Example and Documentation of the `kaobook` class

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Example and Documentation of the kaobook class

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Federico Marotta *

January 20, 2019

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 thesis is available at:

https://myurl.com

Publisher

First printed in Jan 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

Preface

It is my opinion that every LaTeX geek, at least once during his life, feels the need to create his or her own class: this is what happened to me and here is the result, which, however, should be seen as a work still in progress. Actually, this class is not completely original, but it is a blend of all the best ideas that I have found in a number of guides, tutorials, blogs and tex.stackexchange.com posts. In particular, the main ideas come from two sources:

- Ken Arroyo Ohori's Doctoral Thesis, which served, with the author's permission, as a backbone for the implementation of this class;
- The Tufte-Latex Class, which was a model for the style.

I started writing this class as an experiment, and as such it should be regarded. Since it has always been indended for my personal use, it may not be perfect but I find it quite satisfactory for the use I want to make of it. I share this work in the hope that someone might find here the inspiration for writing his or her own class.

Federico Marotta

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1

Introduction

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 text 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, you can read his blog post.

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 printiple that structure and style should be separated as much as possible (see also Section*What this class does not* on the following page). 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 exploit. 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 Headings They span the margins and, in twoside mode, display alternatively the chapter and the section name.

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.

Margin text We provide commands `\sidenote` and `\marginnote` to put text in the margins[1] .

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 1.1**).

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`.

1: Sidenotes (like this!) are numbered while 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

As anticipated, the styling 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 and so on. For this reason, we only provide sensible defaults. The github repository is organised as follows.

kaobook.cls The class file, which contains the definitions of the commands and the environments and loads the required packages.

packages.sty Loads other packages to improve the experience of the user (for instance, `ams*` packages are loaded here as they are not required in every book).

commands.sty Complements to the packages, *e.g.* the specifications of the `theorem` environments.

style.sty Page layout, formatting of the titles...

Moreover, there is a folder containing this very book as an example.[2]

2: 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.

