

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 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.  
seq(1, 100, 4) #I am asking R to create a sequence from 1 to 100 by 4
```

```
## [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
```

```
one_to_100_by_4 <- seq(1, 100, 4) #I am assigning the sequence a name
```

```
#2  
mean_one_to_100_by_4 <- mean(one_to_100_by_4) #I am asking R to calculate the mean of the data  
#set, and also assigning the mean the name mean_one_to_100_by_4
```

```
median_one_to_100_by_4 <- median(one_to_100_by_4) #I am asking R to calculate the median of the  
#data set, and also assigning the median the name median_one_to_100_by_4
```

```
#3.  
mean_one_to_100_by_4 > median_one_to_100_by_4 #I am asking R to determine if the mean is greater
```

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

```
#than the median
```

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
```

```
gibbon_names <- c("hoolock", "hylobates", "nomascus", "symphalangus") #the names of the students,  
#each representing their genus of gibbon, this is character
```

```
scores <- c(100, 65, 87, 26) #scores that each gibbon got on the test
```

```
pass <- c(TRUE, TRUE, TRUE, FALSE) #whether or not they passed the test (received a score greater #than
```

```
#6
```

```
#gibbon_names is a character vector
```

```
#scores is a numeric vector
```

```
#pass is a logical vector
```

```
#7
```

```
gibbon_test_scores <- data.frame(gibbon_names, scores, pass) #this code creates a data frame,  
#using the vectors as columns in the order listed
```

```
#8
```

```
colnames(gibbon_test_scores) <- c("gibbon.name", "gibbon.test.score", "gibbon.pass.fail" )
```

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

Answer: The data frame allows heterogenous elements such as characters and numbers. A matrix only allows homogenous data to be stored- either all numerical or all characters. A matrix also has a fixed number of rows and columns, whereas a data frame can contain multiple data types in multiple columns called fields.

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.

```
ifelse(scores>50, "pass", "fail") #this code will test with if the scores in the vector are
```

```
## [1] "pass" "pass" "pass" "fail"
```

```
#passing (greater than 50)
```

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

Answer: 'ifelse' worked for me. I believe that 'if/else' had an error message saying that "the condition has a length > 1." I believe this is because `ifelse` can be used on vectors, but `if/else` must be used on things that are a length of one. The scores vector has a length of 4 so the code does not work.