Nifty Neato Models

Computational Thinking on the wild frontier

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Contents

Chapter 1

Prerequisites

This is a *sample* book written in **Markdown**. You can use anything that Pandoc's Markdown supports, e.g., a math equation $a^2 + b^2 = c^2$.

The **bookdown** package can be installed from CRAN or Github:

```
install.packages("bookdown")
# or the development version
# devtools::install_github("rstudio/bookdown")
```

Remember each Rmd file contains one and only one chapter, and a chapter is defined by the first-level heading `#`.

To compile this example to PDF, you need XeLaTeX. You are recommended to install TinyTeX (which includes XeLaTeX): https://yihui.org/tinytex/.

Chapter 2

Introduction

You can label chapter and section titles using `{#label}` after them, e.g., we can reference Chapter 2. If you do not manually label them, there will be automatic labels anyway, e.g., Chapter 4.

Figures and tables with captions will be placed in `figure` and `table` environments, respectively.

```
par(mar = c(4, 4, .1, .1))
plot(pressure, type = 'b', pch = 19)
```

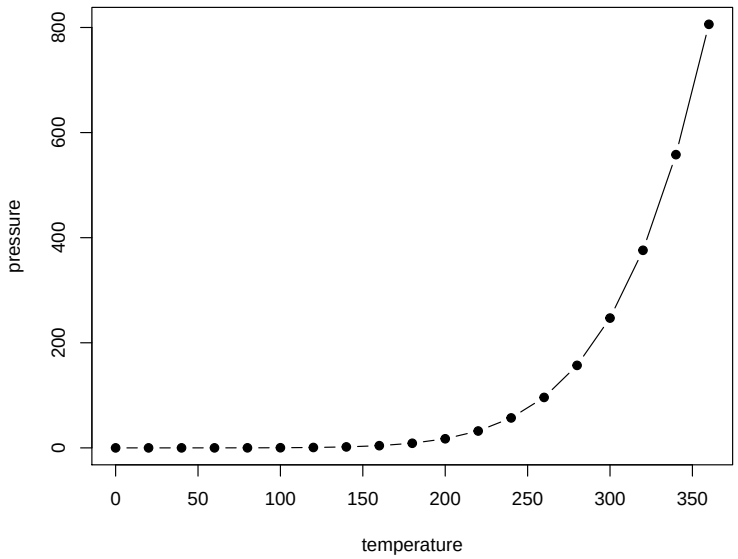

Figure 2.1: Here is a nice figure!

Table 2.1: Here is a nice table!

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa
4.6	3.4	1.4	0.3	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.9	3.1	1.5	0.1	setosa
5.4	3.7	1.5	0.2	setosa
4.8	3.4	1.6	0.2	setosa
4.8	3.0	1.4	0.1	setosa
4.3	3.0	1.1	0.1	setosa
5.8	4.0	1.2	0.2	setosa
5.7	4.4	1.5	0.4	setosa
5.4	3.9	1.3	0.4	setosa
5.1	3.5	1.4	0.3	setosa
5.7	3.8	1.7	0.3	setosa
5.1	3.8	1.5	0.3	setosa

Reference a figure by its code chunk label with the `fig:` prefix, e.g., see Figure 2.1. Similarly, you can reference tables generated from `knitr::kable()`, e.g., see Table 2.1.

```
knitr::kable(
  head(iris, 20), caption = 'Here is a nice table!',
  booktabs = TRUE
)
```

You can write citations, too. For example, we are using the **bookdown** package (Xie, 2020) in this sample book, which was built on top of R Markdown and **knitr** (Xie, 2015).

Chapter 3

Literature

Here is a review of existing methods.

Chapter 4

Methods

We describe our methods in this chapter.

Chapter 5

Applications

Some *significant* applications are demonstrated in this chapter.

