

R Markdown :: CHEAT SHEET



What is R Markdown?

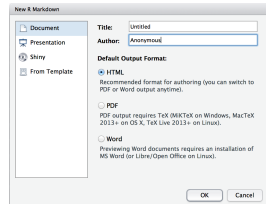


.Rmd files - An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.

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

.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 new inputs (e.g., data, values, etc.)

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

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 Knit with parameters or the params argument of render():
`render("doc.Rmd", params = list(n = 1, d = as.Date("2015-01-01")))`

render

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

input - file to render	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 `getRversion()`

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

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`

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 w `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)
})
```

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/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}
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/superscript^2_2
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
link
Jump to Header 1
image:
Caption
* unordered list
o sub-item 1
o sub-item 2
o 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
o slide bullet 1
o slide bullet 2
(>- to have bullets appear on click)
horizontal rule/slide break:
A footnote ^1
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



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

output: html_document

Body
```

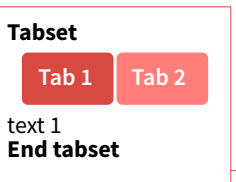
output value	creates
html_document	html
pdf_document	pdf (requires Tex)
word_document	Microsoft Word (.docx)
odt_document	OpenDocument Text
rtf_document	Rich Text Format
md_document	Markdown
github_document	Github compatible markdown
ioslides_presentation	ioslides HTML slides
slidy_presentation	slidy 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 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
```



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
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									

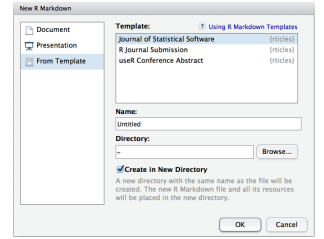
# Create a Reusable Template

1. Create a new package with an 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

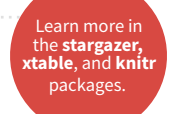
Several functions format R data into tables

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

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

Table with xtable

```
data <- faithful[1:4,]
knitr::kable(data, caption = "Table with kable")
knitr::stargazer(data, type = "html", html.table.attributes = "border=0")
print(xtable::xtable(data, caption = "Table with xtable",
type = "html", html.table.attributes = "border=0"))
stargazer::stargazer(data, type = "html", title = "Table
with stargazer")
```



# 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

```

bibliography: refs.bib
cs1: style.csl

Smith cited [@smith04].
Smith cited without author [-@smith04].
@smith04 cited in line.
Smith cited (Joe Smith 2004).
Smith cited without author (2004).
Joe Smith (2004) cited in line.
```

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

