

# rmarkdown :: CHEATSHEET



## What is rmarkdown?



**.Rmd files** • Develop your code and ideas side-by-side in a single document. Run code as individual chunks or as an entire document.

**Dynamic Documents** • Knit together plots, tables, and results with narrative text. Render to a variety of formats like HTML, PDF, MS Word, or MS Powerpoint.

**Reproducible Research** • Upload, link to, or attach your report to share. Anyone can read or run your code to reproduce your work.

**1. New File**

**2. Embed Code**

**3. Write Text**

**4. Set Output Format(s) and Options**

**5. Save and Render**

**6. Share**

Other callouts: set preview location, insert code chunk, go to code chunk, run code chunk(s), show outline, modify chunk options, run all previous chunks, run current chunk.

## Workflow

- 1 Open a **new .Rmd file** in the RStudio IDE by going to *File > New File > R Markdown*.
- 2 **Embed code** in chunks. Run code by line, by chunk, or all at once.
- 3 **Write text** and add tables, figures, images, and citations. Format with Markdown syntax or the RStudio Visual Markdown Editor.
- 4 **Set output format(s) and options** in the YAML header. Customize themes or add parameters to execute or add interactivity with Shiny.
- 5 **Save and render** the whole document. Knit periodically to preview your work as you write.
- 6 **Share your work!**

**Visual Editor**

add/edit attributes

style options

insert citations

## Embed Code with knitr

### CODE CHUNKS

Surround code chunks with ``r`` and ``` or use the Insert Code Chunk button. Add a chunk label and/or chunk options inside the curly braces after `r`.

```
```${r} chunk-label, include=FALSE}
summary(mtcars)
```
```

### SET GLOBAL OPTIONS

Set options for the entire document in the first chunk.

```
```${r} include=FALSE}
knitr::opts_chunk$set(message = FALSE)
```
```

### INLINE CODE

Insert ``r <code>`` into text sections. Code is evaluated at render and results appear as text.

"Built with ``r getRversion()``" -> "Built with 4.1.0"

| OPTION                            | DEFAULT   | EFFECTS   |
|-----------------------------------|-----------|---|
| <b>echo</b>                       | TRUE      | display code in output document   |
| <b>error</b>                      | FALSE     | TRUE (display error messages in doc)<br>FALSE (stop render when error occurs)                             |
| <b>eval</b>                       | TRUE      | run code in chunk   |
| <b>include</b>                    | TRUE      | include chunk in doc after running  |
| <b>message</b>                    | TRUE      | display code messages in document   |
| <b>warning</b>                    | TRUE      | display code warnings in document   |
| <b>results</b>                    | "markup"  | "asis" (passthrough results)<br>"hide" (don't display results)<br>"hold" (put all results below all code) |
| <b>fig.align</b>                  | "default" | "left", "right", or "center"  |
| <b>fig.alt</b>                    | NULL      | alt text for a figure   |
| <b>fig.cap</b>                    | NULL      | figure caption as a character string  |
| <b>fig.path</b>                   | "figure/" | prefix for generating figure file paths   |
| <b>fig.width &amp; fig.height</b> | 7         | plot dimensions in inches   |
| <b>out.width</b>                  |           | rescales output width, e.g. "75%", "300px"  |
| <b>collapse</b>                   | FALSE     | collapse all sources & output into a single block   |
| <b>comment</b>                    | "###"     | prefix for each line of results   |
| <b>child</b>                      | NULL      | file(s) to knit and then include  |
| <b>purl</b>                       | TRUE      | include or exclude a code chunk when extracting source code with <code>knitr::purl()</code>               |

