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ROLL NO:15L124

DEPT:ECE-'A'

*************************JAVA PROGRAMMING*****************************

TASK->8

PROGRAM:

//TO IMPLEMENT THE CONCEPT OF SINGLE INHERITANCE

SOURCE CODE:

Shape.java

```java
package org.object;
public class Shape{
    protected String name="Circle";
    protected String color="Yellow";
    protected boolean filled=false;
    public Shape(){
       // this.Shape("Circle","yellow",false);
    }
    public Shape(String name,String color,boolean filled){
        this.name=name;
        this.color=color;
        this.filled=filled;
    }
    public void setName(String name){
        this.name=name;
    }
    public void setColor(String color){
        this.color=color;
    }
    public void setFilled(boolean filled){
        this.name=name;
    }
    public String getName(){
        return name;
    }
    public String getColor(){
        return color;
    }
    public boolean isFilled(){
```

```
        return filled;
    }
}
```

Circle.java

```java
package org.object.round;
import org.object.Shape;
public class Circle extends Shape{
    protected double radius=1.0;
    private final static double PI=3.14;
    public Circle(){
      super();
    }
    public Circle(String name,String color, boolean filled, double radius){
        super(name,color,filled);
        this.radius=radius;
    }
    public void setRadius(double radius){
        this.radius=radius;
    }
    public double getRadius(){
        return radius;
    }
    public double getPI(){
        return PI;
    }
    public double area(){
        return this.radius*this.radius*PI;
    }
}
```

Solution.java

```java
package org.main;
import org.object.round.Circle;
public class Solution{
    public static void main(String args[]){
        Circle circle;
        circle=new Circle("CIRCLE","PINK",true,2.0);
        System.out.println("AREA OF CIRCLE   :"+circle.area());
    }}
```

```
C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\Shape.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\round\Circle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\main\Solution.java

C:\Users\students\Documents\inheritance>java -cp bin; org.main.Solution
AREA OF CIRCLE   :12.56

C:\Users\students\Documents\inheritance>
```

//TO IMPLEMENT THE CONCEPT OF MULTILEVEL INHERITANCE:

SOURCE CODE:

 Shape.java

```java
package org.object;
public class Shape{
    protected String name="Circle";
    protected String color="Yellow";
    protected boolean filled=false;
    public Shape(){
       // this.Shape("Circle","yellow",false);
    }
    public Shape(String name,String color,boolean filled){
        this.name=name;
        this.color=color;
        this.filled=filled;
    }
    public void setName(String name){
        this.name=name;
    }
    public void setColor(String color){
        this.color=color;
    }
    public void setFilled(boolean filled){
        this.name=name;
    }
    public String getName(){
        return name;
    }
    public String getColor(){
        return color;
    }
```

```java
    public boolean isFilled(){
        return filled;
    }
}
```

Cylinder.java

```java
package org.object.round;
import org.object.round.Circle;
public class Cylinder extends Circle{
    protected double height=1.0;
    //private final static double PI=3.14;
    public Cylinder(){
      super();
    }
    public Cylinder(String name,String color, boolean filled, double
radius,double height){
        super(name,color,filled,radius);
        this.height=height;
    }
    public void setHeight(double height){
        this.height=height;
    }
    public double getHeight(){
        return height;
    }
    public double area(){
        return super.area()*this.height;
    }
}
```

Circle.java

```java
package org.object.round;
import org.object.Shape;
public class Circle extends Shape{
    protected double radius=1.0;
    private final static double PI=3.14;
    public Circle(){
      super();
    }
    public Circle(String name,String color, boolean filled, double radius){
```

```java
        super(name,color,filled);
        this.radius=radius;
    }
    public void setRadius(double radius){
        this.radius=radius;
    }
    public double getRadius(){
        return radius;
    }
    public double getPI(){
        return PI;
    }
    public double area(){
        return this.radius*this.radius*PI;
    }
}
```

Solution.java

```java
package org.main;
import org.object.round.Circle;
import org.object.round.Cylinder;
public class Solution{
    public static void main(String args[]){
        Circle circle;
        circle=new Circle("CIRCLE","PINK",true,2.0);
        System.out.println("AREA OF CIRCLE    :"+circle.area());
        Cylinder cylinder=new Cylinder("CYLINDER","PINK",true,2.0,4.0);
        System.out.println("AREA OF CYLINDER  :"+cylinder.area());

    }
}
```

```
C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\Shape.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\round\Circle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\round\Cylinder.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\main\Solution.java

C:\Users\students\Documents\inheritance>java -cp bin; org.main.Solution
AREA OF CIRCLE     :12.56
AREA OF CYLINDER   :50.24

C:\Users\students\Documents\inheritance>
```

