USA 🐄 Tutor

Cowntagion

By David Yang

Statement Summary

We have $N \leq 1e5$ nodes and $N-1$ roads

It's a tree — every node is connected to each other through some path

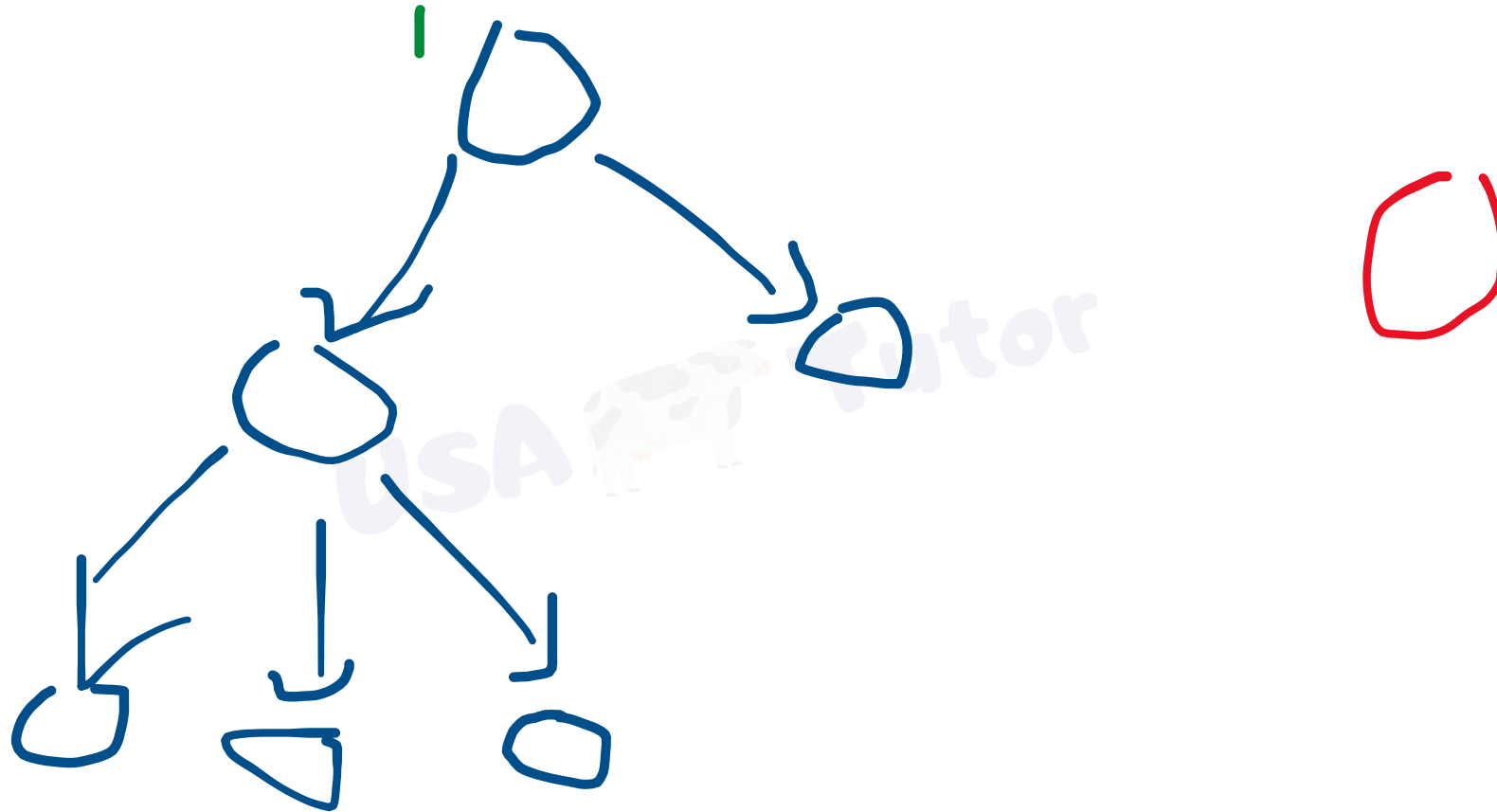A cow starts off infected at node 1

In any move, you can do 2 things
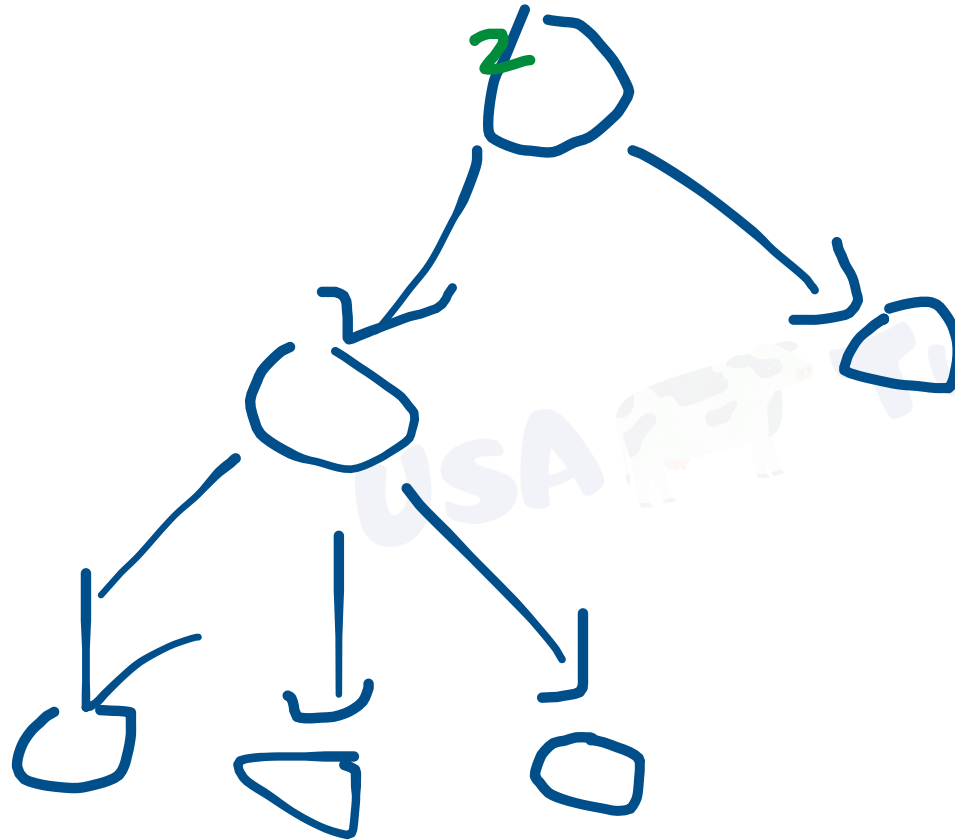
       Double the number of bad cows at any farm

