2006 Paper 1 Question 4

Algorithms

(*a*) Using big-O notation, state the average time and space complexity of quicksort.
[2 marks]

(*b*) What is the worst-case time and space complexity of quicksort? Briefly explain how this worst-case behaviour can occur.
[3 marks]

(*c*) A programmer implements a two-phase sorting algorithm comprising a partial quicksort, which does not recurse on list partitions of 10 items or fewer, followed by an ordinary insertion sort. What is the worst-case time complexity of the second phase? Explain your answer with the aid of a diagram.
[5 marks]