

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 last name into the file name (e.g., “Salk_A02_CodingBasics.Rmd”) prior to submission.

The completed exercise is due on Tuesday, January 21 at 1:00 pm.

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. counting by 4 to get to one hundred
question1 <- seq(1, 100, 4)
#2. finding the mean and median of the "question 1" sequence
mean(question1)

## [1] 49

median(question1)

## [1] 49

#3. determining if the mean is greater than the median (it is not)
mean(question1) > median(question1)

## [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 <- c("Kitiara" , "Riverwind" , "Goldmoon" , "Tika") #character vector
score <- c(95, 83, 68, 45) #numerical vector
pass <- c(TRUE, TRUE, TRUE, FALSE) #logical vector
testscores <- data.frame(student, score, pass)
names(testscores) <- c("Student", "Score", "Passed")
```

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

Answer: Matrices contain the same type of element, while data frames can include different vector types (character, numerical, logical).

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.

```
grade_func1 <- function(x) {
  if ( x >= 50 ) {
    print ("Pass")
  }
  else {
    print ("Fail")
  }
} #using the 'if' and 'else' function to attempt to see the passing and failing scores; does not work

grade_func2 <- function(x) {
  ifelse(x >= 50, "Pass" , "Fail")
} #using the 'ifelse' function to determine the passing and failing scores; does work

grade_func1(score)
```

```
## Warning in if (x >= 50) {: the condition has length > 1 and only the first
## element will be used
```

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

```
grade_func2(score)
```

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

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

Answer: 'ifelse' worked because 'if' and 'else' can only read one object, which it cannot do because the scores are more than one object.