5.1 Example one

5.2 Example two

Chapter 6

Tables are fun

```
library(tidyverse)
library(gt)
```

Tables can be a challenge to render

https://bookdown.org/yihui/bookdown/tables.html

6.1 Paged tables are interactive but only work in .nb.html

```
starwars
```

```
## # A tibble: 87 x 14
##    name  height  mass hair_color skin_color eye_color birth_year sex   gender
##    <chr>  <int> <dbl> <chr>      <chr>      <chr>          <dbl> <chr> <chr>
##  1 Luke~    172    77 blond      fair       blue            19   male  mascu~
##  2 C-3PO    167    75 <NA>       gold       yellow         112   none  mascu~
##  3 R2-D2     96    32 <NA>       white, bl~ red             33   none  mascu~
##  4 Dart~    202   136 none       white      yellow          41.9 male  mascu~
##  5 Leia~    150    49 brown      light      brown           19   fema~ femin~
##  6 Owen~    178   120 brown, gr~ light      blue            52   male  mascu~
##  7 Beru~    165    75 brown      light      blue            47   fema~ femin~
##  8 R5-D4     97    32 <NA>       white, red red             NA   none  mascu~
##  9 Bigg~    183    84 black      light      brown           24   male  mascu~
## 10 Obi-~    182    77 auburn, w~ fair       blue-gray       57   male  mascu~
## # ... with 77 more rows, and 5 more variables: homeworld <chr>, species <chr>,
## #   films <list>, vehicles <list>, starships <list>
```

Table 6.1: Another nice table!

name	height	mass	hair_color	skin_color	eye_color
Luke Skywalker	172	77	blond	fair	blue
C-3PO	167	75	NA	gold	yellow
R2-D2	96	32	NA	white, blue	red
Darth Vader	202	136	none	white	yellow
Leia Organa	150	49	brown	light	brown
Owen Lars	178	120	brown, grey	light	blue
Beru Whitesun lars	165	75	brown	light	blue
R5-D4	97	32	NA	white, red	red
Biggs Darklighter	183	84	black	light	brown
Obi-Wan Kenobi	182	77	auburn, white	fair	blue-gray
Anakin Skywalker	188	84	blond	fair	blue
Wilhuff Tarkin	180	NA	auburn, grey	fair	blue
Chewbacca	228	112	brown	unknown	blue
Han Solo	180	80	brown	fair	brown
Greedo	173	74	NA	green	black
Jabba Desilijic Tiure	175	1358	NA	green-tan, brown	orange
Wedge Antilles	170	77	brown	fair	hazel
Jek Tono Porkins	180	110	brown	fair	blue
Yoda	66	17	white	green	brown
Palpatine	170	75	grey	pale	yellow

6.2 non-interactive

Old school, BUT easily cross functional with PDF and HTML alike

```
knitr::kable(
  head(starwars %>% select(1:6), 20), caption = 'Another nice table!',
  booktabs = TRUE
)
```

6.3 Great Tables

the `gt` package is awesome but doesn't work in PDF

```
starwars %>%
  select(1:4) %>%
  slice_head(n = 8) %>%
```

```
gt() %>%
tab_header(
  title = md("**_Star Wars_ characters**"),
  subtitle = "subtitles are cool"
  ) %>%
tab_source_note(
  source_note = md("Source:  `dplyr::starwars`")
  ) %>%
tab_options(heading.background.color = "darkseagreen")
```

Star Wars characters

subtitles are cool

name	height	mass	hair_color
Luke Skywalker	172	77	blond
C-3PO	167	75	NA
R2-D2	96	32	NA
Darth Vader	202	136	none
Leia Organa	150	49	brown
Owen Lars	178	120	brown, grey
Beru Whitesun lars	165	75	brown
R5-D4	97	32	NA

Source: `dplyr::starwars`

None of this was based on a book by John Little (Little, 2018).

Chapter 7

Final Words

We have finished a nice book.

Bibliography

Little, J. (2018). *Cleaning Data with OpenRefine*. accordion press, 411 Chapel Dr., 2nd edition. ISBN.

Xie, Y. (2015). *Dynamic Documents with R and knitr*. Chapman and Hall/CRC, Boca Raton, Florida, 2nd edition. ISBN 978-1498716963.

Xie, Y. (2020). *bookdown: Authoring Books and Technical Documents with R Markdown*. R package version 0.21.