

1994 Paper 4 Question 7

Data Structures and Algorithms

Suppose that you have been provided with a procedure that can, given n items, find the one that would come at position $n/3$ if the items were sorted into ascending order. Further suppose that when this procedure is called it always costs exactly $10n$ comparisons. Explain how this would allow you to implement a variant on Quicksort exhibiting guaranteed good computing time. [7 marks]

Estimate very roughly (but justify your estimate) how much data would be needed before you could be certain that the worst case for a simple implementation of Quicksort would involve more comparisons than the worst case of your new algorithm. [10 marks]

Would you ever expect anybody to want to use your new method in practical applications? [3 marks]