       Move 1 bad cow across an edge
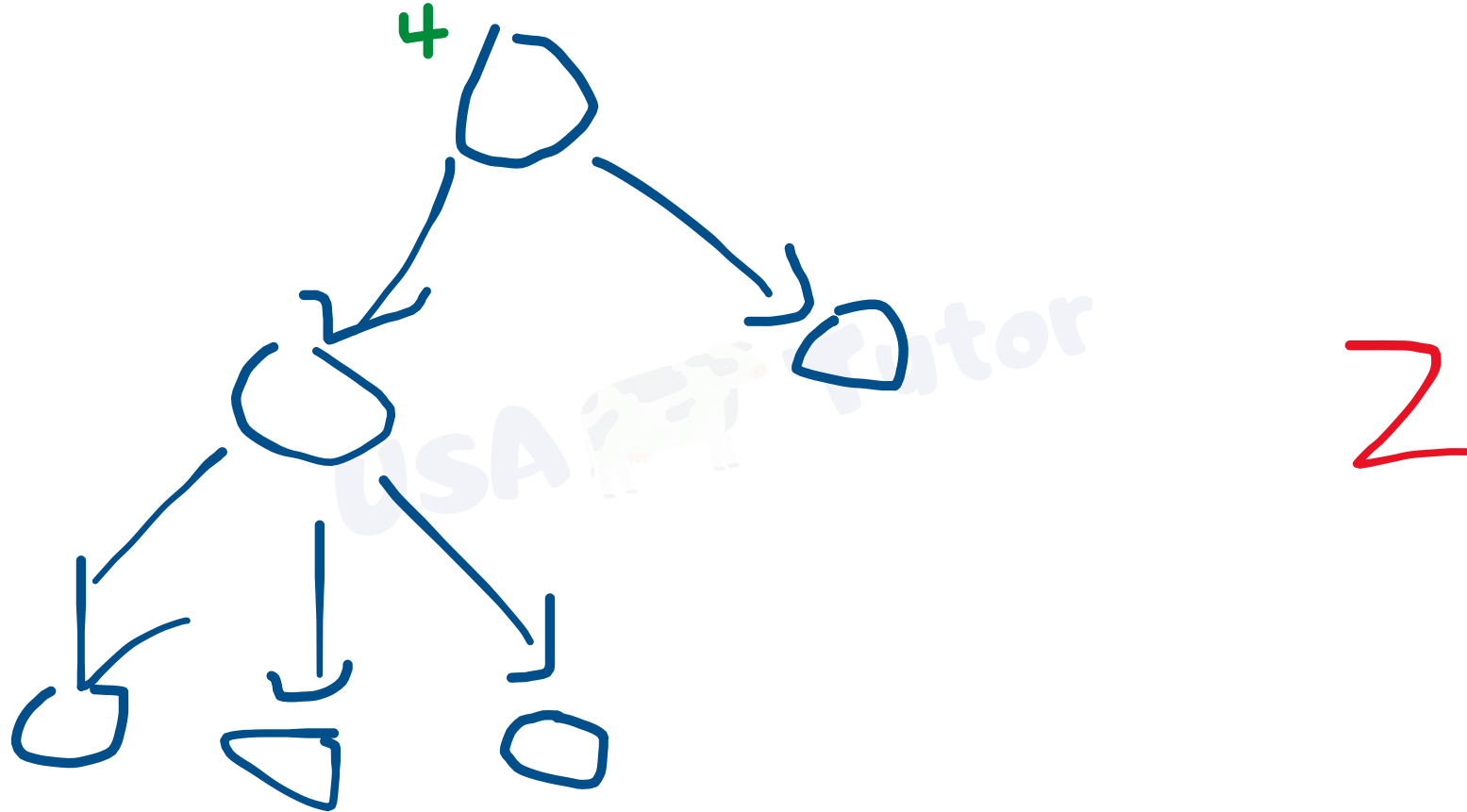
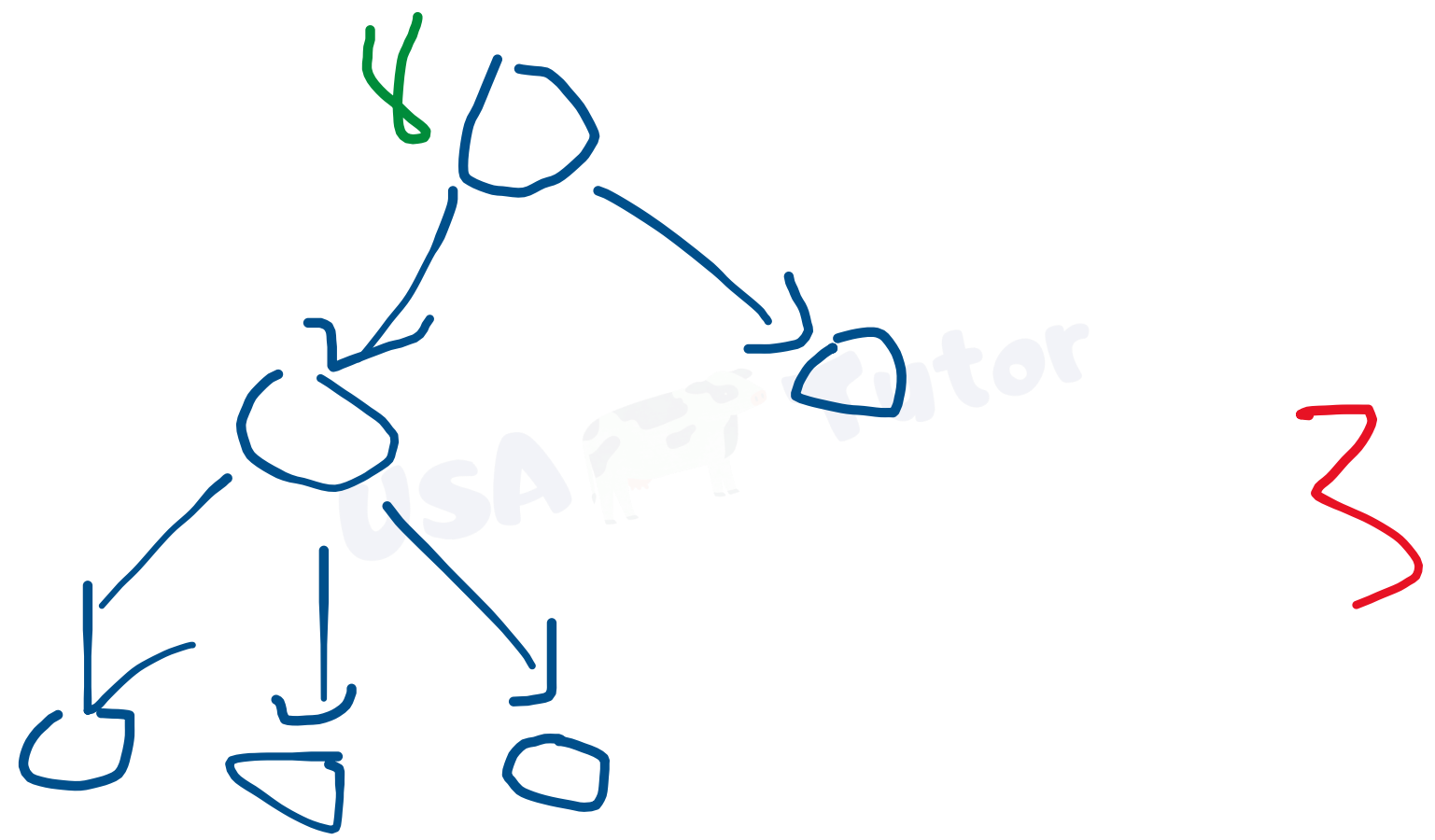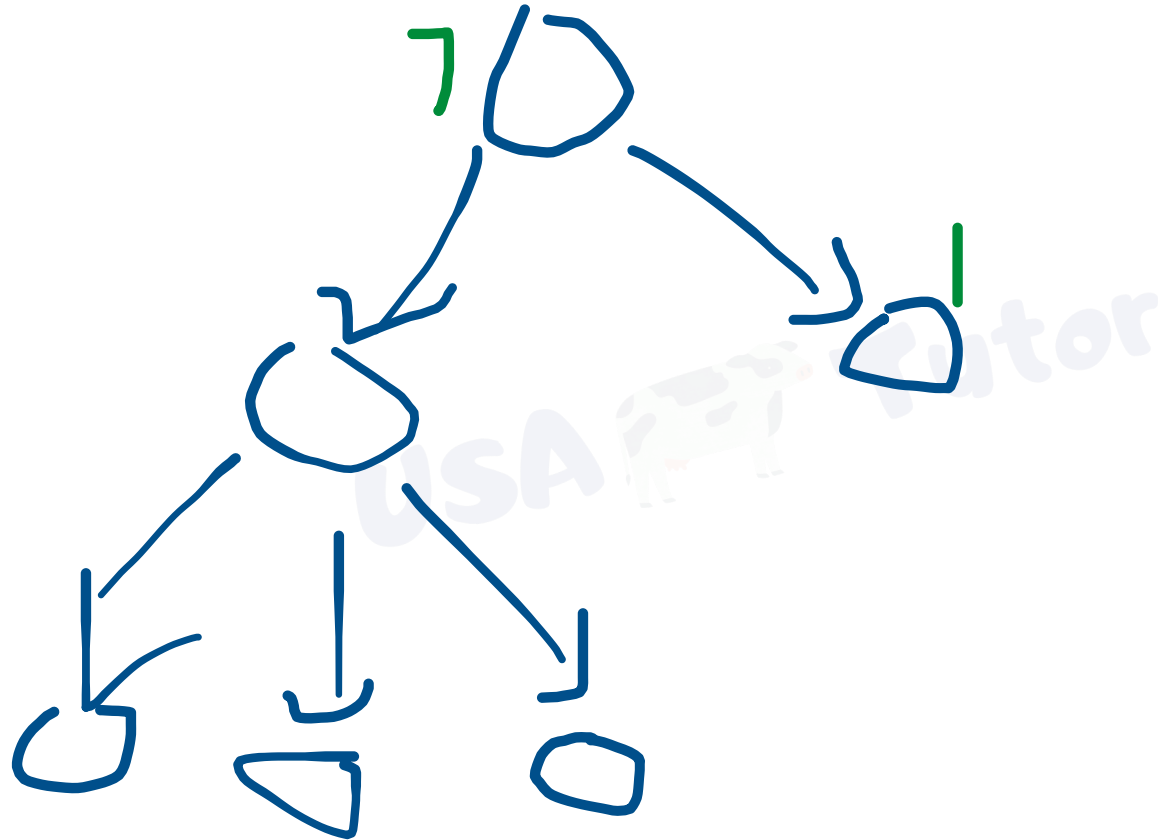Find the min moves to have 1 bad cow at every node

