**Internship 3rd week Assignment**

**2.Implement a Shape class with derived classes Circle, Rectangle, and Triangle, each having a method to calculate the area.**

**package Shapes;**

**// Base abstract class**

**abstract class Shape {**

**// Abstract method to calculate area**

**public abstract double calculateArea();**

**}**

**// Derived class for Circle**

**class Circle extends Shape {**

**private double radius;**

**// Constructor to initialize radius**

**public Circle(double radius) {**

**this.radius = radius;**

**}**

**// Implementing the abstract method to calculate the area of the circle**

***@Override***

**public double calculateArea() {**

**return Math.*PI* \* radius \* radius;**

**}**

**}**

**// Derived class for Rectangle**

**class Rectangle extends Shape {**

**private double width;**

**private double height;**

**// Constructor to initialize width and height**

**public Rectangle(double width, double height) {**

**this.width = width;**

**this.height = height;**

**}**

**// Implementing the abstract method to calculate the area of the rectangle**

***@Override***

**public double calculateArea() {**

**return width \* height;**

**}**

**}**

**// Derived class for Triangle**

**class Triangle extends Shape {**

**private double base;**

**private double height;**

**// Constructor to initialize base and height**

**public Triangle(double base, double height) {**

**this.base = base;**

**this.height = height;**

**}**

**// Implementing the abstract method to calculate the area of the triangle**

***@Override***

**public double calculateArea() {**

**return 0.5 \* base \* height;**

**}**

**}**

**// Main class to test the implementations**

**public class ShapeTest {**

**public static void main(String[] args) {**

**// Create instances of each shape**

**Shape circle = new Circle(5.0);**

**Shape rectangle = new Rectangle(4.0, 6.0);**

**Shape triangle = new Triangle(3.0, 7.0);**

**// Display the areas**

**System.*out*.println("Area of Circle: " + circle.calculateArea());**

**System.*out*.println("Area of Rectangle: " + rectangle.calculateArea());**

**System.*out*.println("Area of Triangle: " + triangle.calculateArea());**

**}**

**}**