Intro to RMarkdown

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3/15/2022

Welcome to RMarkdown!

This is a versatile and useful tool for ensuring your data is reproducible and can help with your own data management.

RMarkdown Formatting

RMarkdown has different formatting than RScript files. For example, in an RScript, my text on the line above this one would be read as a comment, while in an RMarkdown file, it is read as a heading. In RMarkdown, you can also type words and sentences outside of comments that will not be run as code, but become part of our final output document. In this way, you can use RMarkdown to write reports on your research, save them as Word, PDF, or HTML files, and share them with other researchers.

Common Formatting tools:

1. Creating Headers with # – one (#) is a level one header, two (##) is a level two header, and so on.
2. Italicizing – *text between a single asterisk will be italicized*
3. Bolding – **text between double asterisks will be bolded**
4. Create bullet points – leave a blank line, then begin each line in the list with an asterisk
5. Create hyperlinks – put a word or phrase in brackets followed by the link in parentheses: Intro to RMarkdown

Introduction

I am going to use a sample dataset, called mtcars. Using this, I will list variable names, generate *summary statistics*, create plot, and run some statistics tests.
Variable names are:
mpg, cyl, disp, hp, drat, wt, qsec, vs, am, gear, carb
link to codebook

Descriptions

Basic summary stats based on variables. I am interested in the miles per gallon (mpg), weight of car (wt), Automatic or manual (am) and horsepower (hp).

- Mean miles per gallon is: **20.090625**
- Standard deviation of miles per gallon is: **6.0269481**.

Results

Let's run some analyses and look at the results. First, create a plot of mpg by weight To do this, we need to make a code chunk. Code chunks start with three tick marks (to the left of the number 1 on your keyboard), then curly brackets with the letter r inside. Inside the brackets after the r, we can include statements that will determine what the output of our analyses look like. Code chunks end with another three tick marks.

In the chunk below, I have added a few settings:

1. echo = TRUE, which means my code will be displayed in my knitted output file. If I had indicated echo = FALSE, only my plot (or the results of any analyses in this chunk) would be displayed in the file, but the code itself would not appear.
2. fig.align = 'center', which tells R to center my plot on my output file
3. fig.cap = "Correlation between mpg and wt", which tells R what the caption of my figure should be. This appears below the plot.
4. fig.height=4 and fig.width=8, which tell R what dimensions my plot should be on the output page.

There are many other options for code chunk formatting. Some options include:

- warning=TRUE or FALSE, determines whether warnings from R should be displayed in the output document.
- message=TRUE or FALSE determines whether messages from R should be displayed in the output document.
- error=TRUE or FALSE determines whether errors are displayed in the output document. If it is set to FALSE, an error will cause R to halt when knitting, and the error will display in the R console.

```
#inside code chunks, I can use comments in the same way as RScript files!
```

```
plot(mtcars$mpg, mtcars$wt, main = "Scatterplot showing relationship between Miles per Gallon and Weight
```


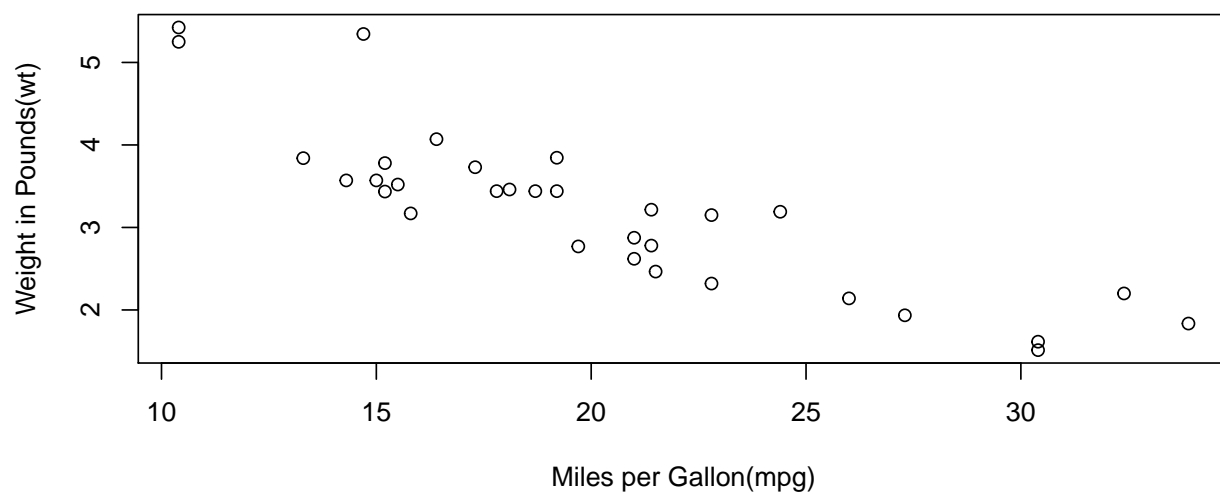**Scatterplot showing relationship between Miles per Gallon and Weight of car**

Figure 1: Correlation between mpg and wt

Next, let's find the correlation coefficient for this association. Correlation coefficient is: -0.8676594.

Lastly, let's conduct a t-test to compare the mpg split by automatic and manual cars.

Comparing miles per gallon by automatic and manual cars. Based on the dataset manual and automatic cars do not have the same miles per gallon. With a p-value of **0.0013736** I reject the null hypothesis that automatic and manual cars have the same miles per gallon. Confidence interval is provided here, does not contain 0 in between. *-11.2801944, -3.2096842.*

Helpful resources

Rmarkdown website
RMarkdown Reference [RMarkdown guide] (https://bookdown.org/yihui/rmarkdown/r-code.html)

Activities

Now, it's your turn!

Activity 1

1. Create a code chunk that prevents warnings and messages from being displayed, but does allow the final code to be seen in the finished file.
2. Create a scatterplot of the relationship between **weight of car (wt)** and **horsepower (hp)**.
3. Include a title, x-axis label, and y-axis label.

Activity 2

1. Create a code chunk that prevents the code from being displayed, but does allow warnings and messages to be seen in the finished file.
2. Find the mean and standard deviation of **cylinders (cyl)**.
3. Find the correlation coefficient between **cylinders(cyl)** and **miles per gallon (mpg)**.
4. ***Bonus:*** Put results in inline text.

Activity 2 Results