Akash's bad solution

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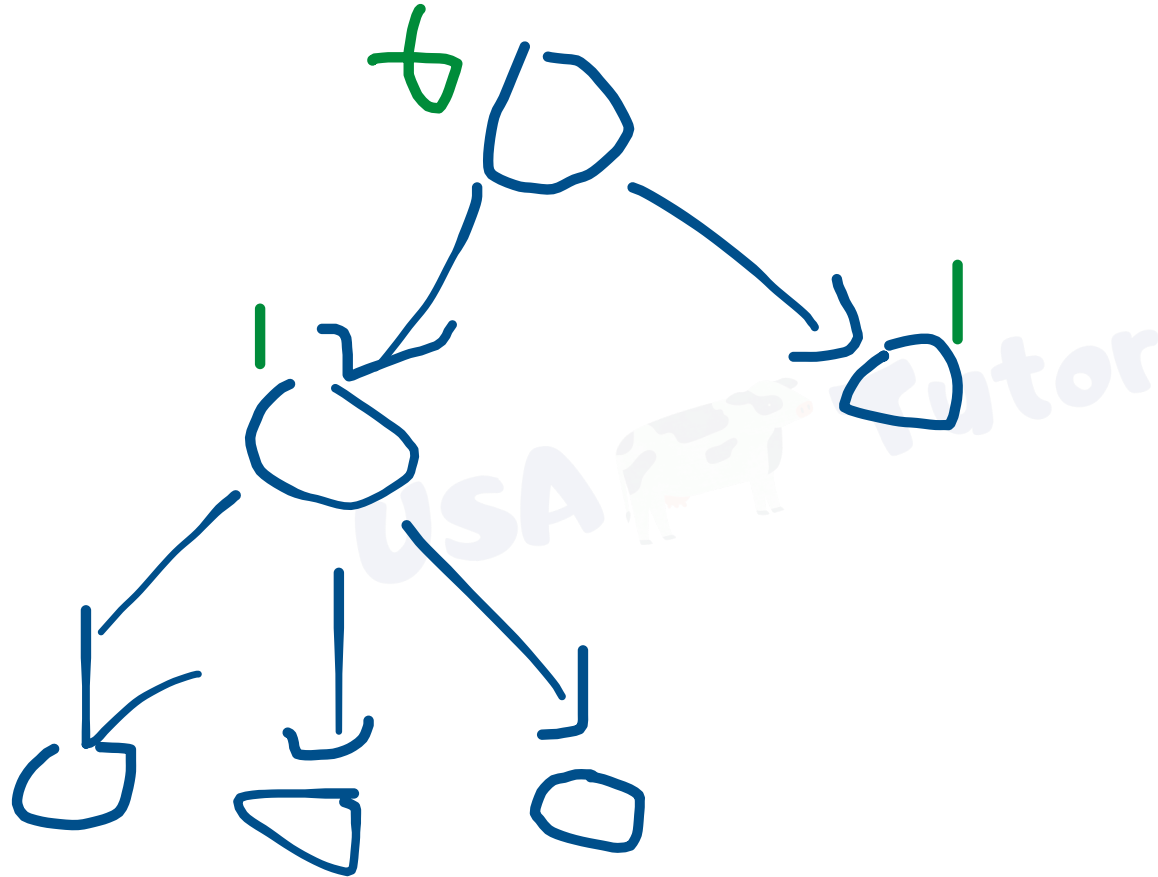# Akash's bad solution

