LAB6(B.Bhagyasri)

1.Create a class called Person with attributes such as name and age. Derive a class called Student from Person that adds an attribute studentId. Write a program to demonstrate single inheritance by creating objects of both classes and displaying their attributes.

```
package Lab6;

public class Student extends Person {
        int student_id;
   public void addStudent(String name,int age,int id) {
        super.addPerson(name, age);
        student_id=id;

   }
   public void display(){

   System.out.println(name);
   System.out.println(age);
   System.out.println(student_id);
   }}

          }
    package Lab6;


    public class Student extends Person {

        int student_id;

       public void addStudent(String name,int age,int id) {

        super.addPerson(name, age);

        student_id=id;


       }

       public void display(){


       System.out.println("Name is" name);

       System.out.println("Age is" age);

       System.out.println("student_id" id);

       }}
```

```
package Lab6;
public class Show {
public static void main(String[] args) {
    Student s=new Student();
    s.addStudent("Bhaghi",21,2);

    s.display();
    }
}
```

Output:

Name is Bhaghi

Age is 21

Student_id is 2

2.Design a class called Shape with methods to calculate the area and perimeter. Derive classes like Circle, Rectangle, and Triangle from Shape. Write a program to create objects of these classes and compute their areas and perimeters.

```
package Lab6;

    public abstract class Shape {
    public double area;
    public double perimeter;
    public abstract void area();
    public abstract void perimeter();

    }
  package Lab6;
  class Circle extends Shape{
  public double radius;
  public Circle(double rad) {
      radius=rad;
      }
 public void area() {
 area=Math.PI*radius*radius;
```

```
    }
    public void perimeter() {
        perimeter=2*Math.PI*radius;

    }}
    package Lab6;
    class Rectangle extends Shape {
     public double length;
     public double width;
     public Rectangle(double len,double wid) {
                length=len;
                width=wid;
    }
    public void area() {
    area= length*width;
        }
        public void perimeter() {
                perimeter=2*(length*width);
        }
}

    package Lab6;

    class Triangle extends Shape{

        public double side1;
        public double side2;
        public double side3;

                public Triangle(double s1,double s2,double s3) {
```

```
        side1=s1;
        side2=s2;
        side3=s3;
    }
    public void area() {
    double s = (side1 + side2 + side3) / 2;
    area=Math.sqrt(s * (s - side1) * (s - side2) * (s - side3));
}
    public void perimeter() {
    perimeter=side1 + side2 + side3;
            }
}
package Lab6;
public abstract class ShapeSimulation {
public static void main(String[] args) {
        Shape c=new Circle(2);
        Shape r=new Rectangle(2,3.4);
        Shape s=new Triangle(3,3,3);
        c.area();
        c.perimeter();
        r.area();
        r.perimeter();
        s.area();
        s.perimeter();

            System.out.println("Area of the Circle = " +c.area);
            System.out.println("Perimeter of the Circle = "+c.perimeter);

            System.out.println("Area of the Rectangle = "+r.area);
            System.out.println("Perimeter of the Rectangle = "+r.perimeter);
```

```
        System.out.println("Area of the Triangle = "+s.area);
        System.out.println("Perimeter of the Triangle = "+s.perimeter);

    }
}
```

Output:

Area of the Circle = 28.274333882308138

Perimeter of the Circle = 18.84955592153876

Area of the Rectangle = 6.8

Perimeter of the Rectangle = 13.6

Area of the Triangle = 3.897114317029974

Perimeter of the Triangle = 9.0

3.Create a base class called Animal with a method named sound(), which prints "Animal makes a sound." Derive classes Cat and Dog from Animal. Override the sound() method in each derived class to print "Cat meows" and "Dog barks" respectively. Write a program to demonstrate method overriding by creating objects of the derived classes and calling the sound() method.

```
package Lab6;

public class Animal {

public void sound() {
            System.out.println("Animal makes a sound");

        }
    }

    package Lab6;

    public class Cat extends Animal{

    public void sound() {

        System.out.println("Cat meows");

            }}
```

```
package Lab6;
public class Dog extends Animal{
public void sound() {
                System.out.println("Dog barks");
}}


package Lab6;
public class AnimalSimulation {
public static void main(String[] args) {
                // TODO Auto-generated method stub
                Animal a=new Animal();
        Animal c=new Cat();
        Animal d=new Dog();
        a.sound();
        c.sound();
        d.sound();
         }
}
```

Output:

Animal makes a sound

Cat meows

Dog barks

4. Design a class called Shape with a method named calculateArea(). Derive classes such as Circle, Rectangle, and Triangle from Shape and override the calculateArea() method in each derived class to compute the area specific to that shape. Write a program to create objects of these classes and invoke the calculateArea() method to calculate and display their respective areas.

1.

```
package Lab6;


public class Shape1 {


    public void calculateArea() {
            }
}


package Lab6;


public class Circle1 extends Shape1{
    private double area;
   private double radius;
   public Circle1(double rad) {
            radius=rad;
   }
    public void calculateArea() {
            area=Math.PI*radius*radius;


            System.out.println("Area of circle"+area);
    }
}
package Lab6;
public class Rectangle1 extends Shape1{
    private double length;
    private double width;
```

```
    private double area;
    public Rectangle1(double len,double wid) {
            length=len;
            width=wid;
    }
    public void calculateArea() {
            area= length*width;
            System.out.println(area);
}
}

package Lab6;
public class Triangle1 extends Shape1{
    private double side1;
    private double side2;
    private double side3;
    private double area;
    public Triangle1(double s1,double s2,double s3) {
            side1=s1;
            side2=s2;
            side3=s3;
}
          public void calculateArea() {
          double s = (side1 + side2 + side3) / 2;
          area=Math.sqrt(s * (s - side1) * (s - side2) * (s - side3));
          System.out.println(area);
            }
            }
package Lab6;
```

```
public class ShapeSimulation1 {

    public static void main(String[] args) {
            // TODO Auto-generated method stub
            Shape1 s=new Shape1();
            Shape1 circle=new Circle1(5);
            Shape1 rect=new Rectangle1(3,4);
            Shape1 tr=new Triangle1(3,3,3);
            s.calculateArea();
            circle.calculateArea();
            rect.calculateArea();
            tr.calculateArea()
}

}
```

Output:

Area of circle is78.53981633974483

Area of rectangle is12.0

Area of triangle is3.897114317029974