

# R Markdown Tutorial

Mikaela Miller with additions from Evan Carey

Sunday, January 04, 2015

## Introduction

This document serves as a short introduction to R Markdown. R Markdown can be used to generate reports that adhere to reproducible research initiatives, capturing computer code, datasets, methods, protocols and results in a single HTML, PDF or WORD document. The following highlights many of the basic commands.

## Resources

The links below are helpful references to get started in R Markdown:

- [http://rmarkdown.rstudio.com/authoring\\_basics.html](http://rmarkdown.rstudio.com/authoring_basics.html)
- <https://www.youtube.com/watch?v=YcJb1HBc-1Q>

## Using Rmarkdown

There are two basic modes for R Markdown: Pandoc Markdown and R code chunks. Pandoc Markdown is where you will write the body of the report.

Remember, always save your R Markdown file. To generate the report, click on the "Knit \_\_\_\_" icon in the menu bar of the Rmd window.

## Pandoc

You can control different aspects of the text in Pandoc Markdown (size, italic, bullet points, etc.). Below are some examples.

Emphasis

*italic* **bold**

*italic* **bold**

Headers

# Header 1

## Header 2

### Header 3

Lists

Unordered List:

- Item 1
- Item 2
  - Item 2a
  - Item 2b

Ordered List:

1. Item 1
2. Item 2
3. Item 3
  - Item 3a
  - Item 3b

## R code chunks

The execution of R code in Markdown is accomplished with R code chunks. You can embed the code and make it visible or hide it (which is useful when the code generates a table or graph). Names can be given to each code chunk for navigation. Results can be cached to speed up processing time.

Generally, I like to make sure the code is working correctly by making an R Script in a separate file. I then copy and paste the code chunks into the R Markdown file.

The most useful and frequently used commands:

- `message=F` (will hide any messages that are produced when the code is executed)
- `warning=F` (will hide any warnings that are produced when the code is executed)
- `cache=T` (caches results to speed up processing)
- `echo=F` (hides the code chunk, in the case you are creating a graphic)
- `results="asis"` (what I have found to be the best option for tables and graphics)

## Example Analysis Workflow

The remainder of the document runs through an example workflow.

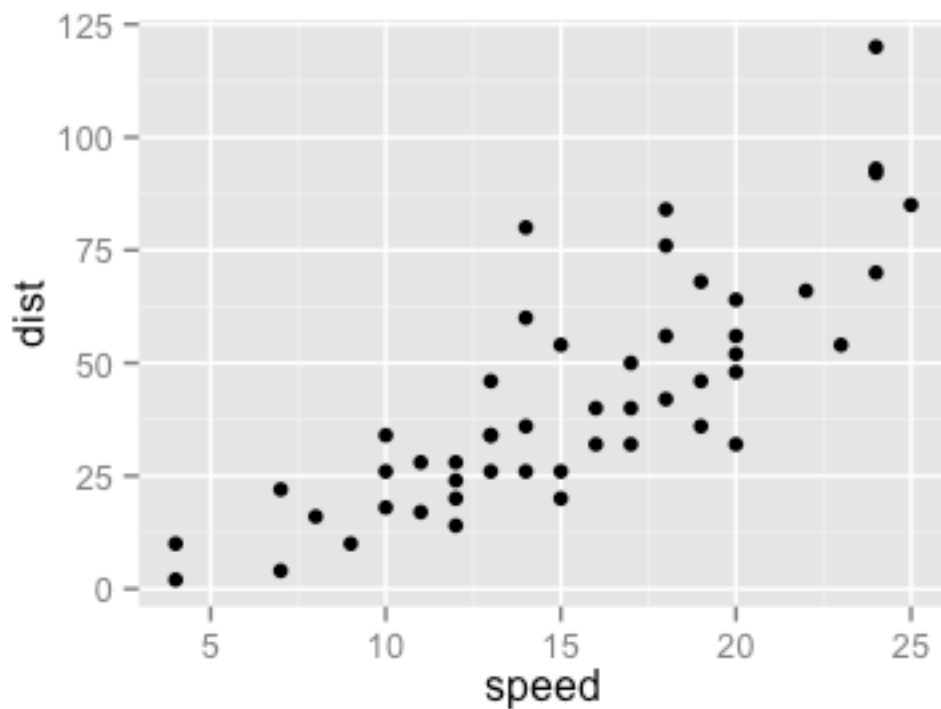
```
# quick summary and plot
library(ggplot2)

## Warning: package 'ggplot2' was built under R version 3.1.2

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

qplot( speed, dist, data=cars)
```



You can add inline calculations that will be updated in the output document using back tick r, for example There were 50 cars.

Better quality tables can be added using the kable function. The library(knitr) is needed for some reason, maybe a bug.

```
## Warning: package 'knitr' was built under R version 3.1.2
```

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
mpg	10.400	15.420	19.200	20.0900	22.80	33.900

cyl	4.000	4.000	6.000	6.1880	8.00	8.000
disp	71.100	120.800	196.300	230.7000	326.00	472.000
hp	52.000	96.500	123.000	146.7000	180.00	335.000
drat	2.760	3.080	3.695	3.5970	3.92	4.930
wt	1.513	2.581	3.325	3.2170	3.61	5.424
qsec	14.500	16.890	17.710	17.8500	18.90	22.900
vs	0.000	0.000	0.000	0.4375	1.00	1.000
am	0.000	0.000	0.000	0.4062	1.00	1.000
gear	3.000	3.000	4.000	3.6880	4.00	5.000
carb	1.000	2.000	2.000	2.8120	4.00	8.000

## Adding images to the R Markdown report

To add an image from a file, you can use the following code and packages. The image file must be in the working directory location. Replace the file location below with the location of an image you want to add.

```
## Warning: package 'png' was built under R version 3.1.2
```



## References

You can cite R packages with the following code:

```
##  
## To cite package 'png' in publications use:  
##  
## Simon Urbanek (2013). png: Read and write PNG images. R package  
## version 0.1-7. http://CRAN.R-project.org/package=png  
##  
## A BibTeX entry for LaTeX users is  
##  
## @Manual{,  
##   title = {png: Read and write PNG images},  
##   author = {Simon Urbanek},  
##   year = {2013},  
##   note = {R package version 0.1-7},  
##   url = {http://CRAN.R-project.org/package=png},  
## }  
##
```

```
## ATTENTION: This citation information has been auto-generated from
## the package DESCRIPTION file and may need manual editing, see
## 'help("citation")'.
```

## Session Information

The session information contains the versions of R and all packages used in the analysis contained in your R Markdown file.

```
## R version 3.1.1 (2014-07-10)
## Platform: x86_64-apple-darwin13.1.0 (64-bit)
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] grid      stats      graphics  grDevices  utils      datasets
##      methods
## [8] base
##
## other attached packages:
## [1] png_0.1-7      knitr_1.9      ggplot2_1.0.0
##
## loaded via a namespace (and not attached):
## [1] colorspace_1.2-4 digest_0.6.8     evaluate_0.5.5   formatR_1.0
## [5] gtable_0.1.2    htmltools_0.2.6 labeling_0.3      MASS_7.3-37
## [9] munsell_0.4.2    plyr_1.8.1      proto_0.3-10     Rcpp_0.11.3
## [13] reshape2_1.4.1  rmarkdown_0.4.2 scales_0.2.4
##      stringr_0.6.2
## [17] tools_3.1.1     yaml_2.1.13
```