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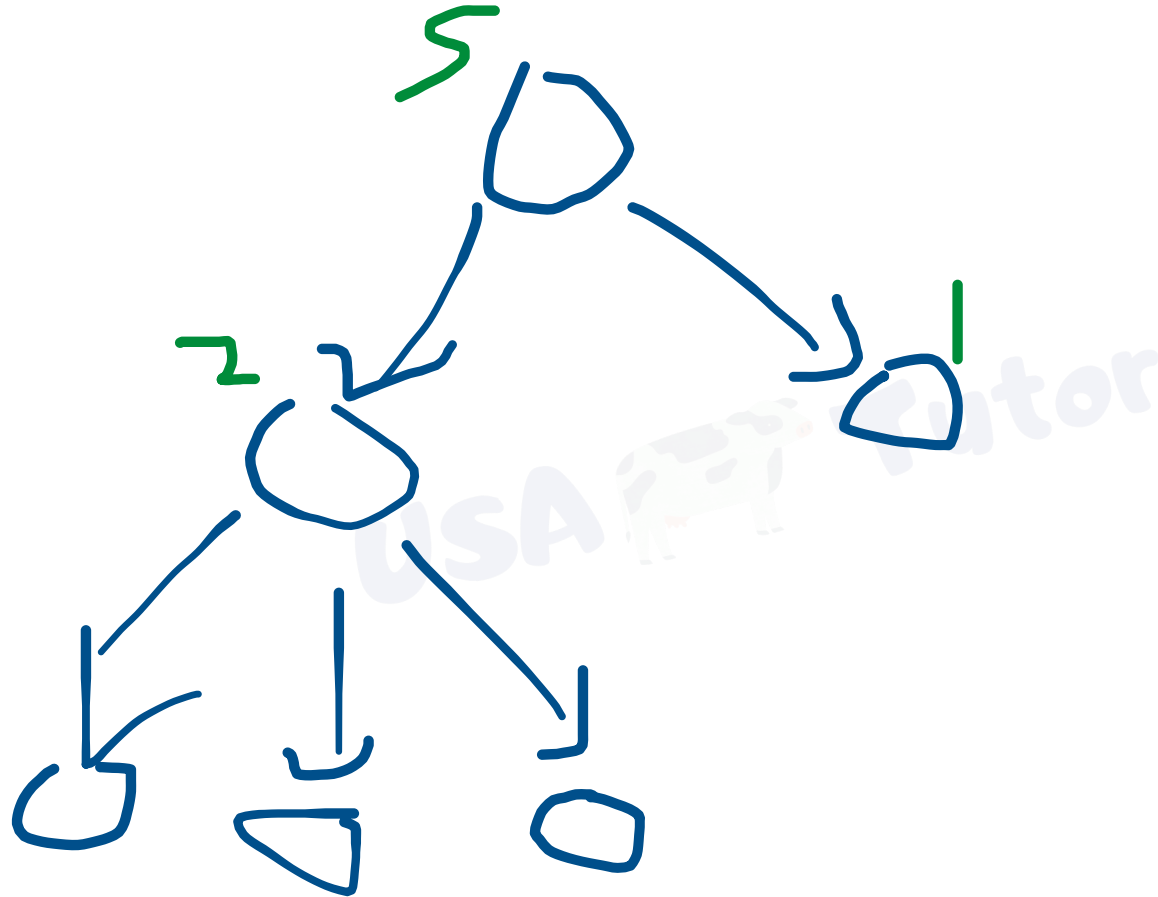
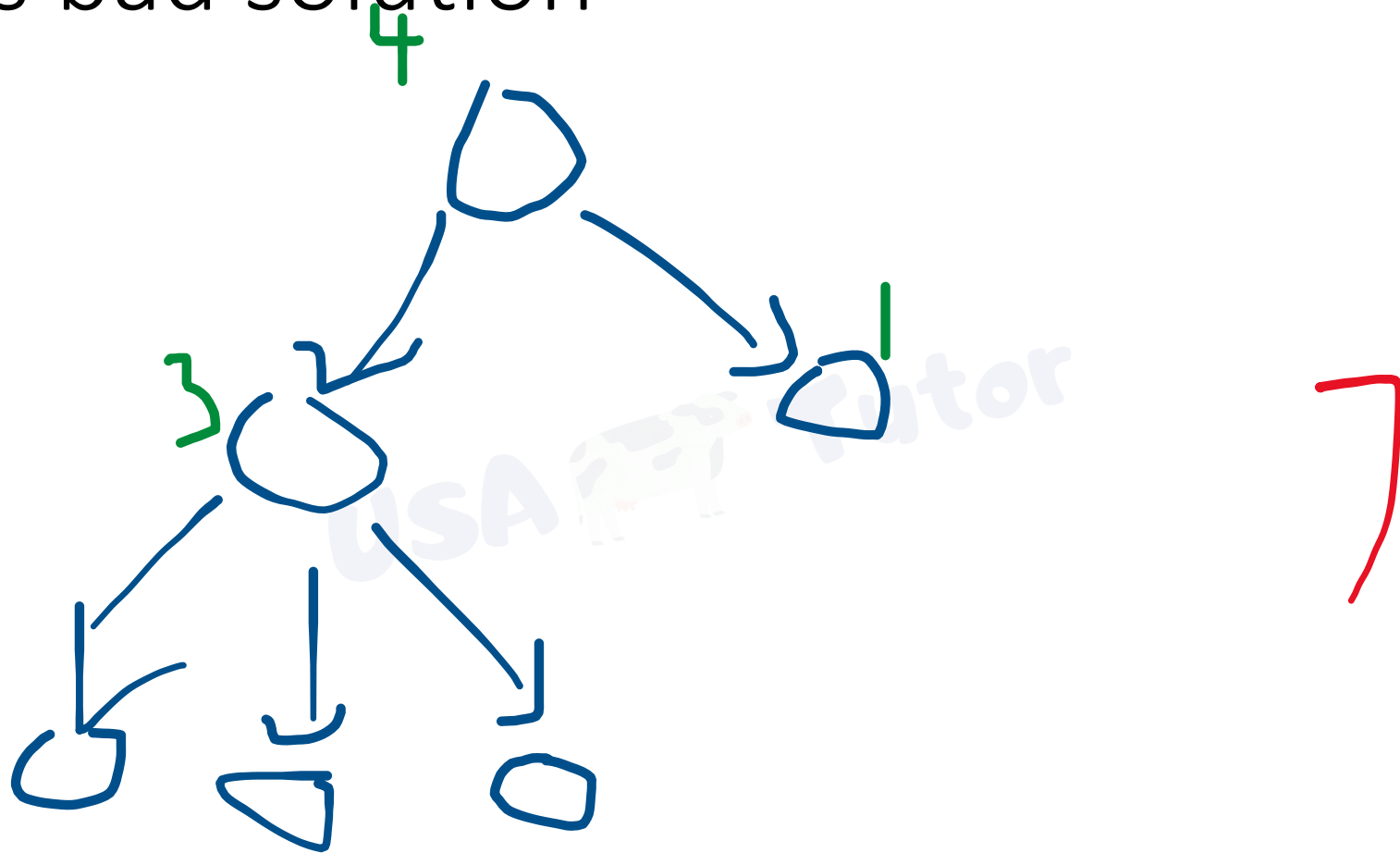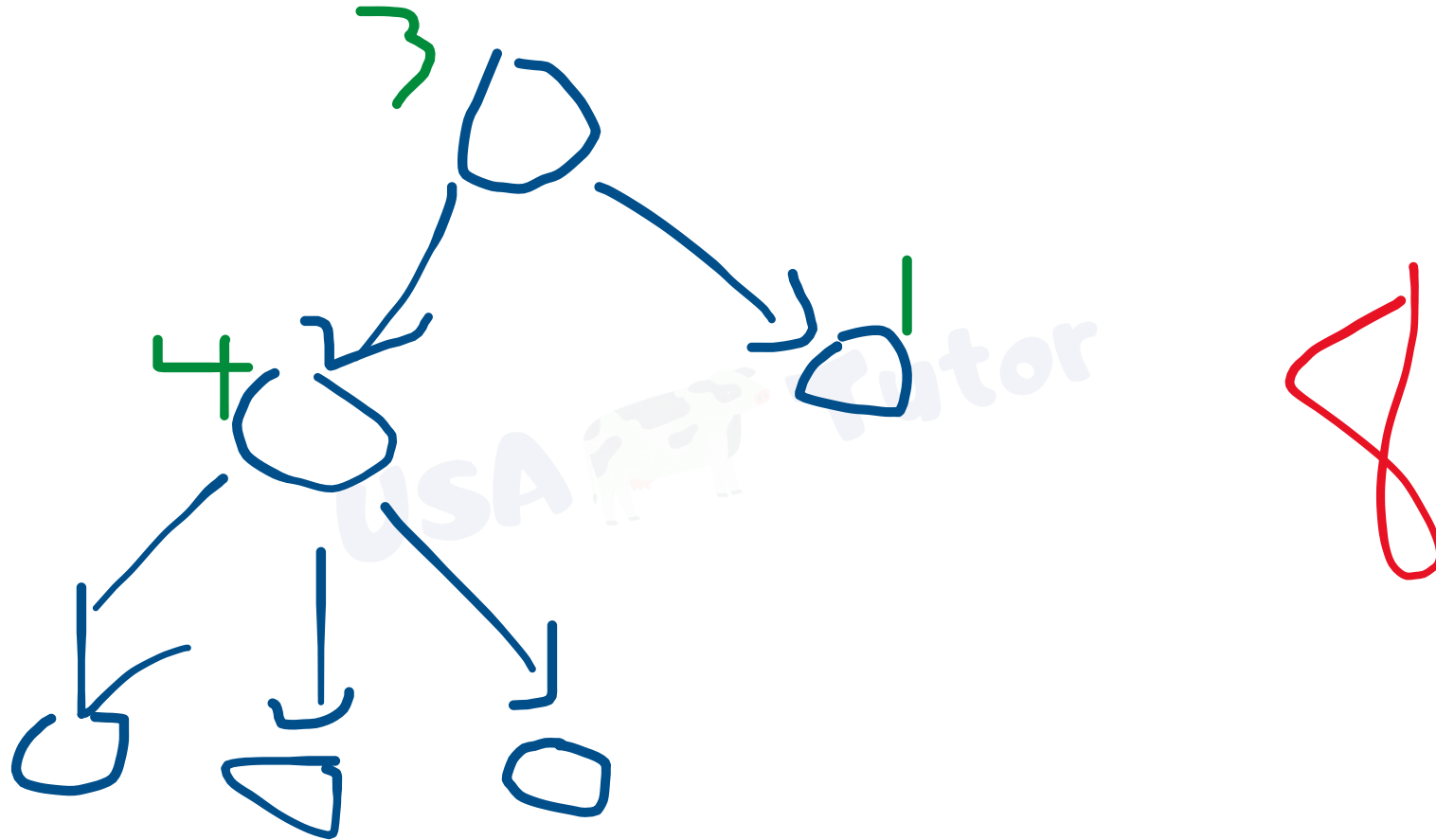