**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 or docx 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.*

**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 which does the following: (1) checks whether temp is a numeric or integer value (if not returns an error message saying "You must enter a number for temp"), and (2) checks whether unit is either C or F (if not, returns "You may only enter 'C' for Celsius or 'F' for Fahrenheit").

*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 updated 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 (you may need to retype the quotation marks because of formatting differences between Word and R):

*convert\_temps(55, "F")*

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

*convert\_temps("C", 20)*

*convert\_temps(32, "Celsius")*

*convert\_temps(85, F)*

**Question 2**

Write a function called **col\_na** that checks whether each column of a data rame has missing values. It should have one argument, **df**, that is a data frame input. There should be a check to make sure that **df** is a data frame. If not, generate the error, "Input must be a data frame."

If there is missing data, you should print the column number and how many values are missing. For instance, "Column 1 has two missing value(s), Column 3 has one missing value(s)" and so on. (NOTE: There are a few approaches here. NA %in% object\_name will tell you whether there is at least one missing value in an object. is.na(vector\_name) will print a vector of TRUE/FALSE for whether every element of a vector is missing (i.e., NA) or not. Hint: You will need to loop through the columns one by one; consider using a paste() statement to get the output described above. Test the function on the data frame below:

mis\_check <- data.frame(scores = c(81,83,95, NA, 100), ID = c("a1","a2","a3","a4","a5"), height = c(NA,NA,123, 165, 187), MPG = c(56,74,12,34,64))