

## **Object Oriented Programming**

### **Assignment 2**

**Due: April 18<sup>th</sup>, 2021 11:59 pm**

#### **Instruction**

This is individual assignment and you are not allowed to collaborate with anyone else.

STATEMENT Design and implement a C++ class named Array. You are expected to provide the following functionalities:

- A constant data member to hold the size of the array. It should be initialized using an argument when the constructor is called. If the argument is negative, it should be initialized to 1.
- A pointer to integer which should point to a memory portion allocated in constructor (using the size data member) and deallocated in destructor. Note that the size of allocated memory cannot change once an instance has been initialized (because the size data member is constant).
- A data member named `local_average` for storing the average of all integers in a particular instance of your Array.
- A static data member named `global_count`, which represents the number of Array objects initialized in your program.
- A static data member named `global_size`, which represents the total number of integers your class has allocated to various instances.
- A static data member named `global_average` for storing the average of all integers of all Array instances initialized.
- Overload stream insertion `<<` and stream extraction operators for class Array
- Overload `+` and `-` operator to add and subtract corresponding elements of two array object having same size.
- Overload subscript operator `[]` for the objects of class Array.
- Overload function operator `()` such that the statement `cout<<ArrObject(1,3)` can be used to print first three elements of the array object.
- Overload `++` and `--` operator to increment and decrement all array elements by 1 respectively.
- Write a driver program to test your class by inputting from user the number of Array instances he wants to create, their sizes and their values in an orderly fashion. While updating values, `local_average` and `global_average` should be printed after every change. Test all the overloaded operators in the driver function.

### EXAMPLE

Suppose that two instances of Array named a1 and a2 are initialized in your program.

	a1	a2
size	4	6
ptr[]	10, 20, 30, 40	50, 60, 70, 80, 90, 100
local_average	25	75
global_count	2	
global_size	10	
global_average	55	

after Increment operator a1++ a1=11,21,31,41

after decrement operator a2-- a2=49,59,69,79,89,99

after a1+a2 statement following message should be displayed "array sizes mismatched"

a1+a2 and a1-a2 are only possible if they have same size.

Cout<<a1 should print 10,20,30,40

cout << a1(2,4) should print 20,30,40

cout<<a1[3] should print 30

cin>>a1[3] should get 3<sup>rd</sup> element of the array a1 from the user