Lab 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.


```java
Lab 4:

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


import java.util.Scanner;
abstract   class Shape {
        int dim1; int dim2;

        Shape () {
            this.dim1 = 0;
            this.dim2 = 0;
        }

        Shape (int dim1, int dim2) {
            this.dim1 = dim1;
            this.dim2 = dim2;
        }

        abstract void printArea();
}

class Rectangle extends Shape {
        Rectangle (int length, int width) {
            super (length, width);
        }

        void printArea() {
            int area = dim1 * dim2;
            System.out.println("Area of Rectangle :" + area);
        }
}
```



```java
class Triangle extends Shape {
        Triangle (int base, int height) {
            super (base, height);
        }

        void printArea() {
            double area = 0.5 * dim1 * dim2;
            System.out.println("Area of Triangle :" + area);
        }
}

class Circle extends Shape {
        Circle (int radius) {
            super (radius, 0);
        }

        void printArea() {
            double area = Math.PI * dim1 * dim1;
            System.out.println("Area of Circle :" + area);
        }
}

public class Shape1 {
        public static void main (String[] args) {
            Scanner sc = new Scanner (System.in);
            System.out.println("Enter length & width of Rectangle :");
            int length = sc.nextInt();
            int width = sc.nextInt();
            Rectangle o1 = new Rectangle (length, width);
            o1.printArea();

            System.out.println("Enter base & height for Triangle :");
            int base = sc.nextInt();
            int height = sc.nextInt();
            Triangle o3 = new Triangle (base, height);
            o2.printArea();
```

```java
            System.out.println("Enter the radius of Circle :");
            int radius = sc.nextInt();
            Circle o3 = new Circle (radius);
            o3.printArea();
        }
}
```

Output

```
Enter The length & width of Rectangle :
4
2
Area of Rectangle : 8
Enter the base & height of Triangle :
2
4
Area of Triangle : 4
Enter the radius of Circle :
3
Area of Circle : 28.26
```

Code:

```java
import java.util.Scanner;

abstract class Shape {
    int dim1;
    int dim2;



    Shape(int dim1, int dim2) {
        this.dim1 = dim1;
        this.dim2 = dim2;
    }



    abstract void printArea();
}

class Rectangle extends Shape {

    Rectangle(int length, int width) {
        super(length, width);
    }

    @Override
    void printArea() {
        int area = dim1 * dim2;
        System.out.println("Area of Rectangle: " + area);
    }
}
```

```java
class Triangle extends Shape {

    Triangle(int base, int height) {
        super(base, height);
    }

    @Override
    void printArea() {
        double area = 0.5 * dim1 * dim2;
        System.out.println("Area of Triangle: " + area);
    }
}

class Circle extends Shape {

    Circle(int radius) {
        super(radius, 0);
    }

    @Override
    void printArea() {
        double area = Math.PI * dim1 * dim1;
        System.out.println("Area of Circle: " + area);
    }
}

public class Shapes {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
```

```java
        System.out.println("Enter length and width for Rectangle:");

        int length = sc.nextInt();

        int width = sc.nextInt();

        Rectangle a1 = new Rectangle(length, width);

        a1.printArea();



        System.out.println("Enter base and height for Triangle:");

        int base = sc.nextInt();

        int height = sc.nextInt();

        Triangle a2 = new Triangle(base, height);

        a2.printArea();



        System.out.println("Enter radius for Circle:");

        int radius = sc.nextInt();

        Circle a3 = new Circle(radius);

        a3.printArea();
    }
}
```

Output:

```
D:\Java_Lab_Programs>javac Shapes.java

D:\Java_Lab_Programs>java Shapes
Enter length and width for Rectangle:
4
2
Area of Rectangle: 8
Enter base and height for Triangle:
2
4
Area of Triangle: 4.0
Enter radius for Circle:
3
Area of Circle: 28.274333882308138

D:\Java_Lab_Programs>
```