

# Bookdown: Flexible Document Creation in RStudio

By: Joseph Thiers

# Ever have trouble with your LaTeX document?



```
corations, markings)
4.5cm
-2cm)
cm)
Goto Error ^ME Abort Trash Aux Files
\begin{document}
\begin{matrix}
\text{1.8 \addtolength{\oddsidemargin}{-1.5cm}} \\
\text{?} \\
\text{./errorfile.tex:8: You can't use 'the letter i' after \advance.} \\
\text{<argument> \oddsidemargin} \\
\text{demargin} \\
\text{1.8 \addtolength{\oddsidemargin}{-1.5cm}} \\
\text{?} \\
\text{./errorfile.tex:8: LaTeX Error: Missing \begin{document}.} \\
\text{See the LaTeX manual or LaTeX Companion for explanation.} \\
\text{Type H <return> for immediate help.} \\
\text{...} \\
\text{1.8 \addtolength{\oddsidemargin}{-1.5cm}} \\
\text{?} \\
\text{./errorfile.tex:12: Undefined control sequence.} \\
\text{1.12 \newcommand{\Z}} \\
\text{?} \\
\text{On error: <ret> ignore, [s] ignore all, [x] complete, [i]+text to insert replacement}
\end{matrix}
```



Poor formatting

27) Neither

28) Row echelon form.

$$35) \begin{bmatrix} -2 & 2 & -1 & 2 \\ 0 & 3 & 3 & -3 \\ 1 & -4 & 2 & 2 \end{bmatrix}$$

$$\begin{matrix} R_1 \leftrightarrow R_3 \\ \frac{1}{3}R_2 \rightarrow R_2 \end{matrix} \begin{bmatrix} 1 & -4 & 2 & 2 \\ 0 & 1 & 1 & -1 \\ 2 & -1 & 2 & 2 \end{bmatrix} \xrightarrow{2R_1 + R_3 \rightarrow R_3} \begin{bmatrix} 1 & -4 & 2 & 2 \\ 0 & 1 & 1 & -1 \\ 0 & -6 & 3 & 6 \end{bmatrix}$$

$$\begin{matrix} 6R_2 + R_3 \rightarrow R_3 \\ 4R_2 + R_1 \rightarrow R_1 \end{matrix} \begin{bmatrix} 1 & 0 & 6 & -2 \\ 0 & 1 & 1 & -1 \\ 0 & 0 & 9 & 0 \end{bmatrix} \xrightarrow{\frac{1}{9}R_3 \rightarrow R_3} \begin{bmatrix} 1 & 0 & 6 & -2 \\ 0 & 1 & 1 & -1 \\ 0 & 0 & 1 & 0 \end{bmatrix} \xrightarrow{\begin{matrix} -R_3 + R_2 \\ -6R_3 + R_1 \end{matrix}}$$

There is another way



# Introducing Bookdown

- ▶ Generate printer-ready books and ebooks from R Markdown documents.
- ▶ A markup language easier to learn than LaTeX, and to write elements such as section headers, lists, quotes, figures, tables, and citations.
- ▶ Multiple choices of output formats: PDF, LaTeX, HTML, EPUB, and Word.
- ▶ Support a wide range of languages: R, C/C++, Python, Fortran, Julia, Shell scripts, and SQL, etc.
- ▶ LaTeX equations, theorems, and proofs work for all output formats.
- ▶ Can be published to GitHub, bookdown.org, and any web servers.
- ▶ Integrated with the RStudio IDE.

# But why Bookdown?

Markdowns allows robust markdown editing.

```
32 Bookdown supports a wide range of Markdown formatting.
33
34 - **Bold**: `**bold text**` → **bold text**
35 - *Italics*: `*italicized text*` → *italicized text*
36 - **Bullet Points**:
37   - First item
38   - Second item
39 - **Numbered Lists**:
40   1. First item
41     - Even sublists
42     - Like this
43   2. Second item
```

Bookdown supports a wide range of Markdown formatting. Here are a few basics:

- **Bold**: `**bold text**` → **bold text**
- *Italics*: `*italicized text*` → *italicized text*
- **Bullet Points**:
  - First item
  - Second item
- **Numbered Lists**:
  1. First item
    - Even sublists
    - Like this
  2. Second item

For additional text formatting options refer to [Chapter 9 Advanced Text Formatting](#).

```
52 ▾ ### 4.3 Task Lists
53 - `[ ]` creates a task list.
54   ``markdown
55   - [x] Completed task
56   - [ ] Incomplete task
57   ``
58
59 - [x] Completed task
60 - [ ] Incomplete task
61
```

- `[ ]` creates a task list.

```
- [x] Completed task
- [ ] Incomplete task
```

It also allows the box to be clickable.

