Midwestern State University – Data Structures – Fall 2018

Mandatory Assignment # 1 | this is an **Individual** assignment.
Deadline for 100%: Friday, September 14 at 8:00 am.

For this assignment, you are **NOT** allowed to use: **pointers**, **neither Global variables**

Description:
You are required to write a C++ program that will compute "r" the linear correlation coefficient.
https://www.mathway.com/examples/statistics/correlation-and-regression/finding-the-linear-correlation-coefficient?id=328

We are going to solve this problem using only six pairs of numbers, however, your code must be designed in such a way that can handle larger problem sizes **BY ACCEPTING ONLY ONE MODIFICATION**

❖Linear Correlation Coefficient r

measures strength of the linear relationship between paired x and y values in a sample

$$r = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{n(\Sigma x^2) - (\Sigma x)^2}\sqrt{n(\Sigma y^2) - (\Sigma y)^2}}$$

```
xxxx myMatrix(removed intentionally);
xxxx sumOfXvalues(removed intentionally);
xxxx sumOfYvalues (removed intentionally);
xxxx sumOfProducts(removed intentionally);
xxxx sumOfSquaredValues(removed intentionally);
xxxx numerator(removed intentionally);
xxxx denominator(removed intentionally);
xxxx rCoefficient(removed intentionally);
xxxx showMeTheMatrix(removed intentionally);
xxxx showMeMore(removed intentionally)
```

- **myMatrix** = MUST ask the user to enter 6 pair of integers numbers (X,Y), where the first number goes to the X column, and the second to the Y column, in other words all info will be saved in a matrix. Example below.

X	Y
1	2
2	3
4	5
2	1
1	5
3	9

These numbers CANNOT be hardcoded, the numbers will be entered by your instructor
[-20 if not respected]

You must ask the user for an X Y pair, not to enter all X, and then to enter all Y values **[-20 if not respected]**

- **sumOfXvalues** =
  - must compute and return the summation of all x values;
  - you cannot hardcode the addition of these numbers
  - **[-20 if not respected]**

- **sumOfYvalues** =
  - must compute and return the summation of all y values;
  - you cannot hardcode the addition of these numbers
  - **[-20 if not respected]**

- **sumOfProducts** =
  - must compute and return the summation of all xy products
  - you cannot hardcode the addition of these numbers
  - **[-20 if not respected]**

- **sumOfSquaredValues** =
  - must compute and return the summation of the squared values
  - you cannot hardcode the addition of these numbers
  - **[-20 if not respected]**

- **numerator** =
  - will compute and return the **numerator** for the "r" expression
  - you cannot hardcode the addition of these numbers
  - **[-20 if not respected]**

- **denominator** =
  - will compute and return the **denominator** for the "r" expression
  - you cannot hardcode the addition of these numbers
  - **[-20 if not respected]**

- **rCoefficient** =
  - will compute and return the value of "r"

- **showMeTheMatrix** = should print on screen in a nice, clean and readable format the matrix created by "**myMatrix**". This function must not allow modification/alteration of the original info (matrix). **[-10 if the matrix is incorrect]**

- **ShowMeMore** = will show the following info in this order.

  [-5 per each incorrect computed value]

  - Sum of x values
  - Sum of y values
  - Sum of products
  - Sum of squared values
  - numerator
  - denominator
  - rCoefficient

Your program must be able to explain any user what he/she is seen on screen

Presentation for your code:

MUST BE AS FOLLOWS: **(-10 points if not respected)**

```
//************************************************************
//                   Assignment #1
//                    Name: John Doe
//                    Data Structures Date: Date of Submission (M/D/Y)
//************************************************************
//      Place your general program documentation here. It should
//      be quite a few lines explaining the programs duty carefully.
//      It should also indicate how to run the program and data
//      input format, filenames etc
//************************************************************

//*****************************************************************
//                      FOR ALL FUNCTIONS function Name::MethodName()
//                    Parameters: List them here and comment
//   A discussion of what the method/function does and required
//   parameters as well as return value.
//*****************************************************************
```

READ NEXT PAGE

Deliverables via D2L:

Only one "*.cpp" (C++ file) named as follows: **NameLastNameA1.cpp**
Example: if you name is John Doe, the file that you are required to submit MUST be named "JohnDoeA1.cpp"

10 points will be substracted if you do not name your file properly.

Deliverable in class:

- a hard copy of your code

[-5 points if not delivered at the beginning of class]
[-5 points if the pages are not stapled together]

Deadline for 100%: Friday, September 14 at 8:00 am.