Template and best practices for typesetting homework papers

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Contents

1 Introduction

1.1 What this document is

This document is intended to serve as a guideline for designing university assignment papers. It's purpose is

- to teach myself LaTeX

- to develop a workflow (i.e. decide on resolutions to use when exporting graphics from R or maps from Qgis and catalog example images with known dimensions in this document)

- to provide an outline I can fill with contents

- to act as a reference for often used typesetting operations like inserting maps, tables, code blocks, etc.

- to standardize the visual appearance of my papers (in regards to color scheme, layout, typeface, etc.)

1.2 Source code

Because this document is at its core a template to kick-start my layout and formatting process, much of the information is actually found within the *document code* (and not in the rendered document) either as comments in between lines of LaTeXcode or simply as preset LaTeXblocks and sections that only need to be populated with content and compiled. If you are reading this text in a PDF viewer you might want to look at the code that was used to make it. You can download it from my gitHub repository:

`https://github.com/nico51two/LaTeX-Template`

or read it on *overleaf.com* where I'll be working on the document until I find it necessary to start using an offline editor:

`https://de.overleaf.com/read/xdschdggxbzx`

1.3 What this document isn't

This is not a guide on how to use LaTeX. It's not didactical and it is certainly not comprehensive. It's purely tailored around my individual needs and preferences. E.g. as of now I have not found it necessary to extensively comment the document code. This might change at some point when I start implementing more complex structures.

2 Fonts and Formatting

2.1 Typefaces

To keep a consistent look across all my documents I decided to only use "Kp-fonts" because

1. it provides a complete replacement for the default LaTeXfont with

    (a) the standard text body typeface you are looking at
    (b) **bold** text
    (c) *italicized* text
    (d) <u>underlined</u> text
    (e) *emphasized* text that does not seem to look very different from the *italicized* text now that I'm seeing it compiled

2. it's specifically designed to ensure readability across many display types and resolutions

3. it looks good in low resolution prints and copies

4. it comes with a mono-spaced font that is necessary to display readable and properly formated programming code in a document

5. it comes with matching glyphs for formulas and mathematical notation

2.2 Code blocks and in-line code

For now all code related content of this document will focus on code written in R. When describing e.g. a data analysis processing chain it can be necessary to use in-line code snippets. This can be done in LaTeXusing the `verb` and `verbatim` commands. Inserting a code block is done like this:

```
# this is a comment
example <- c(1,3,1,2)
mean(example)
```

Referring to a short R-package-specific command within the text body would be done like this: `psych::pairs.panels()`. Notice that this does not produce any output. It's purely about the font. For information on how to create "literate programming" documents and include interpreted code into a document read the workflow chapter.

3 LATEXWorkflow

3.1 drafting and transfer to LATEXenvironment

rough outline of workflow for the whole writing process drafting (markdown) to LATEX.

3.2 Knitr and tidyverse

Knitr blocks show compiled R code and its echoed output. Within the LATEXcode put the R code in between <<>>= and @ to produce a code chunk like this:

```r
library(tidyverse)
data <- as_tibble(mtcars) # show output in chunk
head(data)

## # A tibble: 6 x 11
##     mpg   cyl  disp    hp  drat    wt  qsec    vs    am  gear  carb
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  21       6   160   110  3.9   2.62  16.5     0     1     4     4
## 2  21       6   160   110  3.9   2.88  17.0     0     1     4     4
## 3  22.8     4   108    93  3.85  2.32  18.6     1     1     4     1
## 4  21.4     6   258   110  3.08  3.22  19.4     1     0     3     1
## 5  18.7     8   360   175  3.15  3.44  17.0     0     0     3     2
## 6  18.1     6   225   105  2.76  3.46  20.2     1     0     3     1
```

To create a pretty table in R and pipe it into a document use
`print(xtable(object, type = latex))`
and export the table from R into the LATEXdocument directory.

```r
library(tidyverse)
library(xtable)
data <- as_tibble(head(mtcars))
print(xtable(data, type = "latex"), file = "cartable.tex")
```

