



Algorithms and Data Structures
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Exercise 40

Summer 2008
Wed, Oct. 1st
morning

Motivation

We see more uses of the plane sweep paradigm.

1. Ask questions about the material presented in class.
2. (intersections of circles) Given n circles in the plane, compute their intersections. A circle with center c and radius r is the locus of points having distance exactly r from c . Do not confuse circles with discs. Your algorithm should run in time $O((n + s) \log n)$, where s is the number of intersections.
3. (map overlay) Let G and H be straight-line graphs in the plane, i.e., each vertex has a position in the plane, each edge corresponds to the line segment connecting its endpoints, and edges do not intersect except at their endpoints.
 - (a) Compute the overlay of G and H . The vertices of the overlay are the vertices of G and H plus the intersections of edges of G with edges of H .
 - (b) List all regions of the overlay and for each region its sequence of boundary edges.
 - (c) We are given in addition a set P of points. Determine for each point in P , the regions of G , H , and the overlay containing it. What is the running time of your method?
4. We are given n triangles in the plane. Design an algorithm for computing the area of their union.

Have fun with the solutions.