

Circle Intersection Problem

- Let S be a set of n circles in the plane. Describe a plane sweep algorithm to compute all intersection points between the circles. (Because we deal with circles, not discs, two circles do not intersect if one lies entirely inside the other.) Your algorithm should run in $O((n+k) \log n)$ time, where k is the number of intersection points.

Point Location Problem

- Let S be a set of n triangles in the plane. The boundaries of the triangles are disjoint, but it is possible that a triangle lies completely inside another triangle. Let P be a set of n points in the plane. Give an $O(n \log n)$ algorithm that reports each point in P lying outside all triangles.

Monotone Problem

- Give an efficient algorithm to determine whether a polygon P with n vertices is monotone with respect to some line, not necessarily a horizontal or vertical one.