See more options and defaults by running `str(knitr::opts_chunk$get())`

## RENDERED OUTPUT

file path to output document

find in document

publish to [rpubs.com](https://rpubs.com), [shinyapps.io](https://shinyapps.io), Posit Connect

reload document

Document Title

Author Name

- R Markdown
- Including Plots

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

```
summary(cars)
```

| ##          | speed | dist           |
|-------------|-------|----------------|
| ## Min.     | : 4.0 | Min.: 2.00     |
| ## 1st Qu.: | 12.0  | 1st Qu.: 26.00 |
| ## Median : | 15.0  | Median : 36.00 |
| ## Mean :   | 15.4  | Mean : 42.98   |
| ## 3rd Qu.: | 19.0  | 3rd Qu.: 56.00 |
| ## Max. :   | 25.0  | Max. : 120.00  |

## Insert Citations

Create citations from a bibliography file, a Zotero library, or from DOI references.

### BUILD YOUR BIBLIOGRAPHY

- Add BibTeX or CSL bibliographies to the YAML header.

```
---
title: "My Document"
bibliography: references.bib
link-citations: TRUE
---
```

- If Zotero is installed locally, your main library will automatically be available.
- Add citations by DOI by searching "from DOI" in the **Insert Citation** dialog.

### INSERT CITATIONS

- Access the **Insert Citations** dialog in the Visual Editor by clicking the **@** symbol in the toolbar or by clicking **Insert > Citation**.
- Add citations with markdown syntax by typing `[@cite]` or `@cite`.

## Insert Tables

Output data frames as tables using `kable(data, caption)`.

| eruptions | waiting |
|-----------|---------|
| 3.600     | 79      |
| 1.800     | 54      |
| 3.333     | 74      |
| 2.283     | 62      |

```
```${r}
data <- faithful[1:4, ]
knitr::kable(data,
  caption = "Table with kable")
```
```

Other table packages include **flextable**, **gt**, and **kableExtra**.

## Write with Markdown

The syntax on the left renders as the output on the right.

| Plain text.  | Plain text.  |
|--|--|
| End a line with two spaces to start a new paragraph. | End a line with two spaces to start a new paragraph. |
| Also end with a backslash to make a new line.        | Also end with a backslash to make a new line.        |
| *italics* and **bold**                               | <i>italics</i> and <b>bold</b>                       |
| superscript <sup>2</sup> /subscript <sub>2</sub>     | superscript <sup>2</sup> /subscript <sub>2</sub>     |
| ~strikethrough~                                      | <del>strikethrough</del>                             |
| escaped: * _ \                                       | escaped: * _ \                                       |
| endash: --, emdash: ---                              | endash: –, emdash: —                                 |

| # Header 1               | Header 1                 |
|--------------------------|--------------------------|
| ## Header 2              | Header 2                 |
| ...                      | ...                      |
| ##### Header 6           | Header 6                 |
| - unordered list         | • unordered list         |
| - item 2                 | • item 2                 |
| - item 2a (indent 1 tab) | • item 2a (indent 1 tab) |
| - item 2b                | • item 2b                |
| 1. ordered list          | 1. ordered list          |
| 2. item 2                | 2. item 2                |
| - item 2a (indent 1 tab) | • item 2a (indent 1 tab) |
| - item 2b                | • item 2b                |

| <link url>                                      | <a href="http://www.posit.co/">http://www.posit.co/</a>                               |
|---|---|
| [This is a link.](link url)                     | This is a link.   |
| [This is another link][id].                     | This is another link.   |
| At the end of the document:<br>[id]: link url   |  |
| ![Caption](image.png)<br>or ![Caption][id2]     | Caption.  |
| At the end of the document:<br>[id2]: image.png |   |

| `verbatim code`                   | verbatim code                   |
|-----------------------------------|---------------------------------|
| multiple lines of verbatim code   | multiple lines of verbatim code |
| > block quotes                    | block quotes                    |
| equation: $\$e^{i\pi} + 1 = 0\$$  | equation: $e^{i\pi} + 1 = 0$    |
| equation block:<br>$\$E = mc^2\$$ | equation block:<br>$E = mc^2$   |
| horizontal rule:<br>---           | horizontal rule:<br>-----       |

| Right                 | Left | Default | Center |
|-----------------------|------|---------|--------|
| 12   12   12   12     | 12   | 12      | 12     |
| 123   123   123   123 | 123  | 123     | 123    |
| 1   1   1   1         | 1    | 1       | 1      |

