In-class exercises: Selection

CLRS 9.3-1 In the algorithm SELECT, the input elements are divided into groups of 5. Will the SELECT algorithm work in linear time if they are divided into groups of 7? Argue that SELECT does not run in linear time of groups of 3 are used.

CLRS 9.3-3 Show how QuickSort can be made to run in $O(n \lg n)$ time in the worst case, assuming that all elements are distinct.

CLRS 9.3-5 Suppose that you have a "black-box" worst-case linear time median subroutine. Give a simple, linear time algorithm for SELECT (i).