//TO IMPLEMENT THE CONCEPT OF HIERARCHICAL INHERITANCE:

SOURCE CODE:

Shape.java:

```java
package org.object;
public class Shape{
    protected String name="Circle";
    protected String color="Yellow";
    protected boolean filled=false;
    public Shape(){
        // this.Shape("Circle","yellow",false);
    }
    public Shape(String name,String color,boolean filled){
        this.name=name;
        this.color=color;
        this.filled=filled;
    }
    public void setName(String name){
        this.name=name;
    }
    public void setColor(String color){
        this.color=color;
    }
    public void setFilled(boolean filled){
        this.name=name;
    }
    public String getName(){
        return name;
    }
    public String getColor(){
        return color;
    }
}
```

```java
    public boolean isFilled(){
        return filled;
    }
}
```

Rectangle.java

```java
package org.object.square;
import org.object.Shape;
public class Rectangle extends Shape{
    protected double length=1.0;
    protected double breadth=1.0;
    public Rectangle(){
        super();
    }
    public Rectangle(String name,String color, boolean filled, double
length,double breadth){
        super(name,color,filled);
        this.length=length;
        this.breadth=breadth;
    }
    public void setLength(double length){
        this.length=length;
    }
    public void setBreadth(double breadth){
        this.breadth=breadth;
    }
    public double getLength(){
        return length;
    }
    public double getBreadth(){
        return breadth;
    }
    public double area(){
        return this.length*this.breadth;
    }
}
```

Triangle.java

```java
package org.object.tri;
import org.object.Shape;
public class Triangle extends Shape{
    protected double base=1.0;
```

```java
    protected double height=1.0;
    public Triangle(){
        super();
    }
    public Triangle(String name,String color,boolean filled,double base,double
height){
        super(name,color,filled);
        this.base=base;
        this.height=height;
    }
    public void setBase(double base){
        this.base=base;
    }
    public void setHeight(double height){
        this.height=height;
    }
    public double getBase(){
        return base;
    }
    public double getHeight(){
        return height;
    }
    public double area(){
        return 0.5 * this.base * this.height;
    }
}
```

Circle.java

```java
package org.object.round;
import org.object.Shape;
public class Circle extends Shape{
    protected double radius=1.0;
    private final static double PI=3.14;
    public Circle(){
      super();
    }
    public Circle(String name,String color, boolean filled, double radius){
        super(name,color,filled);
        this.radius=radius;
    }
    public void setRadius(double radius){
        this.radius=radius;
    }
```

```java
    public double getRadius(){
        return radius;
    }
    public double getPI(){
        return PI;
    }
    public double area(){
        return this.radius*this.radius*PI;
    }
}
```

Solution.java

```java
package org.main;
import org.object.round.Circle;
import org.object.square.Rectangle;
import org.object.tri.Triangle;
public class Solution{
    public static void main(String args[]){
        Circle circle;
        circle=new Circle("CIRCLE","PINK",true,2.0);
        System.out.println("AREA OF CIRCLE      :"+circle.area());
        Rectangle rectangle=new Rectangle("RECTANGLE","PINK",true,2.0,4.0);
        System.out.println("AREA OF RECTANGLE   :"+rectangle.area());
        Triangle triangle=new Triangle("TRIANGLE","GREEN",false,2.0,4.0);
        System.out.println("AREA OF TRIANGLE    :"+triangle.area());


    }
}
```

OUTPUT:

```
C:\Users\students\Documents\inheritance>javac -d bin src\org\object\Shape.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\round\Circle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\square\Rectangle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\tri\Triangle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\main\Solution.java

C:\Users\students\Documents\inheritance>java -cp bin; org.main.Solution
AREA OF CIRCLE      :12.56
AREA OF RECTANGLE   :8.0
AREA OF TRIANGLE    :4.0
```

//TO IMPLEMENT THE CONCEPT OF HYBRID INHERITANCE:

SOURCE CODE:

Shape.java:

```java
package org.object;
public class Shape{
    protected String name="Circle";
    protected String color="Yellow";
    protected boolean filled=false;
    public Shape(){
        // this.Shape("Circle","yellow",false);
    }
    public Shape(String name,String color,boolean filled){
        this.name=name;
        this.color=color;
        this.filled=filled;
    }
    public void setName(String name){
        this.name=name;
    }
    public void setColor(String color){
        this.color=color;
    }
    public void setFilled(boolean filled){
        this.name=name;
    }
    public String getName(){
        return name;
    }
    public String getColor(){
        return color;
    }
    public boolean isFilled(){
        return filled;
    }
}
```

