



1. General Questions

- A. What is the difference between classes and objects?
- B. What is constructor and a default constructor?

2. Multiple Choice Questions

Choose the correct answer from the below questions:

A. Which of the following two entities can be connected by the dot operator?

- 1. A class member and a class object.
- 2. A class object and a class.
- 3. A class and a member of that class.
- 4. A class object and a member of that class.

B. Which of the following is a valid class declaration?

- 1. class A { int x; };
- 2. class B { }
- 3. public class A { }
- 4. object A { int x; };

C. The .h file of a class stores:

- 1.The class declaration
- 2.The code of the member functions of the class
- 3.The main program of the class
- 4.All the previous answers are incorrect

D. The default access specifier in a class is:

- 1.private
- 2.public
- 3.protected
- 4.It is not defined

E. Regarding the members of a class specified as private :

- 1.They can only be accessed by the member functions of the class .
- 2.They can only be accessed by the member functions of the class and the friend functions of the class .
- 3.They can only be accessed by the member functions of the class, the friend functions of the class, and the derived classes .
- 4.All the previous answers are incorrect.

3. Programming

3.1 Circle class declaration and implementation given on the below, solve the following questions independently :

A. Write a C++ statement that defines a Circle object named Circle1 with radius 5.

B. Write a C++ statement that changes the radius of object Circle1 to 0, and write the expected output.

C. assuming the following statement in main : "Circle1.radius = 20 ;"

Is there an error? If yes:

1. Explain the error.
2. Show how can you make a changes in the given class implementation or declaration to make this statement true.
(Note : without change on the statement given in question).

D. Write a C++ statement that prints the radius and area of object Circle1 .

```
1 //Circle class declaration Circle.h
2
3 class Circle
4 {
5     private:
6         double radius;
7
8     public:
9         //Constructors
10        Circle();
11        Circle(double);
12
13        void setRadius(int);
14
15        int getRadius();
16        double getArea();
17        double getDiameter();
18
19
20
21 }; //end of class
22
23
```

```

1
2 // Circle.cpp
3 #include <iostream>
4 #include "Circle.h"
5 using namespace std;
6
7 // constructors
8 Circle::Circle()
9 {radius = 1.0; }
10
11 Circle::Circle(double radi)
12 { setRadius(radi); }
13
14 // setter
15 void Circle::setRadius(double r)
16 { if( r == 0 || r == 0.0)
17 {
18     cout<<"Radius is wrong "<<endl;
19 }
20 else
21 { radius = r;}
22 }
23
24 //getter
25 double Circle::getRadius()
26 { return radius;}
27
28 double Circle::getArea()
29 {return pi * radius * radius;}
30
31 double Circle::getDiameter()
32 {return radius * 2;}

```

3.2 Box class given in the below, write the main of this class that include the following:

- A. A declaration and initialization of two objects (Box1 , Box 2).
- B. Declare a pointer to a class named **ptrBox**.
- C. Declare a reference to a class named **refBox**.
- E. Assign the pointer **ptrBox** to object **Box1**.
- F. Assign the reference **refBox** to object **Box2**.
- G. Print the volume of object **Box1** by using **the pointer of object**.
- H. Print the volume of object **Box2** by using **the reference of object**.
- I. Explain when the program executed what happens in each line of Main().

```

1
2 #include <iostream>
3 using namespace std;
4 class Box
5 {
6     public:
7         // Constructor definition
8         Box(double l=2.0, double b=2.0, double h=2.0)
9         {
10            cout <<"Constructor called." << endl;
11            length = l;
12            breadth = b;
13            height = h;
14        }
15        double Volume()
16        {
17            return length * breadth * height;
18        }
19    private:
20        double length;    // Length of a box
21        double breadth;   // Breadth of a box
22        double height;    // Height of a box
23 };

```

3.3 Create a class called Rectangle. This class keeps the following data about each rectangle (Height and Width) .The class should have the following member function:

- A. A **constructor** that initializes the data member to given parameters.
- B. **Setter** and **getter** function for each data member.(NOTE: if the user entered either the height or width <0, then display a message to alert him and re-input the wrong value)
- C. A function **readFromKbd** for interactive entry from the keyboard with prompts(Hint: Use the Setter)
- D. Function **CalculateArea**, which calculate the area of the rectangle.
- E. Function **display**, that display the following:

```

*****
Height:.....
Width:.....
Area:.....
*****

```

3.4 Create a class called CountNum to calculate how many times the letter was repeated in the word.. The output should be like :

```
CHAR    COUNT
enter your text size please:
5
enter your text please:
sarah
s        1
a        2
r        1
a        2
h        1
-
```

3.5 create a class called AreaMenu with three member function (**overloaded function**) the name of this functions (**area**).

- The first function take one argument with type (int), the second function take two argument with type (int), the third function take three arguments (float, int and int).
- (Note : place the class in a separate file " Separate the interface from the implementation").
- The first function calculate the area of Circle, the second function calculate the area of rectangle and the third calculate the area of triangle.
- In the main (use the **Switch** to create the menu)

The output should be like :

```
Function Overloading
1.Area of Circle
2.Area of Rectangle
3.Area of Triangle
4.Exit
:Enter your Choice:2
Enter Sides of the Rectangle:3
4
Area of rectangle:12
Enter your Choice:1
Enter Radius of the Circle:2
Area of Circle:12.56
Enter your Choice:_
```