BU CLA CS 530: Analysis of Algorithms
Spring 1995

Problem Set 14 (due Friday 95.05.05 at 4:30 p.m.)

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1. Design a $\mathcal{O}(n)$ algorithm to find the intersection of $n \geq 1$ rectangles on the plane all of whose sides are parallel to the x-axis and y-axis. (The "intersection" is the set of points that are common to all the rectangles.)

2. A *d-approximate convex hull* of a set of points Q is a convex polygon P such that: (i) all the vertices of P are in Q, and (ii) all the points in Q are either in the interior of P or within distance d from one of the sides of P. Let Q be a set of $n \geq 1$ points in the plane such that there is a number X, for all $p_1 = (x_1, y_1)$ and $p_2 = (x_2, y_2)$ in Q, $|x_1 - x_2| \leq X$ — in words, the x-coordinates of any two points in Q are no more than X apart. Design an algorithm to compute a d-approximate convex hull of Q in time at most $\mathcal{O}(n + (X/d))$.

3. Problem 35-1, part (a) only, page 913 in [CLR]. (Hint: Adjust Jarvis' march.)

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