When working with *overleaf.com* just upload the .tex file and insert in the document like so:

|	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
1	21.00	6.00	160.00	110.00	3.90	2.62	16.46	0.00	1.00	4.00	4.00
2	21.00	6.00	160.00	110.00	3.90	2.88	17.02	0.00	1.00	4.00	4.00
3	22.80	4.00	108.00	93.00	3.85	2.32	18.61	1.00	1.00	4.00	1.00
4	21.40	6.00	258.00	110.00	3.08	3.21	19.44	1.00	0.00	3.00	1.00
5	18.70	8.00	360.00	175.00	3.15	3.44	17.02	0.00	0.00	3.00	2.00
6	18.10	6.00	225.00	105.00	2.76	3.46	20.22	1.00	0.00	3.00	1.00

3.3 Version control

The document code is split up into individual `.tex` and `.Rtex` files which can be managed using GitHub and Overleaf. Check the Intro section for the links.

4 Color Schemes

Since I've decided to always use the same color schemes for visual consistency and for not having to make decisions during data processing it makes sense to stick to colorblind friendly ones.

```r
# demonstrate color blind friendly palette using RColorBrewer in R
library(RColorBrewer)
display.brewer.all(colorblindFriendly = T)
```
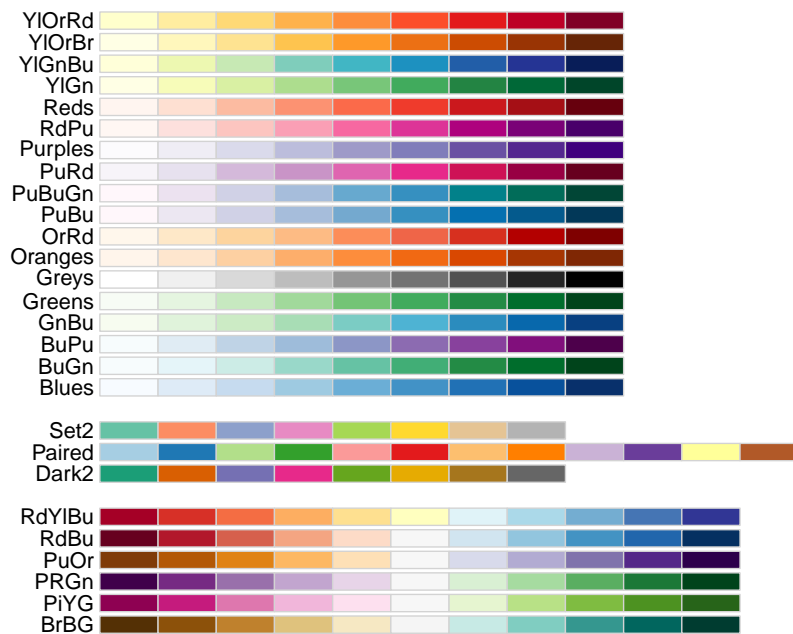
5   Formula Guide

small section on making numbered formulas and using symbols

6 Graph Guide

same as map section with specific layout presets for often used large plots like pairs.panels()

7   Table Guide

small and half page table layout as well as landscape a4 table template

8 Citation Guide

zotero to document workflow. should make it easy to get sources in the doc early.. maybe even make it possible to already add linked in-text citations before the reference list is finished?

9 References

for now this is just a dump for links and such

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
1	21.00	6.00	160.00	110.00	3.90	2.62	16.46	0.00	1.00	4.00	4.00
2	21.00	6.00	160.00	110.00	3.90	2.88	17.02	0.00	1.00	4.00	4.00
3	22.80	4.00	108.00	93.00	3.85	2.32	18.61	1.00	1.00	4.00	1.00
4	21.40	6.00	258.00	110.00	3.08	3.21	19.44	1.00	0.00	3.00	1.00
5	18.70	8.00	360.00	175.00	3.15	3.44	17.02	0.00	0.00	3.00	2.00
6	18.10	6.00	225.00	105.00	2.76	3.46	20.22	1.00	0.00	3.00	1.00

10 to do

write all the sections
create example maps and images
gather sources for data visualization rules