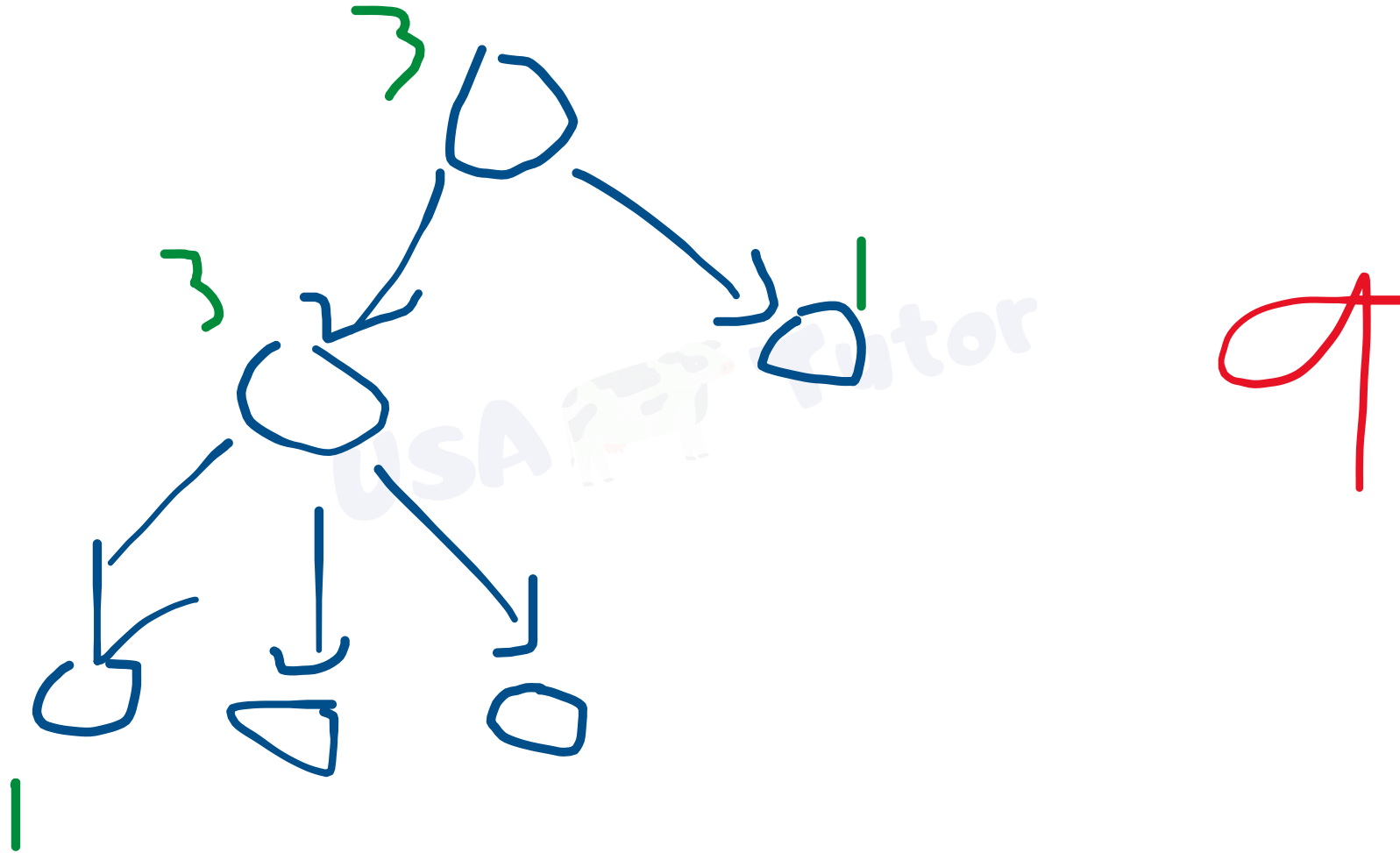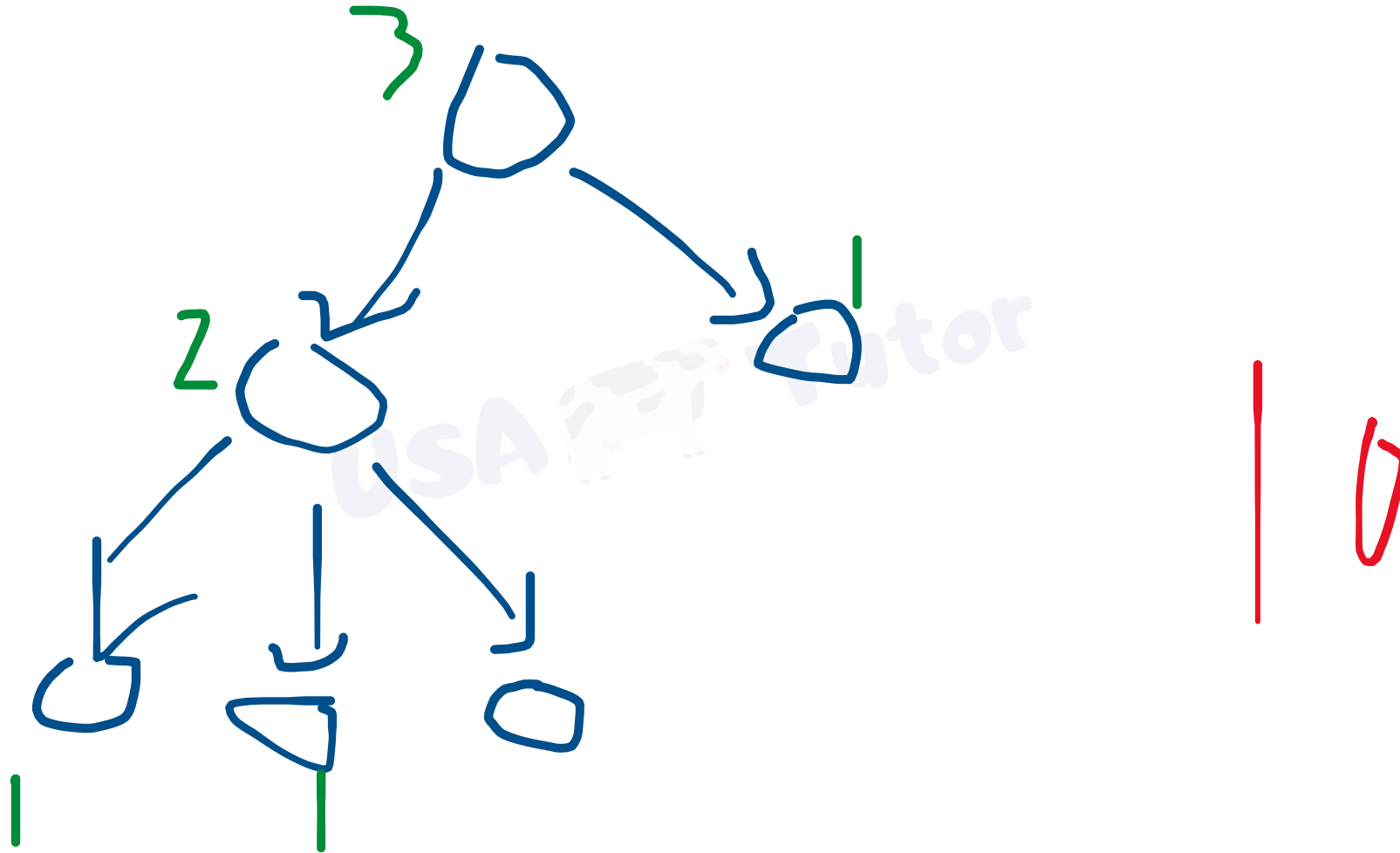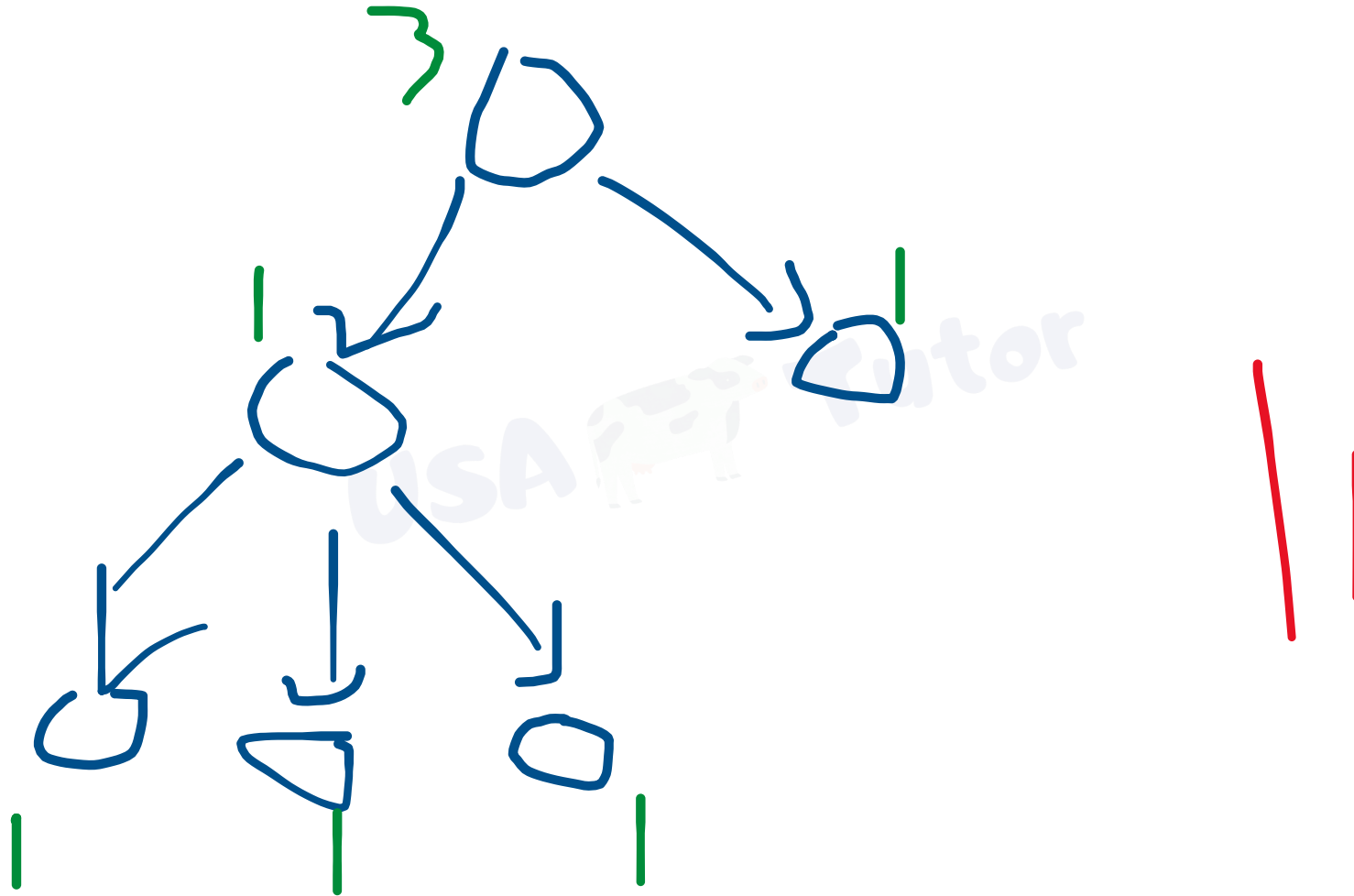# Akash's bad solution

