Exercises Running Time Analysis

1. Assignment 2, Task 1 from FS 2016

Do an exact analysis of the running time of the algorithm findKMax(A, n, k) as given below in pseudocode. Calculate the asymptotic complexity of the algorithm and determine the best and the worst case of the algorithm.

Algorithm: findKMax(A, n, k)

Input: array A[1..n] of length n, $1 \leq k \leq n$
Output: print the maximum value of every contiguous subarray of size k

1 **for** i = 1 **to** n − k + 1 **do**
2 | max = A[i]
3 | **for** j = 1 **to** k – 1 **do**
4 | | **if** A[i+ j] > max **then**
5 | | | max = A[i + j]
6 | print(max)

2. Midterm 1, Exercise 2.3 from FS 2016

Do an exact analysis of the running time of the algorithm alg(A, n) as given below in pseudocode. Calculate the asymptotic complexity of the algorithm and determine the best and the worst case of the algorithm.
What does the algorithm do?

Algorithm: alg(A, n)

Input: array A[1..n] of length n
Output: …

```
 1   for i = 1 to ⌊n/2⌋ do
 2       min = i
 3       max = n – i + 1
 4       if A[min] > A[max] then
 5           exchange A[min] and A[max]
 6       for j = i + 1 to n – i do
 7           if A[j] < A[min] then
 8               min = j
 9           if A[j] > A[max] then
10               max = j
11       exchange A[i] and A[min]
12       exchange A[n – i + 1] and A[max]
```