Stat 212: Day One activities

Introduction to R, RStudio, and R Markdown

RStudio is an R *environment*, basically a fancy program that makes it easier to use R, write code, save it, and share it. Luckily at St. Olaf, we have a server that hosts the program so you don't need to download any files or install software. You can access the server from anywhere, including a tablet or your phone! The link is below, and it is also on our Moodle homepage.

r.stolaf.edu

All of the code I use and write for class will be accessed through this server.

You can sign into the server with your stolaf account (it's already set up for you). Investigate the different panes. In the Console, you can type the commands and R will execute then for you.

```
1 + 1
```

```
## [1] 2
```

```
10 / 2
```

```
## [1] 5
```

```
4 ^ 3
```

```
## [1] 64
```

```
log10(1000)
```

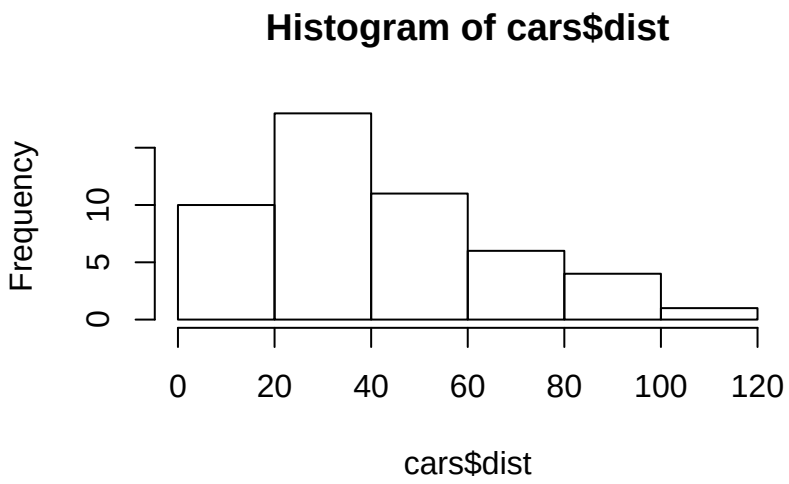
```
## [1] 3
```

R can do more than function as a calculator - it can be used to analyze data! Note: anything following # is just a comment for anyone reading the code and is ignored by R, you don't need the comments for the code to run, but it is good practice to explain what the code does.

```
?cars           # learn about a data set that comes with R (one of many)
summary(cars)   # summary is a "function"
```

```
##      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
```

```
hist(cars$dist) # data set name (cars) and variable name (dist) separated by $
```

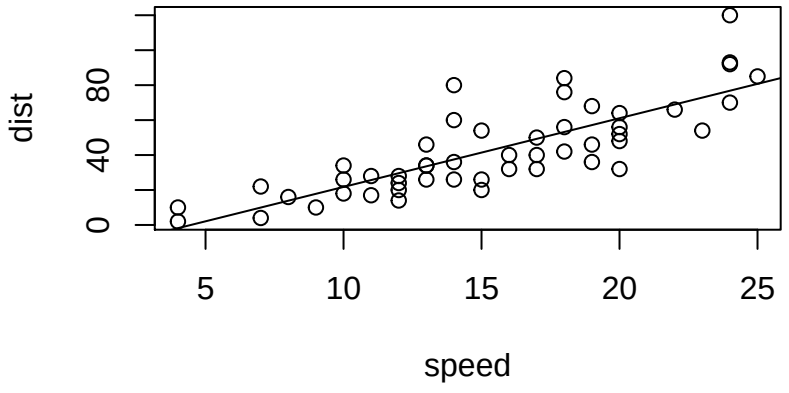



```
plot(cars)      # autoplot all variables in cars data set (there are just 2)

# find best line relating speed to dist
fitline <- lm(dist ~ speed, data = cars)
summary(fitline)
```

```
##
## Call:
## lm(formula = dist ~ speed, data = cars)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -29.069  -9.525  -2.272   9.215  43.201
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -17.5791     6.7584  -2.601   0.0123 *
## speed         3.9324     0.4155   9.464 1.49e-12 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 15.38 on 48 degrees of freedom
## Multiple R-squared:  0.6511, Adjusted R-squared:  0.6438
## F-statistic: 89.57 on 1 and 48 DF,  p-value: 1.49e-12
```

```
# add best line to current scatterplot
abline(fitline)
```



But the Console does not let us save code or go back and edit it, so we still need a better way...

Source editor

In the bottom right pane, under Files, navigate to `Stats 212b S20` → `Class` → `Code`. This is where I will post my code for lectures, examples, homework.

Click on the file `Day1.Rmd`. This should open a file in your Source pane in the upper left that contains the code which produces a handout version of this tutorial. The **Source editor** is exactly what we need. We can write lots of code, run it through the console, edit, and save the results.

VERY IMPORTANT!

As the instructor, ONLY I can edit and save documents in the `Class` folder. You can create, edit, and save files in your `Sumbit` folder.

> Save a copy of Day1.Rmd to your `Submit` folder using the **File > Save As** option.

Only you and the professor have access to this folder; it's the place you should take class notes and work on homework assignments.

RMarkdown

Knitting

Once the file is saved in your `Submit` folder, you can make changes to the document. `Day1.Rmd` is what we call an **RMarkdown** file. It's a way for us to write and save code that performs statistical analysis *within* a regular text document.

First, click on **Knit** at the top of the document and report what happens.

Second, find the following features in the document, change them slightly and notice the effect they have on the knitted document:

- `title`
- `[...](...)`
- `eval = FALSE` vs. `echo = FALSE`
- `###` vs. `##`
- `*...*` vs. `**...**`

Remember to hit `Knit` after changing the document to see what effect it has.