Tutorial 10 - Really programming in R

R relies on variables and RAM

We work in scripts so that we can rerun all of our saved commands and regenerate the same R environment each time we work on a project/assignment.

This is necessary because R relies on variables and RAM. These things are temporarily stored in the R environment, but "disappear" when R is closed.

Be sure you are working in and saving your scripts!

Parentheses, Square Brackets, Curly Braces, oh my!

`(  )` using functions

`[ ]` subsetting

`{  }` control flow: for loops, if-else statements, defining functions

Cheatsheet for R

On today's Sakai page

or directly from the source:

https://rstudio.com/wp-content/uploads/2016/10/r-cheat-sheet-3.pdf

Includes most of what we have covered, but some extra stuff you can ignore.

for loops in R

In Bash, we looped through files in directories, with code like

```
for file in *.txt

do

     echo $file

done
```

In R, we commonly load full files into R and need to combine sets of integers with subsetting to loope through these data structures.

```
for(line in 1:10){

     x <- myDF[line,]

     print(x)

}
```

for loop Review

Given a data frame called `data` that has 4 rows and 3 columns (with column names `A`, `B`, `C`), what code, USING LOOPS, would:

- print each row, one at a time
- print each element of the 3rd column, one at a time

Tips for working with loops

- when writing a loop, work on a single case, get it to work, and then generalize for each row
- think of the index variable as placeholder for each integer in the set you'll loop through
- use print statements to figure out which parts are working and which are not

if-else

This is a useful way to let your code make decisions for you

Given the outcome of a logic test, one or more behaviors can occur

```
if(x > 0){
     print("x is positive")
}else if(x < 0){
     print("x is negative")
}else{
     print("x is equal to zero")
}
```

if-else in a loop

You can even use if-else statements in loops. Actually this is where they are most useful!

Challenge:

Use a `for loop` and `if-else` statement to calculate the sum of wages for males and females in `wages.csv`.

Challenge:

- Use a for loop to calculate the average sepal length for each species in the iris data set. Don't cheat and use the `mean()` function!

- Use a for loop and if-else statement to find the minimum petal width of Setosa iris in the iris data set. Don't cheat and use the `min()` function!

Exercise 8

Due next Friday, 11/12

Fork from TA's Github repository

Remember `R` scripts are just text files and so they can be version controlled with `Git` just like any other file.

You'll need to use `bash` to interact with `Git`