

CSE680 Homework 4
Due Wednesday, April 29 by class time

**Midterm 1: Monday, April 27. Closed books & notes, no calculator.
Covering up to quicksort (included).**

1. In the Convex-Hull algorithm, we assumed that no two points have the same x or y coordinate. Now, suppose there are two points (just two points) that may share a common x coordinate and also there are some points that may share a common y -coordinate. Will the algorithm still work? If not, how to make it work?
2. Write a divide-and-conquer algorithm $\text{Power}(a, n)$ that computes the number a^n . What is the time complexity of your algorithm? Your algorithm must work in $o(n)$, little o of n , time.
3. The running time of an algorithm A is described by the recurrence $T(n) = 7T(n/2) + n^2$. A competing algorithm A' has a running time of $T'(n) = aT'(n/4) + n^2$. What is the largest integer value for a such that A' is asymptotically faster than A (i.e., $T'(n)$ is asymptotically smaller than $T(n)$).