

R Markdown Cheat Sheet

learn more at rmarkdown.rstudio.com



.Rmd files

An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.

Reproducible Research

At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

Dynamic Documents

You can choose to export the finished report as a html, pdf, MS Word, ODT, RTF, or markdown document; or as a html or pdf based slide show.

Workflow

- 1 **Open a new .Rmd file** at File ► New File ► R Markdown. Use the wizard that opens to pre-populate the file with a template

- 2 **Write document** by editing template

- 3 **Knit document to create report** Use knit button or `render()` to knit

- 4 **Preview Output** in IDE window

- 5 **Publish** (optional) to web or server

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

.Rmd structure

YAML Header

Optional section of render (e.g. pandoc) options written as key:value pairs (YAML).

- At start of file
- Between lines of ---

Text

Narration formatted with markdown, mixed with:

Code chunks

Chunks of embedded code. Each chunk:

- Begins with `{r}`
- ends with `}````

R Markdown will run the code and append the results to the doc.

It will use the location of the .Rmd file as the **working directory**

- `rpubs.com`,
- `shinyapps.io`
- RStudio Connect
- Reload document
- Find in document
- File path to output document

- 6 **Examine build log** in R Markdown console
- 7 **Use output file** that is saved alongside .Rmd

render()

Use `rmarkdown::render()` to render/knit at cmd line. Important args:

- input** - file to render
- output_format**
- output_options** - List of render options (as in YAML)
- output_file**
- output_dir**
- params** - list of params to use
- envir** - environment to evaluate code chunks in
- encoding** - of input file

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

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

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

| How many cars? | | |
|----------------|-------|-------|
| 5 | | |
| | 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 |

Embed a complete app into your document with `shiny::shinyAppDir()`

* Your report will be rendered as a Shiny app, which means you must choose an html output format, like **html_document**, and serve it with an active R Session.

Embed code with knitr syntax

Inline code

Insert with ``r<code>``. Results appear as text without code.

Built with
`r getRversion()`

Built with 3.2.3

Code chunks

One or more lines surrounded with `{r}` and `}````. Place chunk options within curly braces, after `r`. Insert with

```
{r echo=TRUE}
getRversion()
```

```
getRversion()
## [1] '3.2.3'
```

Global options

Set with `knitr::opts_chunk$set()`, e.g.

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

Important chunk options

cache - cache results for future knits (default = FALSE)

cache.path - directory to save cached results in (default = "cache/")

child - file(s) to knit and then include (default = NULL)

collapse - collapse all output into single block (default = FALSE)

comment - prefix for each line of results (default = "##")

dependson - chunk dependencies for caching (default = NULL)

echo - Display code in output document (default = TRUE)

engine - code language used in chunk (default = 'R')

error - Display error messages in doc (TRUE) or stop render when errors occur (FALSE) (default = FALSE)

eval - Run code in chunk (default = TRUE)

fig.align - 'left', 'right', or 'center' (default = 'default')

fig.cap - figure caption as character string (default = NULL)

fig.height, fig.width - Dimensions of plots in inches

highlight - highlight source code (default = TRUE)

include - Include chunk in doc after running (default = TRUE)

message - display code messages in document (default = TRUE)

results (default = 'markup')
'asis' - passthrough results
'hide' - do not display results
'hold' - put all results below all code

tidy - tidy code for display (default = FALSE)

warning - display code warnings in document (default = TRUE)

Options not listed above: `R.options`, `aniopts`, `autodep`, `background`, `cache.comments`, `cache.lazy`, `cache.rebuild`, `cache.vars`, `dev`, `dev.args`, `dpi`, `engine.opts`, `engine.path`, `fig.asp`, `fig.env`, `fig.ext`, `fig.keep`, `fig.lp`, `fig.path`, `fig.pos`, `fig.process`, `fig.retina`, `fig.scap`, `fig.show`, `fig.showtext`, `fig.subcap`, `interval`, `out.extra`, `out.height`, `out.width`, `prompt`, `purl`, `ref.label`, `render`, `size`, `split`, `tidy.opts`

Parameters

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

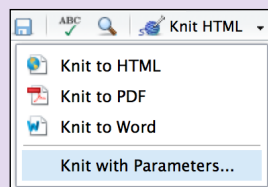
- 1 **Add parameters**
Create and set parameters in the header as sub-values of **params**

```
---
params:
  n: 100
  d: !r Sys.Date()
---
```

