Foundations of Computer Science

(a) This question concerns the data structure of queues.

(i) Describe the primitive queue operations. [3 marks]

(ii) Describe an efficient implementation of queues, presenting code fragments as appropriate (a complete program listing is not required). [3 marks]

(iii) Carefully discuss the efficiency of your implementation, using the concept of amortised time. [4 marks]

(b) Write an ML function to compute all permutations of its argument, a list. (You may assume that the elements of this list are distinct.) For example, given the argument [1, 2, 3], the result should be a list consisting of the elements [1, 2, 3], [2, 1, 3], [2, 3, 1], [1, 3, 2], [3, 1, 2] and [3, 2, 1] in any order. For full credit, your code must be well structured and clearly explained. [10 marks]