

CSE680 Homework 5
Due Monday, May11, by class time

Midterm exam 2: Friday, May 15. Closed books/notes. No calculators. Covering topics from (inclusively) quicksort to whatever to be covered on Monday, 5/11.

1. Show the result of the array (7, 2, 6, 3, 1, 12, 9, 5, 10, 4, 8, 11) converted into a max-heap.
2. Write pseudocode for the procedure Extract-Max(S) that removes and returns the element in S with the largest key, where S is represented by a max-heap.
3. Draw the decision tree for quicksort operating on three elements. (Use the Lumoto Partition as given in the handouts.)
4. Describe an algorithm that, given an array of 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 no more than $O(n + k)$ preprocessing time.
5. Design a simple scheme that makes any comparison-based sorting algorithm stable.