

1. A) Create an interface called **InterfaceRegion** that other classes should implement. It contains three abstract methods:

Contains(Point)

Area()

Print details()

(2)

B) Create an abstract class **REGION** with the following data members and member functions:

String Nameoftheregion

Functions:

GetRegionname()

Contains(Point)

Area()

Print details()

This is the abstract class that implements the **InterfaceRegion** interface and all the different types of regions will extend from. (2)

C) Create another class **POINT** with two data members x and y (1)

D) Derive 2 subclasses **CIRCLE** and **RECTANGLE** from **REGION** and include the following:

CIRCLE:

Point center, the center points are not decimal values. If the user has given decimal values means, it has to through an exception.

Double Radius

Functions:

Get()- read center and radius

Area()- compute and return area

Contains(Point)- Test whether the given point is within the region or not. If present return trueElse return false. If the distance between the given point and the center is greater than the radius then the point is within the region else it is outside the region

Print details()- print the name of the region along with area.(2)

RECTANGLE:

Point topleftcorner

Double height

Double width

Functions:

Get()-

Area()

Contains(Point)- Based on the x and y boundary it has to check whether the given point is present inside or outside the region

Printdetails() (2)

E) Write test function to test all the above functionalities.(1)

2) Define an Abstract class called Time that has protected data fields: seconds, minutes and hours of type integer. Time should have get methods and constructors (default, three arguments), display() that prints the instance data fields. Throw an exception when invalid date is an input (31-13-12), also handle this exception. Derive two classes from class Time: TwentyFourHrClock and TwelveHrClock. Override the display function in the derived classes to print the respective instance as 24-hr clock display and 12-hr clock display.