CSE 680 - Problem Set 3
Due beginning of lecture on November 16th

Problem numbers are from the second edition or the third of "Introduction to algorithms". If unsure about which problem to solve, ask. Collaboration is permitted; looking for solutions from external sources (books, the web, etc.) is prohibited.

1. 6.1-7
2. 6.4-3
3. (a) What is the running time of (deterministic) quicksort when all elements of the input are equal? Explain.

   (b) Show that the following problem can be solved in time $O(n \log n)$: Given an array of n numbers, determine whether all the elements in the array are distinct.
4. 7.4-4
5. (a) What is the smallest possible depth of a leaf in a decision tree for a comparison sort? Explain.

   (b) Describe an algorithm that, given n integers in the range 0 to k, preprocesses its input and then answers any query about how many of the n integers fall into a range $[a..b]$ in $O(1)$ time. Your algorithm should use $\Theta(n+k)$ preprocessing time. (Hint: counting sort)