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 last name into the file name (e.g., "Salk_A02_CodingBasics.Rmd") prior to submission.

The completed exercise is due on Tuesday, January 21 at 1:00 pm.

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.
by.fours <- seq(1,100, by = 4)

#2.
mean(by.fours) # mean of the sequence is 49
```

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

```
median(by.fours)  # median of the sequence of nums is 49
```

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

```
#3.
mean(by.fours) > median(by.fours) # mean is not greater than the median
```

```
## [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 and 6
names <- c("Sally", "John", "Roger", "Emily") #character
scores <- c(82, 45, 90, 75) # numeric
passed <- c(TRUE, FALSE, TRUE, TRUE) #logical

# 7
column.names <- c("Name of student", "Test Score", "Passed?")
test.scores <- data.frame(names, scores, passed)
names(test.scores) <- column.names
test.scores
```

```
##   Name of student Test Score Passed?
## 1           Sally         82    TRUE
## 2            John         45   FALSE
## 3           Roger         90    TRUE
## 4           Emily         75    TRUE
```

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

   Answer: This data frame contains more than one type of element (character, numeric, etc), whereas a matrix can only contain a single type of value

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.

```
pass.fail <- function(x) {
  ifelse(x<50, FALSE, TRUE) # if the score is less than 50, return FALSE, if >= 50 return TRUE
}

pass.fail(test.scores$`Test Score`)
```

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

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

    Answer: ifelse was much easier, becasue I wanted a binary answer to the question: does the number satisfy the condition of <50, yes or no?