COMPUTER SCIENCE TRIPOS Part I A – 2006 – Paper 1

5 Foundations of Computer Science (LCP)

This question has been translated from Standard ML to OCaml

(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 OCaml 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]