Assignment 2: Coding Basics

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OVERVIEW

This exercise accompanies the lessons in Environmental Data Analytics on coding basics.

Directions

1. Change "Student Name" on line 3 (above) with your name.
2. Work through the steps, **creating code and output** that fulfill each instruction.
3. Be sure to **answer the questions** in this assignment document.
4. When you have completed the assignment, **Knit** the text and code into a single PDF file.
5. After Knitting, submit the completed exercise (PDF file) to the dropbox in Sakai. Add your first and last name into the file name (e.g., "FirstLast_A02_CodingBasics.Rmd") prior to submission.

Basics Day 1

1. Generate a sequence of numbers from one to 100, increasing by fours. Assign this sequence a name.

2. Compute the mean and median of this sequence.

3. Ask R to determine whether the mean is greater than the median.

4. Insert comments in your code to describe what you are doing.

```
#1.
sequence100by4 <- seq(1, 100, 4)
sequence100by4
```

```
##  [1]  1  5  9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93 97
```

```
#2.
mean(sequence100by4)
```

```
## [1] 49
```

```
median(sequence100by4)
```

```
## [1] 49
```

```
#3.
mean(sequence100by4) > median(sequence100by4)
```

```
## [1] FALSE
```

Basics Day 2

5. Create a series of vectors, each with four components, consisting of (a) names of students, (b) test scores out of a total 100 points, and (c) whether or not they have passed the test (TRUE or FALSE) with a passing grade of 50.

6. Label each vector with a comment on what type of vector it is.

7. Combine each of the vectors into a data frame. Assign the data frame an informative name.

8. Label the columns of your data frame with informative titles.

```
#5. & 6.
student_name <- c("Larry", "Velma", "Cher", "Stew") # character vector type
test_score <- c(70, 80, 99, 49) # numeric vector type
passed <- c(TRUE, TRUE, TRUE, FALSE) # logical vector type

#7. & 8.
df_test_results <- data.frame("student_name"=student_name, "test_score"=test_score,
                              "passed"=passed)
df_test_results
```

```
##   student_name test_score passed
## 1        Larry         70   TRUE
## 2        Velma         80   TRUE
## 3         Cher         99   TRUE
## 4         Stew         49  FALSE
```

9. QUESTION: How is this data frame different from a matrix?

   Answer: Unlike a matrix, the vectors in a data frame do not all have to be the same data type. For example, the student names vector is character data and the test score vector is numerical data. Vector sequenques must have the same length for both matrices and data frames.

10. Create a function with an if/else statement. Your function should determine whether a test score is a passing grade of 50 or above (TRUE or FALSE). You will need to choose either the `if` and `else` statements or the `ifelse` statement. Hint: Use `print`, not `return`. The name of your function should be informative.

```
greater_than_50 <- function(x){
  ifelse(x>=50, TRUE, FALSE) # if test score x is >= 50, TRUE, else FALSE
}
```

11. Apply your function to the vector with test scores that you created in number 5.

```
# Determines whether each score in the test_score vector is a passing score
passing_grade <- greater_than_50(x = test_score)
passing_grade
```

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

12. QUESTION: Which option of `if` and `else` vs. `ifelse` worked? Why?

   Answer: I used an ifelse statement because if and if-else statements do not work as well with vector data in R. I would have needed to use a "print" statement in order for my function to apply to each number in my vector.