

## Fundamental Algorithms 6

### Exercise 1

Show that the second largest element of a set of  $n$  elements can be determined with less than  $n + \lceil \log n \rceil$  comparisons.

*Hint: start with a divide-and-conquer algorithm to find the largest element!*

### Exercise 2

Analyze the time complexity of the BFPRT algorithm, if the elements of the array are subdivided into  $\lceil \frac{n}{k} \rceil$  groups of  $k$  elements (some groups will only have  $k - 1$  elements if  $n \bmod k \neq 0$ ).

Examine the time complexity for  $k \in \{3, 7, 9, 11, \dots\}$ , and find the optimal value for  $k$  (or give comments on the behaviour at least).