Computational Geometry

Coding Project 2, Group No. 21

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DoublyConnectedEdgeList.java

This file contains the code for the basic data structure used for representing simple polygons i.e the doubly connected edge list or DCEL

The basic attributes of DCEL are as mentioned below

```java
public class DoublyConnectedEdgeList {

    private DCEL_Edge rep_edge; //representative edge
    private int id;  //assigned number to DCEL
    private static int DCEL_count = 0;  //number of DCELs
    private static int edge_count = 0;  //number of edges
    private static int node_count = 0;  //number of nodes
    private static final double eps = 1e-4; //for floating point comparisons

}
```
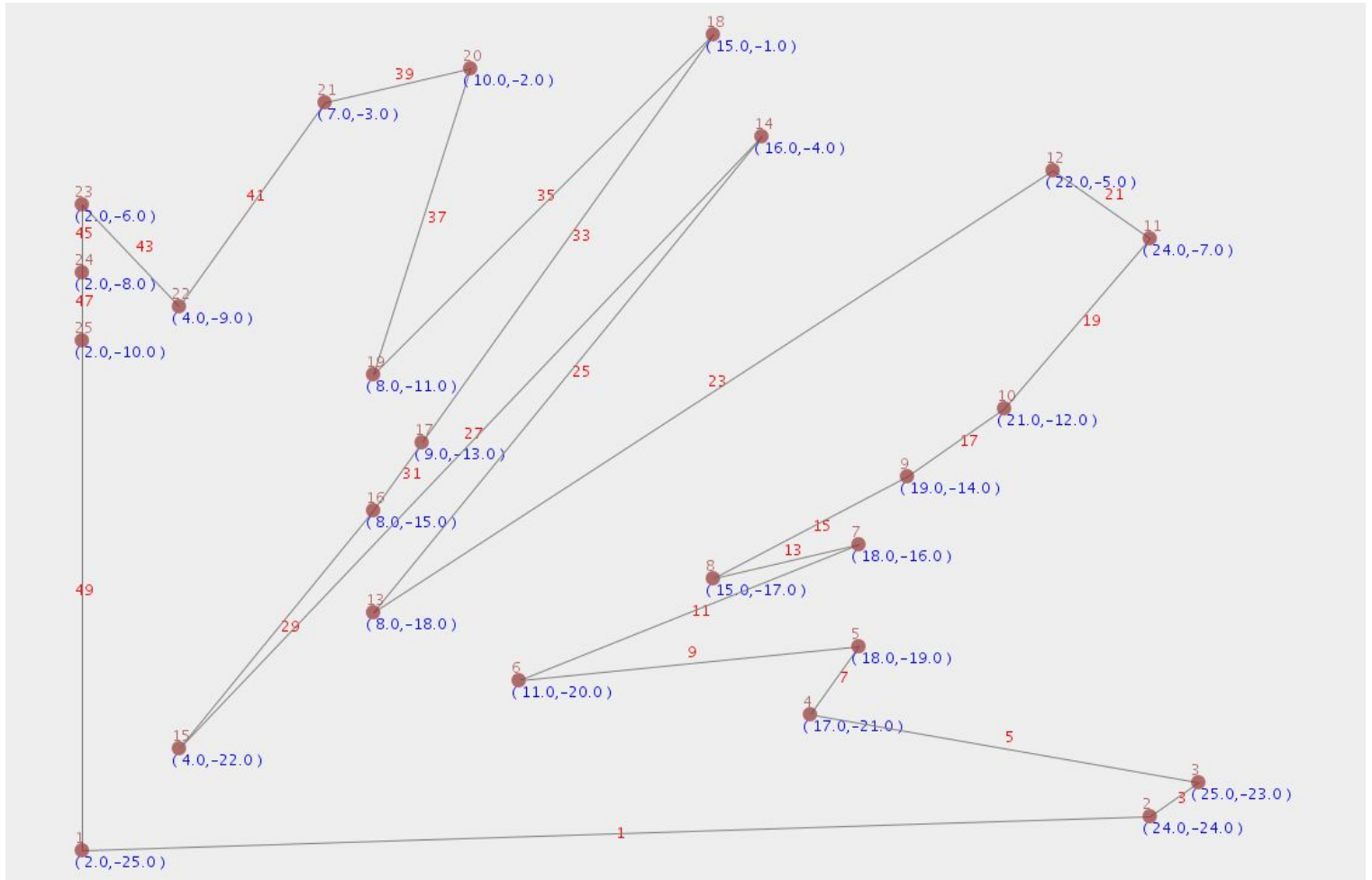
SimplePolygon.java
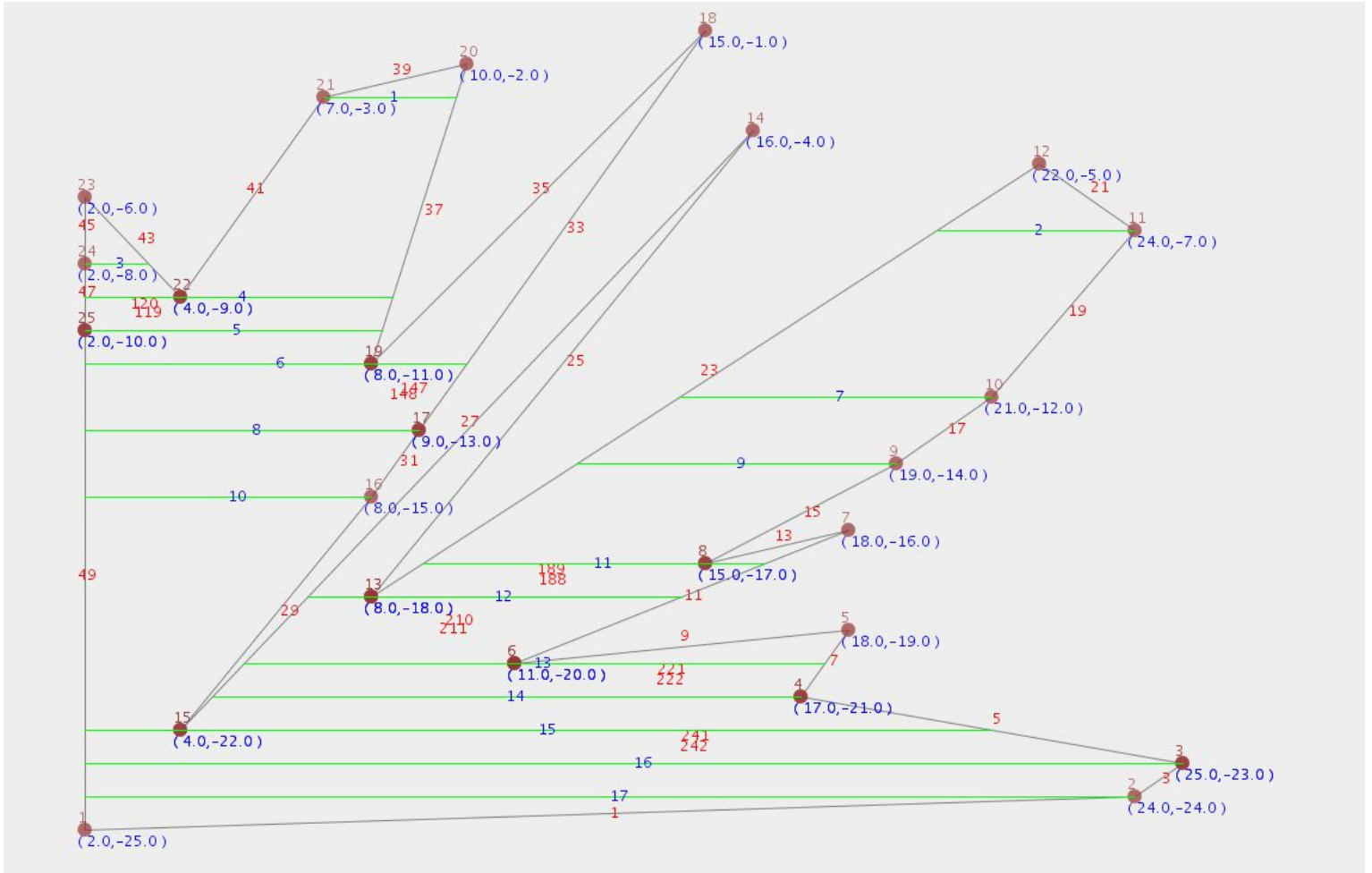
This file contains the main code.

