Homework 1: R Introduction

Answer Key

Adapted from University of Tennessee Biometry course by Dr. Jim Fordyce

Turn in via blackboard next Friday by the end of the day. please title the document **hw1__yourlastname__yourfirstname**. Ideally it will be a PDF file generated from knitting an RMarkdown document.

1. Assign to a vector called X the values 1,3,5,6,7, and 9. Assign to a vector called Y the values 2,7,4,5,2 and 12.

```
X <- c(1, 3, 5, 6, 7, 9)
Y <- c(2, 7, 4, 5, 2, 12)
```

2. Combine the two vectors together as one large vector called Z.

```
Z <- c(X, Y)
```

3. Create a new vector that includes all the values in Z that are less than 6.

```
Z_small <- Z[which(Z < 6)]
```

4. Using R functions, calculate the mean of Z.

```
mean(Z)
```

```
## [1] 5.25
```

5. Create an matrix where the columns are X and Y. Assign this matrix to an object called mat1.

```
mat1 <- cbind(X, Y)

# alternate solution
mat1b <- matrix(c(X, Y), nrow = length(X), ncol = 2, byrow = FALSE)
```

6. Using the R function `rowSums`, calculate the sum of each row.

```
rowSums(mat1)
```

```
## [1]  3 10  9 11  9 21
```

7. Calculate the mean of the rows of mat1 and add this as a third column.

```
means <- rowMeans(mat1)

mat1 <- cbind(mat1, means)

mat1
```

```
##      X  Y means
## [1,] 1  2   1.5
## [2,] 3  7   5.0
## [3,] 5  4   4.5
## [4,] 6  5   5.5
## [5,] 7  2   4.5
## [6,] 9 12  10.5
```

8. Extract the value of mat1 at the second row and first column.

```
mat1[2, 1]
```

```
## X
## 3
```

9. Write mat1 to a .csv file.

For my code to work you will have to have a folder called `Output` in your working directory.

```
write.csv(mat1, file = "Output/hw1_mat.csv", row.names = FALSE)
```

10. Read the .csv file and assign it to an object called mat_new.

```
mat_new <- read.csv(file = "Output/hw1_mat.csv")
```

11 Show that the third number in the first column of `mat_new` is equal to the fourth number in the second column.

```
mat_new[3, 1] == mat_new[4, 2]
```

```
## [1] TRUE
```

If this is not true, check that you set `row.names = FALSE` when writing out the object. Otherwise when reading it back in the first column will be the row numbers.

12 Make 'mat1' a data frame.

```
mat1 <- as.data.frame(mat1)
```

13 Using R functions, calculate the length of X.

```
length(X)
```

```
## [1] 6
```

14 Assign the name "mean" to the third column of mat1.

```
colnames(mat1)[3] <- "mean"

names(mat1)
```

```
## [1] "X"    "Y"    "mean"
```

15 Create a sequence of numbers from -10 to 10 with intevals of 0.5 using R functions. Assign it to an object and calculate the sum of the values.

```
q15 <- seq(-10, 10, by = 0.5)

sum(q15)
```

```
## [1] 0
```