Part I

Class Options, Commands and Environments

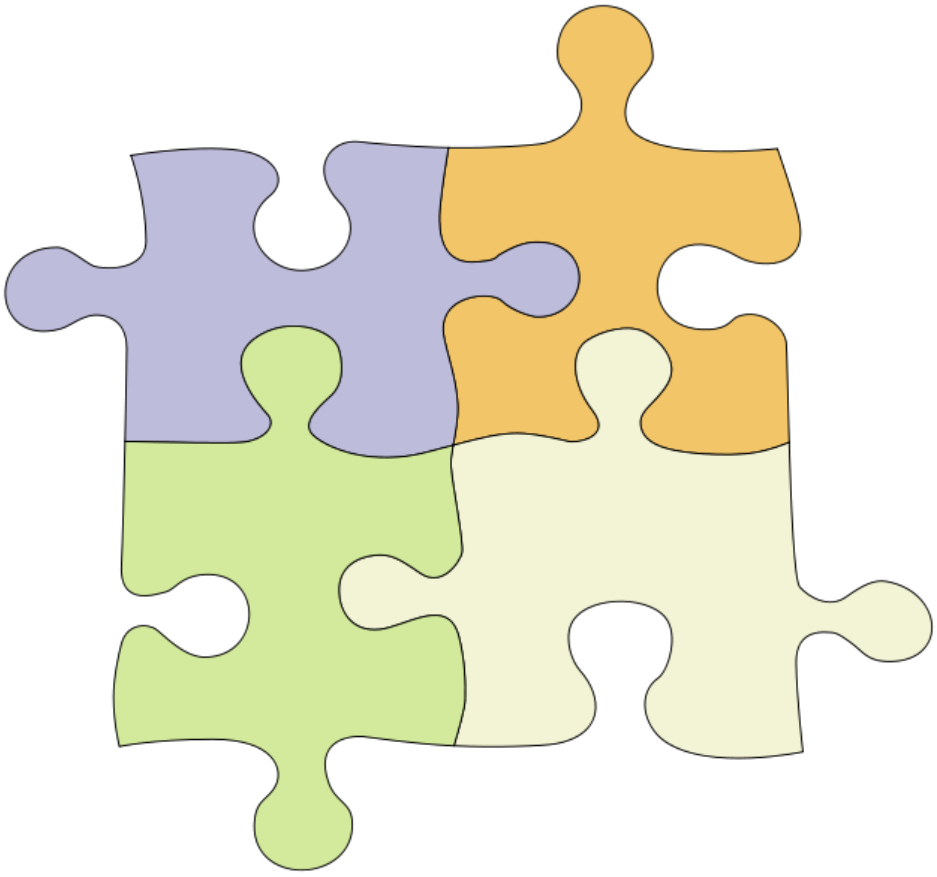

Figure 1.2: https://commons.wikimedia.org/wiki/File:Puzzle-4.svg

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.

2.1 KOMA options

The class is based on the scrbook, therefore it understands all of the options you would normally pass to that class. By default, the font size is 9pt and the paragraphs are separated by space, not marked by indentation. The default value for parskip is half.

The toc has an entry for everything: listoffigures, listoftables, indices, and bibliographies. There are also entries for the tableofcontents itself (through the `\setuptoc{toc}{totoc}` command). If you want entries for the glossaries as well, you can set the `toc` option of the package `glossaries`.

2.2 kao options

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

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

2.3 Other things worth knowing

By default, dispositions are numbered up to the section thanks to the command `\setcounter{secnumdepth}{1}`. We also altered slightly the entries of the parts in the table of contents so as to include "Part". The table of contents can be modified through the package `etoc`, which is loaded because it is needed for the margintocs.

The packages `inputenc`, `hyphenat`, `microtype` are already loaded, but you have to load babel or polyglossia and csquotes, if you wish.

We also load `xcolor`.

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 frontmatter, through the commands `\@plaintitle` and `\@plainauthor`, respectively. The pdftitle and pdfauthor are set through hyperref to the plain values if present, otherwise to the normal values.

The frontmatter uses a layout without margins and a plain page style (*i.e.* no headings). In the mainmatter the margins are wide, the page numbers are arabic (while in the frontmatter there are roman numbers) and the headings are fancy. In the appendix we use `\bookmarksetup{startatroot}` so that the bookmarks to the chapters are on their own; without this, they would be under the previous part. In the backmatter the margins shrink again and we reset again the bookmarks root.

3

Sidenotes and Marginnotes

3.1 Sidenotes

To insert a sidenote, just enter the command `\sidenote{Text of the note}`. You can specify a mark[O] with `\sidenote[mark]{Text}`, or you can specify an offset and a mark with `\sidenote[offset][mark]{Text}`, in which case the mark can be empty. If you want to know more, read the documentation of the `snotez` package.

O: This sidenote has a special mark

Sidenotes are handled through the `snotez` package, which relies on the `marginnote` package. The sidenote counter is never reset, but if you want you can reset it at every chapter.

3.2 Marginnotes

Usage

This command is similar to the previous one: you can use it like `\marginnote[offset]{Text}`, where the offset argument can be left out.

Details

We load the packages `marginnote`, `marginfix` and `placeins`. Since `snotez` uses `marginnote`, what we say for marginnotes is also valid for sidenotes. The style of marginnotes and captions is the same, and the notes are shifted slightly upwards (`\renewcommand{\marginnotevadjust}{-11pt}`) in order to allineate them to the bottom of the line of text where the marginnote is issued.

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 offset option can be either a length or a multiple of `baselineskip`, *e. g.* `marginnote[*-3]Text`.

3.3 Footnotes

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 provide 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 accepts a parameter for the vertical offset, like so: `\margintoc[offset]`. It can be used in any point of the document, but we think it makes sense to use it at the beginning of chapters or parts. We like to put it in the chapter preamble, with this code:

```
\setchapterpreamble[u]{\margintoc}
\chapter{Sidenotes and Marginnotes}
```

* And this is how they look like.

