

Preparing for assignment 1

The problem: **[5 marks]**

Assume that you have been given a sorted array of n integers $A[0, \dots, n-1]$. Design an algorithm to count the number of occurrences of a key c in A . Note, it is possible that the key value c appears multiple times in A .

The time complexity of your algorithm should be $O(\log n)$. This time complexity value is independent of the 'number of repeats' of c in the array A .

Your algorithm must be written in pseudocode.

Your pseudocode should be well structured, that is, you should use sensible variable/function names; use appropriate indentations; be consistent with how you use assignment/equality operations; take care when using index positions for the array entries, etc.

Marking guide:

1 mark - a token attempt, including at least a function header and a return statement.

2 marks - evidence of processing elements in the array using a loop structure; comparisons of array elements with the key c attempted.

3 marks - evidence of using binary search (however, this implementation may not be correct).

This is also the maximum mark for a solution that runs in linear time (assuming that the algorithm is correct).

4 marks - correct idea and implementation, with at most one minor error (this may include poor indentation, inconsistent notation, special cases not handled, etc.)

5 marks - a correct solution.