4. Incremental triangulation

Files: The accompanying files for this assignment are the ones contained in zip file `geoc_lab4.zip`.
Delivery: upload all files required to run your program to the Racó.

The goal is to triangulate a set of points in the plane using an incremental algorithm.

Write a program to incrementally construct a triangulation of a set of points in the plane. Starting from an initial enclosing triangle containing all input points, points will be added one by one. At each step, the new point is inserted in the current triangulation by locating the triangle it falls in and replacing it by three new triangles connecting the newly inserted point with the vertices of the disappeared triangle.

Use an efficient data structure, such as a DCEL, to store the triangulation.

In order to achieve a reasonably quick location of the triangle that contains the following point in the insertion order, use an auxiliary fixed point (namely, one of the given points), or some more advanced data structure.

To try out your program we provide two example files: `toy_example.json.js` (10 points) and `lanzarote.json.js` (about 18,000 vertices).

Further improvement: If you wish to obtain the maximum grade from this exercise, your algorithm must be able to deal with input degeneracies such as alignments and concyclicities. In order to check that, we provide two example files that are both quite small: `toy_example_degen.json.js` (11 points in degenerate position) and `lanzarote-degen.json.js` (199 points in degenerate position).

The input and triangulation program will be invoked from file `geoc_lab4-5.html`. The suggested place to write your triangulation code is in file `triangulation.js`, function `computeTriangulation()`.

The current program assumes that `computeTriangulation()` returns an array of triangles, where each triangle is in turn represented by an array of length 3, with 3 point indices. However, you are free to modify this.

Note: For this lab assignment, you can ignore the parts of `geoc_lab4-5.html` related to the boundaries. Moreover, you do not need to remove the edges incident to the vertices of the containing triangle. That will be done in assignment 5.