6. Develop a JAVA program to create an abstract class Shape with abstract methods calculateArea() and calculatePerimeter(). Create subclasses Circle and Triangle that extend the Shape class and implement the respective methods to calculate the area and perimeter of each shape.

Save Filename as: Shape_peri_area_Main.java

Solution:-

```
abstract class Shape
{
// Abstract methods to calculate area and perimeter
public abstract double calculateArea ();
public abstract double calculatePerimeter ();
}
class Circle extends Shape
{
private double radius;
// Constructor
public Circle (double radius) { this.radius = radius; }
@Override
public double
calculateArea ()
{
return Math.PI * radius * radius;
}
@Override
public double
calculatePerimeter ()
{
return 2 * Math.PI * radius;
}
}
class Triangle extends Shape
```

```
{
private double side1;
private double side2;
private double side3;
// Constructor
public Triangle (double side1, double side2, double side3)
{
this.side1 = side1;
this.side2 = side2;
this.side3 = side3;
}
@Override
public double
calculateArea ()
{
double s = (side1 + side2 + side3) / 2;
return Math.sqrt (s * (s - side1) * (s - side2) * (s – side3));
}
@Override
public double
calculatePerimeter ()
{
return side1 + side2 + side3;
}
}
public class Shape_peri_area_Main
{
public static void main (String[] args)
{
Circle circle = new Circle (5.0);
Triangle triangle = new Triangle (3.0, 4.0, 5.0);
```

```
System.out.println ("Circle:");
System.out.println ("Area: " + circle.calculateArea ());
System.out.println ("Perimeter: " + circle.calculatePerimeter());
System.out.println ();
System.out.println ("Triangle:");
System.out.println ("Area: " + triangle.calculateArea ());
System.out.println ("Perimeter: " + triangle.calculatePerimeter());
}
}
```