

Quiz 2

Date: April 10

1. (5 pts) You are given an **unsorted** list of n integers, where duplicates are allowed. We call a number **frequent** if it occurs in the list at least $\lceil n/4 \rceil$ times. Is the following assertion True or False: **if x is a frequent item, then it must be a quartile, that is, it has rank $n/4$, $n/2$, or $3n/4$.** Briefly justify.

2. (10 pts) In the linear-time **Selection** algorithm described in class, the input elements were divided into groups of 5. What happens if we had divided the elements into groups of 3?

Write out the recurrence relation for the algorithm using size 3 groups. (This requires you to estimate the sizes of the subproblems on which recursive calls are made.) Does the algorithm still run in $O(n)$ time?

Write out the recurrence if the elements were divided into groups of 7. Does the algorithm still run in $O(n)$ time?