

Assignment 2: Coding Basics

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OVERVIEW

This exercise accompanies the lessons in Environmental Data Analytics (ENV872L) on coding basics in R.

Directions

1. Change “Student Name” on line 3 (above) with your name.
2. Use the lesson as a guide. It contains code that can be modified to complete the assignment.
3. Work through the steps, **creating code and output** that fulfill each instruction.
4. Be sure to **answer the questions** in this assignment document. Space for your answers is provided in this document and is indicated by the “>” character. If you need a second paragraph be sure to start the first line with “>”. You should notice that the answer is highlighted in green by RStudio.
5. When you have completed the assignment, **Knit** the text and code into a single PDF file. You will need to have the correct software installed to do this (see Software Installation Guide) Press the **Knit** button in the RStudio scripting panel. This will save the PDF output in your Assignments folder.
6. After Knitting, please submit the completed exercise (PDF file) to the dropbox in Sakai. Please add your last name into the file name (e.g., “Salk_A02_CodingBasics.pdf”) prior to submission.

The completed exercise is due on Thursday, 24 January, 2019 before class begins.

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.

```
#Step 1: generate sequence from 1 - 100 by intervals of 4
Numbers <- seq(1,100,4)
#Step 2: find mean
N_mean <- mean(Numbers); N_mean
```

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

```
#Step 3: find median
N_median <- median(Numbers); N_median
```

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

```
#Step 4: Evaluate whether mean is larger than median
N_mean > N_median
```

```
## [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.

```
Name <- c("Pidgey", "Horsea", "Chansey", "Eevee") #character vector
Score <- c(100, 70, 40, 10) #Numeric vector
Pass <- c(TRUE, TRUE, FALSE, FALSE) #Logical vector

Class <- data.frame(Name, Score, Pass); Class
```

```
##      Name Score Pass
## 1 Pidgey   100  TRUE
## 2 Horsea    70  TRUE
## 3 Chansey   40 FALSE
## 4 Eevee    10 FALSE
```

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

ANSWER: Data frame is different from matrix in the sense that they have a header row that names each column and they show up at global environment as data instead of values. You can also check in a dataframe the data type of each column, while matrix elements are homogeneous (i.e. in a matrix there is only 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. 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 <- function(x) {
  ifelse (x>50, "TRUE", "FALSE")
}

Grade(Score)
```

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

```
Grade2 <- function(x) {
  if (x>50)
  {"TRUE"}
  else
  {"FALSE"}
}

Grade2(Score)
```

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

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

ANSWER: ifelse worked fine, while if and else only displayed the results of first element because the vector has more than 1 element. Perhaps we need a for loop for that. Ifelse reminds me of the Con function in ArcGIS.