CPS 130 Homework 8 Selection

due Thu May 30th

Write and justify your answers in the space provided.¹

1. (CLRS 9.3-3) Show how quicks ort can be made to run in $O(n\log n)$ time in the worst case.

2. (CLRS 9.3-5) Suppose that you have a "black-box" worst-case linear-time median subroutine. Give a simple, linear-time algorithm that solves the selection problem for an arbitrary order statistic.

¹Collaboration is allowed, even encouraged, provided that the names of the collaborators are listed along with the solutions. Students must write up the solutions on their own.

3. Let A be a list of n (not necessarily distinct) integers. Describe an O(n)-algorithm to test whether any item occurs more than $\lceil n/2 \rceil$ times in A.

4. (CLRS 9.3-7) Describe an O(n) algorithm that, given a set S of n distinct numbers and a positive integer $k \le n$, determines the k numbers in S that are closest to the median of S.