It performs the following operations

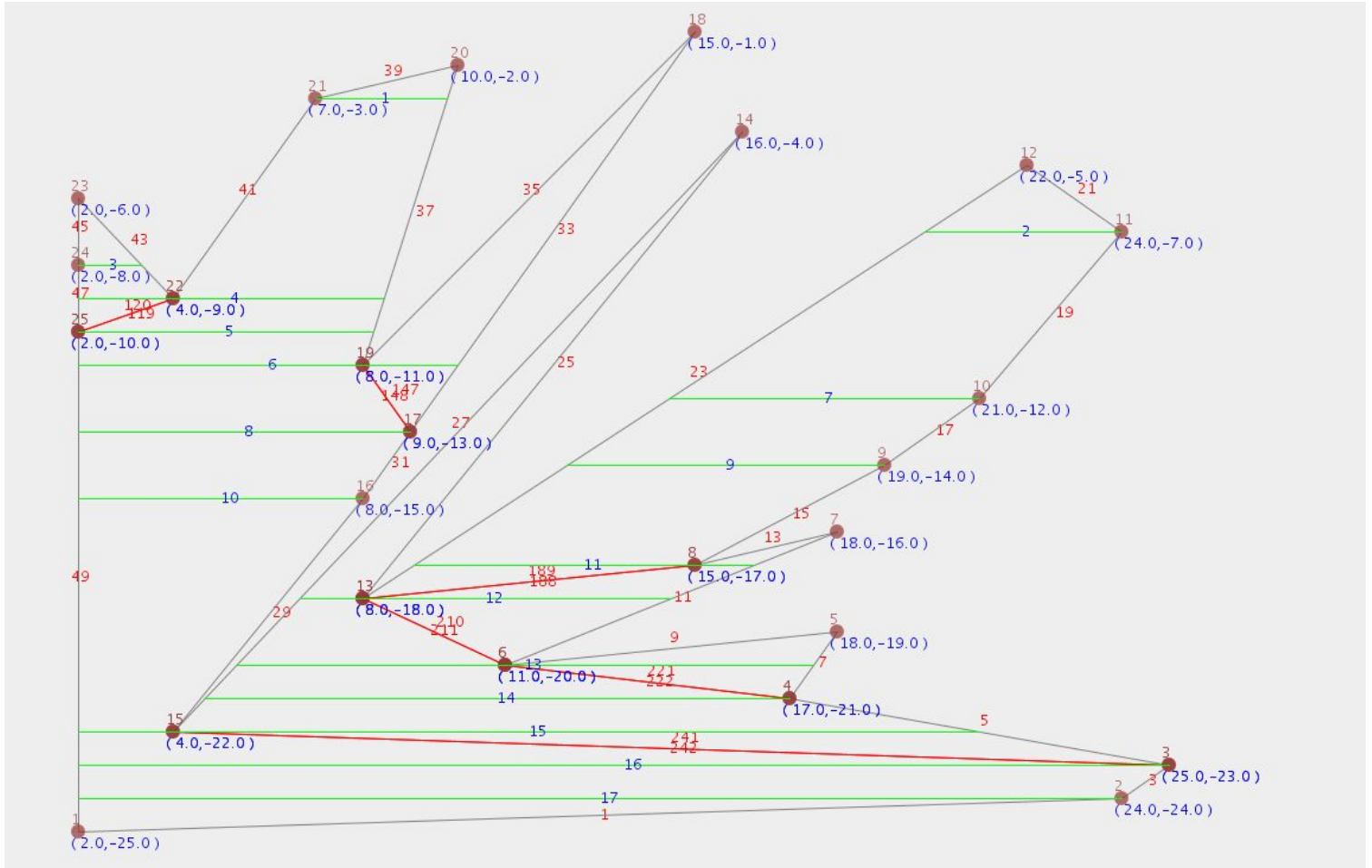Takes input n i.e the number of random points to be generated