**HTML Tabsets**

```
## Results {tabset}
### Plots
text

### Tables
more text
```

**Results**

Plots Tables

text





# Set Output Formats and their Options in YAML

Use the document's YAML header to set an **output format** and customize it with **output options**.

```
---
title: "My Document"
author: "Author Name"
output:
  html_document:
    toc: TRUE
---
```

Indent format 2 characters, indent options 4 characters

| OUTPUT FORMAT           | CREATES                      |
|-------------------------|------------------------------|
| html_document           | .html                        |
| pdf_document*           | .pdf                         |
| word_document           | Microsoft Word (.docx)       |
| powerpoint_presentation | Microsoft Powerpoint (.pptx) |
| odt_document            | OpenDocument Text            |
| rtf_document            | Rich Text Format             |
| md_document             | Markdown                     |
| github_document         | Markdown for Github          |
| ioslides_presentation   | ioslides HTML slides         |
| slidy_presentation      | Slidy HTML slides            |
| beamer_presentation*    | Beamer slides                |

\* Requires LaTeX, use `tinytex::install_tinytex()`  
Also see `flexdashboard`, `bookdown`, `distill`, and `blogdown`.

| IMPORTANT OPTIONS   | DESCRIPTION  | HTML | PDF | MS Word | MS PPT |
|---------------------|--|------|-----|---------|--------|
| anchor_sections     | Show section anchors on mouse hover (TRUE or FALSE)                                    | X    |     |         |        |
| citation_package    | The LaTeX package to process citations ("default", "natbib", "biblatex")               |      | X   |         |        |
| code_download       | Give readers an option to download the .Rmd source code (TRUE or FALSE)                | X    |     |         |        |
| code_folding        | Let readers to toggle the display of R code ("none", "hide", or "show")                | X    |     |         |        |
| css                 | CSS or SCSS file to use to style document (e.g. "style.css")                           | X    |     |         |        |
| dev                 | Graphics device to use for figure output (e.g. "png", "pdf")                           | X    | X   |         |        |
| df_print            | Method for printing data frames ("default", "kable", "tibble", "paged")                | X    | X   | X       | X      |
| fig_caption         | Should figures be rendered with captions (TRUE or FALSE)                               | X    | X   | X       | X      |
| highlight           | Syntax highlighting ("tango", "pygments", "kate", "zenburn", "textmate")               | X    | X   | X       |        |
| includes            | File of content to place in doc ("in_header", "before_body", "after_body")             | X    | X   |         |        |
| keep_md             | Keep the Markdown .md file generated by knitting (TRUE or FALSE)                       | X    | X   | X       | X      |
| keep_tex            | Keep the intermediate TEX file used to convert to PDF (TRUE or FALSE)                  | X    |     |         |        |
| latex_engine        | LaTeX engine for producing PDF output ("pdflatex", "xelatex", or "lualatex")           | X    |     |         |        |
| reference_docx/_doc | docx/pptx file containing styles to copy in the output (e.g. "file.docx", "file.pptx") |      |     | X       | X      |
| theme               | Theme options (see <a href="#">Bootswatch</a> and <a href="#">Custom Themes</a> below) | X    |     |         |        |
| toc                 | Add a table of contents at start of document (TRUE or FALSE)                           | X    | X   | X       | X      |
| toc_depth           | The lowest level of headings to add to table of contents (e.g. 2, 3)                   | X    | X   | X       | X      |
| toc_float           | Float the table of contents to the left of the main document content (TRUE or FALSE)   | X    |     |         |        |

Use `?<output format>` to see all of a format's options, e.g. `?html_document`

## Render

When you render a document, rmarkdown:

1. Runs the code and embeds results and text into an .md file with knitr.
2. Converts the .md file into the output format with Pandoc.



