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Thapar Institute ofEngineering and Technology, Patiala, Punjab
Department Computer Science and Engineering

Course: OOPS
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Q1	What is the use of static data members in C++? Enlist the characteristics of the static data member? How to initialize and access the static data members?
Q2	Create a class **EXAMPLE** with a static data member (X). Initialize the data member X with a value one. Define a static member function [**with name DISPLAY()**] to display the value of data member. Create two objects of **EXAMPLE** and call the **DISPLAY()** function on both the objects.
Q3	Create two classes **TC** and **TF,** to represent the temperature in Celsius and Fahrenheit, respectively. Define the zero argument constructors in both classes to initialize the objects with default values (Assume zero as the default value for both type of temperatures). Define the member functions in both the classes to read the value of temperature from the console. Define a friend function to add the objects of TC and TF and put the result in the object of TC. **NOTE:** Use the following relationship between Celsius and Fahrenheit. Celsius × *1.8* = Fahrenheit-32
Q4	Create a class **STUDENT** to represent the record of a student, containing **ROLL_NO** (a unique number), **NAME** (a string), **MARKS** in five subjects (an array of five real numbers in the range 0 to 10). Define a parameterized constructor to initialize the objects with given values of ROLL_NO, NAME and MARKS. Define a member function that takes an array of five Student objects as parameter and returns average marks in each subject as output.
Q5	Create a class **EMPLOYEE** to represent the record of an employee, containing **EMPID** (a unique number), **NAME** (a string), **SALARY**. Define a parameterized constructor to initialize the objects of EMPLOYEE by given values of EMPID, NAME and SALARY. Define a function to read details of five employees into an array of EMPLOYEE objects. Define a member function to display the name of employees with salary>1000$.
Q6	Create a class **DOB** to represent the date of birth in **YEAR**, **MONTH** and **DAY**. Define a copy constructor in the class. Define the member functions to read and display the objects of class DOB. Define a member function to compute age based on the given object of class DOB. **NOTE:** Assume the current date is 08 July-2021.
Q7	Create a class **TIME** to represent the time in **HOURS**, **MINUTES** and **SECONDS**. Define a copy constructor in the class. Define the member functions to read and display the objects of class TIME. Define a member function to compute the difference of TWO time objects using friend function.
Q8	Consider the following code. An object of class **POINT** represents the coordinates of a point in 2D space (X and Y coordinates)**.** The data member coord[] stores the values of both the

coordinates (**X coordinate in coord[0] and Y coordinate in coord[1]**). Insert the code to perform the following task at mentioned places in the given code.

(i) Task-1: Initialize the data member coord[] by the given values of X and Y in the constructor.
(ii) Task-2: Insert the code to read values of both the coordinates using the keyboard and store them in coord[].
(iii) Task-3: Insert the code to compute the Euclidean distance between any TWO points and to display the computed distance.
(iv) Task-4: Insert a most suitable statement (code) to find the Euclidean distance between the given points p1 and p2.
NOTE: Use the following formula to compute **Euclidean distance** between two points p1=(x_1,y_1) and p2=(x_2,y_2). **Submit the complete code as answer of this question.**

$$\text{Distance}(\text{p1}, \text{p2}) = \sqrt[2]{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

```
#include <iostream>
#include <math.h>
using namespace std;
class Point
{
   int coord[2];

   public:
   Point(int x,int y){  //Insert code for Task-1 here
                        }
    void read()
    {
        //Insert code for Task-2 here
    }
    void fun(Point& p)
    {
        //Insert code for Task-3 here
    }
};

int main()
{
    Point p1(0,0),p2(3,4);
    //Insert code for Task-4 here
    return 0;
}
```

Q9 Consider the below code in C++.

```
#include <iostream>
using namespace std;
class STATIC{
  static int x;
  int y=0;
  public:
  void INCREAMENT(){
        x++;
        y++;        }
  static void PRINT(){
      cout<<"The value of static data member:"<<x<<endl;
      cout<<"The value of Non-static data member:"<<y<<endl;
      }

  void DISPLAY(){
      cout<<"The value of static data member:"<<x<<endl;
      cout<<"The value of Non-static data member:"<<y<<endl;}
};
int STATIC::x=0;
int main()
{
    STATIC s1, s2;

    s1.DISPLAY();       s2.DISPLAY();
    s1.INCREAMENT();
    s1.DISPLAY();       s2.DISPLAY();

    return 0;
}
```

Answer the following questions.

(i) There is an error in **PRINT()** member function of the class **STATIC**. Give the C++ code, which is to be added/removed to/from the body of the **PRINT()** for successful compilation.

(ii) After correcting the PRINT() function, give output of the code with proper justification.