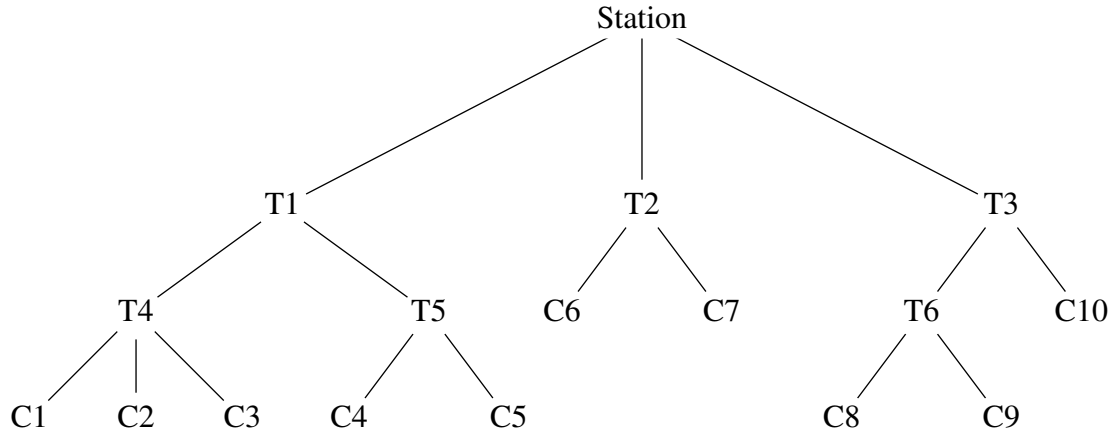


1995 Paper 5 Question 7

Prolog for Artificial Intelligence

Electricity consumers are supplied with electricity from an electricity generating station. Electricity is distributed from the station to the various consumers through a network of transformers as shown in this diagram:



Nodes C1 to C10 are consumers; nodes T1 to T6 are transformers. Each consumer has a direct connection to only one transformer. Sometimes a transformer may malfunction or need to be taken out of service temporarily.

Devise a data structure in Prolog to represent networks like this. [5 marks]

Write a Prolog procedure to define predicate `supplies` such that goal `supplies(X,Y)` succeeds when there is an electricity supply from node X to node Y in the network. [10 marks]

Explain how to enhance your representation to permit multiple connections which can be used to make a supply around a transformer which has been taken out of service. [5 marks]

Note: The `supplies` predicate may contain arguments in addition to X and Y at your discretion.