Intro R Markdown Basics

R-users at SIO

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## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

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

## Including Plots

You can also embed plots, for example:



Note that the echo = FALSE parameter was added to the code chunk to prevent printing of the R code that generated the plot.

# Basics for R Markdown

# This is a first level heading

## This is a second level

### third

## Lists

We can make lists

* one
  + part a
  + part b
* two
* three

or

* one
  + part a

And we can make numbered lists:

1. Numbered list item 1
2. Item 2. The numbers are incremented automatically in the output.

## Formatting text

Blockquotes are a great way to make info stand out

* focus on me

Italics for *emphasis* or *italics*

Bold for **more emphasis** or **bold**

## Equations

We can include equations using LaTeX notation

## Links and images

<http://example.com>

[linked phrase](http://example.com)





optional caption text:sharks are fun

## Tables

### Basic Tables in R-markdown

You can make tables just from R-markdown.

|  |  |
| --- | --- |
| First Header | Second Header |
| Content Cell | Content Cell |
| Content Cell | Content Cell |

### Tables in RMarkdown from R-chunks

You must include the option results='asis' in the R-chunk in order to make tables.

#install packages we need, if you haven't already  
#install.packages(c("knitr","xtable","stargazer"))

#### Tables using kable

kable enables you to make tables from knitr

library(knitr)

## Warning: package 'knitr' was built under R version 3.4.2

kable(head(mtcars), digits = 2, align = c(rep("l", 4), rep("c", 4), rep("r", 4)))

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | mpg | cyl | disp | hp | drat | wt | qsec | vs | am | gear | carb |
| Mazda RX4 | 21.0 | 6 | 160 | 110 | 3.90 | 2.62 | 16.46 | 0 | 1 | 4 | 4 |
| Mazda RX4 Wag | 21.0 | 6 | 160 | 110 | 3.90 | 2.88 | 17.02 | 0 | 1 | 4 | 4 |
| Datsun 710 | 22.8 | 4 | 108 | 93 | 3.85 | 2.32 | 18.61 | 1 | 1 | 4 | 1 |
| Hornet 4 Drive | 21.4 | 6 | 258 | 110 | 3.08 | 3.21 | 19.44 | 1 | 0 | 3 | 1 |
| Hornet Sportabout | 18.7 | 8 | 360 | 175 | 3.15 | 3.44 | 17.02 | 0 | 0 | 3 | 2 |
| Valiant | 18.1 | 6 | 225 | 105 | 2.76 | 3.46 | 20.22 | 1 | 0 | 3 | 1 |

#### Tables using xtable

Some people think you can make nicer tables with the xtable package.

library(xtable)

## Warning: package 'xtable' was built under R version 3.4.2

print(xtable(head(mtcars)), type = "html")

mpg

cyl

disp

hp

drat

wt

qsec

vs

am

gear

carb

Mazda RX4

21.00

6.00

160.00

110.00

3.90

2.62

16.46

0.00

1.00

4.00

4.00

Mazda RX4 Wag

21.00

6.00

160.00

110.00

3.90

2.88

17.02

0.00

1.00

4.00

4.00

Datsun 710

22.80

4.00

108.00

93.00

3.85

2.32

18.61

1.00

1.00

4.00

1.00

Hornet 4 Drive

21.40

6.00

258.00

110.00

3.08

3.21

19.44

1.00

0.00

3.00

1.00

Hornet Sportabout

18.70

8.00

360.00

175.00

3.15

3.44

17.02

0.00

0.00

3.00

2.00

Valiant

18.10

6.00

225.00

105.00

2.76

3.46

20.22

1.00

0.00

3.00

1.00

#### Tables using stargazer

Yet another option, is the stargazer package.

library(stargazer, quietly = TRUE)  
  
fit1 <- lm(mpg ~ wt, mtcars)  
fit2 <- lm(mpg ~ wt + hp, mtcars)  
fit3 <- lm(mpg ~ wt + hp + disp, mtcars)  
  
stargazer(fit1, fit2, fit3, type="text")

======================================================================================== Dependent variable:  
-------------------------------------------------------------------- mpg  
(1) (2) (3)  
---------------------------------------------------------------------------------------- wt -5.344\*\*\* -3.878\*\*\* -3.801\*\*\*  
(0.559) (0.633) (1.066)

hp -0.032\*\*\* -0.031\*\*  
(0.009) (0.011)

disp -0.001  
(0.010)

Constant 37.285\*\*\* 37.227\*\*\* 37.106\*\*\*  
(1.878) (1.599) (2.111)

Observations 32 32 32  
R2 0.753 0.827 0.827  
Adjusted R2 0.745 0.815 0.808  
Residual Std. Error 3.046 (df = 30) 2.593 (df = 29) 2.639 (df = 28)  
F Statistic 91.375\*\*\* (df = 1; 30) 69.211\*\*\* (df = 2; 29) 44.566\*\*\* (df = 3; 28) ======================================================================================== Note: *p<0.1;* ***p<0.05;*** p<0.01

## Figures

In general, figures will appear in a knit document exactly as they would appear in the R session. There are several important figure options to be aware of.

* dev, controls the graphics device used to create the figures. For example pdf, png, or jpeg. Check out tikzDevice if you are creating pdf output. The tikzDevice generates Latex code from R plots for use in Latex documents. That way, all fonts match the main text, and the Tex syntax for mathematics can be used directly in plots. Here are two examples of the power of tikzDevice: <http://bit.ly/114GNdP>, example
* path what directory to save the figures.
* fig\_width, fig\_height, in inches. Can also be set globally.
* fig\_align, left, right or center.

## Getting help in R-markdown

R Markdown integrates a number of R packages and external tools. This means that help is, by-and-large, not available through ?. Instead, as you work through this chapter, and use R Markdown in the future, keep these resources close to hand:

* R Markdown Cheat Sheet: *Help > Cheatsheets > R Markdown Cheat Sheet*,
* R Markdown Reference Guide: *Help > Cheatsheets > R Markdown Reference Guide*.

Both cheatsheets are also available at <http://rstudio.com/cheatsheets>.

## Additional resources

[1] <http://r4ds.had.co.nz/r-markdown.html>

[2] <https://onlinecourses.science.psu.edu/statprogram/markdown>

[3] <https://sachsmc.github.io/knit-git-markr-guide/knitr/knit.html>

[4] <https://dereksonderegger.github.io/570L/16-rmarkdown-tricks.html>

[5] <https://sebastiansauer.github.io/figure_sizing_knitr/>