Lab 5 - Conditions, Strings, and Real Numbers (Area)
CS 161 - Fall 2016

Due date: 11pm, Thursday, October 13th

Goals

- to use conditional statements (ifs)
- to use equality methods on Strings
- to use real numbers (double) including printing them neatly
- to build test cases

Overview

For this lab, you will write a program that asks for the name of a shape, then asks for the appropriate linear measurements and prints the area of the shape.

Choose good variable names. Use methods and parameters. Write descriptive and precise comments including at least one for each of your methods. Indent correctly. Your program does not need nor should it use loops.

Also write at least one test case for each shape as well as a non-shape and print those test cases before asking for input.

Specifications

The Area program will ask the user for the name of a shape (circle, triangle, or rectangle) and then ask for the appropriate linear dimension(s): radius for circle, base and height for triangle, or length and width for rectangle. The program should check that the response(s) are positive and then print a message giving the area of a shape of that size.

Use double for the type of the dimensions.

Use printf when echo-printing the input and the result. See class examples and page 275 of text. All real numbers should be printed with two digits after the decimal point (%.2f at the appropriate place inside the format string). Remember to put a newline (\n) at the end of the format string.

Use the equalsIgnoreCase method of the String class to compare Strings. The == operation compares whether the two operands are the same object; they won't be. The equals method is case-sensitive.

Create the Scanner in the main method (with new Scanner(System.in)) and pass it as a parameter to other methods. Do NOT create more than one Scanner.

Use the Math.PI constant rather than defining your own. The Math library is part of the Java standard, so you do not need to import it.

You should have a printTestCases method that you call before any other printing to remind the user of input and expected output. The last line it prints should be several dashes to separate it visually from the rest of the program execution. Having such a method is not normal for real programs, but it will help you think about what is expected before you start writing the program. The test cases should be different from the examples below. You should be able to comment it out in main to not see it. That was the FIRST method I wrote.
Examples

Please enter the name of the shape (circle, triangle, rectangle): circle
Please enter the radius: 5
The area of a circle with radius 5.00 is 78.54.

Please enter the name of the shape (circle, triangle, rectangle): triangle
Please enter the base: 6
Please enter the height: 7
The area of a triangle with base 6.00 and height 7.00 is 21.00.

Please enter the name of the shape (circle, triangle, rectangle): rectangle
Please enter the length: 3.25
Please enter the width: 5.4
The area of a rectangle with length 3.25 and width 5.40 is 17.55.

Please enter the name of the shape (circle, triangle, rectangle): rectangle
Please enter the length: 3
Please enter the width: -4
The value for width(-4.00) is not positive.

Please enter the name of the shape (circle, triangle, rectangle): square
The shape(square) is not supported.

Additional Examples as Test Case Output

circle
1
Expected: The area of a circle with radius 1.00 is 3.14.

triangle
10 2
Expected: The area of a triangle with base 10.00 and height 3.00 is 15.00.

rectangle
5.317 6.152
Expected: The area of a rectangle with length 5.32 and width 6.15 is 32.71.

rectangle
-3 4
Expected: The value for length(-3.00) is not positive.

hexagon
Expected: The shape(hexagon) is not supported.