Programming Paradigms Lab Assignment (CS453)

Assignment Sheet 3 : C++ Class and Object concepts

Time : Two weeks

Develop the below programs with C++ Class and Object concepts mentioned below wherever applicable.

- ➢ Any C++ concepts as mentioned in Assignment Sheet 2
- ➢ Access Specifier
- ➢ Constant data member
- ➢ Default Constructor
- ➢ Overloaded Constructor
- ➢ Copy Constructor
- ➢ 'this' pointer
- ➢ Assignment(=) operator
- ➢ Static member/member function
- ➢ Operator overloading : addition(+) operator

Problems

1. Write a program to take input of N number of students information such as Name, Age, Department and Year. The student information should be shored in array of `Student` Class. Print those information in the console. Develop member functions of `Student` Class such as `ReadStudentData(...)`, `PrintStudentData(...)` for this purpose.

2. Develop a program of finite(limited) stack where elements to be stored is integer.
   - ➢ Create a Stack class named `MyStack` with required data members and member functions. Note that each stack can have different maximum size based on initialization.
   - ➢ Develop the below stack routines as member function of the class
     - ➢ `Push(...)` : Push element(s) into a particular stack
     - ➢ `Pop(...)` : Pop an element from the stack
     - ➢ `MaxSize(...)` : Should notify the maximum number of elements the stack can store
     - ➢ `CurrentSize(...)` : Should notify the current number of elements in the

stack

> `IsEmpty(...)` : Should notify if the stack is empty

> `Display(...)` : Should display the current snapshot of the stack content

> Demonstrate the basic stack functionality using above routines

> Demonstrate that multiple stack can be instantiated and can co-exists independently

> Demonstrate that a new stack can be created from an existing class using "copy constructor" and "= operator".

Once problem 1 and 2 are completed, then attempt problem 3.

3. Modify the <u>Problem 2</u> with below support -

> Provide a mechanism to maintain the count of stacks created

> Provide a mechanism to update a stack by adding two existing stacks using "+ operator".

Example code :

```
MyStack aStackA, aStackB, aStackC;

...

aStackC = aStackA + aStackB;
```

> Provide a mechanism to restrict that maximum N stacks can be created