Akash's bad solution

Analysis of Akash's Bad Solution

His idea — double everything at node 1, and then move the cows
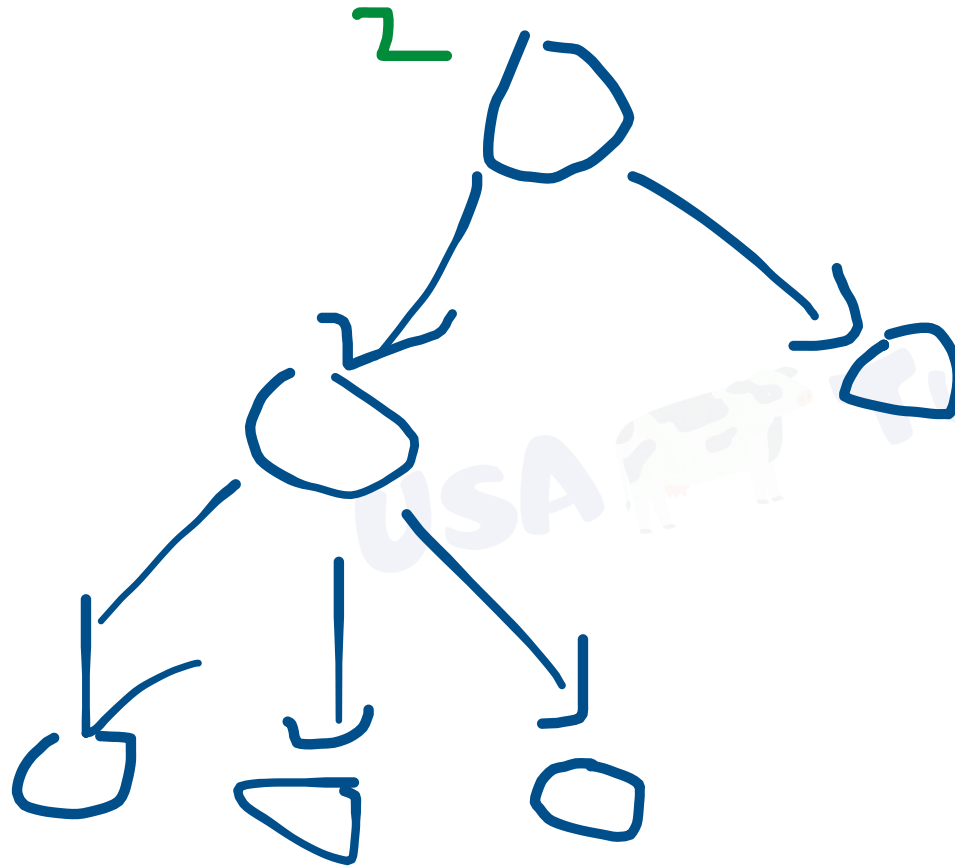
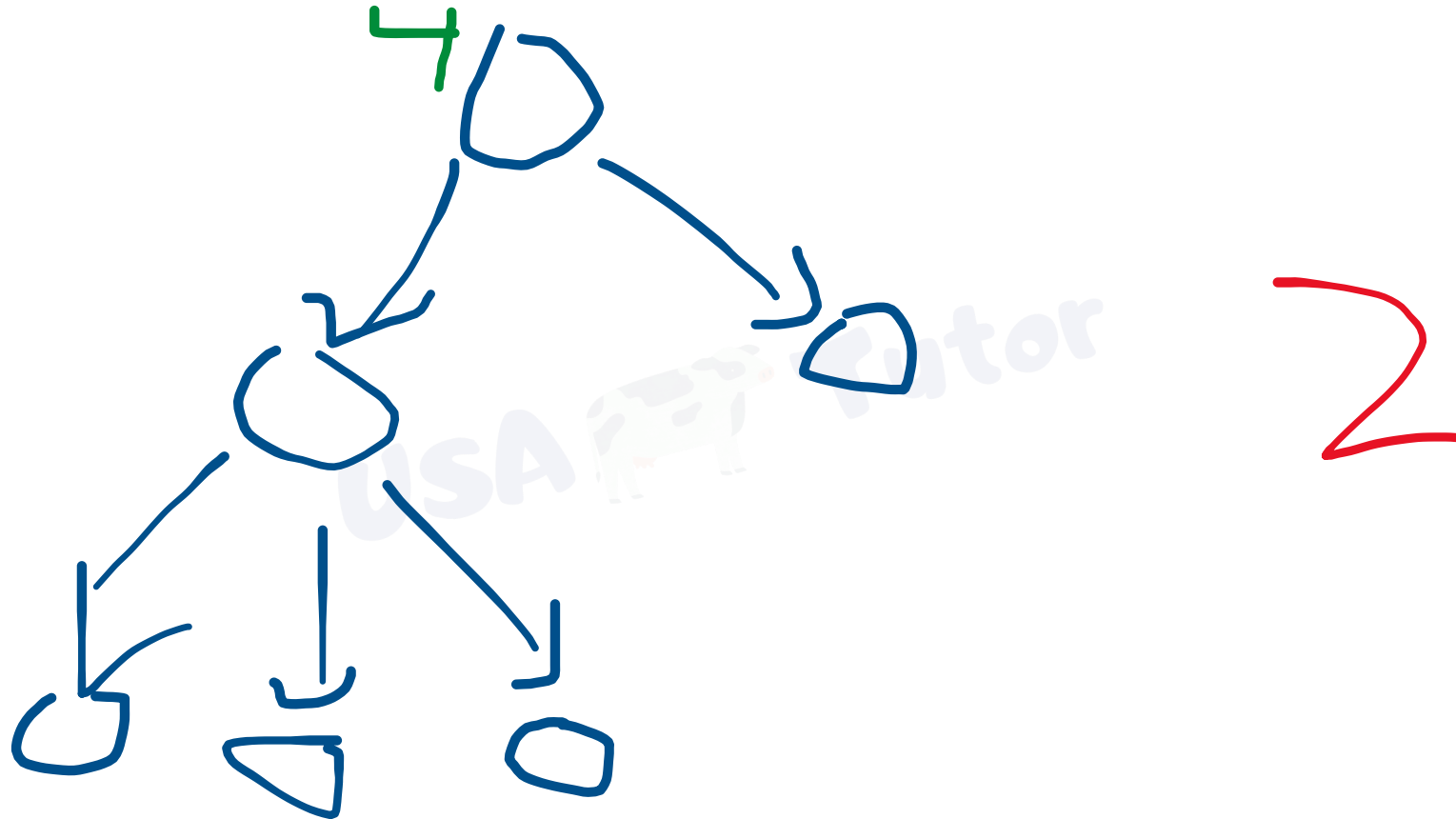He thought this was optimal

It's not.

