OOP

Lab Manual (Lab 4)

****

Session: Spring 2024

LAB INSTRUCTOR: AYESHA MAJID ALI

**TASKS:**

**Task 1:** Create a Java program to calculate and display the area of different shapes: Circle, Rectangle, and Triangle. Use inheritance and method overriding to achieve this.

1. Create a Shape class with a method ***calculateArea()*** that returns 0.

***2.***Create a Circle class that inherits from Shape and overrides the ***calculateArea()*** method to calculate and return the area of a circle using the formula: ***π \* r^2.***

3. Create a Rectangle class that inherits from Shape and overrides the **calculateArea()** method to calculate and return the area of a rectangle using the formula: length \* width.

4. Create a Triangle class that inherits from Shape and overrides the **calculateArea()** method to calculate and return the area of a triangle using the generalized formula

5. In your main program, create objects of each shape type, set their respective dimensions (e.g., radius for a circle, length and width for a rectangle, base and height for a triangle) within their respective Class, and call their calculateArea() methods to calculate and display their areas.

**Task 2:** Initialize a class Shape. The Shape class represents three classes of shapes.

1) a Right-angled triangle with two equal sides, 2) a circle, and 3) a square. The

Shape class has one protected integer variable “parameter” which is.

1. The length of one side in case of a right-angle triangle

2. The length of one side of the square

3. The radius in case of a circle

Derive three classes Circle, Triangle, and Square from the Shape class and write.

their respective Area functions (where these are located, in terms of scope, you

have to think about. small hint, you’ll take a parameter for the Area function - this.

will make more sense when you read the next paragraph). The area functions.

should print the shape name, parameter value, and the area.