

# R Markdown :: CHEAT SHEET

## What is R Markdown?

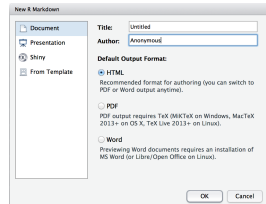


**.Rmd files** • An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.

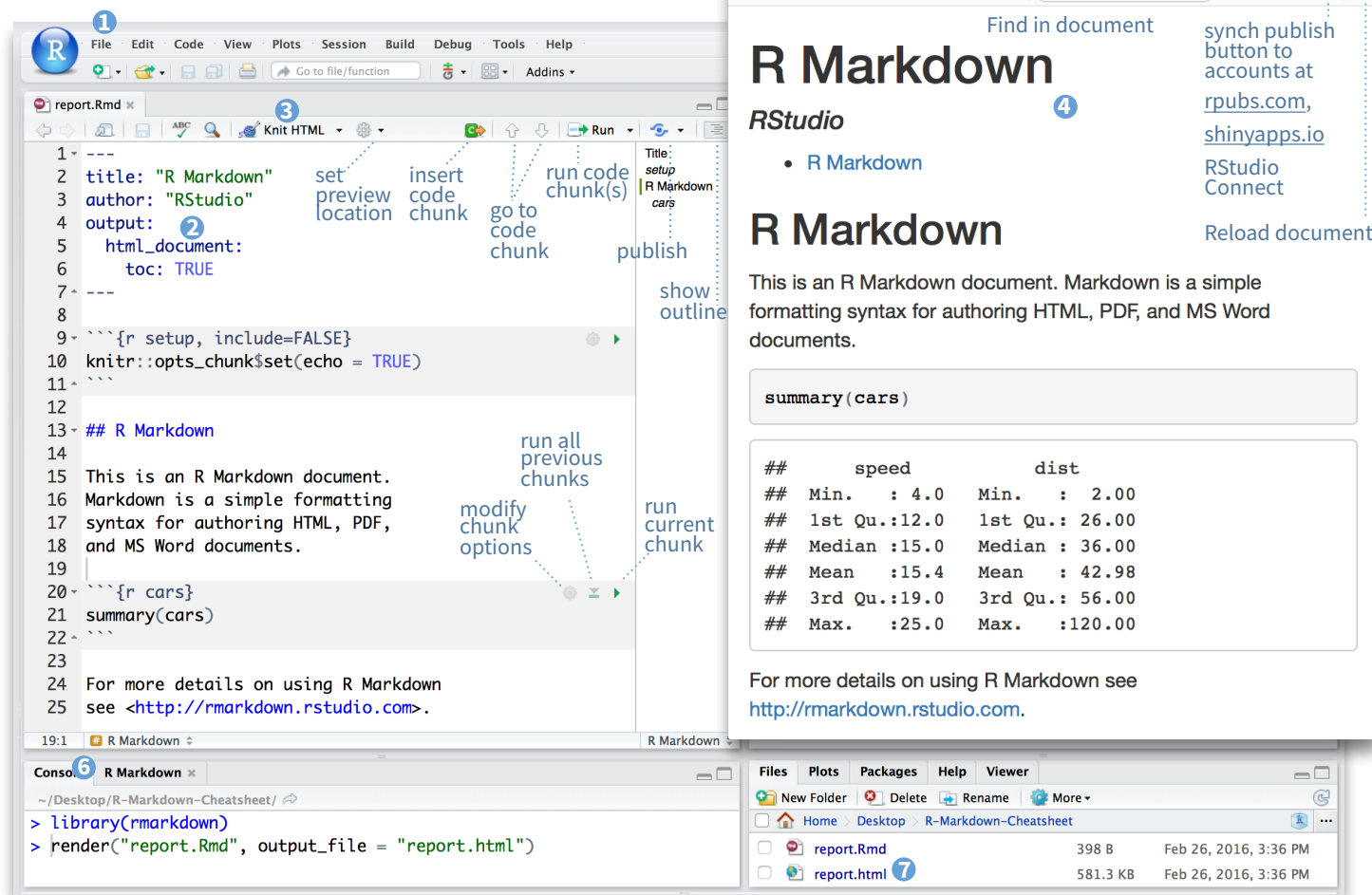
**Reproducible Research** • At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

**Dynamic Documents** • You can choose to export the finished report in a variety of formats, including html, pdf, MS Word, or RTF documents; html or pdf based slides, Notebooks, and more.

