**CMPE 50, Object-Oriented Concepts and Methodology, Spring 2021**

**Lab #6 – Introduction to Classes**

**Exercise 1:**

Write the definition of a class representing a student record:

The student record class should have member variables for all the grading components, namely:

- best 2 out of the 3 quiz scores, graded on the basis of 10 points, weighted at 25% (only the two highest scores should be taken into consideration for calculation)

- 1 midterm exam, graded on the basis of 100 points, weighted at 25%

- 1 final exam, graded on the basis of 100 points, weighted at 50%

- The student’s weighted average numeric score

Weighted average numeric score =

((quiz1 + quiz2)/20 \* 0.25 + mid / 100 \* 0.25 + final / 100 \* 0.5) \* 100

Make all member variables private.

(note that at this point, you don’t have to worry about assigning values to the member variables – you are just declaring them, creating placeholders for future objects of this class; you need, however, to make appropriate decisions regarding the data type of each variable)

* Include member functions for each of the following:

1. Member functions to *set* each of the member variables to values given as arguments to the function, i.e., the *mutators- void return type*
2. Member functions to *retrieve* the data from each of the member variables, i.e., the *accessors*
3. A default constructor that gives default values to the objects of the class when initializing them.
4. A void function, i.e., a function that has no return value, that calculates the student’s weighted average numeric score for the entire course and sets the corresponding member variable

Test your code using a simple test program. (By using the accessor to retrieve the weighted average numeric score).

**Exercise 2:**

Define a class for a type called Counter. An object of this type is used to count things, so it records a count that is a nonnegative whole number. Include the member variable(s) you think are appropriate for this class. Also, include the following member functions:

1. a default constructor that sets the counter to zero
2. a constructor with one argument that sets the counter to the value specified by its argument
3. a function used to increase the count by one
4. a function used to decrease the count by one
5. a function that prints the current count value

Be sure that no member functions allow the value of the counter to become negative (Provide appropriate messaging in case the value becomes zero).

Embed your class definition in a test program.

**Exercise 3:**

Write a C++ program to find the area of circle using class Circle which has the following details:  
a) Accept radius from the user- this would be the argument  
b. Calculate the area- using the calculate() function  
c. Display the result- Using cout statements, display the Area to the user (display() function)

*For Example, the main function should look like this:*

int main()  
{  
        Circle cir(radius);   //object created: cir is the object name  
        cir.calculate();   //calling function  
        cir.display();  //calling function  
        return 0;  
}