Triangle.java

```java
package org.object.tri;
import org.object.Shape;
public class Triangle extends Shape{
    protected double base=1.0;
```

```java
    protected double height=1.0;
    public Triangle(){
        super();
    }
    public Triangle(String name,String color,boolean filled,double base,double
height){
        super(name,color,filled);
        this.base=base;
        this.height=height;
    }
    public void setBase(double base){
        this.base=base;
    }
    public void setHeight(double height){
        this.height=height;
    }
    public double getBase(){
        return base;
    }
    public double getHeight(){
        return height;
    }
    public double area(){
        return 0.5 * this.base * this.height;
    }
}
```

Circle.java

```java
package org.object.round;
import org.object.Shape;
public class Circle extends Shape{
    protected double radius=1.0;
    private final static double PI=3.14;
    public Circle(){
      super();
    }
    public Circle(String name,String color, boolean filled, double radius){
        super(name,color,filled);
        this.radius=radius;
    }
    public void setRadius(double radius){
        this.radius=radius;
    }
}
```

```java
    public double getRadius(){
        return radius;
    }
    public double getPI(){
        return PI;
    }
    public double area(){
        return this.radius*this.radius*PI;
    }
}
```

Cylinder.java

```java
package org.object.round;
import org.object.round.Circle;
public class Cylinder extends Circle{
    protected double height=1.0;
    //private final static double PI=3.14;
    public Cylinder(){
      super();
    }
    public Cylinder(String name,String color, boolean filled, double
radius,double height){
        super(name,color,filled,radius);
        this.height=height;
    }
    public void setHeight(double height){
        this.height=height;
    }
    public double getHeight(){
        return height;
    }
    public double area(){
        return super.area()*this.height;
    }
}
```

Rectangle.java:

```java
package org.object.square;
import org.object.Shape;
public class Rectangle extends Shape{
    protected double length=1.0;
    protected double breadth=1.0;
```

```java
    public Rectangle(){
        super();
    }
    public Rectangle(String name,String color, boolean filled, double
length,double breadth){
        super(name,color,filled);
        this.length=length;
        this.breadth=breadth;
    }
    public void setLength(double length){
        this.length=length;
    }
    public void setBreadth(double breadth){
        this.breadth=breadth;
    }
    public double getLength(){
        return length;
    }
    public double getBreadth(){
        return breadth;
    }
    public double area(){
        return this.length*this.breadth;
    }
}
```

Square.java:

```java
package org.object.square;
import org.object.square.Rectangle;
public class Square extends Rectangle{
    protected double side = 1.0;
    public Square(){

    }
    public Square(String name,String color, boolean filled, double length,double
breadth,double side){
        super(name,color,filled,length,breadth);
        this.side=side;
    }
    public void setSide(double side){
        this.side=side;
    }
    public double getside(){
```

```
        return side;
    }
    public double area(){
        return this.side * this.side;
    }

}
```

Solution.java:

```java
package org.main;
import org.object.round.Circle;
import org.object.round.Cylinder;
import org.object.square.Rectangle;
import org.object.square.Square;
import org.object.tri.Triangle;
public class Solution{
    public static void main(String args[]){

        Circle circle=new Circle("CIRCLE","PINK",true,2.0);
        System.out.println("AREA OF CIRCLE      :"+circle.area());
        Cylinder cylinder=new Cylinder("CYLINDER","PINK",true,2.0,4.0);
        System.out.println("AREA OF CYLINDER   :"+cylinder.area());
        Rectangle rectangle=new Rectangle("RECTANGLE","PINK",true,2.0,4.0);
        System.out.println("AREA OF RECTANGLE  :"+rectangle.area());
        Triangle triangle=new Triangle("TRIANGLE","GREEN",false,2.0,4.0);
        System.out.println("AREA OF TRIANGLE    :"+triangle.area());
        Square square=new Square("SQUARE","PINK",true,2.0,4.0,3.0);
        System.out.println("AREA OF SQUARE      :"+square.area());

    }
}
```

OUTPUT:

```
C:\Users\students\Documents\inheritance>javac -d bin src\org\object\Shape.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\round\Circle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\square\Rectangle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\tri\Triangle.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\object\square\Square.java

C:\Users\students\Documents\inheritance>javac -d bin -cp bin; src\org\main\Solution.java

C:\Users\students\Documents\inheritance>java -cp bin; org.main.Solution
AREA OF CIRCLE      :12.56
AREA OF CYLINDER    :50.24
AREA OF RECTANGLE   :8.0
AREA OF TRIANGLE    :4.0
AREA OF SQUARE      :9.0
```