

A Minimal Book Example

John Doe

2022-09-01

Contents

1	About	5
1.1	Usage	5
1.2	Render book	5
1.3	Preview book	6
2	Hello bookdown	7
2.1	A section	7
3	Cross-references	9
3.1	Chapters and sub-chapters	9
3.2	Captioned figures and tables	9
4	Parts	13
5	Footnotes and citations	15
5.1	Footnotes	15
5.2	Citations	15
6	Blocks	17
6.1	Equations	17
6.2	Theorems and proofs	17
6.3	Callout blocks	17

7	Sharing your book	19
7.1	Publishing	19
7.2	404 pages	19
7.3	Metadata for sharing	19

Chapter 1

About

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

1.1 Usage

Each **bookdown** chapter is an .Rmd file, and each .Rmd file can contain one (and only one) chapter. A chapter *must* start with a first-level heading: **# A good chapter**, and can contain one (and only one) first-level heading.

Use second-level and higher headings within chapters like: **## A short section** or **### An even shorter section**.

The `index.Rmd` file is required, and is also your first book chapter. It will be the homepage when you render the book.

1.2 Render book

You can render the HTML version of this example book without changing anything:

1. Find the **Build** pane in the RStudio IDE, and
2. Click on **Build Book**, then select your output format, or select “All formats” if you’d like to use multiple formats from the same book source files.

Or build the book from the R console:

```
bookdown::render_book()
```

To render this example to PDF as a `bookdown::pdf_book`, you'll need to install XeLaTeX. You are recommended to install TinyTeX (which includes XeLaTeX): <https://yihui.org/tinytex/>.

1.3 Preview book

As you work, you may start a local server to live preview this HTML book. This preview will update as you edit the book when you save individual .Rmd files. You can start the server in a work session by using the RStudio add-in “Preview book”, or from the R console:

```
bookdown::serve_book()
```

Chapter 2

Hello bookdown

All chapters start with a first-level heading followed by your chapter title, like the line above. There should be only one first-level heading (#) per .Rmd file.

2.1 A section

All chapter sections start with a second-level (##) or higher heading followed by your section title, like the sections above and below here. You can have as many as you want within a chapter.

An unnumbered section

Chapters and sections are numbered by default. To un-number a heading, add a {.unnumbered} or the shorter {-} at the end of the heading, like in this section.

Chapter 3

Cross-references

Cross-references make it easier for your readers to find and link to elements in your book.

3.1 Chapters and sub-chapters

There are two steps to cross-reference any heading:

1. Label the heading: `# Hello world {#nice-label}`.
 - Leave the label off if you like the automated heading generated based on your heading title: for example, `# Hello world = # Hello world {#hello-world}`.
 - To label an un-numbered heading, use: `# Hello world {-#nice-label}` or `{# Hello world .unnumbered}`.
2. Next, reference the labeled heading anywhere in the text using `\@ref(nice-label)`; for example, please see Chapter 3.
 - If you prefer text as the link instead of a numbered reference use: any text you want can go here.

3.2 Captioned figures and tables

Figures and tables *with captions* can also be cross-referenced from elsewhere in your book using `\@ref(fig:chunk-label)` and `\@ref(tab:chunk-label)`, respectively.

See Figure 3.1.

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



Figure 3.1: Here is a nice figure!

Don't miss Table 3.1.

```
knitr::kable(  
  head(pressure, 10), caption = 'Here is a nice table!',  
  booktabs = TRUE  
)
```

Table 3.1: Here is a nice table!

temperature	pressure
0	0.0002
20	0.0012
40	0.0060
60	0.0300
80	0.0900
100	0.2700
120	0.7500
140	1.8500
160	4.2000
180	8.8000

Chapter 4

Parts

You can add parts to organize one or more book chapters together. Parts can be inserted at the top of an .Rmd file, before the first-level chapter heading in that same file.

Add a numbered part: `# (PART) Act one {-}` (followed by `# A chapter`)

Add an unnumbered part: `# (PART*) Act one {-}` (followed by `# A chapter`)

Add an appendix as a special kind of un-numbered part: `# (APPENDIX) Other stuff {-}` (followed by `# A chapter`). Chapters in an appendix are prepended with letters instead of numbers.

