Algorithms 2025/26: Tick 3 (Algs 2 Tick 1)

Your task is to implement a program that can find minimum spanning trees among the edges between points in a 2D Cartesian plane. This graph is an undirected, weighted, fully-connected graph with edge weights equal to the Euclidean distance between the endpoints.

Implement your algorithm in Java. Your implementation should be contained in a single Java class which implements the interface below: the *mst(..)* method is passed a list of points (from which your code can compute a complete set of edges and weights, if it requires it), and your method must return the subset of edges it chooses to be in an MST (any MST is fine – the points may admit a number of equally minimum spanning trees).

Any method with running time in $O(|V|^3)$ is acceptable for Tick 3. To earn Tick 3*, your approach must be in $O(|V| \lg |V|)$ and use on Kruskal's Algorithm over the $O(|V|)$-cardinality subset of edges obtained via a *Delaunay Triangulation* of the input points. Implement the *mststarredtick(..)* method in your class (as well as *mst(..)* for the standard tick) to compete for the starred tick!

Your implementation should not require any external libraries but may use the Java standard library (e.g. `java.util.*` classes).

Submit a single Java source file containing a class that implements the interface provided. Helper functions are allowed and encouraged to make your code readable! You may write unit tests and a class containing a main(String[]) function in other files but are not asked to submit those.

Submit >> here << You may re-submit if you wish. **The deadline is 12:00 on Wed 18 Mar 2026**.

```
import java.util.ArrayList;
interface Algs202526Tick3 {
  static record Point(float x, float y) {}
  static record Edge(Point l, Point r) {}
  ArrayList<Edge> mst(ArrayList<Point> points);
  default ArrayList<Edge> mststarredtick(ArrayList<Point> points)
    { throw new RuntimeException("Not implemented"); }
}
```

Save this ^^ into Algs202526Tick3.java, then write your solution in Solution.java:

```
public class Solution implements Algs202526Tick3 {...}
```

Dr John Fawcett, Mar 2026