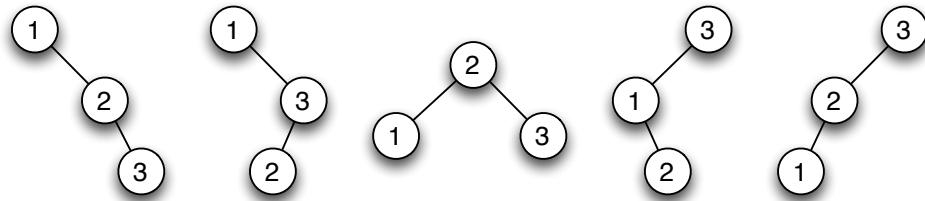


COMPUTER SCIENCE TRIPOS Part IA – 2013 – Paper 1

1 Foundations of Computer Science (LCP)

*This question has been translated from Standard ML to OCaml*

- (a) Write brief notes on OCaml variants and pattern-matching in function declarations. [6 marks]
- (b) A binary tree is either a *leaf* (containing no information) or is a *branch* containing a label and two subtrees (called the *left* and *right* subtrees). Write OCaml code for a function that takes a label and two lists of trees, returning all trees that consist of a branch with the given label, with the left subtree taken from the first list of trees and the right subtree taken from the second list of trees. [6 marks]
- (c) Write OCaml code for a function that, given a list of distinct values, returns a list of all possible binary trees whose labels, enumerated in inorder, match that list. For example, given the list [1; 2; 3] your function should return (in any order) the following list of trees:



[8 marks]

All OCaml code must be explained clearly and should be free of needless complexity.