Chapter 5

Footnotes and citations

5.1 Footnotes

Footnotes are put inside the square brackets after a caret `^[]`. Like this one ¹.

5.2 Citations

Reference items in your bibliography file(s) using `@key`.

For example, we are using the **bookdown** package [Xie, 2022] (check out the last code chunk in `index.Rmd` to see how this citation key was added) in this sample book, which was built on top of R Markdown and **knitr** [Xie, 2015] (this citation was added manually in an external file `book.bib`). Note that the `.bib` files need to be listed in the `index.Rmd` with the YAML `bibliography` key.

The RStudio Visual Markdown Editor can also make it easier to insert citations: <https://rstudio.github.io/visual-markdown-editing/#/citations>

¹This is a footnote.

Chapter 6

Blocks

6.1 Equations

Here is an equation.

$$f(k) = \binom{n}{k} p^k (1-p)^{n-k} \quad (6.1)$$

You may refer to using `\@ref{eq:binom}`, like see Equation (6.1).

6.2 Theorems and proofs

Labeled theorems can be referenced in text using `\@ref{thm:tri}`, for example, check out this smart theorem 6.1.

Theorem 6.1. *For a right triangle, if c denotes the length of the hypotenuse and a and b denote the lengths of the **other** two sides, we have*

$$a^2 + b^2 = c^2$$

Read more here <https://bookdown.org/yihui/bookdown/markdown-extensions-by-bookdown.html>.

6.3 Callout blocks

The R Markdown Cookbook provides more help on how to use custom blocks to design your own callouts: <https://bookdown.org/yihui/rmarkdown-cookbook/custom-blocks.html>

Chapter 7

Sharing your book

7.1 Publishing

HTML books can be published online, see: <https://bookdown.org/yihui/bookdown/publishing.html>

7.2 404 pages

By default, users will be directed to a 404 page if they try to access a webpage that cannot be found. If you'd like to customize your 404 page instead of using the default, you may add either a `_404.Rmd` or `_404.md` file to your project root and use code and/or Markdown syntax.

7.3 Metadata for sharing

Bookdown HTML books will provide HTML metadata for social sharing on platforms like Twitter, Facebook, and LinkedIn, using information you provide in the `index.Rmd` YAML. To setup, set the `url` for your book and the path to your `cover-image` file. Your book's `title` and `description` are also used.

This `gitbook` uses the same social sharing data across all chapters in your book—all links shared will look the same.

Specify your book's source repository on GitHub using the `edit` key under the configuration options in the `_output.yml` file, which allows users to suggest an edit by linking to a chapter's source file.

Read more about the features of this output format here:

<https://pkgs.rstudio.com/bookdown/reference/gitbook.html>

Or use:

```
?bookdown::gitbook
```

7.3.1 Deploying book

- <https://rachaellappan.github.io/bookdown/>

Using Bookdown for tidy documentation In my last blog post, I described how I use R Markdown as a tool in my research to document the analyses I do. I find this very useful to keep a record of the mass of troubleshooting and trial and error I do when I start a new analysis, but when it comes to having a neat record of the final pipeline for someone else to read (and hopefully understand) I needed to create something tidier.

I came across Bookdown by Yihui Xie, an R package that turns R Markdown documents into a neatly indexed book. Some nice examples of Bookdown books include the book about writing books with Bookdown (yes), Tim Stuart’s lab notebook which I mentioned in my last post and the vignette for Superheat, a fantastic R package for heatmaps from Rebecca Barter.

My first attempt at using Bookdown for neat documentation can be found here, where I recorded all of the analysis I did for our 16S rRNA amplicon dataset (paper currently under review). I found it useful both as a way of keeping a good record that I can easily refer to later, and to show other people exactly how I did the analysis in far more detail than the methods section of a paper would allow.

So, I thought I’d write a post on how I have used and hosted a Bookdown book on GitHub. I assume that RStudio is installed for making R Markdown documents - see my previous post.

