

22/1/24

LAB PROGRAM-4

Abstract Shape class

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.

A. PROGRAM:

```
import java.util.Scanner;
```

```
abstract class Shape
```

```
{
```

```
    double x, y;
```

```
    Shape(double x, double y)
```

```
    {
```

```
        this.x = x;
```

```
        this.y = y;
```

```
    }
```

```
    abstract void printArea();
```

```
}
```

```
class Rectangle extends Shape
```

```
{
```

```
    Rectangle(double x, double y)
```

```
    { super(x, y); }
```

```
    void printArea()
```

```
    {
```

```
        System.out.println("Area of Rectangle : " +
```

```
        (x * y) + "Square units\n");
```

```
    }
```

```
}
```

```
class Triangle extends Shape
```

```
{
```

```
    Triangle(double x, double y)
```

```
    { super(x, y); }
```

```
    void printArea()
```

```
    {
```

```
        System.out.println("Area of Triangle : " +
```

```
                                 $(0.5 * x * y)$  + "square units \n");
```

```
    }
```

```
}
```

```
class Circle extends Shape
```

```
{
```

```
    Circle(double x)
```

```
    { super(x, 0); }
```

```
    void printArea()
```

```
    {
```

```
        System.out.println("Area of Circle : " +  $(3.14 * x * x)$ 
```

```
                                + "square units \n");
```

```
    }
```

```
}
```

```
class ShapeRun
```

```
{
```

```
    public static void main(String[] args)
```

```
    {
```

```
        double x, y;
```

```
        Scanner input = new Scanner(System.in);
```

```
        System.out.println("Enter length and width dimensions of Rectangle !");
```

```
        x = input.nextDouble();
```

```
        y = input.nextDouble();
```

```
        Rectangle rectangle = new Rectangle(x, y);
```

```
        rectangle.printArea();
```



```

                                height & base
System.out.println("Enter dimensions of Triangle:");
x = input.nextDouble();
y = input.nextDouble();
Triangle triangle = new Triangle(x, y);
triangle.printArea();

```

```

                                radius
System.out.println("Enter dimensions of Circle:");
x = input.nextDouble();
Circle circle = new Circle(x);
circle.printArea();

```

```

input.close();
}
}

```

OUTPUT ->

Enter length and width of Rectangle:

10
20

Area of Rectangle: 200.0 square units

Enter height and base of Triangle:


10
20

Area of Triangle: 100.0 square units

Enter radius of Circle:

10

Area of Circle: 314.0 square units


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```
import java.util.Scanner;
```

```
abstract class Shape
```

```
{
```

```
double x,y;
```

```
Shape(double x,double y)
```

```
{
```

```
this.x=x;
```

```
this.y=y;
```

```
}
```

```
abstract void printArea();
```

```
}
```

```
class Rectangle extends Shape
```

```
{
```

```
Rectangle(double x,double y)
```

```
{
```

```
super(x,y);
```

```
}
```

```
void printArea()
```

```
{
```

```
System.out.println("Area of Rectangle: " + (x*y) + " square units\n");
```

```
}
```

```
}
```

```
class Triangle extends Shape
```

```
{
```

```
Triangle(double x,double y)
```

```
{
```

```
super(x,y);
```

```
}
```

```
void printArea()
{
    System.out.println("Area of Triangle: " + (0.5*x*y) + " square units\n");
}
}
```

```
class Circle extends Shape
{
    Circle(double x)
    {
        super(x,0);
    }
    void printArea()
    {
        System.out.println("Area of Circle: " + (3.14*x*x) + " square units\n");
    }
}
```

```
class ShapeRun
{
    public static void main(String[] args)
    {
        double x,y;
        Scanner input=new Scanner(System.in);
        System.out.println("Enter length and width of Rectangle: ");
        x=input.nextDouble();
        y=input.nextDouble();
        Rectangle rectangle=new Rectangle(x,y);
        rectangle.printArea();
    }
}
```

```
System.out.println("Enter height and base of Triangle: ");  
x=input.nextDouble();  
y=input.nextDouble();  
Triangle triangle=new Triangle(x,y);  
triangle.printArea();
```

```
System.out.println("Enter radius of Circle: ");  
x=input.nextDouble();  
Circle circle=new Circle(x);  
circle.printArea();
```

```
input.close();  
}  
}
```

Output:

Enter length and width of Rectangle:

10

20

Area of Rectangle: 200.0 square units

Enter height and base of Triangle:

10

20

Area of Triangle: 100.0 square units

Enter radius of Circle:

10

Area of Circle: 314.0 square units