

4. Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

```
import java.util.*;
import java.lang.Math.*;

abstract class shape{
    public int a;
    public int b;
    abstract public void printArea();
    Scanner s=new Scanner(System.in);
}

class rectangle extends shape{
    public void printArea(){
        System.out.print("Please enter length and breadth of rectangle: ");
        float a=s.nextFloat();
        float b=s.nextFloat();
        float area=a*b;
        System.out.println("Area="+area+"sq.units");
    }
}

class triangle extends shape{
    public void printArea(){
        System.out.print("Please enter three sides of triangle: ");
        float a=s.nextFloat();
        float b=s.nextFloat();
        float c=s.nextFloat();
        float d=(a+b+c)/2;
        double area=Math.sqrt(d*(d-a)*(d-b)*(d-c));
        System.out.println("Area="+area+"sq.units");
    }
}

class circle extends shape{
    public void printArea(){
        System.out.print("Please enter radius of circle: ");
        float a=s.nextFloat();
        float area=22/7*a*a;
        System.out.println("Area="+area+"sq.units");
    }
}
```

```
class Shapedemo{
    public static void main(String args[]){
        shape r=new rectangle();
        shape t=new triangle();
        shape c=new circle();
        for(int i=0;i<100;i++){
            System.out.println("\n1)Triangle\n2)Rectangle\n3)Circle\n");
            System.out.println("Enter your choice: ");
            Scanner s=new Scanner(System.in);
            int ch=s.nextInt();
            switch(ch){
                case 1: t.printArea();
                        break;
                case 2: r.printArea();
                        break;
                case 3: c.printArea();
                        break;
                default:
                    System.out.println("Invalid choice");
            }
        }
    }
}
```

output:

```
bash-5.0$ /Library/Java/JavaVirtualMachines/jdk-15.jdk/Contents/Home/bin/java -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:61892 --enable-preview -XX:+ShowCodeDetails InExceptionMessages -Dfile.encoding=UTF-8 -cp "/Users/adityaprakasha/Library/Application Support/Code/User/workspaceStorage/cfbc9c7f24e20b2c0e1ac38bf24bd34d/redhat.java/jdt_ws/java_895310d3/bin" Shapedemo
```

```
1)Triangle
2)Rectangle
3)Circle
```

Enter your choice:

1

Please enter three sides of triangle: 3

4

5

Area=6.0sq.units

```
1)Triangle
2)Rectangle
3)Circle
```

Enter your choice:

2

Please enter length and breadth of rectangle: 2

3

Area=6.0sq.units

```
1)Triangle
2)Rectangle
3)Circle
```

Enter your choice:

4

Invalid choice

```
1)Triangle
2)Rectangle
3)Circle
```

Enter your choice:

3

Please enter radius of circle: 4

Area=48.0sq.units

```
1)Triangle
2)Rectangle
3)Circle
```

Enter your choice:

■