Jaypee University of Engineering and Technology, Guna
Department of Computer Science and Engineering
Object Oriented Programming (18B11CI211)
Assignment-2
Floating Date: 20/04/2019 Submission Date: 1/05/2019

[Imp Note: No assignment will be accepted after deadline in any case. All the programs must be written in C++ with distinguished variable names. If any kind of plagiarism is observed, you will get zero mark]

Question 1 Write a class to represent a vector (a series of float values). Include member functions to perform the following tasks:

(i) To create the vector
(ii) To modify the value of a given element
(iii) To multiply by a scalar value
(iv) To display the vector in the form (10, 20, 30, …)

Write a program to test your class.

Question 2 How to determine the size of a derived class? Explain all possible factors with examples.

Question 3 Create a class FLOAT that contains one float data member. Overload all four arithmetic operators so that they operate on the objects of FLOAT.

Question 4 Write a C++ program to perform the following tasks:

(i) Create 'Student' class, with two data members: name and Branch_Number ; Branch_Number is an integer and name is a string. The value of Branch_Number is 1 for CSE student and 2 for ECE student.

(ii) Derive two classes 'CSE' and 'ECE'. There are three subjects in each branch. Marks obtained in each subject is considered as data members. In other word, for the class CSE, the data members are CSE_sub1_marks, CSE_sub2_marks and CSE_sub3_marks. Similarly, for class ECE, the data members are ECE_sub1_marks, ECE_sub2_marks and ECE_sub3_marks.

(iii) Input appropriate data from the keyboard for 2 CSE and 3 ECE Students. Write necessary function to get data.

(iv) Display Branch_Number, name, marks for CSE students first and then for ECE students.

Question 5 Let we have to prepare the final result of each student for a particular subject. The final marks are sum of marks obtained by the student in T1, T2, T3, P1, P2, and attendance in theory class. Let there are following classes:

(a) Student: Its data members are student name and roll number and member function is to print the values of the data members.

(b) T1T2T3: Its data members are marks obtained by a student in T1, T2, and T3 and member function is to print the values of the data members.

(c) P1P2: Its data members are marks obtained by a student in P1 and P2 and member function is to print the values of the data members.

(d) Attendance: Data member of this class is the percentage of attendance of a student in the theory class and member function is to print the values of the data member.

(e) Total: Data members of this class are total marks obtained and the grade secured by a student and member function is to print the values of the data members.

Apart from that, there are two other classes:

(a) Faculty: which have no data member but have a member function to assign the marks of T1, T2, T3, P1, P2, and percentage of attendance to each student.

(b) Administration: which have no data member but have member functions to enter the name and roll number of each student, and to calculate the total marks and final grade of each student.

Grade 'A' for> 80% marks, 'B' for 70 to 80%, 'C' for 60 to 70%, D for 50 to 60%, F for <50%.

Base on above information, do the following:

(i) Write a function which prints the name and grades of all students in the ascending order of the grades. In case of same grade, print all respective names in alphabetical order.

(ii) Write a function which prints the name and grades of all students in the alphabetical order of the name of the students.

(iii) Write a function to search the grade of a student based on the first name of the student. In case of multiple entries with same name, print all the names with roll number and respective grades.

Here, consider Student as a base class whose derived classes are T1T2T3, P1P2, and Attendance. Further, consider the class Total which inherits the classes T1T2T3, P1P2, and Attendance as multiple inheritance. Classes Faculty and Administration are independent classes.

Question 6 Consider a case of single inheritance where Landline phone is a base class and Mobile phone is the derived class. Both the classes are as follow:

(a) Landline: It has subscriber name and number as data members. The member functions are to provide the features of calling on a subscriber's number and receiving a call.

Void call (int sub_number);

Void receive();

(b) Mobile: Apart from inheriting the features of a Landline phone, it provides following additional features:

(i) Maintaining a phonebook to save the name and phone number of friends and relatives. For this, a data member of type array of strings has to be added.

(ii) Calling to a subscriber with its name.

Void call (string sub_name);

This function first searches the name of the subscriber to be called in the phonebook to find the corresponding phone number and then, invokes the function “void call (int sub_number)” by passing the searched phone number as argument.

(iii) Maintaining a list of last 20 dialled numbers. For this, a data member of type array of 20 integers has to be added. An entry will be made to this array each time whenever call() function will be invoked. In case of 21th entry to the array, the earliest entry will be replaced with the latest entry.

(iv) Calling on a number from the list of dialled numbers. This function first displays the list of dialled numbers and provides an option to choose a phone number from the list to which a call has to be made. Finally, it invokes call() function and passes the chosen phone number as an argument.

Finally, write the main program to show the features of each class.