

R Markdown :: CHEAT SHEET

What is R Markdown?

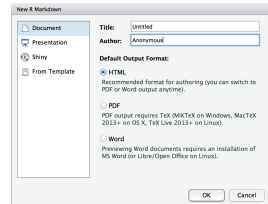


.Rmd files • An R Markdown (.Rmd) file is a record of your research. It contains the code that a scientist needs to reproduce your work along with the narration that a reader needs to understand your work.

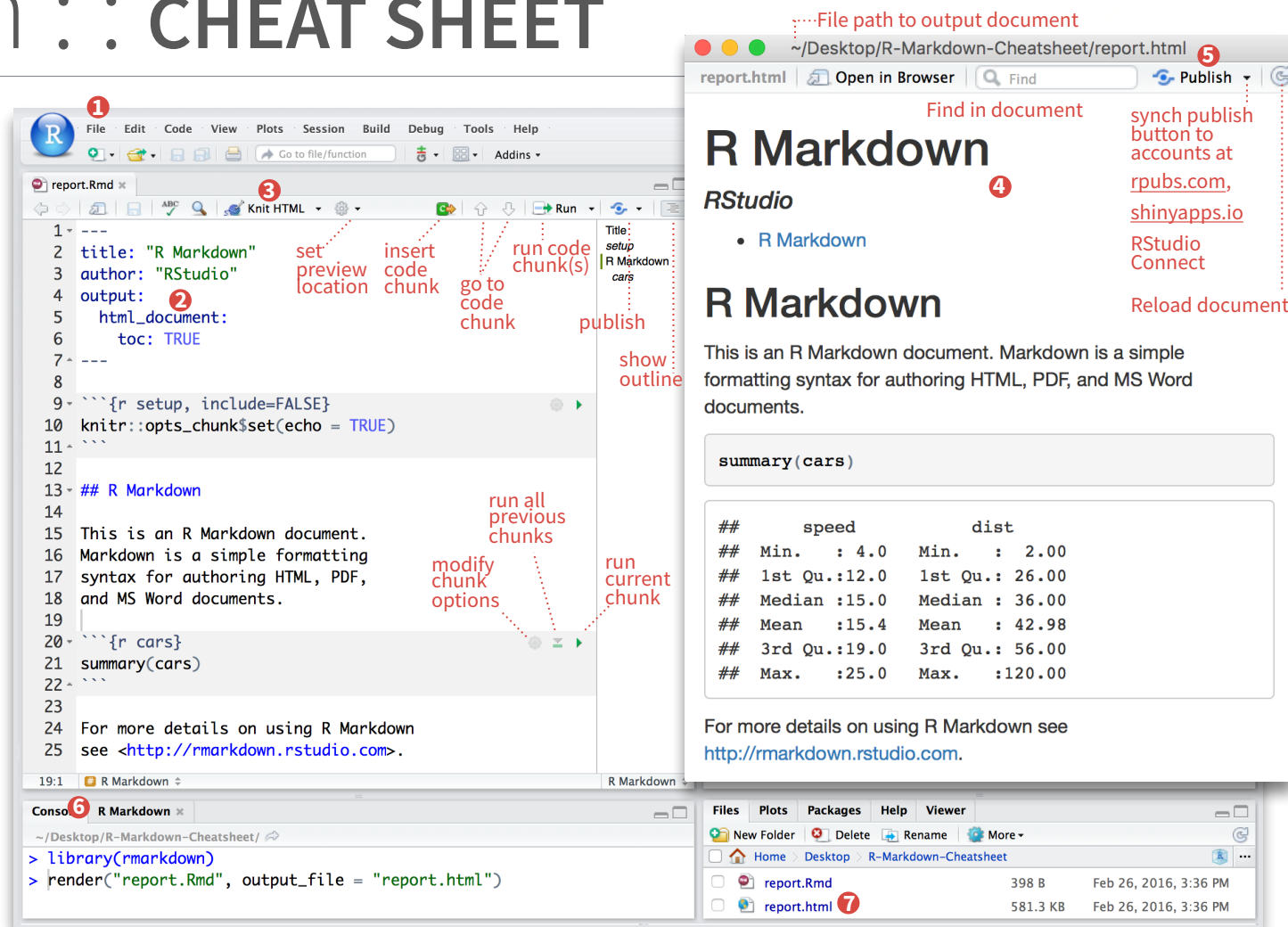
Reproducible Research • At the click of a button, or the type of a command, you can rerun the code in an R Markdown file to reproduce your work and export the results as a finished report.

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)

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 ````${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 new inputs (e.g., data, values, etc.)

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

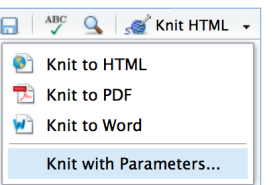
1. **Add parameters** • Create and set parameters in the header as sub-values of params

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")))
```

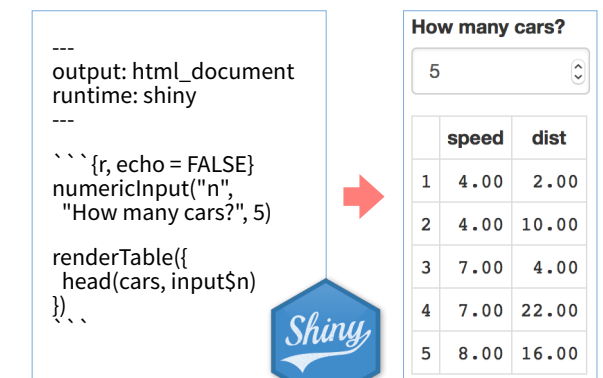
Today's date is `!r params$d`



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/superscript²~
~~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/superscript²
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
 - A. sub-sub-item 1

1. A list whose numbering

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- slide bullet 1
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(>- 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

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

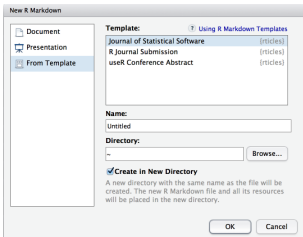
text 1

End tabset

Create a Reusable Template

1. Create a new package with 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  
---
```



| 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 | 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 | | | | | | | | | |

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 |

```
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
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.