- 2 **Call parameters**
Call parameter values in code as **params\$<name>**

```
Today's date
is `r params$d`
```

- 3 **Set parameters**
Set values with **Knit with parameters** or the **params** argument of `render()`:



```
render("doc.Rmd",
  params = list(n = 1, d = as.Date("2015-01-01")))
```

Pandoc's Markdown

Write with syntax on the left to create effect on right (after render)

Plain text

End a line with two spaces to start a new paragraph.

italics and ****bold****

`verbatim code`

sub/superscript^{^2}_{^2~}

~~strikethrough~~

escaped: * _ \\\

endash: --, emdash: ---

equation: $A = \pi * r^2$

equation block:

\$\$E = mc^2\$\$

> block quote

Header1 {#anchor}

Header 2 {#css_id}

Header 3 {.#css_class}

Header 4

Header 5

Header 6

<!--Text comment-->

\textbf{Tex ignored in HTML}

HTML ignored in pdfs

<http://www.rstudio.com>

[link](www.rstudio.com)

Jump to [Header 1](#anchor)

image:

![Caption](smallorb.png)

* unordered list

+ sub-item 1

+ sub-item 2

- sub-sub-item 1

* item 2

Continued (indent 4 spaces)

1. ordered list

2. item 2

i) sub-item 1

A. sub-sub-item 1

(@) A list whose numbering

continues after

(@) an interruption

Term 1

: Definition 1

Right Left Default Center

12 12 12 12

123 123 123 123

1 1 1 1

- slide bullet 1

- slide bullet 2

(>- to have bullets appear on click)

horizontal rule/slide break:

A footnote [^1]

[^1]: Here is the footnote.

Plain text

End a line with two spaces to start a new paragraph.

italics and **bold**

verbatim code

sub/superscript²₂

strikethrough

escaped: * _ \

endash: --, emdash: ---

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Header 2

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Set render options with YAML

| sub-option | description | html | pdf | word | odt | rtf | md | github | ioslides | slidy | beamer |
|-----------------------|--|------|-----|------|-----|-----|----|--------|----------|-------|--------|
| citation_package | The LaTeX package to process citations, natbib, biblatex or none | | X | | | | X | | | | X |
| code_folding | Let readers to toggle the display of R code, "none", "hide", or "show" | X | | | | | | | | | |
| colortheme | Beamer color theme to use | | | | | | | | | | X |
| css | CSS file to use to style document | X | | | | | | | X | X | |
| dev | Graphics device to use for figure output (e.g. "png") | X | X | | | | X | X | X | X | X |
| duration | Add a countdown timer (in minutes) to footer of slides | | | | | | | | | X | |
| fig_caption | Should figures be rendered with captions? | X | X | X | X | | | | X | X | X |
| fig_height, fig_width | Default figure height and width (in inches) for document | X | X | X | X | X | X | X | X | X | X |
| highlight | Syntax highlighting: "tango", "pygments", "kate", "zenburn", "textmate" | X | X | X | | | | | | X | X |
| includes | File of content to place in document (in_header, before_body, after_body) | X | X | | X | | X | X | X | X | X |
| incremental | Should bullets appear one at a time (on presenter mouse clicks)? | | | | | | | | X | X | X |
| keep_md | Save a copy of .md file that contains knitr output | X | | X | X | X | | | X | X | |
| keep_tex | Save a copy of .tex file that contains knitr output | | X | | | | | | | | X |
| latex_engine | Engine to render latex, "pdflatex", "xelatex", or "lualatex" | | X | | | | | | | | X |
| lib_dir | Directory of dependency files to use (Bootstrap, MathJax, etc.) | X | | | | | | | X | X | |
| mathjax | Set to local or a URL to use a local/URL version of MathJax to render | X | | | | | | | X | X | |
| md_extensions | Markdown extensions to add to default definition or R Markdown | X | X | X | X | X | X | X | X | X | X |
| number_sections | Add section numbering to headers | X | X | | | | | | | | |
| pandoc_args | Additional arguments to pass to Pandoc | X | X | X | X | X | X | X | X | X | X |
| preserve_yaml | Preserve YAML front matter in final document? | | | | | | | X | | | |
| reference_docx | docx file whose styles should be copied when producing docx output | | | X | | | | | | | |
| self_contained | Embed dependencies into the doc | X | | | | | | | X | X | |
| slide_level | The lowest heading level that defines individual slides | | | | | | | | | | X |
| smaller | Use the smaller font size in the presentation? | | | | | | | | X | | |
| smart | Convert straight quotes to curly, dashes to em-dashes, ... to ellipses, etc. | X | | | | | | | X | X | |
| template | Pandoc template to use when rendering file | X | X | | X | | | | X | X | |
| theme | Bootswatch or Beamer theme to use for page | X | | | | | | | | | X |
| toc | Add a table of contents at start of document | X | X | X | | X | X | X | | | X |
| toc_depth | The lowest level of headings to add to table of contents | X | X | X | | X | X | X | | | |
| toc_float | Float the table of contents to the left of the main content | X | | | | | | | | | |

