

2003 Paper 1 Question 5

Foundations of Computer Science

This question has been translated from Standard ML to OCaml

- (a) Describe how lazy lists can be implemented using OCaml. [2 marks]
- (b) Code a function to concatenate two lazy lists, by analogy to the ‘append’ function for ordinary OCaml lists. Describe what happens if your function is applied to a pair of infinite lists. [3 marks]
- (c) Code a function to combine two lazy lists, interleaving the elements of each. [3 marks]
- (d) Code the lazy list whose elements are all ordinary lists of zeroes and ones, namely `[]`; `[0]`; `[1]`; `[0; 0]`; `[0; 1]`; `[1; 0]`; `[1; 1]`; `[0; 0; 0]`; [6 marks]
- (e) A *palindrome* is a list that equals its own reverse. Code the lazy list whose elements are all palindromes of 0s and 1s, namely `[]`; `[0]`; `[1]`; `[0; 0]`; `[0; 0; 0]`; `[0; 1; 0]`; `[1; 1]`; `[1; 0; 1]`; `[1; 1; 1]`; You may take the reversal function `List.rev` as given. [6 marks]