# 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.

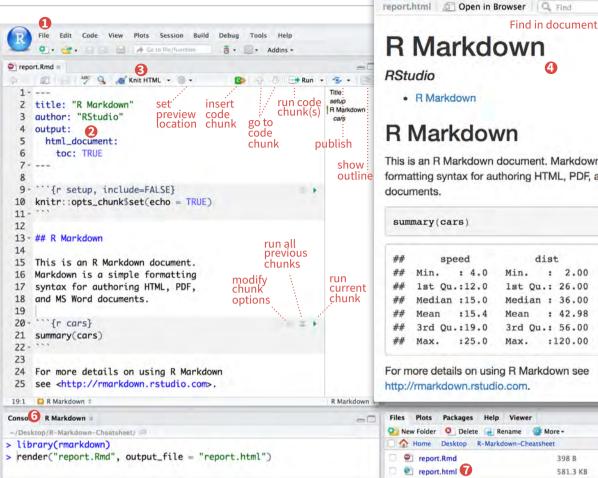
Reproducible Research · At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

**Dvnamic 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



- Open a new .Rmd file at File ➤ New File ➤ R Markdown. Use the wizard that opens to prepopulate the file with a template
- Write document by editing template
- 3 Knit document to create report; use knit button or render() to knit
- 4 Preview Output in IDE window
- **6** 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) params - list of params to use

**envir** - environment to evaluate code chunks in

**encoding** - of input

Feb 26, 2016, 3:36 PM

# Embed code with knitr syntax

Insert with 'r <code>'. Results appear as text without code. Built with `r getRversion()` Built with 3.2.3

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

getRversion() ## [1] '3.2.3'

output file

output dir

### **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 =

cache.path - directory to save cached results in (default = "cache/") child - file(s) to knit and then include (default =

**collapse** - collapse all output into single block

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

dependson - chunk dependencies for caching

getRversion()

echo - Display code in output document (default =

engine - code language used in chunk (default =

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

eval - Run code in chunk (default = TRUE)

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

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

**fig.cap** - figure caption as character string (default

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

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

tidy - tidy code for display (default = FALSE)

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

'hold' - put all results below all code Embed a complete app into your document with shiny::**shinyAppDir()** 

> Markdown documents securely, schedule automatic updates, and interact with parameters in real time. www.rstudio.com/products/connect/

# accounts at rpubs.com, shinyapps.io RStudio Connect Reload document This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word : 2.00 1st Qu.: 26.00 Median : 36.00 3rd Ou.: 56.00 :120.00 For more details on using R Markdown see Feb 26, 2016, 3:36 PM 398 R

····File path to output document — /Desktop/R-Markdown-Cheatsheet/report.html

# .rmd Structure rmarkdown



### YAML Header

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

At start of file

Between lines of - - -

Publish . G

synch publish button to

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

1. Add parameters · Create and set parameters in the header as subvalues of params

2. Call parameters · Call parameter values in code as params\$<name>

3. Set parameters · Set values wth Knit with parameters or the params argument of render():

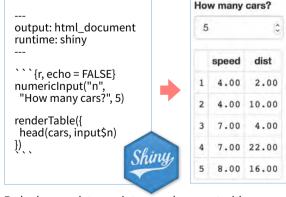
render("doc.Rmd", params = list(n = 1, d = as.Date("2015-01-01"))

| :<br>.) | params:<br>n: 100<br>d: !r Sys.Date() |  |  |  |  |
|---------|---------------------------------------|--|--|--|--|
|         | Today's date is `r params\$d`         |  |  |  |  |
|         | □ ABC S Knit HTML -                   |  |  |  |  |
|         | Mit to HTML                           |  |  |  |  |
|         | Knit to PDF                           |  |  |  |  |
|         | M Knit to Word                        |  |  |  |  |
|         | Knit with Parameters                  |  |  |  |  |

## **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



## 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<sup>2</sup>2

endash: -, emdash

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

 $F = mc^2$ 

block quote

escaped: \* \

equation block:

Plain text End a line with two spaces to start a new paragraph titalics\* and \*\*bold verbatim code sub/superscript^2^~2~ ~~strikethrough escaped: \\* \\_ endash: --. emdash: equation:  $A = \pi^*r^{2}$ 

 $$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} <em>HTML ignored in pdfs</em>

<a href="http://www.rstudio.com">http://www.rstudio.com</a> [link](www.rstudio.com) Jump to [Header 1](#anchor)

![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]

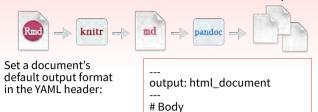
[^1]: Here is the footnote.