Options not listed: extra_dependencies, fig_crop, fig_retina, font_adjustment, font_theme, footer, logo, html_preview, reference_odt, transition, variant, widescreen

When you render, R Markdown

1. runs the R code, embeds results and text into .md file with knitr
2. then converts the .md file into the finished format with pandoc



Set a document's default output format in the YAML header:

```
---
output: html_document
---
```

output value

html_document

pdf_document

word_document

odt_document

rtf_document

md_document

github_document

ioslides_presentation

slidy_presentation

beamer_presentation

creates

html

pdf (requires Tex)

Microsoft Word (.docx)

OpenDocument Text

Rich Text Format

Markdown

Github compatible markdown

ioslides HTML slides

slidy HTML slides

Beamer pdf slides (requires Tex)

Customize output with sub-options (listed at right):

```
---
output:
  html_document:
    code_folding: hide
    toc_float: TRUE
---
```

html tabsets

Use .tabset css class to place sub-headers into tabs

```
# Tabset {.tabset .tabset-fade .tabset-pills}
## Tab 1
text 1
## Tab 2
text 2
### End tabset
```

Tabset

Tab 1 Tab 2

text 1

End tabset

Create a Reusable template

- 1 Create a new package with a inst/rmarkdown/templates directory
- 2 In the directory, Place a folder that contains:
 - template.yaml (see below)
 - skeleton.Rmd (contents of the template)
 - any supporting files
- 3 Install the package
- 4 Access template in wizard at File ► New File ► R Markdown

template.yaml

```
---
name: My Template
---
```

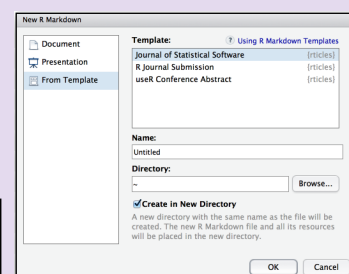


Table suggestions

Several functions format R data into tables

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

| | |
|--------------|---------|
| eruptions | waiting |
| 1 3.60 79.00 | |
| 2 1.80 54.00 | |
| 3 3.33 74.00 | |
| 4 2.28 62.00 | |

| | |
|------------|---------|
| eruptions | waiting |
| 1 3.600 79 | |
| 2 1.800 54 | |
| 3 3.333 74 | |
| 4 2.283 62 | |

data <- faithful[1:4,]

```
`r`{r results = 'asis'}
knitr::kable(data, caption = "Table with kable")
`r`
```

```
`r`{r results = "asis"}
print(xtable::xtable(data, caption = "Table with xtable"),
      type = "html", html.table.attributes = "border=0")
`r`
```

```
`r`{r results = "asis"}
stargazer::stargazer(data, type = "html",
                      title = "Table with stargazer")
`r`
```

Learn more in the **stargazer**, **xtable**, and **knitr** packages.

Citations and Bibliographies

Create citations with .bib, .bibtex, .copac, .enl, .json, .medline, .mods, .ris, .wos, and .xml files

- 1 Set bibliography file and CSL 1.0 Style file (optional) in the YAML header

```
---
bibliography: refs.bib
csl: style.csl
---
```

- 2 Use citation keys in text

Smith cited [Smith04].
Smith cited without author [-Smith04].
@Smith04 cited in line.

- 3 Render. Bibliography will be added to end of document

Smith cited (Joe Smith 2004).
Smith cited without author (2004).
Joe Smith (2004) cited in line.