- ☒ Completed task
- ☐ Incomplete task

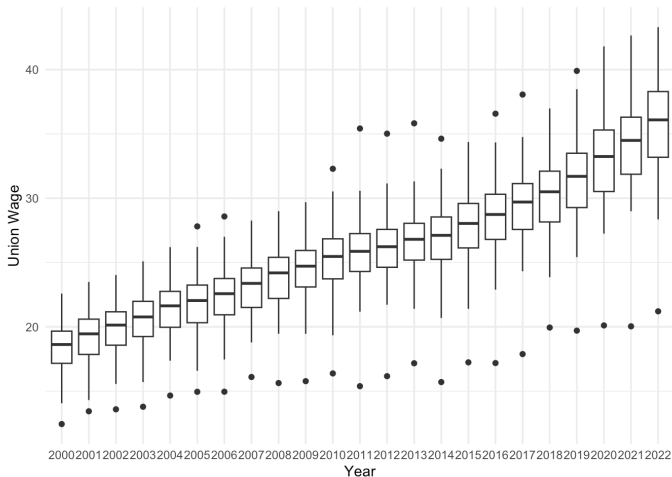
## Seamlessly Embed Code

- **Union Wage Premium:** I also calculated the “union wage premium,” which is basically the extra amount union workers make compared to nonunion workers.

```
union_wage_premium <- filtered_wages[,  
  list(raw_premium = mean(union_wage_premium_raw, na.rm = TRUE),  
    adjusted_premium = mean(union_wage_premium_adjusted,  
      na.rm = TRUE)), by = year]
```

# Including plots

```
ggplot(filtered_wages, aes(x = factor(year), y = union_wage)) +  
  geom_boxplot() +  
  labs(x = "Year", y = "Union Wage") +  
  theme_minimal()
```



# Seamless LaTeX Integration

Proofs can be added using the `proof` environment.

```
::: {.proof}
\textbf{Proof: }Let  $x \in \mathbb{Z}$ . Suppose  $7x+5$  is odd. Then  $7x+5=2k+1$  for some  $k$ 
\begin{align*}
7x+5&=2k+1\\
7x&=2k-4\\
x&=2k-6x-4\\
x&=2(k-3x-2).
\end{align*}
Since  $k-3x-2 \in \mathbb{Z}$ ,  $x$  is even.
:::
```

*Proof.* Let  $x \in \mathbb{Z}$ . Suppose  $7x + 5$  is odd. Then  $7x + 5 = 2k + 1$  for some  $k \in \mathbb{Z}$ . Then

$$\begin{aligned}7x + 5 &= 2k + 1 \\7x &= 2k - 4 \\x &= 2k - 6x - 4 \\x &= 2(k - 3x - 2).\end{aligned}$$

Since  $k - 3x - 2 \in \mathbb{Z}$ ,  $x$  is even.





## Customizable Aesthetics via CSS

```
15 ▾ .blackbox {  
16     padding: 1em;  
17     background: black;  
18     color: white;  
19     border: 2px solid orange;  
20     border-radius: 10px;  
21 ^ }  
22 ▾ .center {  
23     text-align: center;  
24 ^ }  
25 ▾ h1, h2, h3, h4, h5, h6 {  
26     font-family: "Times New Roman", Times, serif;  
27     color: darkblue;  
28 ^ }  
29 ▾ hr {  
30     border: 1px solid black;  
31     width: 100%;
```

## 5.4 Tips for LaTeX in Bookdown

- **Use Labels Consistently:** Use meaningful and unique labels for cross-referencing.
- **Use Math Mode:** Always enclose mathematical symbols in `$...$` or `$$...$$` to render correctly.
- **Add Theorem Styles:** Customize theorem environments in `_bookdown.yml` for specific needs:

```
markdown theorem: lab: "Theorem " lem: "Lemma "
```

### EXERCISE TIME!

Add an equation and a theorem to your document using LaTeX. Alternatively, copy over some LaTeX code you've written before and place it in one of your chapters.