## 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 server
- 6 **Examine build log** in R Markdown console
- 7 **Use output file** that is saved along side .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

## 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()  
```\n
```

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

### GLOBAL OPTIONS

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

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

## 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)

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`

**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)

## .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**

## Parameters

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

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

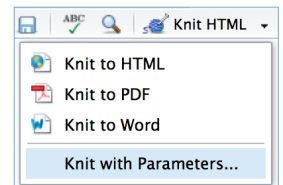
```
---  
params:  
  n: 100  
  d: !r Sys.Date()  
---
```

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()`:

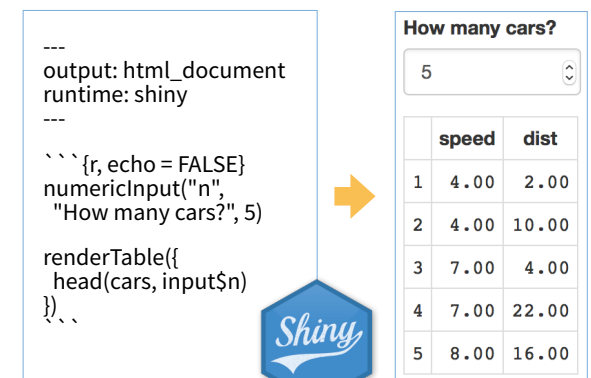
```
render("doc.Rmd", params = list(n = 1,  
  d = as.Date("2015-01-01")))
```



## Interactive Documents

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



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

NOTE: 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.



# 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{Text ignored in HTML}

<em>HTML ignored in pdfs</em>

<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/superscript<sup>2</sup><sub>2</sub>  
strikethrough  
escaped: \* \_ \  
endash: --, emdash: ---  
equation:  $A = \pi * r^2$   
equation block:

$$E = mc^2$$

block quote

## Header1

## Header 2

### Header 3

#### Header 4

##### Header 5

###### Header 6

HTML ignored in pdfs

<http://www.rstudio.com>

Jump to [Header 1](#)  
image:

Caption

- 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

1. A list whose numbering

continues after

2. 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:

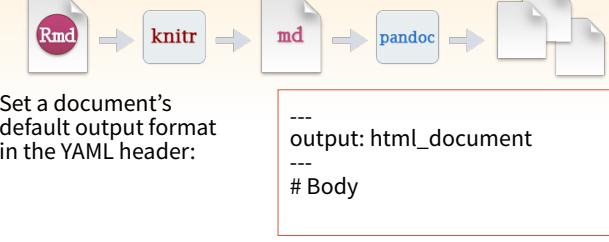
A footnote <sup>1</sup>

1. Here is the footnote. ↩

# Set render options with YAML

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



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 to

the right):

---  
output: html\_document:  
code\_folding: hide  
toc\_float: TRUE  
---  
# Body

## html tabsets

Use tablet css class to place sub-headers into tabs

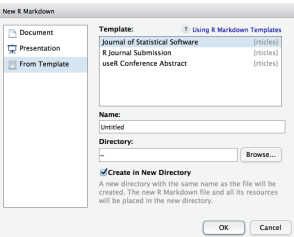
# Tabset {tabset .tabset-fade .tabset-pills}  
## Tab 1  
text 1  
## Tab 2  
text 2  
### End tabset

**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  
---



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 equations	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 quarterly_report.html).	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									

# Table Suggestions

Several functions format R data into tables

Table with kable	eruptions	waiting
1	3.600	79
2	1.800	54
3	3.333	74
4	2.283	62

eruptions	waiting
1	3.600 79.00
2	1.80 54.00
3	3.33 74.00
4	2.28 62.00

Table with stargazer	eruptions	waiting
1	3.600	79
2	1.800	54
3	3.333	74
4	2.283	62

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

knitr::xtable(data, caption = "Table with xtable",
  type = "html", html.table.attributes = "border=0")

stargazer::stargazer(data, type = "html", title = "Table with stargazer")
```

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
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.

