

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. Generate a sequence of numbers from one to 100, increasing by fours. Assign this sequence a name.

```
Num <- seq(1, 100, 4)
```

#2.

Compute the mean

```
mean(Num)
```

```
## [1] 49
```

Compute the median

```
median(Num)
```

```
## [1] 49
```

#3. Determine whether the mean is greater than the median

```
mean(Num) > median(Num)
```

```
## [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.

```
vector1 <- c("Amily", "Bob", "Caroline", "Dave") # character vector
vector1

## [1] "Amily"      "Bob"         "Caroline"    "Dave"

vector2 <- c(75, 54, 69, 43) # numeric vector
vector2

## [1] 75 54 69 43

vector3 <- c(TRUE,TRUE,TRUE,FALSE) #logical vector
vector3

## [1] TRUE TRUE TRUE FALSE

Studentsgrades <- data.frame(vector1, vector2, vector3)
names(Studentsgrades) <- c("Name","Grade","Passed")
```

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

Answer: In a data frame the columns contain different types of data, but in a matrix all the elements are the same type of data.

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.

```
gradepass <- function(x) {
  if(x < 50) {
    print(FALSE)
  }
  else {
    print(TRUE)
  }
}

gradepass2 <- function(x) {
  ifelse(x < 50, print(FALSE), print(TRUE))
}

gradepass(vector2)

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

## [1] TRUE

gradepass2(vector2)

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

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

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

Answer: “ifelse” worked, because in R, conditional statements are not vector operations. They deal only with a single value. If a vector is put in, the “if” statement will only check the very first element and issue a warning.