QMB 6358: Software Tools for Business Analytics
Executive Development Center
College of Business
University of Central Florida
Fall 2020

Assignment 2

Due Wednesday, September 16, 2020 at 11:59 PM
in your GitHub repo.

Instructions:

Complete this assignment within the space on your GitHub repo in a folder called `assignment_02`. In this folder, save your answer to Question 1 in a file called `Q1_functions.R`. In the same folder, save a copy of the sample file called `Q2_testing.R` that will contain your R code for Question 2.

When you are finished, upload your code to your GitHub repo using the interface in a browser. You are free to discuss your approach to each question with your classmates but you must upload your own work.

Question 1:

Create functions to perform the following calculations. Insert your function definitions in the file `Q1_functions.R` from the `assignment_02` folder in the QMB6358F20 course repository.

For each example, there are at least two solutions. One is to use a `for` loop and the other is to use arithmentic operations on the inputs in vector form. For your examples, a vector can be created with the `c()` function, as in `x <- c(1, 2, 3, 2, 2)`. It is fine to choose simple examples to test your function that you can work out by hand, as long as they test that the function works correctly.

a) Write a function `sum_sq_dev` that takes in a vector `x` and a number `mu` and returns the sum of the squared deviations from the numbers in `x` and the number `mu`. That is, calculate the following formula:

$$SSD(x, \mu) = \sum_{i=1}^{n} (x_i - \mu)^2$$

b) Write a function that calculates the covariance between two vectors `y` and `x`, of equal length n, and return this as the output from the function `covar_y_x`. That is, calculate the following formula, in which $\bar{x}$ and $\bar{y}$ are the averages of the values in `x` and `y`:

$$COV(y, x) = \frac{1}{n} \sum_{i=1}^{n} (y_i - \bar{y})(x_i - \bar{x})$$

You can use the `cov` function to test your function.

Question 2:

Using the examples you created in the function design recipes for the functions in Question 1, test your library of functions.

1. Enter the examples in the script called `Q2_testing.R` that reads in your library of functions from the script `Q1_functions.R`.
2. Define the functions one-by-one, by running the blocks of code in `Q1_functions.R` that define, for example, the function `sum_sq_dev`.
3. Test the functions one-by-one, by running the block of code in `Q1_testing.R` that each function.
4. Check whether the results are correct. If there are any errors or incorrect calculations, make adjustments to `Q1_functions.R` and run the tests in `Q1_testing.R` again.
5. Once they are correct, edit the files on your GitHub repository to submit the corrected version.