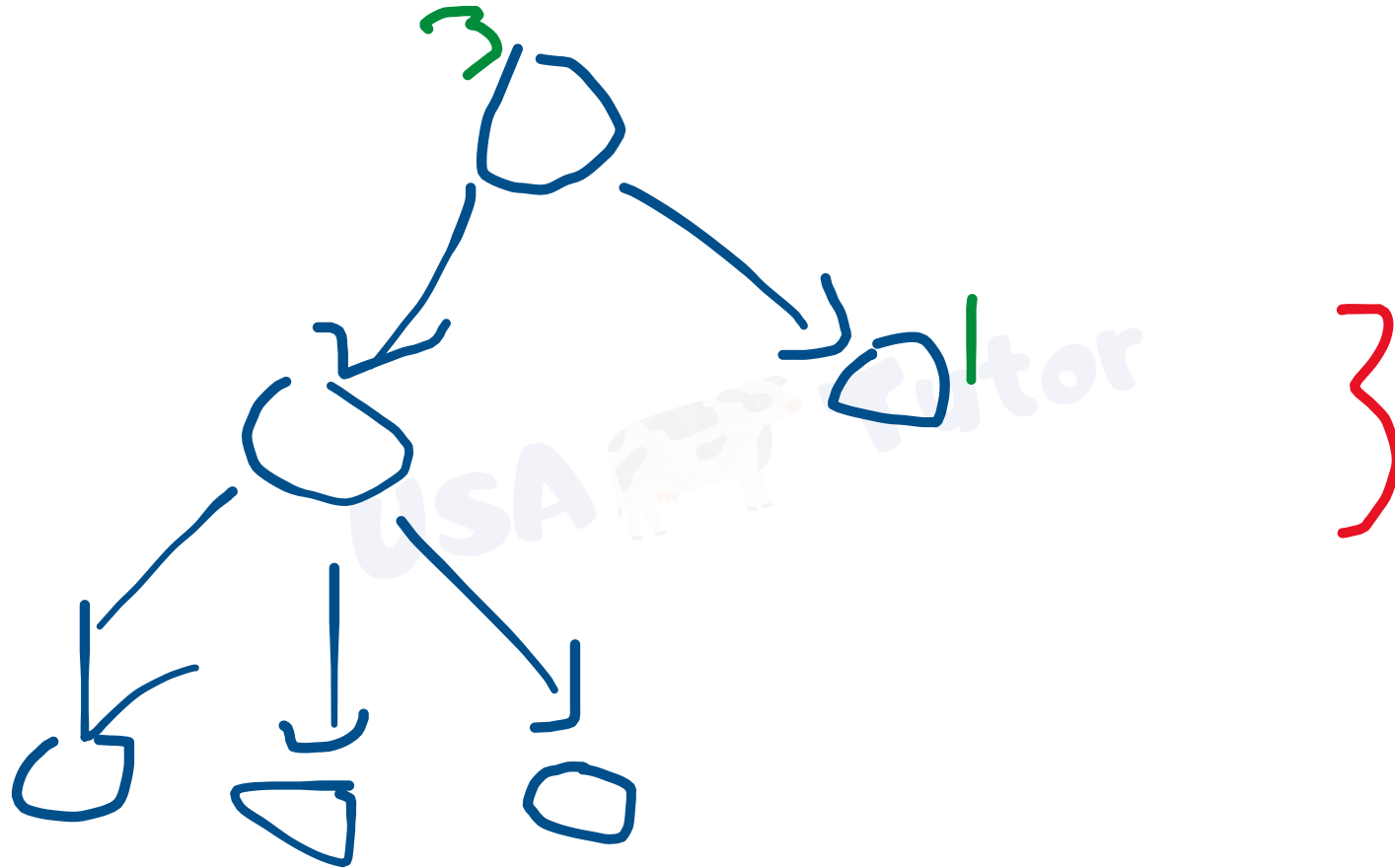# David's Correct and Good solution

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