**Lab 4: Functions**

**Instructions**

* Create a Quarto file called “Lab 4: Functions”
* Copy the questions/prompts with the numbers/letters into the markdown file as text (i.e., in between code chunks, without any #). Use a header for each question #.
* Provide the code responses into code chunks directly beneath the questions (or beneath the text if the question requires both verbal and code answers).
* Submit both a knitted HTML file and your .qmd file to ELMS before 11:59pm.
* *See ‘lab assignment demo’ file (.qmd) on ELMS or Jupyter for an example.* *Do not directly edit this file, instead create your own markdown file, copy the content from the demo and edit that.*
* **Write code to implement the described functionality *from scratch*. You cannot use any package, library, or built-in function that answers the bulk of the question for you. For both questions, you should be able to find the answers using only *for loops* and *if statements*.**

**Question 1**

a.) Write a function called **convert\_temps()** that converts temperatures between Fahrenheit and Celsius in both directions. To give you an idea of how to construct and use the function, this would be what you would get if the function existed in R and you looked at the help for it:

**Description**

convert\_temps() converts a temperature from Fahrenheit to Celsius or vice versa. Have the output of the function be, “You entered [temperature entered] [metric entered], your new temperature is [new temperature] [new metric].”

**Usage**

convert\_temps(temp, unit)

**Arguments**

temp A numeric value corresponding to a temperature in Fahrenheit or Celsius.

unit Character input, either “C” or “F”, indicating whether temp is in Celsius or Fahrenheit, respectively. Make it covert to the other letter.

*HINT: To convert from Fahrenheit to Celsius, subtract 32 first then multiply by 5/9. To convert from Celsius to Fahrenheit, multiply by 9/5 first, then add 32.*

b.) Test your function with 0 C, 100 C, 0 F and 100 F.

c.) Using the stop() function, add a condition within your function (you could call it **convert\_temps\_check()** to avoid overwriting the first function), which does the following: (1) checks whether temp is a numeric value (if not returns an error message saying “temp is not numeric”), (2) checks whether unit is a character vector (if not returns “unit is not a string”), and (3) checks whether unit is either C or F (if not, returns “This function only works for Celsius, “C”, and Fahrenheit, “F”).

*HINT: Remember the nchar() function to count the number of characters in a string.*

*HINT: It may be better in this case to first check if any of the stop conditions apply (using if… else if…), for each of these cases call stop(), then if none apply (the final ‘else’) calculate the conversion after that.*

d.) Test your new function with the following, and for the cases where you get an error message explain in a sentence or two below the code chunk why it didn’t work (make sure you re-type the quotation marks in R as those below will often not copy paste in the right format):

> convert\_temps\_check(55, "F")

> convert\_temps\_check(unit = "C", temp = 20)

> convert\_temps\_check("C", 20)

> convert\_temps\_check(32, "Celsius")

> convert\_temps\_check(85, F)

If R is not letting you knit the .qmd file into html because of the error messages, you can comment the code and just copy the error message in your explanation of why it didn’t work.