

# R Markdown :: CHEAT SHEET

## What is R Markdown?

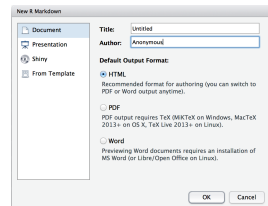


**.Rmd files** • An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.

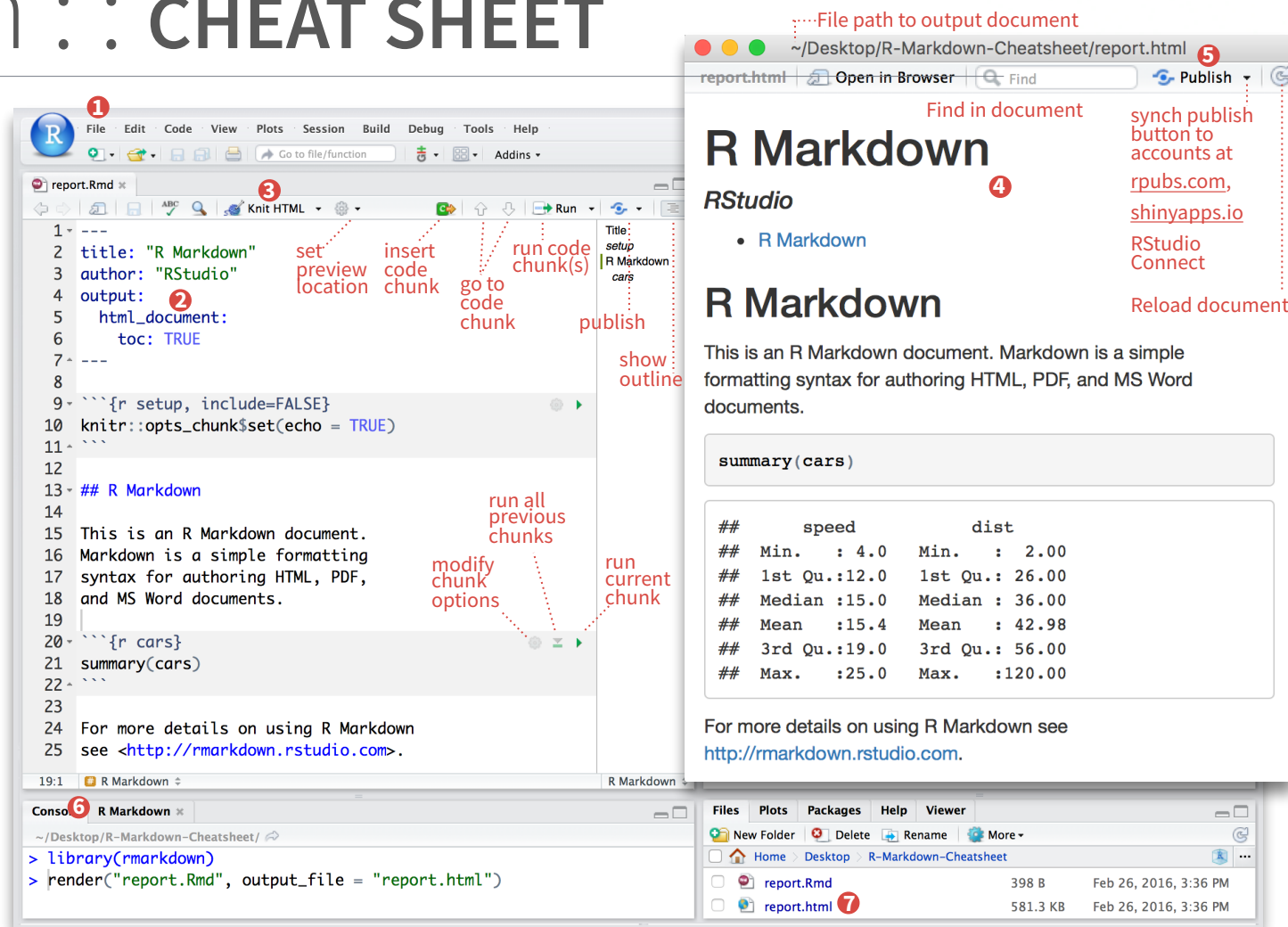
**Reproducible Research** • At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

**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 ````${code}````. 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)



## .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 ---

### Text

Narration formatted with markdown, mixed with:

### Code Chunks

Chunks of embedded code. Each chunk:

Begins with ````${code}````

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

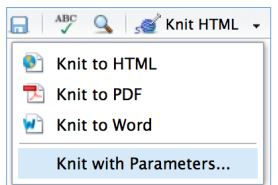
```
---
params:
  n: 100
  d: !r Sys.Date()
---
```

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()`:

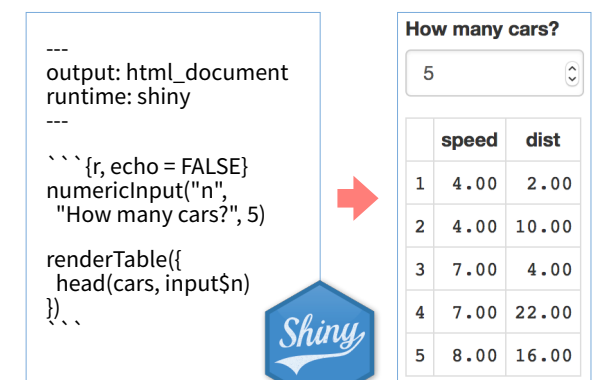
```
render("doc.Rmd", params = list(n = 1,
d = as.Date("2015-01-01")))
```



## 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<sup>2</sup>~  
~~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>  
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:

- unordered list
  - sub-item 1
  - sub-item 2
    - sub-sub-item 1
- item 2

Continued (indent 4 spaces)

- ordered list
- item 2
  - sub-item 1
    - sub-sub-item 1

1. A list whose numbering

continues after

2. an interruption

Term 1

Definition 1

| Right | Left | Default | Center |
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| 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



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

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

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
```

Indent 2 spaces

Indent 4 spaces

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

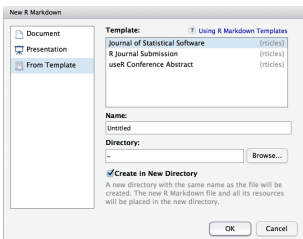
text 1

End tabset

# Create a Reusable Template

1. Create a new package with 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

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

```
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")
```

```
---
```

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

Table with xtable

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

```
`{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
2. Use **citation keys in text**

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

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.

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

