CSc 437
Homework 1 (100 pts.)
Due: 9/21/11

Instructions. All assignments are to be completed on separate paper. Use only one side of the paper. Assignments will be due at the beginning of class, or via email. To receive full credit, you must show all of your work.

All questions are taken from the textbook

1. 1.1

2. 1.6b

3. 1.8

4. You are given pointers to two arrays in the memory of your computer. One points to an array array $A[1..n]$ containing the vertices of a convex polygon P, and the array $B[1..n]$ containing the vertices of a convex polygon Q. Suggest an algorithm that finds in time $O(\log^2 n)$ if P and Q has a point in common, (actually doable in $O(\log n)$ time).

5. Show that for the line sweep algorithm to be correct, it is enough to maintain for every segment what is the next event that happens along this segment. Note that if this all you remember, the proof of the correctness of the algorithm need to be revised. How would you use this fact to guarantee that the space requirement of the algorithm to be $O(n)$.

6. You are given a polygon P with n vertices $\{v_1 \ldots v_n\}$ in the order along the polygon. Also given a set S of n points. Find for each point of S if it lies inside P. The total time of your algorithm should be $O(n \log n)$.

7. 2.5

8. 2.8

9. 2.10

10. 2.11

11. 2.14