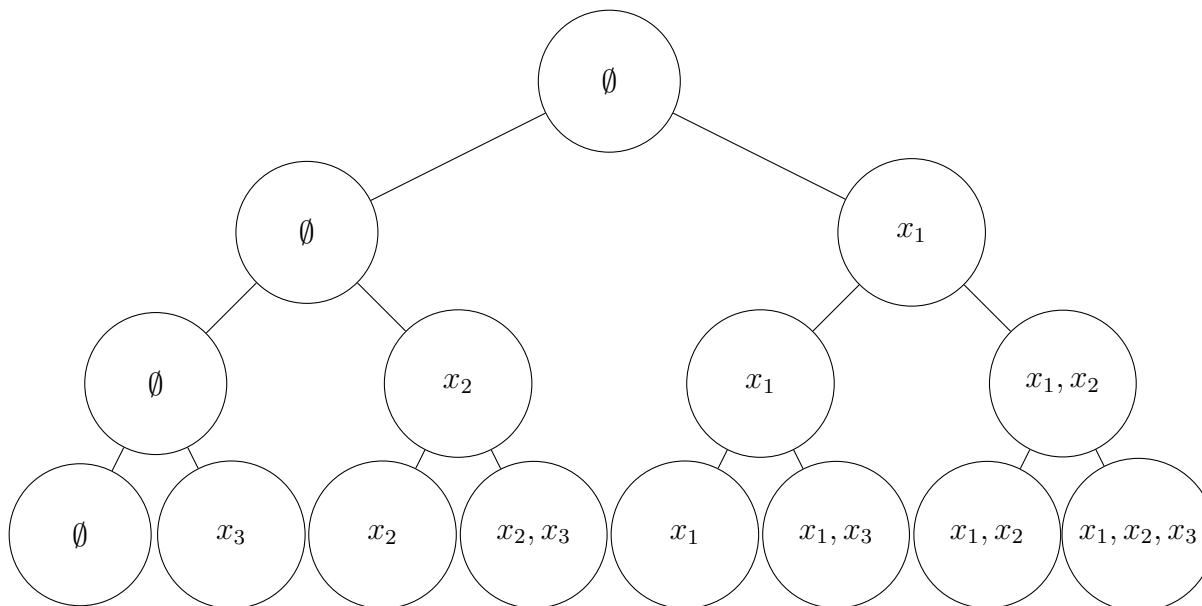


Assignment 8

Consider the Longest Increasing Subsequence Problem from class. In this problem, we are given a list of numbers $x_1, \dots, x_n$ and want to find the longest increasing subsequence (not necessarily consecutive) within this list. In class, we first considered the tree of possible solutions:



We argued that the optimal solution would be somewhere at the bottom level of this tree, but that there would be 2^n nodes at the bottom and thus it would be infeasible to check all of them. So we came up with a few pruning rules that would reduce the number of solutions we'd have to feasibly check:

- i) Any sequence that doesn't even form an increasing sequence can be pruned.
 - ii) If two sequences on the same depth have the same length, prune the one that ends in a larger number.
 - iii) If two sequences on the same depth end in the same number, prune the one with less length.
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1. Convince me that each of the pruning rules are valid - that is, even after pruning off the described subtrees at every level, we will still have the optimal solution somewhere on the bottom level of the remaining subtrees.

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