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DEPT:ECE-'A'

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

TASK->9

PROGRAM:

//TO IMPLEMENT THE CONCEPT OF DATA ABSTRACTION

SOURCE CODE:

Shape.java:

```
package org.object;

public abstract class Shape {
	protected String name = "Circle";

	protected String color = "Yellow";

	protected boolean filled = false;

	public abstract double area();

	public Shape() {

	}

	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.filled = filled;
	}

	public String getName() {

		return name;

	}

	public String getColor() {

		return color;

	}

	public boolean isFilled() {

		return filled;
	}

}
```

Circle.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;
	}

	@Override
	public String toString() {
		return "Circle     " + "[AREA=" + area() + "]";
	}

}
```

Cylinder.java:

```
package org.object.round;

public class Cylinder extends Circle {
	protected double height = 1.0;

	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;
	}

	public String toString() {
		return "Cylinder   " + "[AREA=" + area() + "]";
	}
}
```

Rectangle.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;
	}

	public String toString() {
		return "Rectangle  " + "[AREA=" + area() + "]";
	}
}
```

Triangle.java:

```
package org.object.tri;

import org.object.Shape;

public class Triangle extends Shape {
```

```
	protected double base = 1.0;
	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;
	}

	public String toString() {
		return "Triangle    " + "[AREA=" + area() + "]";
	}
}
```

Square.java:

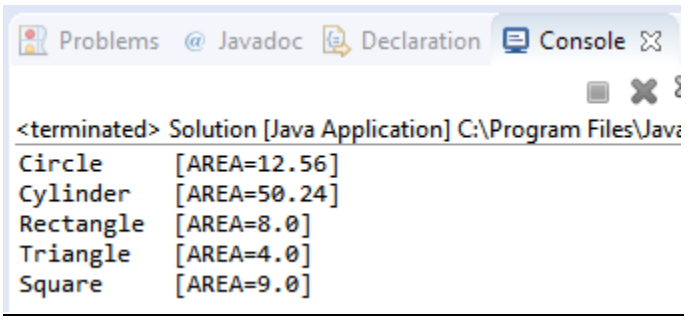
```
package org.object.square;

import org.object.Shape;

public class Square extends Shape {
	protected double side = 1.0;

	public Square() {

	}

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

```
	public void setSide(double side) {
		this.side = side;
	}

	public double getside() {
		return side;
	}

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

	public String toString() {
		return "Square     " + "[AREA=" + area() + "]";
	}
}
```

Solution.java:

```
package org.main;

import org.object.Shape;
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[]) {
		Shape shapes[] = new Shape[10];
		shapes[0] = new Circle("CIRCLE", "PINK", true, 2.0);

		System.out.println(shapes[0]);
		shapes[1] = new Cylinder("CYLINDER", "PINK", true, 2.0, 4.0);

		System.out.println(shapes[1]);
		shapes[2] = new Rectangle("RECTANGLE", "PINK", true, 2.0, 4.0);

		System.out.println(shapes[2]);
		shapes[3] = new Triangle("TRIANGLE", "GREEN", false, 2.0, 4.0);

		System.out.println(shapes[3]);
		shapes[4] = new Square("SQUARE", "PINK", true, 3.0);

		System.out.println(shapes[4]);

	}

}
```

OUTPUT:


Problems
Javadoc
Declaration
Console
<terminated> Solution [Java Application] C:\Program Files\Java
Circle [AREA=12.56]
Cylinder [AREA=50.24]
Rectangle [AREA=8.0]
Triangle [AREA=4.0]
Square [AREA=9.0]