RIT | Golisano College of Computing and Information Sciences
School of Information

ISTE-120 - Computational Problem Solving for the Information Domain I
Homework Assignment 5 (HW05)

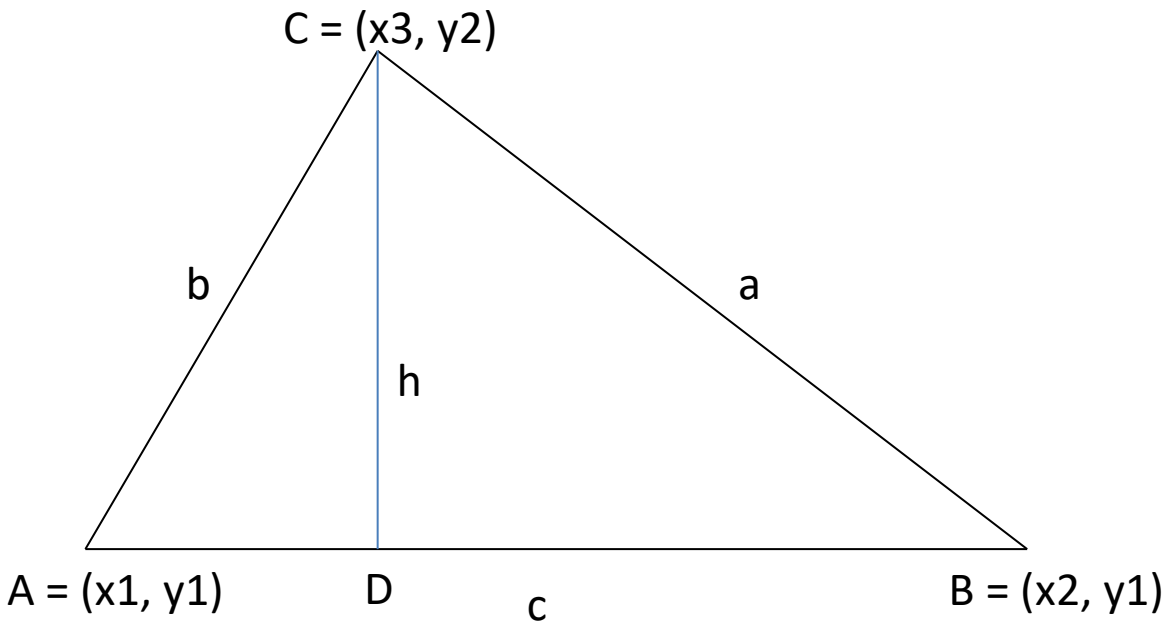
DELIVERABLE

Zip all files together and submit them to the MyCourses Assignment folder for this homework. Homework MUST be submitted on time to receive full credit. Homework submitted to the "late" dropbox will receive a maximum grade of 80%. Homework not submitted to either assignment folder will receive no credit.

ASSIGNMENT

(Based on Horstmann, Big Java 4th ed. – Project 4.1)

This project requires triangle calculations. A triangle is defined by the *x*- and *y*-coordinates of its three corner points. Consider the following picture:



Note that points A and B have the same y-coordinate (not for all possible triangles, but for this assignment). Thus, the height (h) is easily calculated. Also note that sides a, b and c are not necessarily of equal length and angles A, B and C are not necessarily 90 degrees or of equal size.

This assignment requires the computation of the following properties of a given triangle:

- the lengths of all sides (`lengthA, lengthB, lengthC`)
  - by subtracting x values and the Pythogorean Theorem
- the number of degrees in all angles (`angleA, angleB, angleC`)
- for A and B you can calculate the sine of the angle (lookup or remember how to calculate the sine in a right triangle). Then use the arcsine (`asin`) method of the `Math` class. For C you can use the fact the all of the angles of a triangle must sum to 180 degrees
- the perimeter (`calcPerimeter`)
  - sum of the lengths of the three sides
- the area (`calcArea`)
  - area of a triangle = ½ base x height. The base is any size, and the height is the perpendicular distance from the base to the opposite vertex
- height (`getHeight`)
  - subtract y values

Implement a `Triangle` class with methods above and a `TriangleTester` class that prompts a user for corner point coordinates and produces a formatted output as follows:

Obtaining the points:

Hard code in the coordinates for A (x1, y1), B (x2, y2), and C (x3, y3).

```
double x1 = 0.0;
double y1 = 0.0;
double x2 = 4.0;
double y2 = 0.0;  // y1 must always equal y2
double x3 = 3.0;
double y3 = 3.0;
```

Output:

```
Triangle with coordinates: A (0.0,0.0), B (4.0,0.0), C (3.0,3.0)
Area     :  6.00
Perimeter: 11.40
Length side a:  3.16
Length side b:  4.24
Length side c:  4.00
Height h:       3.00
Angle A: 45.00
Angle B: 71.57
Angle C: 63.43
```

DETAILS

1. Submit files to the MyCourses Assignment folder
2. All calculations must be done in the Triangle class
3. Proper data types should be used

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Name: _____

Homework 5 Grade Sheet

Triangle	Point Value	Points Earned
Triangle Class	60	
Constructor initializes the coordinate values	6	
calcArea method is correct	6	
calcPerimeter method is correct	6	
lengthA method is correct	6	
lengthB method is correct	6	
lengthC method is correct	6	
angleA method is correct	6	
angleB method is correct	6	
angleC method is correct	6	
getHeight method is correct	6	
TriangleTester class	40	
Coordinates are hard coded in properly	7	
Input data is parsed properly	7	
Triangle is constructed properly	6	
Output message show coordinates correctly	5	
The following values are printed: area perimeter length of each sides degrees in each angle height	10	
Output matches specification	5	
Total Points	100	

Note: If your program fails to compile, you will receive a zero for the assignment. A clean compilation means that the compiler generates no warning messages.

Additional Comments: