

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.
seq1 <- seq (1, 100, 4) # create a sequence from 1 to 100 with a step of 4

#2.
mean(seq1) # calculate the mean of the created sequence

## [1] 49

median(seq1) # calculate the median of the created sequence

## [1] 49

#3.
mean(seq1) > median(seq1) # evaluate if the mean is greater than the median. It is not.

## [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.

```
# Create three 4-component vectors with student grade information

student_name <- c("Arnold", "Brittany", "Christopher", "Drew") # character - student names
test_score <- c(96, 76, 81, 43) # numeric - test score (out of 100)
passed <- c(TRUE, TRUE, TRUE, FALSE) # logical - passed? (greater than 50?)
# passed <- test_scores > 50 # alternative method for creating "passed" vector of boolean values

# Combine student grade information vectors into dataframe

gradebook <- data.frame(student_name, test_score, passed)
#column titles come directly from vectors - any reason to change these?
```

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

Answer: A dataframe differs from a matrix in that it is able to contain different data types in its different columns, whereas a matrix can only contain one data type.

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.

```
# Create function to determine whether a test score is above passing

eval_passing_grade <- function(score) {
  passing_grade = 50
  grade_status <- ifelse(score > passing_grade, TRUE, FALSE)
  print(grade_status)
}

# Test of 'if'/'else' statement method - non-functional
# eval_passing_grade <- function(score) {
#   passing_grade = 50
#   grade_status <- if(score > passing_grade) {TRUE} else {FALSE}
#   print(grade_status)
# }

# Apply function to test scores vector
eval_passing_grade(test_score)
```

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

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

Answer: The 'ifelse()' function worked and allowed me to write the statement in a single line. To check why the other wouldn't have worked, I wrote out a quick 'if(){}else{}' structure (commented out above to show work) and recieved an error that the condition length was greater than one, so only the first element would be used. Therefore, I think the ifelse worked because it is a vectorized function, while I would need to iterate through the list elements explicitly to use the 'if'/'else' construction.