

COMPUTER SCIENCE TRIPOS Part IA – 2008 – Paper 1

5 Foundations of Computer Science (LCP)

This question has been translated from Standard ML to OCaml

- (a) Describe how lazy lists, which have possibly infinite length, can be implemented in OCaml. Illustrate your answer by presenting a function that accepts one (or more) lazy lists and produces another lazy list. [6 marks]
- (b) A *lazy binary tree* either is empty or is a branch containing a label and two lazy binary trees, possibly to infinite depth. Present an OCaml type to represent lazy binary trees. [2 marks]
- (c) Present an OCaml function that produces a lazy binary tree whose labels include all the integers, including the negative integers. [3 marks]
- (d) Present an OCaml function that accepts a lazy binary tree and produces a lazy list that contains all of the tree's labels. [9 marks]

All OCaml code must be explained clearly.