# Assignment 2: Coding Basics

Atalie Fischer

## 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. Create sequence from 1 to 10, increasing by 4.
seq1 <- seq(1, 10, 4)

#2. Mean and median of sequence.
mean(seq1)
```

```
## [1] 5
```

```
median(seq1)
```

```
## [1] 5
```

```
#3. Is the mean of the sequence greater than the median?
mean(seq1) > median(seq1)
```

```
## [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.

```
#Create series of vectors
names <- c("Billy", "Bob", "Joe") #character
names
```

```
## [1] "Billy" "Bob"   "Joe"
```

```
scores <- c(65, 35, 95) #numeric
scores
```

```
## [1] 65 35 95
```

```
pass <- c(ifelse(scores > 50, TRUE, FALSE)) #logical
pass
```

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

```
df_class_grades <- data.frame("Names" = names, "Score" = scores, "Passed" = pass)
class(df_class_grades)
```

```
## [1] "data.frame"
```

```
df_class_grades
```

```
##   Names Score Passed
## 1 Billy    65   TRUE
## 2   Bob    35  FALSE
## 3   Joe    95   TRUE
```

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

   Answer: Data frames are different from matrices in that they can contain different types of vectors, whereas matrices must have vectors of all the same type of vector. This data frame has three different types of vectors - numeric, character, and logical.

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.

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

```
print(ifelse(scores > 50, TRUE, FALSE))
```

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

```
print(if(scores > 50) {TRUE} else {FALSE})
```

```
## Warning in if (scores > 50) {: the condition has length > 1 and only the first
## element will be used
```

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

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

    Answer: The ifelse() function worked with the vector. if() did not work becasue conditions with lengths greater than one are not accepted, and only the first element is used.