1. Installing and using Bookdown I followed Sean Kross’ tutorial on how to start a Bookdown book. His GitHub repository contains a basic starting point from which I simply add more chapters (as separate R Markdown documents) and a `data/` directory where I put the files that I need to read in to R for the parts where I run some code. As I work on each chapter, I knit it to make sure it looks okay.

Sean Kross provides a great starting point for making a Bookdown book.

2. Setting it up with GitHub This involves using a bit of Git. If you are unfamiliar with Git, Software Carpentry has great introductory Git lessons but I will describe the steps here anyway.

The goal is to create a repository on GitHub (a place to upload the files for your Bookdown book), and connect the files on your computer to this repository so that the book can be displayed online from your GitHub account.

If you would like to keep track of the changes you make to your book (version control), set this up before you start working on it.

Create a GitHub account, if you don't have one already.

Create a new private repository while logged in to GitHub in a web browser (from the “+” menu in the top right). This is where the files in your book will be uploaded to; as mine contain a lot of analysed data I prefer to keep the files in a private repository but this is up to you. Keep the resulting webpage open for now.

If you are using Windows, install Git Bash. Keep the default options until you are prompted to select a terminal emulator, and select “Use Windows default console window”. This is how it is installed for Software Carpentry workshops. The Git Bash terminal will allow you to use Git from the command line on a Windows machine.

Connect Git to your GitHub account by giving it your email and username:

```
git config --global user.email "you@example.com" git config --global user.name  
"Your Name" Open up Git Bash and move to the directory where  
your Bookdown book is. For example (my USB is in G: drive): cd  
/g/PhD/Bookdown/bookdown-start-master/ Initiate a repository inside this  
directory: git init Connect the repository here on your computer to the online  
repository in your GitHub account. Do this by adding all of the files in the  
directory to the staging area of Git (the place for files that are ready to be  
saved in their current state to keep track of their changes): git add . Commit  
the changes (save a snapshot of the files as they currently are) with whatever  
message you like:
```

```
git commit -m "Started book" Tell Git where your online repository is - this link  
will be on the webpage you have after creating the online repository through  
your GitHub account:
```

```
git remote add origin https://github.com/rachaelappan/test.git And send the  
files there:
```

```
git push -u origin master You will be prompted for your GitHub login. Then if  
you refresh your GitHub repository, you can see the basic Bookdown files are  
now there.
```

Now you can start working on your book. Whenever you want to “save” the current version of the book, just repeat the git add, git commit and git push steps as above. This is useful for keeping track of how the book has changed (for example, if you need to revert back to a previous version) but your files are always saved on your computer.

3. Knitting the whole book Once all of my chapters are ready to become a complete book, I use the simple one-liner as described here in R while in the book's directory with `index.Rmd`.

```
bookdown::render_book("index.Rmd", "bookdown::gitbook")
```

```
#bookdown::render_book("index.Rmd", "bookdown::gitbook")
```

4. Hosting the book Now that the book is ready for the world to see, you simply need to tell GitHub where to find the rendered book. In your GitHub repository, enter the settings tab up the top and enable GitHub pages on the `/docs` folder. Because the book has been knitted, the HTML version of your book has been generated and is in the `docs` folder. GitHub pages creates a URL that will display those HTML pages.

Note that if your repository is private, people won't be able to view the files you've uploaded to GitHub but they will see the complete book.

That's it! I hope you find Bookdown as useful a tool as I have, I am always excited by neat and tidy ways to display complex information.

If you have any questions or comments, find me on Twitter or email me!

Written on October 9, 2017

<https://bookdown.org/yihui/bookdown/github.html>

Bibliography

Yihui Xie. *Dynamic Documents with R and knitr*. Chapman and Hall/CRC, Boca Raton, Florida, 2nd edition, 2015. URL <http://yihui.org/knitr/>. ISBN 978-1498716963.

Yihui Xie. *bookdown: Authoring Books and Technical Documents with R Markdown*, 2022. URL <https://CRAN.R-project.org/package=bookdown>. R package version 0.28.