```
package A4;

/**
 *
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 */

//import java.lang.Math.*;
import java.util.Scanner;

abstract class Shape{
    protected String color;
    public Shape(){
        color="red";
    }

    public Shape(String color){
        this.color=color;
    }

    public String getColor(){
        return color;
    }

    public void setColor(String color){
        this.color=color;
    }

    abstract float getArea();

    abstract float getPerimeter();
}


class Circle extends Shape{
    protected float radius;
    public Circle(){
        radius=1;
    }

    public Circle(float radius){
        this.radius=radius;
    }

    public Circle(float radius, String color){
        super(color);
        this.radius=radius;
    }

    public float getRadius(){
        return radius;
    }

    public void setRadius(float radius){
        this.radius=radius;
    }
```

```
     public float getArea(){
         return (float) (Math.PI*radius*radius);
     }

      public float getPerimeter(){
          return (float) (2*Math.PI*radius);
      }
}

class Rectangle extends Shape{
    protected float width, length;

    public Rectangle(){
        width=length=1;
    }

    public Rectangle(float width, float length){
        this.width=width;
        this.length=length;
    }

    public Rectangle(float width, float length, String color){
        super(color);
        this.width=width;
        this.length=length;
    }

    public float getWidth(){
        return width;
    }

    public void setWidth(float width){
        this.width=width;
    }

    public float getLength(){
        return length;
    }

    public void setLength(float length){
        this.length=length;
    }

    public float getArea(){
        return length*width;
     }

    public float getPerimeter(){
        return 2*(length+width);
    }

}

class Square extends Rectangle{
    protected float side;
```

```
    public Square(){
        super();
        side=1;
    }

    public Square(float side){
        super(side, side);
        this.side=side;
    }

    public Square(float side, String color){
        super(side, side, color);
        this.side=side;
    }

   public float getSide(){
        return side;
    }

    public void setSide(float side){
        setWidth(side);
        setLength(side);
        this.side=side;
    }
}

public class TestAbstract {
    public static void main(String[] args) {
        int choice;
        String color, shapeType;
        float radius, length, width;

        Scanner in=new Scanner(System.in);


        Circle cir=null;
        Rectangle rect=null;
        Square sq=null;


        System.out.println("\t\tSHAPE: CIRCLE");
        System.out.println("Choice:\n\t1. Create object\n\t2. Create
object with radius\n\t3. Create object with radius and color\n\t0.
Exit\nEnter choice: ");
        choice=in.nextInt();


        switch(choice)
        {
            case 1: cir=new Circle();
                    System.out.println("Object created
successfully!");
                    break;
            case 2: System.out.println("Enter radius: ");
                    radius=in.nextFloat();
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                    cir=new Circle(radius);
                    break;
            case 3: System.out.println("Enter radius: ");
                    radius=in.nextFloat();
                    System.out.println("Enter color : ");
                    in.nextLine();
                    color=in.nextLine();
                    cir=new Circle(radius, color);
                    break;
        }

        System.out.println("Choice:\n\t1. Set Detail\n\t0.
Exit\nEnter choice: ");
        choice=in.nextInt();
        while(choice!=0){
            switch(choice){
            case 1: System.out.println("Enter radius: ");
                    radius=in.nextFloat();
                    cir.setRadius(radius);
                    System.out.println("Enter color : ");
                    in.nextLine();
                    color=in.nextLine();
                    cir.setColor(color);
                    break;
            }
            System.out.println("Choice:\n\t1. Set Detail\n\t0.
Exit\nEnter choice: ");
            choice=in.nextInt();
        }



        System.out.println("\t\tSHAPE: RECTANGLE");
        System.out.println("Choice:\n\t1. Create object\n\t2. Create
object with size\n\t3. Create object with size and color\n\t0.
