1995 Paper 6 Question 7

Prolog for Artificial Intelligence

Consider the task of normalising sum expressions. For example, the sums $(a + b) + (c + d)$ and $(a + (b + (c + d)))$ may be normalised into a standard form that is left associative: $a + b + c + d$ or equivalently $((a + b) + c) + d$. Write a Prolog procedure to define predicate `normsum` such that the goal `normsum(X,Y)` succeeds when the sum expression X normalises to Y. Procedures not using the technique of difference structures will not receive full marks. [20 marks]