**Project-3**

**Objective:**

The purpose of this project is to expose you to the analysis, design and implementation of a bag using arrays. iT further strengthen your knowledge and understanding of classes, objects, data members, member functions, and interface.

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**Problem Specification:**

Design a bag that will do the following:

Accept a student’s name (string) and maintains an array of test scores. Methods are,

**add** which adds a score at the first available position. That is the position immediately following the last added score. If the array is empty, you add at the first position. If the array is full, then you cannot add and must indicate that.

**Remove** which removes the last score; scores in the middle or front, cannot be removed. If the array is empty then you cannot remove and must indicate that.

**clear** which clears the array of all the scores, but before you do that you must print the name and contents of the array backward.

**Requirements:**

* Create a CRC card as explained in chapter 1.
* Specify each method’s purpose, describe its parameters, and write a pseudo-code version of its header as explained in chapter 1.
* Create a class diagram showing the class name, public and private members.
* You are to create an abstract class to be used as a base class with all its methods being pure abstract methods.
* You are to create a subclass that contains the class declaration and interface for the class’s methods.
* You are to define a default constructor that will ask for a student name to be entered from the keyboard and stores it. It also initializes a counter that keeps track of the number of scores in the array and is maintained when you add, remove, or clear.
* You have to define a null destructor.
* The maximum number of test scores is 5 and is stored in the class data as a static constant.
* The test scores may be integers, floats or doubles.
* Two methods are defined to determine if the array **isFull** or **isEmpty.**

The file “proj3.cpp” is the client file that tests the methods defined in the implementation file and declared in the header file called “proj1.h”

**Grading Criteria:**

5 points a header file is used to define the class.

5 points a C++ implementation file contains member functions definitions.

5 points default constructor is defined and performs its task.

5 points destructor is defined and is null.

10 points class templates are used to accommodate different types.

5 points the preprocessor directive #ifndef is properly used.

5 points all accessor methods are constants and parameters passed are also constants

5 points Good programming practices: Proper spacing, comments, use of variables, indentations and appearance of program.

10 points methods specifications and pseudopod.

5 points CRC card is submitted correct and complete.

5 points a UML class diagram is submitted and is correct.

10 points the clear method calls the print function which prints the array elements last to first before clearing the array.

20 points Program solution fits specifications.

5 points test results to account for all methods.

**Submission Details:**

Hand-in the specifications, source program files, test results.

Due Date 11-16-2021