## With LaTeX

```
31 \titleformat{\section}
32   {\fontsize{10pt}{12pt}\bfseries} |
33   {\thesection}
34   {1em}
35   {}
36 \titleformat{\subsection}
37   {\fontsize{10pt}{12pt}\bfseries}
38   {\thesubsection}
39   {1em}
40   {}
41 \setlength{\fboxsep}{.8em}
42
43 \newenvironment{blackbox}{
44   \definecolor{shadecolor}{rgb}{0, 0, 0}
45   \color{white}
```

# LaTeX Change

that mission hasn't changed. We need to keep building union power to make sure everyone gets a fair shake in this rapidly changing economy.

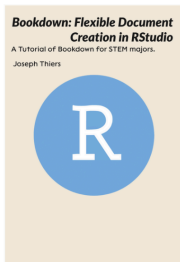
## **UNIONS MATTER!**

Your take away from this should be that the more of us who join unions, the better all of our wages will be!

## Output to multiple Formats

```
12 ▾ bookdown::pdf_book:  
13 ▾   includes:  
14     in_header: preamble.tex  
15     latex_engine: xelatex  
16     citation_package: natbib  
17     keep_tex: yes  
18 bookdown::epub_book: default|  
19 bookdown::word_document2: default
```

# epub and Word



epub

Document Creation in RStudio

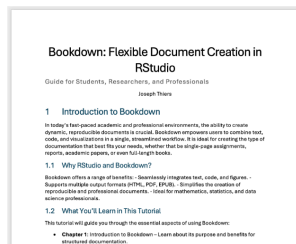
## 1 Introduction to Bookdown

In today's fast-paced academic and professional environments, the ability to create dynamic, reproducible documents is crucial. Bookdown empowers users to combine text, code, and visualizations in a single, streamlined workflow. It is ideal for creating the type of documentation that best fits your needs, whether that be single-page assignments, reports, academic papers, or even full-length books.

### 1.1 Why RStudio and Bookdown?

Bookdown offers a range of benefits: - Seamlessly integrates text, code, and figures. - Supports multiple output formats (HTML, PDF, EPUB). - Simplifies the creation of reproducible and professional documents. - Ideal for mathematics, statistics, and data science professionals.

Word



# HTML and PDF

## HTML

Introduction Tutorial to Bookdown

1 Introduction to Bookdown

1.1 Why RStudio and Bookdown?

1.2 What You'll Learn in This Tutorial...

2 Getting Started

3 Writing Content

3.1 Creating Chapters and Sections

3.2 Formatting Text in Bookdown

3.3 Adding Code Chunks

3.4 Adding Images to Your Bookdown...

4 Cross Referencing and Citations

4.1 Cross-Referencing Sections

4.2 See Section @ref{examplepap...}

4.3 Cross-Referencing Text

4.4 Cross-Referencing Figures

4.5 Cross-Referencing Tables

## Bookdown: Flexible Document Creation in RStudio

### *Guide for Students, Researchers, and Professionals*

Joseph Thiers

## Chapter 1 Introduction to Bookdown

In today's fast-paced academic and professional environments, the

## PDF

## Chapter 1

# Introduction to Bookdown

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## 1.2 What You'll Learn in This Tutorial

This tutorial will guide you through the essential aspects of using Bookdown:

- **Chapter 1:** Introduction to Bookdown – Learn about its purpose and benefits for structured documentation.
- **Chapter ??:** Getting Started – Install R, RStudio, and Bookdown, create

# Robust Documentation



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## BOOKDOWN

### Write HTML, PDF, ePub, and Kindle books with R Markdown

The **bookdown** package is an [open-source R package](#) that facilitates writing books and long-form articles/reports with R Markdown. Features include:

- Generate printer-ready books and ebooks from R Markdown documents.
- A markup language easier to learn than LaTeX, and to write elements such as section headers, lists, quotes, figures, tables, and citations.
- Multiple choices of output formats: PDF, LaTeX, HTML, EPUB, and Word.
- Possibility of including dynamic graphics and interactive applications (HTML widgets and Shiny apps).
- Support a wide range of languages: R, C/C++, Python, Fortran, Julia, Shell scripts, and SQL, etc.
- LaTeX equations, theorems, and proofs work for all output formats.





# Lots of additional Resources

- ▶ Bookdown Documentation  
<https://bookdown.org/yihui/bookdown/>
- ▶ R Markdown Cookbook  
<https://bookdown.org/yihui/rmarkdown-cookbook/>
- ▶ Pandoc <https://pandoc.org/>
- ▶ RStudio Bookdown Community  
<https://community.rstudio.com/tags/bookdown>
- ▶ Gallery of Books to Download  
<https://bookdown.org/home/archive/>

## Conclusion

QR for my Tutorial