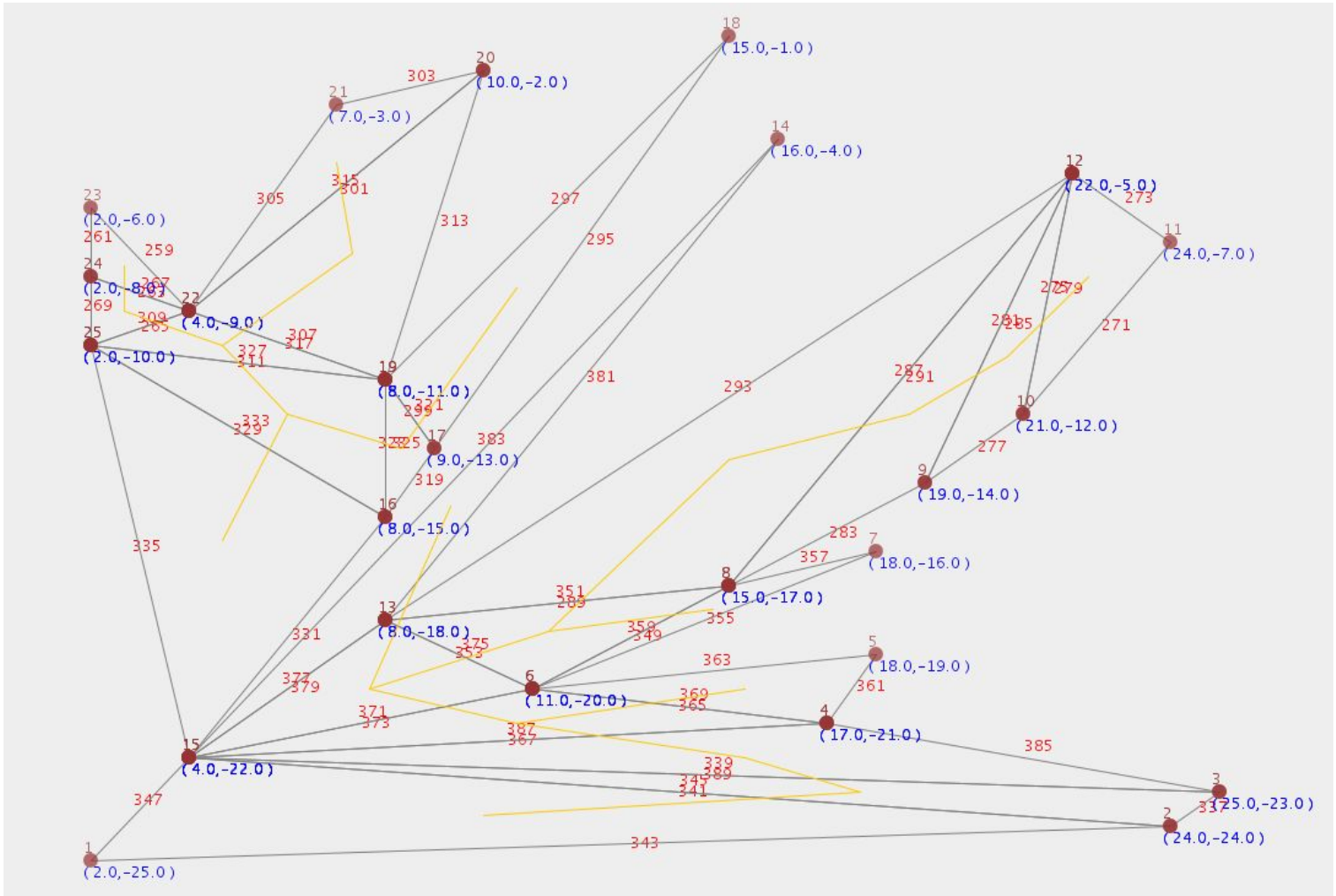# Generates a simple polygon from the given set of points

Performs trapezoidalization of the simple polygon

Computes monotone partition of the trapezoidalized polygon

Triangulates each of the monotone partition

Computes the dual graph of the triangulation

- Hence solves the art gallery problem for a polygon constructed out of random points

IMPORTANT

For a detailed discussion of code with complete explanation of data structures and algorithms used along with their time complexities please refer to the following github repository

https://github.com/Sharan-Lobana/TriangulationWithMonotonePartitioning

THANK YOU