

2000 Paper 3 Question 5

Data Structures and Algorithms

Describe an efficient algorithm based on Quicksort that will find the element of a set that would be at position k if the elements were sorted. [6 marks]

Describe another algorithm that will find the same element, but with a guaranteed worst case time of $O(n)$. [7 marks]

Give a rough estimate of the number of comparisons each of your methods would perform when $k = 50$, operating on a set of 100 random 32-bit integers. [7 marks]