CSC 279/479 Computational Geometry - homework 2
due: Sep 25th, 11:59pm ET, submit on Gradescope

PROBLEM 6—construct a simple polygon

Let $p_1, \ldots, p_n$ be a set of n points in the plane. Give an $O(n \log n)$ algorithm that outputs a simple polygon containing all the points.

PROBLEM 7—which segments are visible?

Let $s_1, \ldots, s_n$ be a set of n disjoint line segments in the plane. Let p be a point that is not on any of the segments. Give an $O(n \log n)$ algorithm that outputs the segments that are visible from p (a segment s is visible from p if there exists a point q on s such that the segment pq does not intersect any of the other (than s) segments in $\{s_1, \ldots, s_n\}$).

PROBLEM 8—implementation.

Implement one of the following algorithms that we covered in class: counting intersections of axis-aligned segments (in $O(n \log n)$ time), reporting all intersections of segments (in $O((A + n) \log n)$ time; here A is the number of intersections), deciding if in a collection of circles there exist 2 that intersect (in $O(n \log n)$ time). Any language is OK. Write a short note explaining your implementation

PROBLEM 9—open problem exploration

Pick an open problem in computational geometry, a good starting point is:

- `https://topp.openproblem.net/` or
- `https://jeffe.cs.illinois.edu/open/`

Look at the description of the problem and a few related papers. Write a short ($< 1/2$ page) description of the problem and how one might approach it.