When you render, R Markdown

1. runs the R code, embeds results and text into .md file with knitr

Set render options with YAML

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



### Header1

### Header 2

Header 3

Header 4 Header 5

Header 6

HTML ignored in pdfs http://www.rstudio.com

Jump to Header image



Caption

- unordered list o sub-itom 1
  - sub-item 2

Continued (indent 4 spaces)

- 1 ordered list 2. item 2

A. sub-sub-item 1. A list whose numbering

continues after

2. an interruption

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

slide bullet

slide bullet 2

(>- to have bullets appear on click) horizontal rule/slide break:

A footnote

1. Here is the footnote. ←

### creates html

html document pdf\_document word document odt document rtf\_document md document

output value

github\_document ioslides\_presentation slidy\_presentation

beamer\_presentation

Customize output with sub-options (listed to

pdf (requires Tex) Microsoft Word (.docx) OpenDocument Text **Rich Text Format** Markdown Github compatible markdown ioslides HTML slides slidy HTML slides

ndent 4 output: html document: code folding: hide toc\_float: TRUE # Body

Beamer pdf slides (requires Tex)

### html tabsets

directory

Use tablet css class to place sub-headers into tabs



Create a Reusable Template

1. Create a new package with a inst/rmarkdown/templates

4. Access template in wizard at File ➤ New File ➤ R Markdown

2. In the directory, **Place a folder** that contains:

**skeleton.Rmd** (contents of the template)

template.yaml (see below)

any supporting files

template.yaml

3. Install the package

name: My Template

# **Table Suggestions**

Several functions format R data into tables



sub-option

code\_folding

colortheme

CSS

dev

duration

highlight

includes

incremental

keep\_md

keep\_tex

lib\_dir

mathjax

latex\_engine

md\_extensions

pandoc\_args

preserve\_yaml

reference\_docx

self contained

slide level

smaller

smart

theme

toc

template

toc\_depth

toc\_float

number\_sections

fig\_caption

fig\_height, fig\_width

citation package

description

Beamer color theme to use

CSS file to use to style document

The LaTeX package to process citations, natbib, biblatex or none

Graphics device to use for figure output (e.g. "png")

Save a copy of .md file that contains knitr output

Save a copy of .tex file that contains knitr output

Add section numbering to headers

Embed dependencies into the doc

Additional arguments to pass to Pandoc

Preserve YAML front matter in final document?

Use the smaller font size in the presentation?

Bootswatch or Beamer theme to use for page

Add a table of contents at start of document

The lowest heading level that defines individual slides

The lowest level of headings to add to table of contents

Float the table of contents to the left of the main content

Should figures be rendered with captions?

Add a countdown timer (in minutes) to footer of slides

Default figure height and width (in inches) for document

Engine to render latex, "pdflatex", "xelatex", or "lualatex"

Directory of dependency files to use (Bootstrap, MathJax, etc.)

Markdown extensions to add to default definition or R Markdown

docx file whose styles should be copied when producing docx output

Convert straight quotes to curly, dashes to em-dashes, ... to ellipses, etc.

Pandoc template to use when rendering file quarterly report.html).

Let readers to toggle the display of R code, "none", "hide", or "show"

Syntax highlighting: "tango", "pygments", "kate", "zenburn", "textmate"

Should bullets appear one at a time (on presenter mouse clicks)?

File of content to place in document (in\_header, before\_body, after\_body)

Set to local or a URL to use a local/URL version of MathJax to render equations

3.60 79.00 1.80 54.00 3.33 74.00 2.28 62.00 Table with stargazer eruptionswaiting 1 3.600 79 2 1.800 3 3.333 74 4 2.283

data <- faithful[1:4,]

```{r results = 'asis'

knitr::kable(data, caption = "Table with kable")

`{r results = "asis

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

```{r results = "asis"

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

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.

rmarkdown

Χ

ХХ

х х

Χ

х х

Χ

ΧХ

 $X \quad X \quad X$ 

 $X \quad X \quad X$ 

Χ

 $X \quad X \quad X \quad X$ 

X X X X X X X X X X

X X X X X X X X X X

 $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$   $\mathsf{X}$ 

Χ

 $X \quad X \quad X$ 

X X X

Χ

 $X \quad X \quad X$ 

ХХ

 $X \quad X \quad X$ 

 $X \quad X \quad X \quad X \quad X$ 

 $X \quad X \quad X \quad X \quad X$ 

X X

ХХ

ΧХ

ΧХ

ΧХ



