

CS380 Computational Geometry Spring 2013

Homework:	3	Professor:	Dianna Xu
Due Date:	2/28/13	E-mail:	<code>dxu@cs.brynmawr.edu</code>
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Assignment 3

You have the choice of doing the two theory questions (3 and 4) or the implementation (5). If you are implementing, submit a printed copy of your code, together with at least three test cases and printouts of sample runs on those test cases. The test cases should be chosen to clearly demonstrate that your code works. You may assume that the input points lie in general position. To generate the input set, you can either use graph paper by hand, or use a greedy randomized generator (i.e. randomly generate a point, if collinear with any already in the set, throw away and repeat).

1. Prove that the intersection of two convex sets is again convex.
2. Exercises 2.19 and 2.20 in O'Rourke
3. Exercise 2.22 in O'Rourke
4. Exercise 2.38 and 2.43 in O'Rourke
5. **Theory Choice** Exercise 2.5 in O'Rourke
6. **Theory Choice** Exercise 2.6 in O'Rourke
7. **Implementation Choice** Implement the naive convex hull algorithm by finding hull edges. Input xy -coordinates of n points in the plane. Two points a and b end up on the hull if and only if the directed line L_{ab} through a and b has every other point on or to the left of L_{ab} . Running this test over all pairs of points a and b will result in the set of points that lie on the hull, with lots of duplicates. Remove the duplicates and output (print out) the set, in no particular order.