Assignment 2: Coding Basics

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OVERVIEW

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

Directions

1. Rename this file `<FirstLast>_A02_CodingBasics.Rmd` (replacing `<FirstLast>` with your first and last name).
2. Change "Student Name" on line 3 (above) with your name.
3. Work through the steps, **creating code and output** that fulfill each instruction.
4. Be sure to **answer the questions** in this assignment document.
5. When you have completed the assignment, **Knit** the text and code into a single PDF file.
6. After Knitting, submit the completed exercise (PDF file) to Sakai.

Basics, Part 1

1. Generate a sequence of numbers from one to 30, increasing by threes. 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.

```r
#1. The name "x" is assigned to a sequence from 1 to 30, increasing by threes.
x<-seq(1,30,3)

#2. The names "x_mean" and "x_median" are assigned to the mean and median values computed
#for the designated sequence.
x_mean<-mean(x)
x_median<-median(x)

#3. The mean and median values are being compared to determine if the mean is greater than the median.
mean_median_comparison<-x_mean>x_median

#This prints the outcomes of the commands performed.
print(x)
```

```
##  [1]  1  4  7 10 13 16 19 22 25 28
```

```r
print(x_mean)
```

```
## [1] 14.5
```

```
print(x_median)
```

```
## [1] 14.5
```

```
print(mean_median_comparison)
```

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

Basics, Part 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.

```
#Vectors are defined for names of students, test scores values, and whether the students have passed.

#student_name is a character vector.
student_name = c("Fiona", "Declan", "Aidan", "Maureen")
#test_scores is a numerical vector.
test_scores = c(95,48,74,92)
#passed_test is a logical vector.
passed_test = c(TRUE, FALSE, TRUE, TRUE)

#Vectors are placed within a data frame that prints the values in a list format.
student_information<-list(
student_name,
test_scores,
passed_test
)

#This prints the list of student information.
print(student_information)
```

```
## [[1]]
## [1] "Fiona"   "Declan"  "Aidan"   "Maureen"
##
## [[2]]
## [1] 95 48 74 92
##
## [[3]]
## [1]  TRUE FALSE  TRUE  TRUE
```

```
#I utilized Chat GPT to assist with generating the code for this section.
```

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

   Answer: A single data frame can contain different types of vectors. For example, student_information contains character, numerical, and logical vectors. On the contrary, only a single vector type can be contained across a matrix.

10. Create a function with an if/else statement. Your function should take a **vector** of test scores and print (not return) whether a given 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.

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

```
#This function uses an if/else statement to evaluate student test scores
#and determine whether these are passing grades equal to or above 50.
test_scores_passing_check<-function(test_scores){
  ifelse(test_scores>=50, "Pass", "Fail")
}

#This then runs the function for test scores.
test_scores_passing_check(test_scores)
```

```
## [1] "Pass" "Fail" "Pass" "Pass"
```

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

    Answer: The 'ifelse' option worked, as opposed to 'if' and 'else', because the latter option produced an error regarding it's inability to evaluate vectors.