**Save**, then **Knit** to preview the document output. The resulting HTML/PDF/MS Word/etc. document will be created and saved in the same directory as the .Rmd file.

Use `rmarkdown::render()` to render/knit in the R console. See `?render` for available options.

## Share

**Publish on Posit Connect**

to share R Markdown documents securely, schedule automatic updates, and interact with parameters in real-time. [posit.co/products/enterprise/connect](https://posit.co/products/enterprise/connect).



## More Header Options

### PARAMETERS

Parameterize your documents to reuse with new inputs (e.g., data, values, etc.).

1. **Add parameters** in the header as sub-values of params.
 

```
---
params:
  state: "hawaii"
---
```
2. **Call parameters** in code using `params$<name>`.
 

```
data <- df[, params$state]
summary(data)
```
3. **Set parameters** with Knit with Parameters or the params argument of `render()`.

### REUSABLE TEMPLATES

1. **Create a new package** with a `inst/rmarkdown/` templates directory.
2. **Add a folder** containing `template.yaml` (below) and `skeleton.Rmd` (template contents).
 

```
---
name: "My Template"
---
```
3. **Install** the package to access template by going to **File > New R Markdown > From Template**.

### BOOTSWATCH THEMES

Customize HTML documents with Bootswatch themes from the `bslib` package using the theme output option.

Use `bslib::bootswatch_themes()` to list available themes.

```
---
title: "Document Title"
author: "Author Name"
output:
  html_document:
    theme:
      bootswatch: solar
---
```

### CUSTOM THEMES

Customize individual HTML elements using `bslib` variables. Use `?bs_theme` to see more variables.

```
---
output:
  html_document:
    theme:
      bg: "#121212"
      fg: "#E4E4E4"
      base_font:
        google: "Prompt"
---
```

More on `bslib` at [pkgs.rstudio.com/bslib/](https://pkgs.rstudio.com/bslib/).

### STYLING WITH CSS AND SCSS

Add CSS and SCSS to your document by adding a path to a file with the `css` option in the YAML header.

```
---
title: "My Document"
author: "Author Name"
output:
  html_document:
    css: "style.css"
---
```

Apply CSS styling by writing HTML tags directly or:

- Use markdown to apply style attributes inline.

Bracketed Span

A {.my-color} word.

A green word.

Fenced Div

`:: {.my-color}`

All of these words are green.

All of these words are green.

- Use the Visual Editor. Go to **Format > Div/Span** and add CSS styling directly with Edit Attributes.

.my-css-tag
⋮

This is a div with some text in it.

### INTERACTIVITY

Turn your report into an interactive Shiny document in 4 steps:

1. Add **runtime: shiny** to the YAML header.
2. Call Shiny input functions to embed input objects.
3. Call Shiny render functions to embed reactive output.
4. Render with `rmarkdown::run()` or click **Run Document** in RStudio IDE.

```
---
output: html_document
runtime: shiny
---
```

```
```{r, echo = FALSE}
numericInput("n", "How many cars?", 5)

renderTable({
  head(cars, input$n)
})
```

How many cars?

|   | speed | dist  |
|---|-------|-------|
| 1 | 4.00  | 2.00  |
| 2 | 4.00  | 10.00 |
| 3 | 7.00  | 4.00  |
| 4 | 7.00  | 22.00 |
| 5 | 8.00  | 16.00 |

Also see Shiny Pre-rendered for better performance. [rmarkdown.rstudio.com/authoring\\_shiny\\_pre-rendered](https://rmarkdown.rstudio.com/authoring_shiny_pre-rendered).

Embed a complete app into your document with `shiny::shinyAppDir()`. More at [bookdown.org/yihui/rmarkdown/shiny-embedded.html](https://bookdown.org/yihui/rmarkdown/shiny-embedded.html).

