

IST 387 HW 2

Copyright 2021, Jeffrey Stanton, Jeffrey Saltz, and Jasmina Tacheva

Enter your name here: Ezra Cohen

Attribution statement: (choose only one and delete the rest)

1. I did this homework by myself, with help from the book and the professor.
2. I did this homework with help from the book and the professor and these Internet sources:
3. I did this homework with help from <Name of another student> but did not cut and paste any code.

Reminders of things to practice from last week:

Assignment arrow <-

The combine command c()

Descriptive statistics mean() sum() max()

Arithmetic operators + - * /

Boolean operators > < >= <= == !=

This Week: Explore the **quakes** dataset (which is included in R). Copy the **quakes** dataset into a new dataframe (call it **myQuakes**), so that if you need to start over, you can do so easily (by copying quakes into myQuakes again). Summarize the variables in **myQuakes**. Use these commands to get started:

```
myQuakes <- quakes           # Copy into new data frame
summary(myQuakes)           # Summarize data in the console
head(myQuakes)              # View the data in a new tab in RStudio
```

```
      lat      long      depth      mag
Min.   :-38.59  Min.   :165.7  Min.    : 40.0  Min.    :4.00
1st Qu.: -23.47 1st Qu.:179.6 1st Qu.: 99.0 1st Qu.:4.30
Median :-20.30 Median :181.4 Median :247.0 Median :4.60
Mean   :-20.64 Mean   :179.5 Mean   :311.4 Mean   :4.62
3rd Qu.: -17.64 3rd Qu.:183.2 3rd Qu.:543.0 3rd Qu.:4.90
Max.    :-10.72 Max.    :188.1 Max.    :680.0 Max.    :6.40

stations
Min.   : 10.00
1st Qu.: 18.00
Median : 27.00
Mean   : 33.42
3rd Qu.: 42.00
Max.    :132.00
```

A data.frame: 6 × 5

```
      lat      long      depth      mag      stations
<dbl> <dbl> <int> <dbl> <int>
1-20.42 181.62562   4.8    41
2-20.62 181.03650   4.2    15
3-26.00 184.1042    5.4    43
4-17.97 181.66626   4.1    19
5-20.42 181.96649   4.0    11
6-19.68 184.31195   4.0    12
```

Step 1: Explore the earthquake magnitude variable called **mag**

(To address these items, add a comment after the command that produces the result in your code.)

A. What is the average magnitude? Use mean() or summary():

```
mean(myQuakes$mag)
```

B. What is the magnitude of the largest earthquake? Use max() or summary() and save the result in a variable called **maxQuake**:

```
maxQuake <- max(myQuakes$mag)
maxQuake
```

C. What is the magnitude of the smallest earthquake? Use min() or summary() and save the result in a variable called **minQuake**:

D. Create a **sorted dataframe** based on magnitude and store it in **quakeSorted**. **Hint:** Use order()

```
minQuake <- min(myQuakes$mag)
minQuake
```

Step 2: Explore the **stations** variable

E. **Write a comment:** Does there appear to be a relationship between magnitude and the number of reporting stations?

```
magandstations <- myQuakes[, -1:-3]
sortedmagandstations <- data.frame(sort(magandstations$mag), magandstations$stations)
head(sortedmagandstations, 10)
tail(sortedmagandstations, 10)
#Looking at the amount of stations that reported for the lowest 10 magnitude versus the amount of stations that r
eported for the highest 10 magnitudes shows that More stations reported on the higher magnitude earthquakes
```

F. What are the latitude and longitude of the quake reported by the largest number of stations? **Hint:** Use which.max()

```
index <- which.max(myQuakes$mag)
myQuakes[index, -3:-5]
```

G. What are the latitude and longitude of the quake reported by the smallest number of stations? **Hint:** Use which.min()

```
index2 <- which.min(myQuakes$stations)
myQuakes[index2, -3:-5]
```

Step 3: Using conditional if statements

H. Test if **maxQuake** is greater than 7 (output “yes” or “no”)

Hint: Try modifying the following code in R:

```
if (maxQuake > 7) "yes" else "no"
```

‘100 is less than 150’

I. Following the same logic, test if minQuake is less than 3 (output “yes” or “no”):

```
if (minQuake < 3) "yes" else "no"
```