Lab # 4

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CPSC 1150 - 003

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Lab Title: Bank Accout Lab

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Department: CSIS

Program Bank Account

File Name: Lab4.java

Purpose: Calculate triangle perimeter and area.

Input: Triangle coordinates.

Output: Triangle perimeter, area

Technical Information:

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Compiler: Java SDK 17.0.1

Computer: Intel i5 3.70GHz, 16GB RAM

Operating System: Window 10

Language: Java

Program Logic (Pseudocode)

Algorithm: How many years and months it takes to deplete an account with a given initial balance and interest rate.

(definition)

* 1. a\_x, a\_y: x-coordinate and y-coordinate of A
  2. b\_x, b\_y: x-coordinate and y-coordinate of B
  3. c\_x, c\_y: x-coordinate and y-coordinate of C
  4. dAB, dBC, dCA: distance between A and B, B and C, C and A
  5. sAB, sBC, sCA: slope value of AB, BC, and CA

verifyCoordinate START

1. Initial valid as true.
2. If x < 0 or x > 40, then valid is false.
3. If y < 0 or y > 40, then valid is false
4. If valid is false, then print error.
5. Return valid.

END

getInput START

1. Get a\_x and a\_y.
2. Get b\_x and b\_y.
3. Get c\_x and c\_y.
4. Initial valid as true.
5. If verifyCoordinate(a\_x, a\_y), then valid is false.
6. If verifyCoordinate(b\_x, b\_y), then valid is false.
7. If verifyCoordinate(c\_x, c\_y), then valid is false.
8. Return valid

END

calculateSlope START

1. Return

END

isLine START

1. Set sAB = calculateSlope(b\_x, b\_y, a\_x, a\_y)
2. Set sBC = calculateSlope(c\_x, c\_y, b\_x, b\_y)
3. Set sCA = calculateSlope(a\_x, a\_y, c\_x, c\_y)
4. If (|sAB–sBC| < EPSILON and |sBC–sCA|- < EPSILON) then
   1. Print out the result
   2. Return true
5. Else return false

END

calculateDistance START

1. Return

END

calculatePerimeter START

1. Set dAB = calculateDistance(a\_x, a\_y, b\_x, b\_y)
2. Set dBC = calculateDistance(b\_x, b\_y, c\_x, c\_y)
3. Set dAC = calculateDistance(c\_x, c\_y, a\_x, a\_y)
4. Return

END

calculateArea START

1. Set s = calculatePerimeter() / 2
2. Return

END

main START

1. Initial repeat
2. Do
   1. If getInput is true
      1. If isLine is false
         1. Display triangle coordinates
         2. Display perimeter
         3. Display area
   2. Ask if client want to repeat program
   3. Initial answer and get from input
   4. If answer is 1 then set repeat = true
   5. Else repeat = false
3. While(repeat)

END

Generate your test cases based on the specifications in your lab assignment. Follow following format for each test case: (Refer to external document of your first lab)

*purpose*

*input*

*output*

*expected value*

*passed or failed*

Test Cases:

**Test valid coordinate without repeat**

Input:

x-coordinate of A: 5

y-coordinate of A: 7

x-coordinate of B: 13

y-coordinate of B: 9

x-coordinate of C: 27

y-coordinate of C: 0

Output:

Triangle: A(5,7), B(13,9), and C(27, 0)

Perimeter: 47.97632098955895

Area: 49.99999999999998

Expect:

Perimeter: 47.98

Area: 50.000

PASSED

**Test valid coordinate with repeat**

Input:

x-coordinate of A: 5

y-coordinate of A: 7

x-coordinate of B: 13

y-coordinate of B: 9

x-coordinate of C: 27

y-coordinate of C: 0

Would you like to repeat the program (1 for yes, 2 for no)?1

x-coordinate of A: 7

y-coordinate of A: 3

x-coordinate of B: 16

y-coordinate of B: 35

x-coordinate of C: 15

y-coordinate of C: 27

Output:

Triangle: A(5,7), B(13,9), and C(27, 0)

Perimeter: 47.97632098955895

Area: 49.99999999999998

Triangle: A(7,3), B(16,35), and C(15, 27)

Perimeter: 66.6020193068349

Area: 19.99999999999979

Expect:

Perimeter: 47.98

Area: 50.00

Perimeter: 66.6

Area: 20.00

PASSED

**Test invalid and valid coordinates**

Input:

x-coordinate of A: -1

y-coordinate of A: 2

x-coordinate of B: 9

y-coordinate of B: 16

x-coordinate of C: 50

y-coordinate of C: 7

Would you like to repeat the program (1 for yes, 2 for no)?1

x-coordinate of A: 25

y-coordinate of A: 36

x-coordinate of B: 32

y-coordinate of B: 17

x-coordinate of C: 14

y-coordinate of C: 39

Output:

Coordinate (-1, 2) is not in acceptable range.

Coordinate (50, 7) is not in acceptable range.

Triangle: A(25,36), B(32,17), and C(14, 39)

Perimeter: 60.075551789411755

Area: 93.99999999999996

Expect:

Coordinate (-1, 2) is not in acceptable range.

Coordinate (50, 7) is not in acceptable range.

Perimeter: 60.08

Area: 94.00

PASSED

**Test three points in same line**

Input:

x-coordinate of A: 1

y-coordinate of A: 1

x-coordinate of B: 2

y-coordinate of B: 2

x-coordinate of C: 3

y-coordinate of C: 3

Output:

Three points are on the same line.

Expect:

Three points are on the same line.

PASSED

Note:

As my rule, method name must be verb, so I change the method name a little bit.