

CS 430 - Third Quiz

Please work on separate paper, and write only the final solution here. Also, check your work as you are not able to run the code, so it better be right. This is a open notes and books test. No electronic devices though. You have 30 minutes. Good luck!

Problem 1 Write pseudocode code for the problem below. If you decide to use procedures/functions/methods from the class (such as, say, DELETE-MAX(S) for S a max-heap), explain clearly what they do and in what running time. Explain the data structures, if any. Then use them.

Suppose we are given a n -element sequence S such that each element in S represents a different vote in an election, where each vote is given as an integer representing the ID of the chosen candidate. Suppose you know the number $k < n$ of candidates running. Describe a $O(n \log k)$ algorithm for determining who wins the election.

Argue that your running time is correct. Note that k could be much smaller than n and $\Theta(n \log n)$ is only a partial solution.