

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 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. Using the seq function from the base package to generate a sequence of numbers from 1 to 100 in increments of 4

```
num_seq <- seq(1, 100, by=4)
```

#2. calculating the mean and median of this sequence

```
mean.num_seq <- mean(num_seq)
```

```
mean.num_seq
```

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

```
median.num_seq <- median(num_seq)
```

```
median.num_seq
```

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

#3. Using an if condition to check whether mean is greater than the median

```
mean.num_seq > median.num_seq
```

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

```
#if (mean.num_seq > median.num_seq) {
#  print("Mean of the sequence is greater than the median")} else {
#  print("Mean of the sequence is not greater than the median")}
```

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_names <- c("a", "b", "c", "d") #vector containing 4 names of students
test_scores <- c("54", "95", "12", "70") #vector containing test scores
(random numbers)
test_grades <- test_scores>=50 #vector containing grades of the 4 students
based on their test scores
marksheet.df <- data.frame(student_names, test_scores, test_grades) #creating
a data frame from the three vectors we created
colnames(marksheet.df) <- c("names", "scores", "grades") #changing the column
names to something meaningful but easier to write than the vector names
themselves
```

9. QUESTION: How is this data frame different from a matrix?
 Answer: A matrix is a simple collection of numbers arranged across rows and columns. Whereas a data frame is a more sophisticated data structure that can store a mix of data types along with column/row names.
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.

```
passingGrade <- 50 #variable to store the passing score of this test
passingTest <- function(vect, pass, print=TRUE) {
  for (i in 1:length(vect)) {
    if (vect[i]>=pass) {
      print(paste(vect[i], "is a passing grade"))
    } else {
      print(paste(vect[i], "is not passing grade"))
    }
  }
}
passingTest(test_scores, passingGrade)
```

```
## [1] "54 is a passing grade"
## [1] "95 is a passing grade"
## [1] "12 is not passing grade"
## [1] "70 is a passing grade"

passingTest2 <- function(vect, pass, print=TRUE) {
  for (i in 1:length(vect)) {
    ifelse (vect[i]>=pass, print(paste(vect[i], "is a passing grade")),
    print(paste(vect[i], "is not passing grade")))
  }
}
passingTest2(test_scores, passingGrade)

## [1] "54 is a passing grade"
## [1] "95 is a passing grade"
## [1] "12 is not passing grade"
## [1] "70 is a passing grade"
```

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

Answer: I tried both, and got the same result (as we can see above)