cell2	cell3	cell4
	cell5	cell6	cell7
	cell8	cell9	cell10

I don't have much else to say, so I will just insert some blind text. Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

4.2 Margin Figures and Tables

Marginfigures can be inserted with the environment `marginfigure`. In this case, the whole picture is confined to the margin and the caption is below it. Figure **??** is obtained with something like this:

Listing 4.2: Another caption.

```
\begin{marginfigure}
    \includegraphics{monalisa}
    \caption[The Mona Lisa]{The Mona Lisa.}
    \labfig{marginmonalisa}
\end{marginfigure}
```

There is also the `margintable` environment, of which Table **??** is an example. Notice how you can place the caption above the table by just placing the `\caption` command before beginning the `tabular` environment. Usually, figure captions are below, while table captions are above. This rule is also respected for normal figures and tables: the captions are always on the side, but for figure they are aligned to the bottom, while for tables to the top.

Marginfigures and tables can be positioned with an optional offset command, like so:

```
\begin{marginfigure}[offset]
    \includegraphics{seaside}
\end{marginfigure}
```

Offset ca be either a measure or a multiple of `\baselineskip`, much like with `\sidenote`, `\marginnote` and `\margintoc`.If you are wondering how I inserted this orange bubble, have a look at the `todo` package.

Table 4.2: Another useless table.

col1	col2	col3
Multiple row	cell2	cell3
	cell5	cell6
	cell8	cell9

Improve this part.

4.3 Wide Figures and Tables

Figure 4.2: A wide seaside, and a wide caption. Credits: By Bushra Feroz — Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=68724647

With the environments `figure*` and `table*` you can insert figures which span the whole page width. The caption will be positioned below or above, according to taste.

You may have noticed the full width image at the very beginning of this chapter: that, however, is set up in an entirely different way, which you'll read about in Chapter **??**. Now it is time to tackle hyperreferences.

References 5

5.1 Citations

To cite someone [**Visscher2008**, **James2013**] is very simple: just use the `\sidecite` command. It does not have an offset argument yet, but it probably will in the future. This command supports multiple entries, as you can see, and by default it prints the reference on the margin as well as adding it to the bibliography at the end of the document. Note that the citations have nothing to do with the text,[**James2013**] but they are completely random as they only serve the purpose to illustrate the feature.

For this setup I wrote a separate package, `kaobiblio`, which you can find in the `styles` directory and include in your main tex file. This package accepts all the options that you can pass to `biblatex`, and actually it passes them to `biblatex` under the hood. Moreover, it also defines some commands, like `\sidecite`, and environments that can be used within a `kao` book.[1]

1: For this reason you should always use `kaobiblio` instead of `biblatex`, but the syntax and the options are exactly the same.

As you have seen, the `\sidecite` command will print a citation in the margin. However, this command would be useless without a way to customise the format of the citation, so the `kaobook` provides also the `\formatmargincitation` command. By 'renewing' that command, you can choose which items will be printed in the margins. The best way to understand how it works is to see the actual definition of this command.

```
\newcommand{\formatmargincitation}[1]{
    \parencite{#1}: \citeauthor*{#1} (\citeyear{#1}), \citetitle{#1}\\
}
```

Thus, the `\formatmargincitation` accepts one parameter, which is the citation key, and prints the parencite followed by a colon, then the author, then the year (in brackets), and finally the title.[**Battle2014**] Now, suppose that you wish the margin citation to display the year and the author, followed by the title, and finally a fixed arbitrary string; you would add to your document:

```
\renewcommand{\formatmargincitation}[1]{
    \citeyear{#1}, \citeauthor*{#1}: \citetitle{#1}; very interesting!\\
}
```

The above code results in citations that look like the following.[**Zou2005**] Of course, changing the format is most useful when you also change the default bibliography style. For instance, if you want to use the 'philosophy-modern' style for your bibliography, you might have something like this in the preamble:

Zou2005 Zou2005 Zou2005 very interesting!

```
\usepackage[style=philosophy-modern]{styles/kaobiblio}
\renewcommand{\formatmargincitation}[1]{
    \sdcite{#1}\\
}
\addbibresource{main.bib}
```