Classes & Interfaces

1. Develop an abstract class named Worker with private data members name and address along with the getter and setter methods for the fields, a two-argument constructor and an abstract method called earnings() to compute the income of a worker. Design another class named PieceWorker that should contain private instance variables wage (to store the worker's wage per piece) and pieces (to store the number of pieces produced). Provide a concrete implementation of the method earnings in the class PieceWorker that calculates the worker's earnings by multiplying the number of pieces produced by the wage per piece. Develop a class containing the main method to show the invocation of the earnings( ) method on a PieceWorker object.

2. Develop a class named Triangle that implements an interface called GeometricObject. The interface GeometricObject has the abstract methods getArea() that computes and returns the area of a geometric object and getPerimeter() that computes and returns the perimeter of a geometric object. The Triangle class should have private double data fields named side1, side2, and side3 denoting the length of the three sides of a triangle, a constructor that creates a triangle with the specified value for side1, side2 and side3, the getter and setter methods for all three data fields and an implementation of the getArea() and getPerimeter() method. Develop a driver class to show the invocation of the getArea() and getPerimeter() method on a Triangle object.

3. Develop an interface with two methods namely, withdraw money and deposit money. Develop a class Account that implements the interface with necessary private data members such as current account balance and account number. Develop another class CreditCardAccount that implements the interface with necessary data members such as current credit limit and the credit card number. When money is withdrawn from a credit card account; the credit limit is diminished by the amount of money withdrawn and by an additional 0.5% of the amount of money withdrawn and when the money is deposited; the credit limit is increased by the amount of money deposited. Develop a class containing the main method and create an account object and a credit card account object and demonstrate the withdrawal and deposit method on the objects.

4. Develop an interface with two methods namely, add and multiply for addition and multiplication of mathematical objects such as vectors and matrices. Develop a class Vector that implements the interface with necessary data members. Develop another class Matrix that implements the interface with necessary data members. Develop a class containing the main method and show the computation of the sum of two vectors and their scalar product and the sum of two matrices and the product of the matrices.

5. Develop an interface with two methods for computing area and perimeter of a 2D shape. Develop a class Circle that implements this interface with necessary data members. Develop another class Rectangle that implements the interface with necessary data members. Develop a class containing the main method and show the area and perimeter of a circle object with specified radius and center and the area and perimeter of a rectangle object with specified dimensions.