Exit\nEnter choice: ");
        choice=in.nextInt();


        switch(choice)
        {
            case 1: rect=new Rectangle();
                    System.out.println("Object created
successfully!");
                    break;
            case 2: System.out.println("Enter length: ");
                    length=in.nextFloat();
                    System.out.println("Enter width: ");
                    width=in.nextFloat();
                    rect=new Rectangle(length, width);
                    break;
            case 3: System.out.println("Enter length: ");
                    length=in.nextFloat();
                    System.out.println("Enter width: ");
                    width=in.nextFloat();
                    System.out.println("Enter color : ");
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                    in.nextLine();
                    color=in.nextLine();
                    rect=new Rectangle(length, width, color);
                    break;
        }

        System.out.println("Choice:\n\t1. Set Detail\n\t0.
Exit\nEnter choice: ");
        choice=in.nextInt();
        while(choice!=0){
            switch(choice){
            case 1: System.out.println("Enter length: ");
                    length=in.nextFloat();
                    rect.setLength(length);
                    System.out.println("Enter width : ");
                    width=in.nextFloat();
                    rect.setWidth(width);
                    System.out.println("Enter color : ");
                    in.nextLine();
                    color=in.nextLine();
                    rect.setColor(color);
                    break;
            }
            System.out.println("Choice:\n\t1. Set Detail\n\t0.
Exit\nEnter choice: ");
            choice=in.nextInt();
        }




        System.out.println("\t\tSHAPE: SQUARE");
        System.out.println("Choice:\n\t1. Create object\n\t2. Create
object with side\n\t3. Create object with side and color\n\t0.
Exit\nEnter choice: ");
        choice=in.nextInt();


        switch(choice)
        {
            case 1: sq=new Square();
                    System.out.println("Object created
successfully!");
                    break;
            case 2: System.out.println("Enter side  : ");
                    length=in.nextFloat();
                    sq=new Square(length);
                    break;
            case 3: System.out.println("Enter side  : ");
                    length=in.nextFloat();
                    System.out.println("Enter color : ");
                    in.nextLine();
                    color=in.nextLine();
                    sq=new Square(length, color);
                    break;
        }
```

```
        System.out.println("Choice:\n\t1. Set Detail\n\t0.
Exit\nEnter choice: ");
        choice=in.nextInt();
        while(choice!=0){
            switch(choice){
            case 1: System.out.println("Enter side: ");
                    length=in.nextFloat();
                    sq.setSide(length);
                    System.out.println("Enter color : ");
                    in.nextLine();
                    color=in.nextLine();
                    sq.setColor(color);
                    break;
            }
            System.out.println("Choice:\n\t1. Set Detail\n\t0.
Exit\nEnter choice: ");
            choice=in.nextInt();
        }

        Shape s[]={cir, rect, sq};

        for(Shape obj:s){
            shapeType=obj.getClass().getName();
            switch(shapeType){
                case "A4.Circle": System.out.println("\t\tSHAPE :
CIRCLE");
                                  System.out.println("\tCIRCLE
PARAMETERS");
                                  Circle c=(Circle) obj;
                                  System.out.println("Radius   :
"+c.getRadius());
                                  break;
                case "A4.Rectangle": System.out.println("\t\tSHAPE :
RECTANGLE");
                                     System.out.println("\tRECTANGLE
PARAMETERS");
                                     Rectangle r=(Rectangle) obj;
                                     System.out.println("Length   :
"+r.getLength());
                                     System.out.println("Width    :
"+r.getWidth());
                                     break;
                case "A4.Square": System.out.println("\t\tSHAPE :
SQUARE");
                                  System.out.println("\tSQUARE
PARAMETERS");
                                  Square sqr=(Square) obj;
                                  System.out.println("Side     :
"+sqr.getSide());

            }
            System.out.println("Area     : "+obj.getArea());
            System.out.println("Perimeter: "+obj.getPerimeter());
            System.out.println("Color    : "+obj.getColor());
        }
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        }

    }
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