

## Lab 6: if, else, and quantile

The following worksheet is due by 8pm one day after this lab. You can find the submission dropbox in Brightspace by clicking on Content – > Lab Content.

0. Open a new R Markdown file.

Note: Your worksheet is to be submitted as the output of an R Markdown file (you can knit it to HTML and then convert it to PDF, or you can knit it to PDF if you have LaTeX on your computer, or you can knit it to Word and then convert that to a PDF).

0.1 Download the data sets covid\_wordwide.csv and normal\_distribution.csv and save them to whatever directory you are using for this course.

Please note that learning if-else statements loops can be frustrating at first. It is often helpful to have a scrap piece of paper and draw out by hand what you want the statement / loop to do. Once you have drawn it out, then write the R code for it. You will only get better with practice.

1. Generate a dataset of student grades, with columns for the student's name, their midterm score, and their final exam score as below.

```
name = c("Alice", "Bob", "Charlie", "David", "Emily", "Frank", "Grace", "Henry", "Isabel", "John",  
"Karen", "Liam", "Megan", "Nate", "Olivia"),  
midterm = c(80, 70, 91, 85, 55, 80, 95, 50, 65, 75, 80, 85, 90, 75, 80),  
final = c(85, 80, 70, 90, 55, 85, 90, 75, 85, 70, 80, 80, 70, 60, 75)
```

(a) Take this dataset as input and returns a vector of the final grades for each student.

(b) Use if statements to assign a letter grade (A, B, C, D, or F) to the student named "Charlie." (weighted average of the midterm is (0.4) and final scores is (0.6)), with the following criteria:

A: grade  $\geq 90$

B: grade  $\geq 80$  and grade  $< 90$

C: grade  $\geq 70$  and grade  $< 80$

D: grade  $\geq 60$  and grade  $< 70$

F: grade  $< 60$

Bonus: Assign a letter grade (A, B, C, D, or F) based on the student's overall grade (the weighted average of the midterm is (0.4) and final scores is (0.6)), with the following criteria for all students in data frame.

2. You have a variable `x` that contains a numeric value. You can consider any numeric value for `x`.

(a) Check whether `x` is positive, negative, or zero.

(b) Considering the numeric value of `x`, print out `x` "is positive" or `x` "is negative" or `x` "is zero."

3. Load the `normal_distribution.csv` dataset and save it as `nd`.

(a) Generate the density curve of the `nd` using the `density()` function.

(b) Find the mean of `nd` and save it as `mu`.

(c) find the standard deviation of `nd` and save it as `sig`.

(d) Use the function `quantile()` and the values `mu` and `sig` to find the value in `nd` that is greater than 65% of the values in `nd`.