1.Program for area&perimeter of circle and ellipse with Interface

**Program:**

interface Shape{

double pi =3.14;

public double perimeter();

public double area();

}

class Circle implements Shape{

float radius;

Circle(float r){

radius = r;

}

public double area(){

return pi\*radius\*radius;

}

public double perimeter(){

return 2\*pi\*radius;

}

}

class Ellipse implements Shape{

float a,b;

Ellipse(float a,float b){

this.a = a;

this.b=b;

}

public double perimeter(){

return (2\*pi\*Math.sqrt(a\*a+b\*b));

}

public double area(){

return pi\*a\*b;

}

}

public class Main

{

public static void main(String[] args) {

Circle c = new Circle(7.0f);

Ellipse e = new Ellipse(3.0f,5.0f);

System.out.println("area of circle is "+ c.area());

System.out.println("area of ellipse is "+ e.area());

System.out.println("perimeter of circle is "+ c.perimeter());

System.out.println("perimeter of ellipse is "+ e.perimeter());

}

}

**Output:**

**area of circle is 153.86**

**area of ellipse is 47.1**

**perimeter of circle is 43.96**

**perimeter of ellipse is 36.61837789962849**

2. Design a vehicle class that contains the following properties of motor vehicles:

Fuel tank capacity, average fuel consumption per 100 km and the distance a vehicle can travel on a full tank. The vehicle class should be designed as a base class from which the Car and Truck classes are derived. The derived classes should have following member functions.

I.A function that contains data for a vehicle from the user

II.A function that computes and returns the distance a vehicle can travel on a full tank.

III.A function that computes and returns how many times a vehicle has to be refuelled to travel a given distance.

Test the class in the main method.

**Program:**

class Vehicle{

int capacity;

float consumption, distance;

Vehicle(int a,float b, float c){

capacity=a;

consumption=b;

distance=c;

}

}

class Car extends Vehicle{

Car(int a, float b, float c){

super(a,b,c);

}

float compute\_dist(){

float d=capacity\*consumption/80;

return d;

}

float compute\_fuel(int d){

return (distance\*80)/(consumption);

}

}

class Truck extends Vehicle{

Truck(int a, float b, float c){

super(a,b,c);

}

float compute\_dist(){

float d=capacity\*consumption/800;

return d;

}

float compute\_fuel(int d){

return (distance\*800)/(consumption);

}

}

public class Vehicle\_main

{

public static void main(String[] args) {

Car c = new Car(20,15.0f,10.0f);

System.out.println("Distance covered by Car: "+ c.compute\_dist()+" km\n"+"Fuel Consumed by Car: "+c.compute\_fuel(5)+" litres");

Truck t= new Truck(55,30.0f,40.0f);

System.out.println("\nDistance covered by Truck: "+ t.compute\_dist()+" km\n"+"Fuel Consumed by Truck: "+t.compute\_fuel(15)+" litres \n");

}

}

**Output:**

**Distance covered by Car: 3.75 km**

**Fuel Consumed by Car: 53.333332 litres**

**Distance covered by Truck: 2.0625 km**

**Fuel Consumed by Truck: 1066.6666 litres**