

2001 Paper 3 Question 5

Data Structures and Algorithms

- (a) Carefully describe an implementation of quicksort to sort the elements of an integer vector, and state, without proof, its expected and worst case complexity for both time and space in terms of the size of the vector. [7 marks]
- (b) Describe a more efficient algorithm for the case where it is known that the vector has exactly 10^6 elements uniformly distributed over the range 0 to 10^6 . [7 marks]
- (c) Describe an efficient algorithm to find the median of a set of 10^6 integers where it is known that there are fewer than 100 distinct integers in the set. [6 marks]