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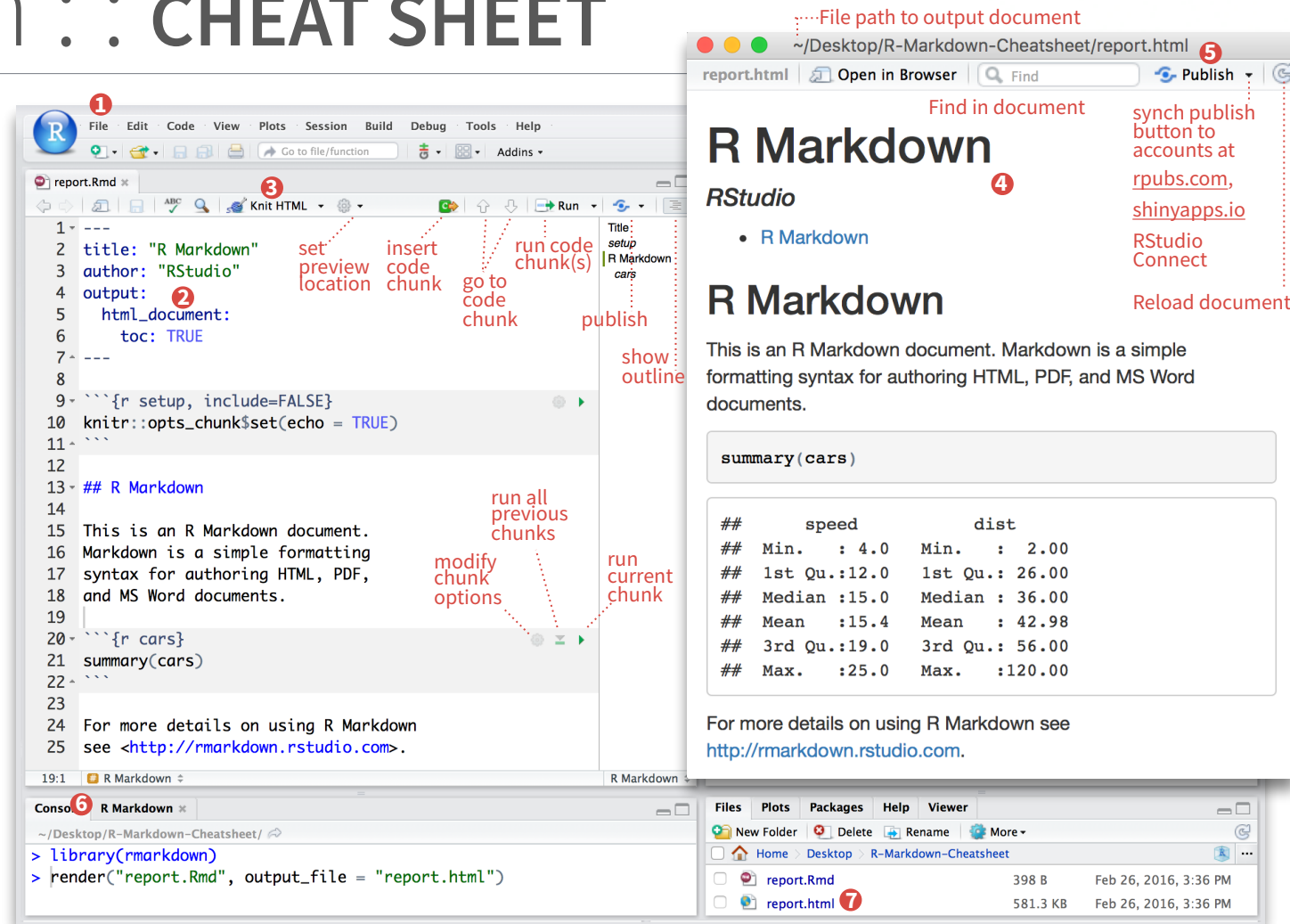
Reproducible Research · At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

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
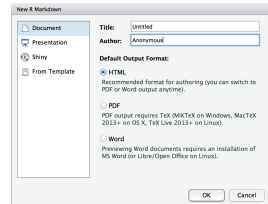
❶ **Open a new .Rmd file** at File ▶ New File ▶ R Markdown. Use the wizard that opens to pre-populate the file with a template

