

Lab 24

Instructions: Complete the steps below. Be sure to show your code to one of the lab TAs before you leave, so that you can receive credit for this lab. You must also upload a copy of all your source code (.java) files to the link on Blackboard by **11:59 PM on Wednesday December 2, 2020 for L01, L02, L03, L05 and by 11:59 PM on Tuesday December 1, 2020 for L06, L07, L08 and L09.**

1. Design a class named Triangle that extends GeometricObject class (attached with this Lab).

The class contains

- Three double data fields named *side1*, *side2*, and *side3* with default values 1.0 to denote three sides of a triangle.
- A no-arg constructor that creates a default triangle.
- A constructor that creates a triangle with specified *side1*, *side2*, and *side3*.
- The accessor methods for all three data fields.
- A method named `getArea()` that returns the area of this triangle.
- A method named `getPerimeter()` that returns the area of this triangle.
- A method named `toString()` that returns a string description for the triangle.

The formula for computing the area of a triangle is:

$$s = \frac{side1 + side2 + side3}{2}, \text{ area} = \sqrt{s(s - side1)(s - side2)(s - side3)}$$

The `toString()` method is implemented as follows:

```
return "Triangle: side1 = " + side1 + " side2 = " + side2 + " side3 = " + side3;
```

Write a test program that prompts the user to enter three sides of the triangle, a color, and a Boolean value to indicate whether the triangle is filled. The program should create a Triangle object with these sides and set the color and filled properties using the input. The program should display the area, perimeter, color and true or false to indicate whether it is filled or not.

2. Design a class named Person and its two subclasses named Student and Employee. Make Faculty and Staff subclasses of Employee. A person has a name, address, phone number and e-mail address. A student has a class status (freshman, sophomore, junior or senior). Define the status as constant. An employee has an office, salary, and experience (number of years, integer value). A faculty member has office hours and a rank. A staff member has a title. Override the `toString` method in each of the class to display the class name and the person's name.

Grading Guidelines: This lab is graded on a scale of 0-6 points, assigned as follows:

- **0 points:** Student is absent or does not appear to have completed any work for the lab
- **2 point (2*1):** Student has written the program, but it has errors.
- **4 points (2*2):** Student has written the program it compiles without error, but it does not produce the correct output.
- **6 points (2*3):** Student has written the program and it compiles and runs correctly, without any errors.