1. Exercise 8.1-4, p 194. [6 points]

2. Exercise 8.3-4, p 200. [4 points]

3. Given a sequence $S$ of $n$ comparable elements and a positive integer $k$, describe an $O(n)$ method for finding the $k$ items whose rank is closest to that of the median. [6 points]

4. Given a sequence $S$ of $n$ comparable elements and a positive integer $k$, describe an $O(n)$ method for finding the $k$ items whose value is closest to that of the median. [8 points]

Total: 24 points

Notes:

- $Q1$: To reiterate the hint: It is not sufficient to simply combine the lower bounds for the individual subsequences.
- $Q2$: Apply lemma 8.4.
- $Q3$: An item’s rank is its relative value in the list. The smallest element has rank 1, the largest rank $n$, and the median rank $n/2$.
- $Q4$: Note that you may be returning different values than in the previous question. You may want to find the median first, then look at the difference between each element and the median. Find the $k$ smallest of these latter values.