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 quicksort 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.

[1]Collaboration 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 $k \leq n$, determines the k numbers in S that are closest to the median of S.