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.
seq100 <- seq(1,100,4) #generates sequence from 1 to 100, increment of 4 and assigns to object

#2.
mean(seq100) #computes the mean
```

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

```
median(seq100) #computes the median
```

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

```
#3.
mean(seq100) > median(seq100) #mean greater than 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.

```
student_names <- c("Ann", "Jan", "Fran", "Nan") # character/string vector
test_scores <- c(98, 72, 50, 41) # numeric/integer vector
pass_50 <- c(test_scores>=50) # logical vector

school_df <- data.frame("Name"=student_names, "Grade"=test_scores, "Pass"=pass_50)
school_df
```

```
##   Name Grade  Pass
## 1  Ann    98  TRUE
## 2  Jan    72  TRUE
## 3 Fran    50  TRUE
## 4  Nan    41 FALSE
```

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

   Answer: Dataframes are more flexible and can have columns with different data types while matrices cannot.

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.

```
passing_score <- function(x) {
  ifelse(x >= 50, TRUE, FALSE)
}

passing_score(test_scores)
```

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

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

    Answer: `ifelse` worked because it allows you to run the function over a vector. You get an error related to length if you try to run a `function(x)` using `if` and `else` if `x` has a length greater than 1. You would probably have to loop an `if` and `else` statement to get it to evaluate multiple values.