Assignment 3

Draw a triangle with Java. Function: 1. Calculate the length of each edge with the coordinate of three angles; 2. Calculate the area of this triangle.

**package** geometry;//under the package of geometry//

**import** java.awt.geom.Point2D;//import the Point2D package from java.awt.geom.//

**public** **class** Triangle {//declare a class named Triangle//

**private** Point2D pointA;//declare a pointA privately in Point2D//

**private** Point2D pointB;//declare a pointB privately in Point2D//

**private** Point2D pointC;//declare a pointC privately in Point2D//

**private** **double** segmentA;//declare a segmentA privately in "double" type//

**private** **double** segmentB;//declare a segmentB privately in "double" type//

**private** **double** segmentC;//declare a segmentC privately in "double" type//

**public** Triangle (Point2D ptA, Point2D ptB, Point2D ptC){//declare a constructor and call the function from three points in Point2D. A constructor share the same name with the class and has no return value//

**this**.pointA = ptA;//"this." refers to Point2D function. Assign a local variable ptA with Point2D function//

**this**.pointB = ptB;//Assign a local variable ptB with Point2D function//

**this**.pointC = ptC;//Assign a local variable ptC with Point2D function//

}

**public** **double** calculateLength(){//declare function named calculateLength in "double" type//

**double** edge\_length;//declare a local variable named edge\_length in "double" type//

segmentA = Math.*sqrt*(Math.*pow*((**this**.pointB.getX() - **this**.pointC.getX()), 2) + Math.*pow*((**this**.pointB.getY() - **this**.pointC.getY()), 2) );

segmentB = Math.*sqrt*(Math.*pow*((**this**.pointA.getX() - **this**.pointC.getX()), 2) + Math.*pow*((**this**.pointA.getY() - **this**.pointC.getY()), 2) );

segmentC = Math.*sqrt*(Math.*pow*((**this**.pointA.getX() - **this**.pointB.getX()), 2) + Math.*pow*((**this**.pointA.getY() - **this**.pointB.getY()), 2) );

//calculate the length of three segments with package Math//

edge\_length = segmentA + segmentB + segmentC;//local variable edge\_length is the sum of three segments//

**return** edge\_length;//return the value of local variable edge\_length//

}//this is the end of function calcualteLength//

**public** **double** getArea(**double** edge\_length){//declare a function named "getArea" and call the variable of edge\_length//

**double** area = 0;//declare a local variable named "area", assign the initial value 0 to this variable//

**if**(segmentA + segmentB <= segmentC || segmentB + segmentC <= segmentA || segmentC + segmentA <= segmentB){//this "if" condition determines whether three segments can construct a triangle //

System.***out***.println("These three segments cannot form a trangle.");//if the previous conditions are fulfilled, no triangle could be built//

}**else**{//if the previous conditions are not fulfilled, continue from conditions in "else"//

**double** p = edge\_length/2;//declare a local variable named p under type "double". p is equal to half of the value of edge\_length//

area = Math.*sqrt*(p \* (p-segmentA) \* (p-segmentB) \* (p-segmentC));//assign an equation for local variable area to calculate the area of a triangle//

}

**return** area;//return local variable area//

}//this is the end of function getArea//

**public** **static** **void** main(String [] args){//declare the main method of this class//

Point2D ptA = **new** Point2D.Double(2, 2);//declare a local variable name ptA with type "Point2D", assign memory space and an actual instance (2, 2) to this local variable using "new", so that we could use this local variable in main function//

Point2D ptB = **new** Point2D.Double(10, 6);

Point2D ptC = **new** Point2D.Double(8, 6);

Triangle triangle = **new** Triangle (ptA, ptB, ptC);//declare a constructor with type "Triangle" and name it "triangle". In this function, it calls from local variables ptA, ptB, ptC//

**double** sumOfEdge = triangle.calculateLength();//declare a local double variable named sumOfEdge and call the function from calculateLength//

**double** area = triangle.getArea(sumOfEdge);//declare a local double variable named area and call the function from getArea. Since getArea function calculateLength, which is referred as sumOfLength in main function, so sumOfLength is in bracket//

System.***out***.println("The side length of the trangle is: " + sumOfEdge);//print out sumOfEdge//

System.***out***.println("The area of the trangle is: " + area);//print out area//

}

}