Lab 2 - R Markdown and Basic Objects

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In this lab, you will familiarize yourself with R Markdown, file management, and basic objects and functions. Follow the instructions below and use R Markdown to create a pdf document with your code and answers to the following questions on Gradescope. You may find a template file by clicking "Code" in the top right corner of this page.

Your final submission should clearly include all code needed to generate your answers and should be formatted according to the guidelines outlined in class. In particular, make sure:

- 1. Code and output are clearly organized by question.
- 2. Unnecessary messages, warning, and output are removed.

You may collaborate with your classmates and consult external resources, but you should write and submit your own answer. Any classmates with whom you collaborate should be credited at the top of your submission. Similarly, if you consult any external references, you should cite them clearly and explicitly.

A. File paths and Introduction to R Markdown

1. Create a MATH167R directory somewhere on your computer that will contain all your work for this class. Within the MATH167R folder, create subdirectories for labs, checkins, and data. Save this .Rmd document in your data folder and then Render/Knit your Rmd document. The following code chunk should print the location of your Rmd. document:

getwd()

[1] "D:/RStudio/sjsu/2024/spring/math167r_02/labs/02_r_markdown_and_basic_objects"

2. In the console, run the command getwd(). What is the output? If it is different from your answer to Question 1, why? Explain, in your own words, what the working directory is.

The output is [1] "D:/MATH167R/data". It is different from my answer to Question 1 because the working directory where getwd() is executed from is different from each question. In Question 1, getwd() was executed from the path: D:/MATH167R/data/02_lab.qmd where 02_lab.qmd is located in D:/MATH167R/data/02_lab.qmd. In Question 2, the working directory for the console is D:/MATH167R and executing getwd() will print the same working directory path of the console.

3. Every time you Render/Knit your Rmd document, all of the code is run in a **new** R session. Any code run in the interactive session **does not affect** your rendered html file. Create a code chunk below that sets the value of x to be your favorite number and then uses print(x) to print it out.

```
x <- 3
print(x)
```

[1] 3

4. Download this dataset to your data folder, then use a code chunk with the code cars <- read.csv("YOUR PATH HERE") to open the file. You will need to replace the text YOUR PATH HERE with the correct location of the dataset to open this successfully.

5. Run the code head(cars) in a code chunk to display the first few rows of this dataset.

head(cars)

```
speed dist
       4
1
2
       4
            10
       7
3
             4
       7
4
            22
       8
5
            16
6
       9
            10
```

B. Vectors and Matrices

6. Write a line of code to generate a vector of length 100 whose entries are 1, 2, ..., 100.

```
lab03_q06_matrix <- c(1:100)
```

- 7. Write a line of code to generate the following matrix:
- 1 2 3
- 4 5 6
- 7 8 9

```
lab03_q07_matrix <- matrix(c(1, 4, 7, 2, 5, 8, 3, 6, 9), nrow = 3, ncol = 3) lab03_q07_matrix
```

```
[,1] [,2] [,3]
[1,] 1 2 3
[2,] 4 5 6
[3,] 7 8 9
```

C. Working with Data Frames

Use the following code to load the penguins data.

```
# load palmer penguins package
library(palmerpenguins)

# open penguins data as a data frame
data(penguins)
penguins <- as.data.frame(penguins)</pre>
```

8. Using the mean() function, compute the mean body mass of penguins in the dataset, dropping any missing values.

```
penguins_body_mass_g_clean <- na.omit(penguins$body_mass_g)
mean(penguins_body_mass_g_clean)</pre>
```

[1] 4201.754

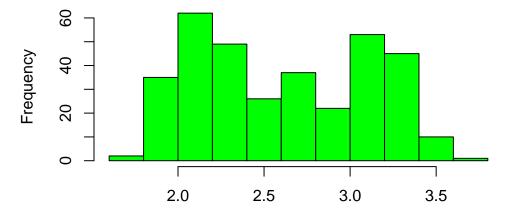
9. Using the max function, compute the maximum flipper length of penguins in the dataset, dropping any missing values.

```
penguins_fipper_length_mm_clean <- na.omit(penguins$flipper_length_mm)
max(penguins_fipper_length_mm_clean)</pre>
```

[1] 231

10. Using the hist function, create a histogram of the ratio of the penguins' bill length to bill depth, dropping any missing values. What is the shape of the resulting distribution?

Histogram for Penguins' Bill Length to Bill Depth Ratio



Bill Length to Bill Depth Ratio