

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.

```
#1.
thirty_sequence <- seq(1, 30, 3)
# I'm creating a sequence of numbers from 1 to 30 increasing by 3 and giving this sequence
# the name "thirty_sequence".
#2.
mean(thirty_sequence) # this computes the mean of thirty_sequence, which equals 14.5

## [1] 14.5

median(thirty_sequence) # this computes the median of thirty_sequence which equals 14.5

## [1] 14.5

#3.
mean(thirty_sequence)>median(thirty_sequence) # this is asking if the mean of

## [1] FALSE
```

```
# thirty_sequence is greater than the median of thirty_sequence, to which the answer is 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.

```
#5. #6.
names <- c("Sue", "Rob", "Chris", "Greg") # type of vector is character
scores <- c( 87, 90, 99, 83) # type of vector is numeric
pass <- c(TRUE, TRUE, TRUE, TRUE) # type of vector is logical
#7.
student_stats <- data.frame(names, scores, pass)
#8.
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
```

```
student_stats <- student_stats %>%
  rename(student_name = "names",
         test_score = "scores",
         pass_true_or_false = "pass")
```

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

Answer: A matrix can only consist of a single class of data while a data frame can contain a variety of classes of data. In this case, the data frame has numerical, logical, and character types of data which would not be able to coexist in 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.

```

#10.
pass_or_fail <- function(x){
  y <- ifelse(x < 50, "FALSE", "TRUE")
  print(y)
}

# pass_or_fail2 <- function(x) {
#   if(x > 50) {
#     print(TRUE)
#   }
#   else {
#     print(FALSE)
#   }
# }
#11.
pass_or_fail(student_stats$test_score)

```

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

```
# pass_or_fail2(student_stats$test_score)
```

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

Answer: Using `ifelse` works because it can accept a vector. `If...else` will not work with a vector input. It gives an error that the condition has a length greater than 1. The `if` function can only take individual elements and not a vector. Note that in the code above I tried both methods and commented out the function and test that didn't work.