

2001 Paper 6 Question 7

Prolog for Artificial Intelligence

A weighted binary tree can be defined using compound terms in the following way. A node of the tree is represented by the term $n(V, L, R)$, where V stands for the value of the node, and L and R stand for the left and right branches, respectively. A terminal node has the R and L components instantiated to the null list.

Given an input tree T , write a Prolog program that constructs a tree of the same shape as T , but in which the value of each node has been set to the value of the maximum value node in T .

[Note: Maximum marks are available only for programs that perform this task in one recursive descent of the input tree, and which use no more than four clauses.]

[20 marks]