Due in class: Nov 29.

(1) Describe an $O(n)$ algorithm that given a set $S$ of $n$ distinct numbers and an integer $k \geq 1$ determines the $k$ numbers in $S$ that are closest to the median of $S$.

(2) Let $X$ and $Y$ be two arrays each containing $n$ numbers in sorted order. Give a $O(\log n)$ time algorithm to find the median of all $2n$ elements in arrays $X$ and $Y$.

(3) In the Selection algorithm discussed in class, we broke the elements into groups of size 5. Why does the algorithm fail when we use groups of size 3?

(4) Show that second smallest of $n$ elements can be found with $n + \lceil \log n \rceil - 2$ comparisons. Design a divide and conquer algorithm to find the smallest element first.