Figure 4.1: By Bushra Feroz - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=68724647

4 Figures and Tables

4.1 Normal figures and tables

Normal figures and tables can be inserted just like in any standard LaTeX document. The captions will be positioned in the margins thanks to the `floatrow` package. The space between the figure and the text can be specified with the following commands:

```
\renewcommand\FBaskip{4pt}
\renewcommand\FBbskip{4pt}
```

Here is a picture of Mona Lisa (**Figure 4.2**), as an example. The captions are formatted as the marginnotes; to change the options you can use `\captsetup` from the `caption` package.

Figure 4.2: 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.

I don't have much 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 –

col1	col2	col3
Multiple row	cell2 cell5 cell8	cell3 cell6 cell9

Table 4.1: A useless table.

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.

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. There is also the `margintable` environment, of which **Table 4.2** is an example.

col1	col2	col3
Multiple row	cell2 cell5 cell8	cell3 cell6 cell9

Table 4.2: Another useless table.

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

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

Offset ca be either a measure or a multiple of `\baselineskip` in the format `[*5]`. If you are wondering how I inserted this orange bubble, have a look at the `todo` package.

improve this part

4.3 Wide figures and tables

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

Now, if you will excuse me, I will add some more blindtext. 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 –

Figure 4.3: 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. 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.

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5

References

5.1 Citations

To cite someone [1, 2] 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. For this setup I used biblatex but I think that workarounds are possible [2] . Note that the citations have nothing to do with the text, they are completely random as they only serve the purpose to illustrate the feature.

[1]: Visscher et al. (2008), 'Heritability in the genomics era–concepts and misconceptions.'
[2]: James et al. (2013), *An Introduction to Statistical Learning*

[2]: James et al. (2013), *An Introduction to Statistical Learning*

5.2 Glossaries and Indices

I previously defined some glossary entries and now I am going to use them, for instance, like this: computer. Since we are here, let us reference an acronym: this is the full version, Frame per Second (FPS), and this is the short one FPS. These entries will appear in the glossary in the backmatter.

Now let us try the index. I have just called `\index{index}`, and an entry in the index has been added.

6

Mathematics and Boxes

6.1 Theorems

Despite most people complain at the sight of a book full of equations, mathematics is an important part of many books. Here, we shall illustrate some of the possibilities. We believe that theorems, definitions, remarks and examples should be emphasised with a shaded background; however, the colour should not be to heavy on the eyes, so we have chosen light yellow.[4]

4: The boxes are all of the same colour here, because we did not want our document to look like Harlequin.

Definition 6.1.1 *Let (X, d) be a metric space. A subset $U \subset X$ is an open set if, for any $x \in U$ there exists $r > 0$ such that $B(x, r) \subset U$. We call the topology associated to d the set τ_d of all the open subsets of (X, d).*

Definition 6.1.1 is very important.

Theorem 6.1.1 *A finite intersection of open sets of (X, d) is an open set of (X, d), i.e τ_d is closed under finite intersections. Any union of open sets of (X, d) is an open set of (X, d).*

Proposition 6.1.2 *A finite intersection of open sets of (X, d) is an open set of (X, d), i.e τ_d is closed under finite intersections. Any union of open sets of (X, d) is an open set of (X, d).*

Lemma 6.1.3 *A finite intersection[a] of open sets of (X, d) is an open set of (X, d), i.e τ_d is closed under finite intersections. Any union of open sets of (X, d) is an open set of (X, d).*

[a] I'm a footnote

You can even insert footnotes inside the theorem environments; they will be displayed at the bottom of the box.

You can safely ignore the content of the theorems...

