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]