❷ **Write document** by editing template

❸ **Knit document to create report**; use knit button or **render()** to knit

❹ **Preview Output** in IDE window

❺ **Publish** (optional) to web server

❻ **Examine build log** in R Markdown console

❼ **Use output file** that is saved along side .Rmd

File path to output document
`~/Desktop/R-Markdown-Cheatsheet/report.html` ❺

report.html | Open in Browser | 🔍 Find | 🔗 Publish ▾

Find in document

R Markdown
RStudio
- R Markdown ❹

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.

synch publish button to accounts at rpubs.com, shinyapps.io, RStudio Connect

Reload document

File ► report.Rmd

```
1  ---
2  title: "R Markdown"
3  author: "RStudio"
4  output:
5    html_document:
6      toc: TRUE
7  ---
8
9  ```{r setup, include=FALSE}
10 knitr::opts_chunk$set(echo = TRUE)
11 ```
12
13 ## R Markdown
14
15 This is an R Markdown document.
16 Markdown is a simple formatting
17 syntax for authoring HTML, PDF,
18 and MS Word documents.
19
20 ```{r cars}
21 summary(cars)
22 ```
23
24 For more details on using R Markdown
25 see <http://rmarkdown.rstudio.com>.
```

set preview location · insert code chunk · go to code chunk · run code chunk(s) · publish · show outline · run all previous chunks · modify chunk options · run current chunk

```
Console  R Markdown
~/Desktop/R-Markdown-Cheatsheet/
> library(rmarkdown)
> render("report.Rmd", output_file = "report.html")
```

```
Files  Plots  Packages  Help  Viewer
New Folder   Delete   Rename   More
Home  Desktop  R-Markdown-Cheatsheet
report.Rmd     398 B    Feb 26, 2016, 3:36 PM
report.html    581.3 KB Feb 26, 2016, 3:36 PM
```

.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.)

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>

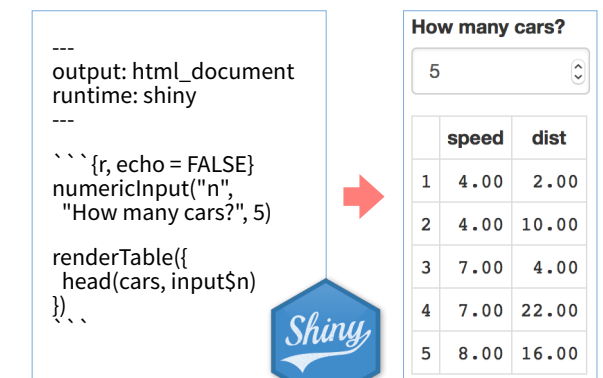3. **Set parameters ·** Set values wth Knit with parameters or the params argument of render():
render("doc.Rmd", params = list(n = 1, d = as.Date("2015-01-01"))

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

Today's date is `` `r params$d` ``

Knit to HTML
Knit to PDF
Knit to Word
Knit with Parameters...
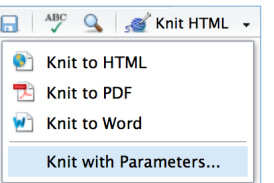
Interactive Documents

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

```
---
output: html_document
runtime: shiny
---

```{r, echo = FALSE}
numericInput("n",
  "How many cars?", 5)

renderTable({
  head(cars, input$n)
})```
```

How many cars?
5

	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/

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()
```` ``` ````

```
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)

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

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{Tex 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/superscript²₂
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
    ○ 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 [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

Rmd → knitr → md → 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):

Indent 2 spaces   Indent 4 spaces

```
---
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
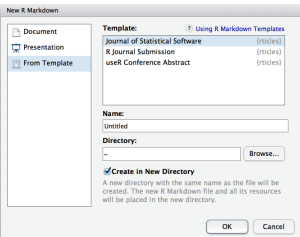### End tabset
```

Tabset

Tab 1   Tab 2

text 1
End tabset

sub-option	description	html	pdf	word	odt	rtf	md	gtluhb	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
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
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
includes	File of content to place in document (in_header, before_body, after_body)	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
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		X
toc	Add a table of contents at start of document	X	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 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
---
```

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

	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

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,]
```` {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")

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**

```
---
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.