Java Tutorial – Exercise 2

Before working on this exercise, please watch the videos of the tutorial until Chapter 08. Links to these videos can be found under:

`https://www.geoinfo.uni-bonn.de/en/teaching/java-tutorial`

Task 1

Point
x: double
y: double
Point(double, double)

Rectangle
lowerLeft: Point upperRight: Point
Rectangle(Point, Point) perimeter(): double area(): double intersects(Rectangle): boolean

Given the UML diagrams above, implement the Java classes `Point` and `Rectangle`. The class `Point` has the two attributes `x` and `y` of type `double` defining the coordinates of a 2D point. The class `Rectangle` has the two attributes `lowerLeft` and `upperRight` of type `Point` defining the lower left corner and the upper right corner of an axis-parallel rectangle. Implement the following methods.

1. A constructor `Point(double, double)` for the instantiation of new points, which expects two parameters for setting the attributes `x` and `y`.

2. A constructor `Rectangle(Point, Point)` for the instantiation of new rectangles, which expects two parameters for setting the attributes `lowerLeft` and `upperRight`.

3. A method `perimeter()` that returns the perimeter of an object of class `Rectangle`.

4. A method `area()` that returns the area of an object of class `Rectangle`.

5. A method `intersects(Rectangle)` that checks whether to objects of the class `Rectangle` intersect. The method should return true or false.

Given three rectangles $R_1 = (5.0\ 2.0,\ 9.0\ 5.0)$, $R_2 = (1.0\ 5.5,\ 6.0\ 7.5)$ and $R_3 = (7.5\ 4.0,\ 12.5\ 8.0)$, instantiate the rectangles as objects of class `Rectangle` in the method `main`. Compute both the area and the perimeter of all three rectangles and print the results on the console. Check whether there is a pair of rectangles that intersects.