

R Markdown :: CHEAT SHEET

What is R Markdown?

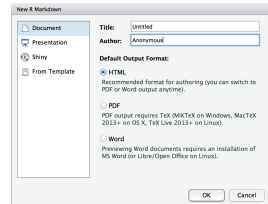


.Rmd files • An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.

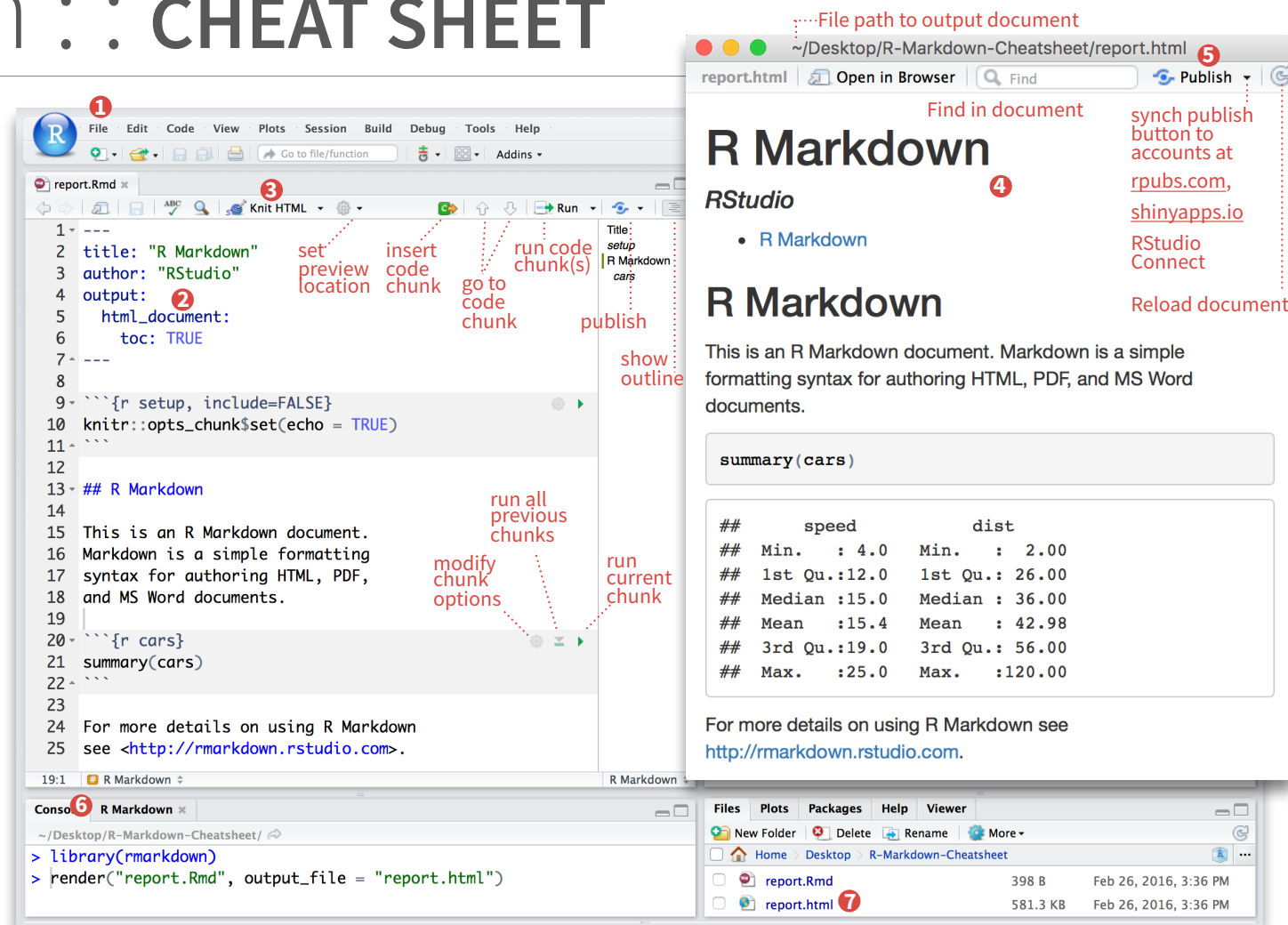
Reproducible Research • At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

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 ``{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`



.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 ``{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()  
---
```

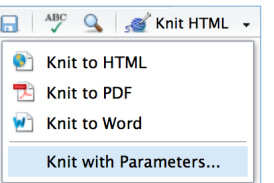
1. **Add parameters** • Create and set parameters in the header as sub-values of params

2. **Call parameters** • Call parameter values in code as `params$<name>`

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

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

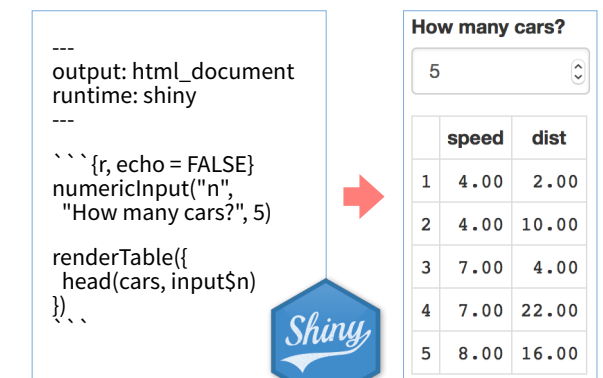
```
render("doc.Rmd", params = list(n = 1,  
d = as.Date("2015-01-01")))
```



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 w `rmarkdown::run` or click Run Document in RStudio IDE



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/



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}
<em>HTML ignored in pdfs</em>
<http://www.rstudio.com>
[link](www.rstudio.com)
Jump to [Header 1](#anchor)
image:
!<img alt="smallorb.png" />
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
(@) 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:
!<img alt="smallorb.png" />
Caption
* unordered list
o sub-item 1
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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.
```



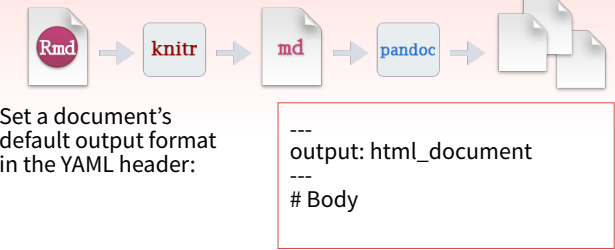
Caption

```

* 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
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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

- 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



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 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 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
---
```

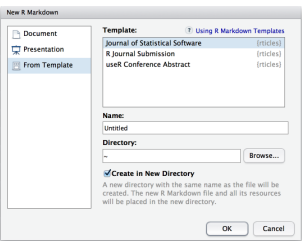


Table Suggestions

Several functions format R data into tables

Table with kable		
eruptions	waiting	
1	3.600	79
2	1.800	54
3	3.333	74
4	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		
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
cs1: 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.