Corollary 6.1.4 (Finite Intersection, Countable Union) *A finite intersection of open sets of (X, d) is an open set of (X, d), i.e τ_d is closed under finite intersections. Any union of open sets of (X, d) is an open set of (X, d).*

Proof. The proof is left to the reader as a trivial exercise. Hint: 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. □

Definition 6.1.2 *Let (X, d) be a metric space. A subset $U \subset X$ is an open set if, for any $x \in U$ there exists $r > 0$ such that $B(x, r) \subset U$. We call the topology associated to d the set τ_d of all the open subsets of (X, d).*

$$x = a_0 + \cfrac{1}{a_1 + \cfrac{1}{a_2 + \cfrac{1}{a_3 + \cfrac{1}{a_4}}}}$$

Example 6.1.1 Let (X, d) be a metric space. A subset $U \subset X$ is an open set if, for any $x \in U$ there exists $r > 0$ such that $B(x, r) \subset U$. We call the topology associated to d the set τ_{d} of all the open subsets of (X, d).

Remark 6.1.1 Let (X, d) be a metric space. A subset $U \subset X$ is an open set if, for any $x \in U$ there exists $r > 0$ such that $B(x, r) \subset U$. We call the topology associated to d the set τ_{d} of all the open subsets of (X, d).

As you may have noticed, definitions, example and remarks have independent counters; theorems, propositions, lemmas and corollaries share the same counter.

Remark 6.1.2 Here is how an integral looks like inline: $\int_a^b x^2 dx$, and here is the same integral displayed in its own paragraph:

$$\int_a^b x^2 dx$$

We provide two files for the theorem styles: plaintheorems.sty, which you should include if you do not want coloured boxes around theorems; and mdftheorems.sty, which is the one used for this document.

6.2 Boxes & Custom Environments [5]

5: Notice that in the table of contents and in the header, the name of this section is 'Boxes & Environments'; we achieved this with the optional argument of the `section` command.

Say you want to insert a special section, an optional content or just something you want to emphasise. Boxes are the right choice. We used mdframed to construct the ones shown below.

Title of the box

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.

If you set up a counter, you can even create your own numbered environment.

Comment 6.2.1

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.

6.3 Experiments

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.

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title of margin note

Margin note inside a kaobox. (Actually, kaobox inside a marginnote!)

A

Heading on Level 0 (chapter)

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.

A.1 Heading on Level 1 (section)

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.

Heading on Level 2 (subsection)

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.

Heading on Level 3 (subsubsection)

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.

Heading on Level 4 (paragraph) 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.

A.2 Lists

Example for list (itemize)

- First item in a list
- Second item in a list
- Third item in a list
- Fourth item in a list
- Fifth item in a list

*Example for list (4*itemize)*

- First item in a list
  - First item in a list
    - First item in a list
      - First item in a list
      - Second item in a list
    - Second item in a list
  - Second item in a list
- Second item in a list

Example for list (enumerate)

1. First item in a list
2. Second item in a list
3. Third item in a list
4. Fourth item in a list
5. Fifth item in a list

*Example for list (4*enumerate)*

1. First item in a list
    a) First item in a list
        i. First item in a list
            A. First item in a list
            B. Second item in a list
        ii. Second item in a list
    b) Second item in a list
2. Second item in a list

Example for list (description)

First item in a list

Second item in a list

Third item in a list

Fourth item in a list

Fifth item in a list

*Example for list (4*description)*

First item in a list

First item in a list

First item in a list

First item in a list

Second item in a list

Second item in a list

Second item in a list

Second item in a list

Bibliography

[1] Peter M Visscher, William G Hill, and Naomi R Wray. 'Heritability in the genomics era–concepts and misconceptions.' In: *Nat. Rev. Genet.* 9.4 (2008), pp. 255–266. DOI: 10.1038/nrg2322 (cited on page 13).

[2] Gareth James et al. *An Introduction to Statistical Learning*. 2013 (cited on page 13).

Alphabetical Index

Special Terms

C

computer is a programmable machine that receives input, stores and manipulates data, and provides output in a useful format. 13

F

FPS Frame per Second. 13