Lab 6 Class and Objects (1)

Question-1.
Part-a
Design and implement a class to compute the area of a triangle using the values of their sides.

The design of class (named Triangle) should include:

a) Three private members side1, side2 and side3, which present sides of a triangle.

b) One private member to preserve the computed area of triangle.

c) A default constructor (i.e. Traingle())to initialize sides of triangle as zero.

d) A parameter constructor (i.e. Traingle(int, int, int))to initialize the values of sides for corresponding triangle.

e) A set method (i.e. setSides(int, int, int)) to enter the new values for the sides.

f) A method (i.e. computeArea()) to compute the area of triangle.

g) A get method (i.e. getArea()) to display the area.

Hint-1. Area of Tringle should be computed through the following Heron's Formula

Area = sqrt(s*(s-a)*(s-b)*(s-c)), where s=(a+b+c)/2.

Hint-2. You need to include `<cmath>` library to use the `sqrt()` function.

For the Implementation of Class

1. Create first Triangle object (i.e. triangle1) with default constructor and display its area.
2. Create second Triangle object (i.e. triangle2) with parameter constructor and display its area.
3. Call the setSides() method using object (i.e. triangle1) and display its area.

Hint. Write code in the main() function for implementation.

Note: The first two test cases have fix value to test the use of constructor. The third test case will be generated by user input.

Expected Outputs

```
Area of Triangle (i.e. triangle1): 0
Area of Triangle (i.e. triangle2 with sides 3, 4 and 5): 6
Enter New Sides for Triangle:
4
2
3
Area of Triangle: 2.90474
```

Part-b

Extend the program to define a non-member function `largerTraingle()`, which accepts two Triangle objects (i.e. traingle1 and triangle2) as input. The function should print whether the first Triangle (i.e. triangle1) has a larger area than the second one (i.e. triangle2) or not. You may use the following template for `largerTriange()`.

```
void largertriangle(Triangle t1, Triangle t2)
{
}
```

Modify the implementation of program in the previous part by creating two objects with default parameters and call the setSides(int, int, int)) to enter the new values for the sides of both triangles.

Expected Outputs

Example 1
Enter New Sides for Triangle 1: 4 2 3 Enter New Sides for Triangle 2: 3 2 3 The Area 2.90474 of Triangle 1 is larger than area 2.82843 of Triangle 2.
Example 2
Enter New Sides for Triangle 1: 4 2 3 Enter New Sides for Triangle 2: 3 4 5 The Area 6 of Triangle 2 is larger than area 2.90474 of Triangle 1.
Example 3:
Enter New Sides for Triangle 1: 4 2 3 Enter New Sides for Triangle 2: 4 2 3 The areas of the two triangles are identical.

Question-2.

Design a class to record the trade of an octopus card. Each record consists of month, day, and balance. The program will accept an array of records, and then sort them according to the balance and display all the records. Then, the program sorts all the records according to the time and displays them again. Both sorting should be in ascending order.

Note:

1. The values of input are in the order of month, day, balance.
2. When sort the records according to the time, compare the month first. If the month of two records is identical, compare their day.
3. The size of the array will not be larger than 30.

Expected Outcomes

Example

```
Enter the number of the records:
10
Enter the contents of each records:
5 20 400
3 12 -65.3
5 11 -9.4
5 11 -2.8
10 31 200
6 2 -230.5
2 11 -67.3
5 25 -127.5
7 2 200
8 29 -67.3
Sort according to the balance:
6 2 -230.5
5 25 -127.5
2 11 -67.3
8 29 -67.3
3 12 -65.3
5 11 -9.4
5 11 -2.8
10 31 200
7 2 200
5 20 400
Sort according to the time:
2 11 -67.3
3 12 -65.3
5 11 -9.4
5 11 -2.8
5 20 400
5 25 -127.5
6 2 -230.5
7 2 200
8 29 -67.3
10 31 200
```