Lab Assignment-5

UTA018: Object Oriented Programming

Topics covered: Inheritance, abstract base class and virtual functions/class

**Q1.** Class *Student* contains data members *RollNo and Name* as protected. Member functions GetDetails() to *RollNo and Name* and *DisplayDetails()* to display *RollNo and Name*.

Class *Marks* is publicly inherited from *Student*. It contains protected data member *Subject1* and *Subject2* i.e. marks obtain in two subjects and *GetMarks()* and *DisplayMarks()* are two public member functions.

Class *Result* is publicly inherited from *Mark*. It contains private data member *TotalMarks* and two public methods *CalculateResult( )* and *DisplayResult()* with status whether the student has “*PASSED”* or “*FAILED”.*

Write a C ++ program to show the results according to the following formats:

Enter the number of students: 2

Enter student roll number: 1

Enter name of the student: A

Enter the marks of subject 1: 27

Enter the marks of subject 1: 32

Enter student roll number: 2

Enter name of the student: B

Enter the marks of subject 1: 65

Enter the marks of subject 1: 45

Roll No. Name Subject1 Subject2 Total Marks Obtained Result

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1 A 27 32 59 FAILED

2 B 65 45 110 PASSED

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Make the necessary assumptions with comments.

**Q2**. Implement a C++ program to define three classes *Alpha,* *Beta* and *Gamma*, each class having private data members. *Gamma* is a class derived from *Alpha* and *Beta* (by applying multiple inheritance). Use constructors and destructors to read and display data.

**Q3.** Write a program to define class *X, Y* and *Z*. Each class contains one character array as a data member. Using multiple inheritance, concatenate strings of class *X* and *Y* and store it in class *Z*. Using constructor and destructors, show all the three strings.

**Q4.** Write a C++ program to implement the diamond problem (hybrid inheritance). State the necessary assumptions using comments.

**Q5.** Write a C++ program creating an abstract class *Student*. Create three derived classes *Science*, *Art* and *Commerce* from the base class. Create the objects of the derived classes and process them and access them using array of pointer of type *Student*.

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