

**Homework problems:**

**13.1 (due Dec 7, 2006)** We are given  $n$  points  $(x_1, y_1), \dots, (x_n, y_n)$  in the plane. We want to find a simple polygon containing all the points. Give an  $O(n \log n)$  algorithm for this problem.

(A polygon is called simple if its segments do not intersect.)

**13.2 (due Dec 7, 2006)** Let  $H$  be a set of disjoint horizontal line segments, and let  $V$  be a set of disjoint vertical line segments. Let  $n = |H| + |V|$ . Give an  $O(n \log n)$  algorithm to count the number of intersections in  $H \cup V$  (i. e., the number of intersections between the horizontal and vertical segments).

**13.3 (due Dec 7, 2006)** We are given  $n$  unit circles in the plane (a unit circle is a circle with radius 1). We want to find out whether any two of them intersect. Give an  $O(n \log n)$  algorithm for this problem.

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**Bonus problem:**

**13.4 (due Dec 7, 2006)** We are given  $n$  axis-parallel rectangles  $R_1, \dots, R_n$  in the plane. Give an efficient algorithm to compute the area of their union  $R$  (i. e., the area of  $\bigcup_{i=1}^n R_i$ ).