

# Habits

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- ▶ You can create a slide show broken up into sections by using the # and ## heading tags
- ▶ You can also create a new slide without a header using a horizontal rule (---).

In the morning

# Getting up

1. Turn off alarm
2. Get out of bed

# Breakfast

- ▶ Eat eggs
- ▶ Drink coffee

In the evening

# Dinner

- ▶ Eat spaghetti

# Dinner

- ▶ Eat spaghetti
- ▶ Drink wine



```
summary(cars)
```

```
##           speed           dist
##  Min.      : 4.0    Min.      : 2
##  1st Qu.:12.0    1st Qu.: 26
##  Median :15.0    Median : 36
##  Mean   :15.4    Mean   : 42
##  3rd Qu.:19.0    3rd Qu.: 56
##  Max.    :25.0    Max.    :120
```

## Going to sleep

- ▶ Get in bed
- ▶ Count sheep

## Images

# R Markdown :: CHEAT SHEET

## What is R Markdown?

**.Rmd file** - 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 > New R Markdown...**
- 2 **Knit document by clicking the Knit button**
- 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 reset file** that is saved alongside .Rmd

## render

input	output_options	output_file
file to render	List of render options (as in <code>utils</code> )	
output_format		output_dir

Embed code with knitr syntax

**INLINE CODE**  
Insert with `<code>`. Results appear as text without code.  
Built with `<code>getversion()` Built with 3.2.3

## CODE CHUNKS

One or more lines surrounded with `'''(r)'''` and spaces within curly braces, after `k`. Insert with 

```
'''(r echo=TRUE)'''
gitRivers2019
```

### 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 = "\n")

**dependon** - 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)

Options not listed above: R.options, as.is.opts, engine.opts, engine.path, fig.asp, fig.ext, fig.expr, fig.extra, fig.height, fig.width, format, plot.opts

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

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

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

**highlight** - highlight source code (default = FALSE)

**include** - include chunk in doc after running (default = TRUE)

**message** - display code messages in document (default = TRUE)  
**results** (default = 'marking')  
 'ans' - 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)

ep, background, cache comments, cache lazy, cache rebuild, cache vars, dev, dev args, doi  
keep, fig ip, fig path, fig pos, fig process, fig retina, fig scap, fig show, fig shownext, fig sub  
label, render, size, split, tidy opt

## .rmd Structure

**YAML Header**  
Optional section of header (e.g. pandoc)  
options written as key-value pairs (YAML).  
At start of file  
Between lines of ---  
**Text**  
Sourcecode formatted with markdowns, mixed with:  
**Code Chunks**  
Chunks of embedded code. Each chunk:  
Begins with ````{r}`  
ends with `````  
It 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 `router` as sub-values of `params`

**2. Call parameters** - Call parameter values in `code` as `params['name']`

**3. Set parameters** - Set values with `next` with parameters; or the `params` argument of `render()`:

```
render('doc.html', {params: {id: 1, d: d.toDate('2015-01-01')}})
```

```
params: {
  id: 100
  // 5 Sys Data()
  ...
}
```

Today's date is " + params.id + "

[Go to JSFiddle](#)  
[Go to PDF](#)  
[Go to Word](#)

[Go with Parameters](#)

## Interactive Documents

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 markdown: run or click Run Document in RStudio IDE.

```

output: html_document
runtime: shiny

---
(y, echo = FALSE)
numericInput("n",
  "How many cars?", 5)

renderTable()
head(cars, input$n)
P. 1

```

NOTE: Your report will rendered as a shiny app, which means you must choose an html output format, like `html_document` and save it with an `active` file extension.

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Figure 1: RMarkdown cheatsheet

# Tables

- ▶ Tables could be generated using `kable()` or `kbl()`. Short table can also be created within R by using `tibble::tribble`.

Table 1: kable example

First Header	Second Header
Content Cell 1	Content Cell 2
Content Cell 3	Content Cell 4

- ▶ Notice that `kableExtra` may not be able to load all  $\text{\LaTeX}$  packages as in a `pdf_document/pdf_document2` output format and you may have to add that in yourselves.

# Mathematics

- Standalone equation.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- In an aligned environment.

$$e^{i\pi} + 1 = 0$$

$$\frac{1}{\sigma\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-\frac{1}{2}(x-\mu)^2/\sigma^2} dx = 1$$

$$\int_1^{\sqrt[3]{3}} z^2 dz \times \cos\left(\frac{3\pi}{9}\right) = \log(\sqrt[3]{e})$$