

# 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

## Embed code with knitr syntax

**INLINE CODE**  
Insert with `'r<code>'`. Results appear as text without code.  
Built with `'r<getReversion()>'` → Built with 3.2.3

```
CODE CHUNKS
One or more lines surrounded with '```{r}' and
options within curly braces, after r. Insert with
'```{r echo=TRUE}'
getReversion()
## [1] "3.2.3"
```

## 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 = ##)

File path to output document  
~/Desktop/R-Markdown-CheatSheet/report.html

Find in document  
Publish  
synch button to accounts at rpubs.com, shinyapps.io  
RStudio Connect  
Reload document

**R Markdown**  
This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents.

**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

For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

## render

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

input	output_options	output_file	output_dir	params	envir	encoding
File to render	List of render options (as in YAMl)			list of params to use	environment to evaluate code chunks in	of input file

## CODE CHUNKS

One or more lines surrounded with `'```{r}'` and options within curly braces, after `r`. Insert with `'```{r echo=TRUE}'`  
`getReversion()`

**GLOBAL OPTIONS**  
Set with knitr: `opts_chunk$set()`, e.g.  
`'```{r include=FALSE}'`  
`knitr::opts_chunk$set(eco = TRUE)`

- 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 = 'center')
- 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 keyvalue 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

- 1. **Add parameters** - Create and set parameters in the header as sub-values of params
- 2. **Call parameters** - Call parameter values in code as `params$<name>`
- 3. **Set parameters** - Set values with knitr with parameters or the params argument of `render()`:  
`render("doc.Rmd", params = list(n = 1, d = as.Date("2015-01-01")))`

## Interactive Documents

1. 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 w `markdow:::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)
})
...
shiny::shinyAppDir()
```

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

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

**Publish on RStudio Connect**, to share R Markdown documents securely, schedule automatic updates, and interact with parameters in real time.  
[www.rstudio.com/products/connect/](http://www.rstudio.com/products/connect/)

# 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/supscript2->2~
--strikethrough~
escaped: \ \ \ \ \
endash: -- endash: ---
equation: SA = PI^r(1/2)S
equation block:

$$E = mc^2$$

```

```
Plain text
End a line with two spaces
to start a new paragraph.
italics and bold
verbatim code
sub/supscript2
strikethrough
escaped: \ \ \ \ \
endash: -- endash: ---
equation: A =  $\pi r^2$ 
equation block:

$$E = mc^2$$

```

```
> block quote
```

```
block quote
```

```
# Header 1 (#anchor)
```

```
## Header 2 (#css_id)
```

```
### Header 3 (.css_class)
```

```
#### Header 4
```

```
##### Header 5
```

```
##### Header 6
```

```
<-Text comment-->
```

```
<math>Tex ignored in HTML
```

```
<em>HTML ignored in pdf</em>
```

```
<http://www.studio.com>
```

```
[[link](www.studio.com)]
```

```
[[Header 1](#anchor)]
```

```
[[Caption](small.png)]
```

```
* unordered list
```

```
+ sub-item 1
```

```
- sub-sub-item 1
```

```
* Item 2
```

```
Continued (indent 4 spaces)
```

```
1. ordered list
```

```
2. Item 2
```

```
l) sub-item 1
```

```
A. sub-sub-item 1
```

```
@(A list whose numbering
```

```
continues after
```

```
@( an interruption
```

```
Term 1
```

```
: Definition 1
```

```
Right | Left | Default | Center |
```

```
123 | 123 | 123 | 123 |
```

```
1 | 1 | 1 | 1 |
```

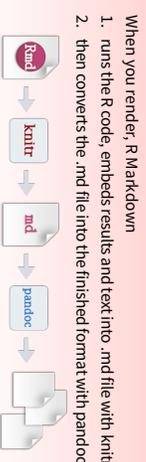
```
-> to have bullets appear on click)
```

```
horizontal rule/slide break:
```

```
***
```

```
A footnote [^1]
```

```
[^1]: Here is the footnote.
```



When you render, R Markdown

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

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

```
---
output: html_document
# Body
```

output value creates

html_document	html
pdf_document	pdf (requires Tex)
word_document	Microsoft Word (.docx)
odt_document	OpenDocument Text
rtf_document	Rich Text Format
md_document	Markdown
github_document	GitHub compatible markdown
ioslides_presentation	ioslides HTML slides
slidy_presentation	slidy HTML slides
beamer_presentation	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 tabler 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

End tabset

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)

indent 2 spaces

indent 4 spaces

output: html\_document

code\_folding: hide

toc\_float: TRUE

# Body

Tabset

Tab 1

Tab 2

End tabset

# Set render options with YAML

When you render, R Markdown

1. runs the R code, embeds results and text into .rmd file with Knitr

2. then converts the .rmd file into the finished format with pandoc

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

```
---
output: html_document
# Body
```

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)

indent 2 spaces

indent 4 spaces

output: html\_document

code\_folding: hide

toc\_float: TRUE

# Body

Tabset

Tab 1

Tab 2

End tabset

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

# Table Suggestions

Several functions format R data into tables

Tables with xtable	emphonswallowing	Table with stargazer
3,600 79	1 3,60 79.00	1 3,600 79
1,800 54	2 1,80 54.00	2 1,800 54
1,800 74	3 3,33 74.00	3 3,333 74
3,333 74	4 2,28 62.00	4 3,333 74
2,283 62	Table with xtable	4 2,283 62

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

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

```
[[results = "asis"]]
stargazer::stargazer(data, type = "html", title = "Table
with stargazer")
```

# Citations and Bibliographies

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

1. Set bibliography file and CSL 1.0	2. Use citation keys in text	bibliography: refs.bib	CSL: style.csl
Smith cited [smith04].	Smith cited without author [smith04].		
Smith cited in line.	Smith cited in line.		

```
[[results = "asis"]]
stargazer::stargazer(data, type = "html", title = "Table
with stargazer")
```

```
[[results = "asis"]]
print(kable::kable(data, caption = "Table with xtable"),
type = "html", html.table.attributes = "border=0")
```

```
[[results = "asis"]]
stargazer::stargazer(data, type = "html", title = "Table
with stargazer")
```