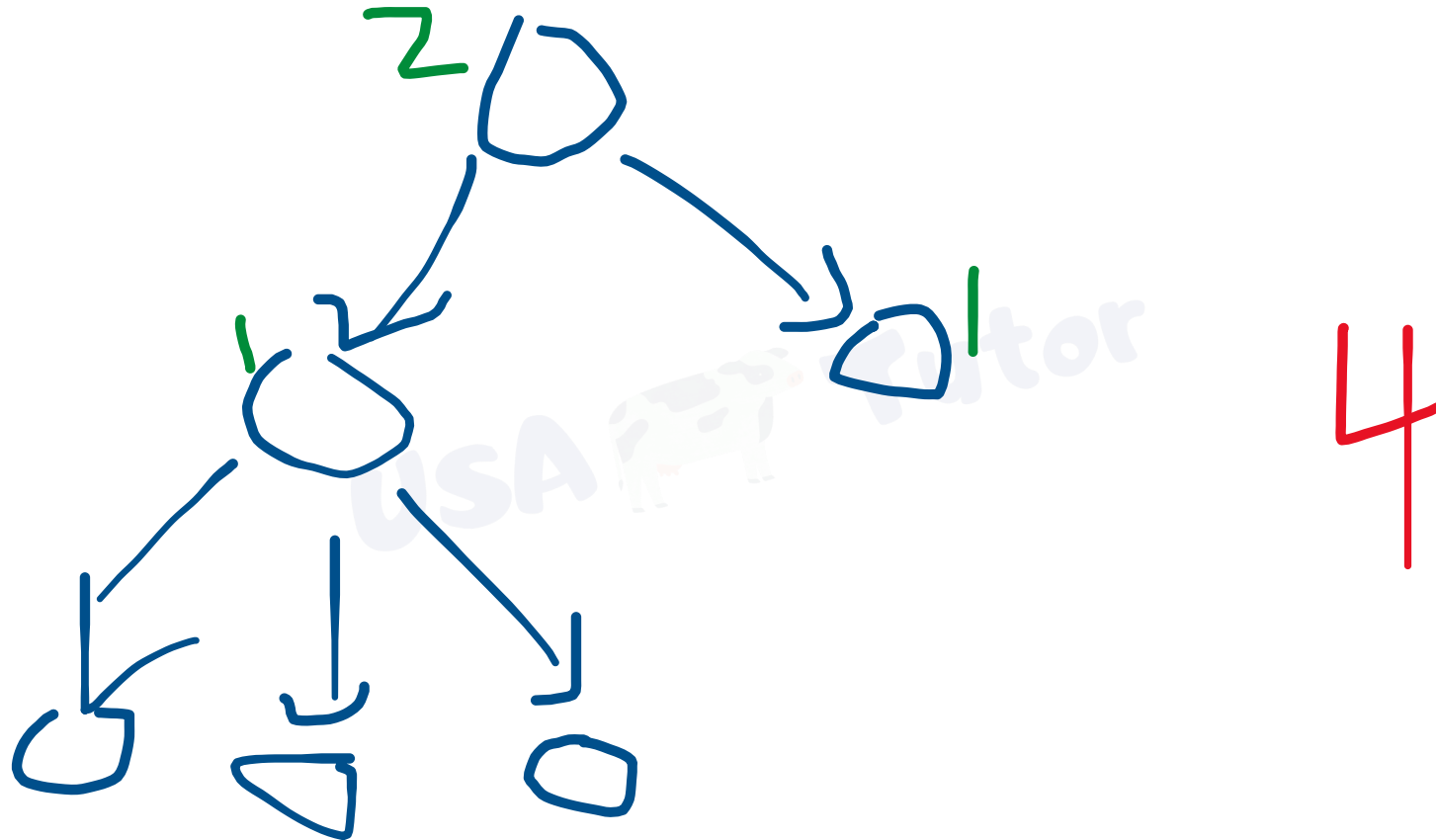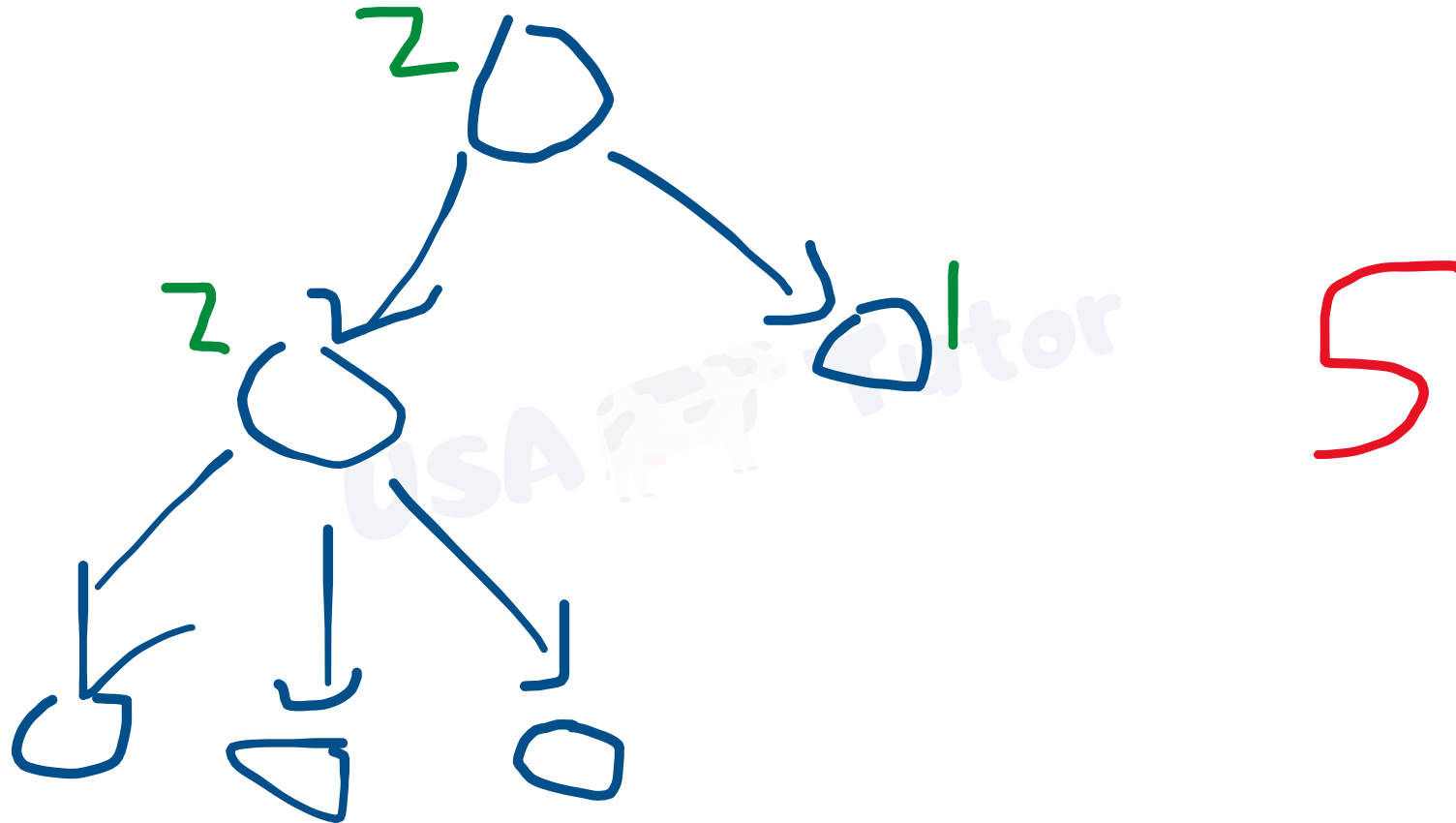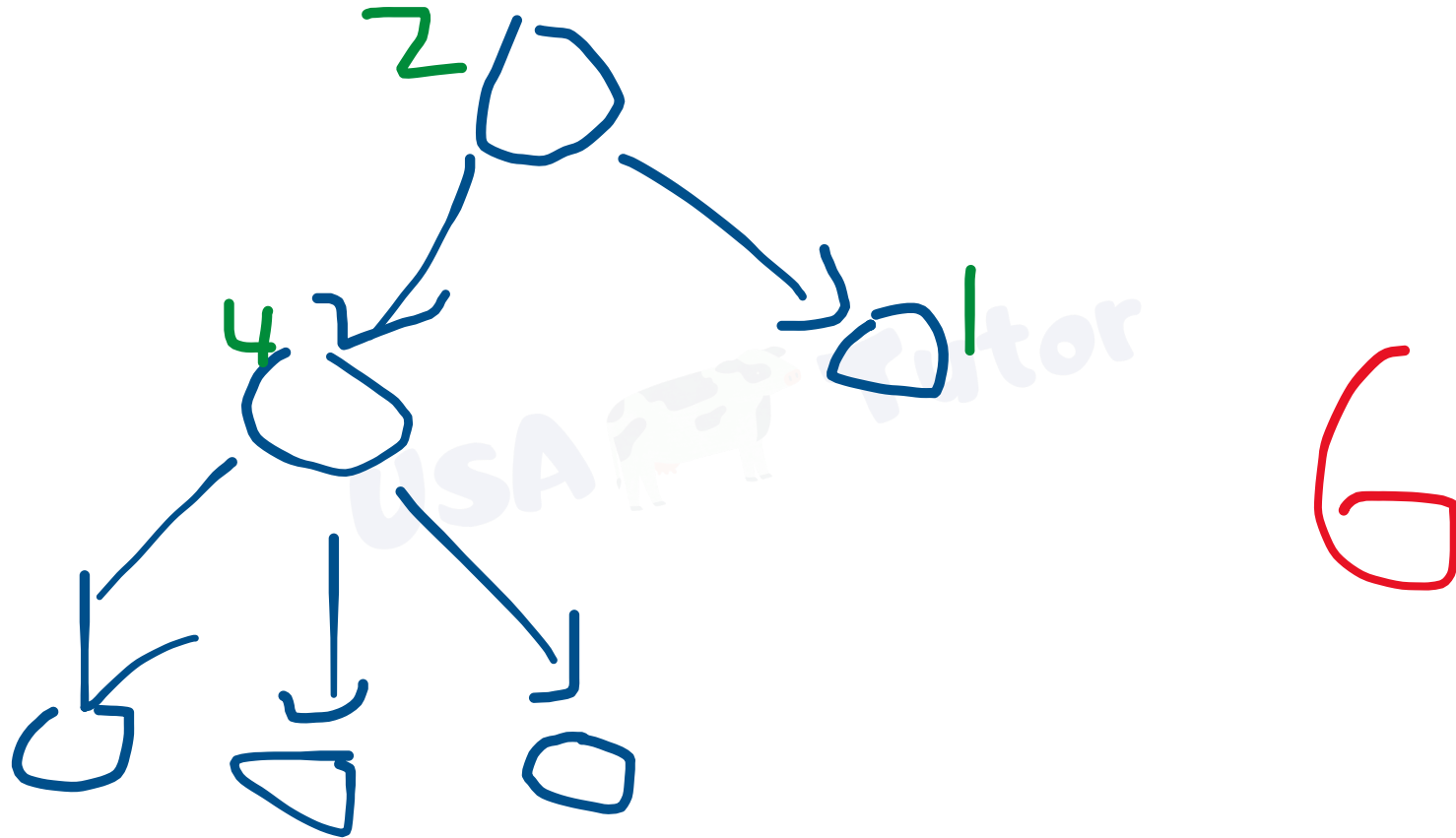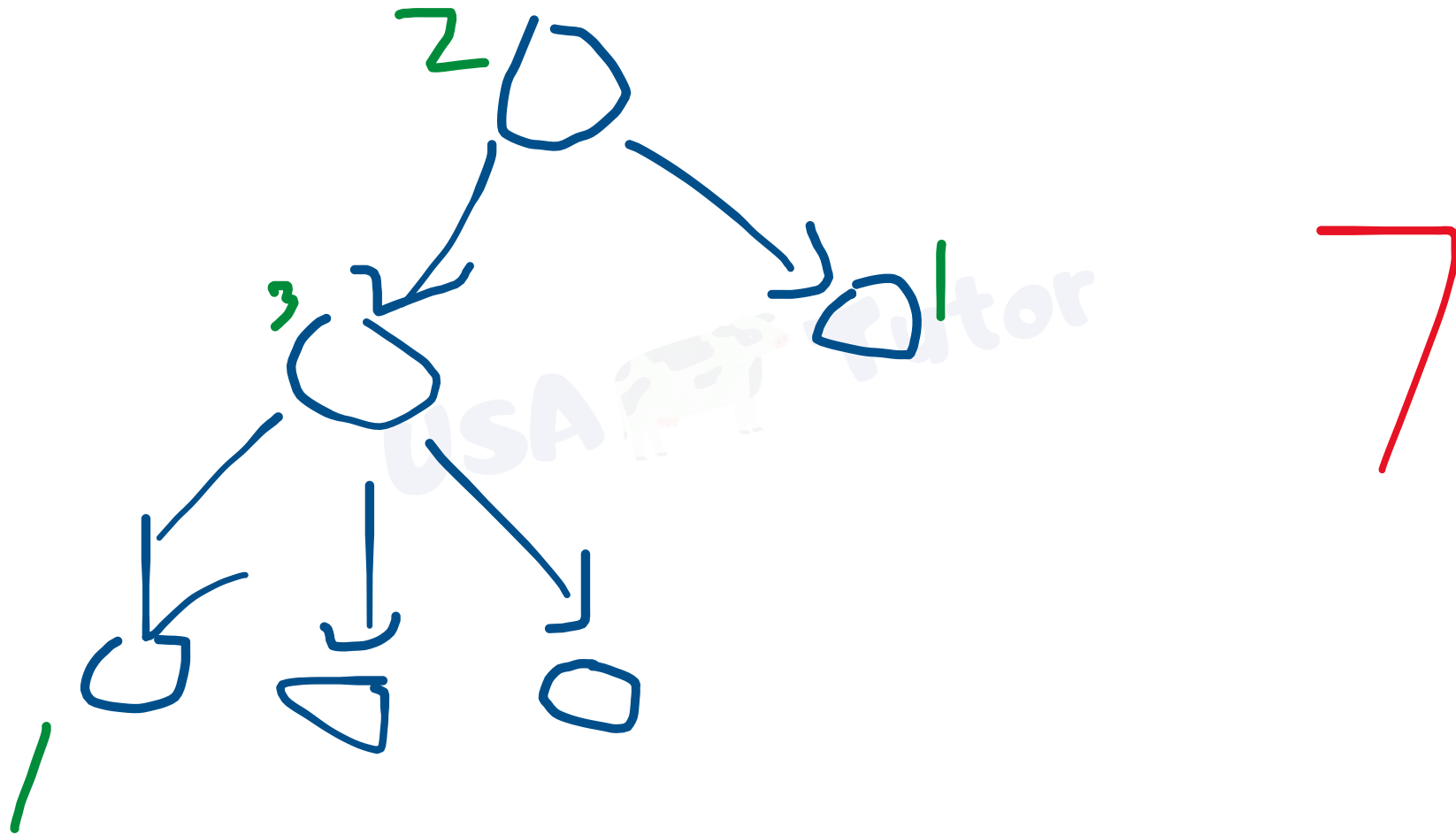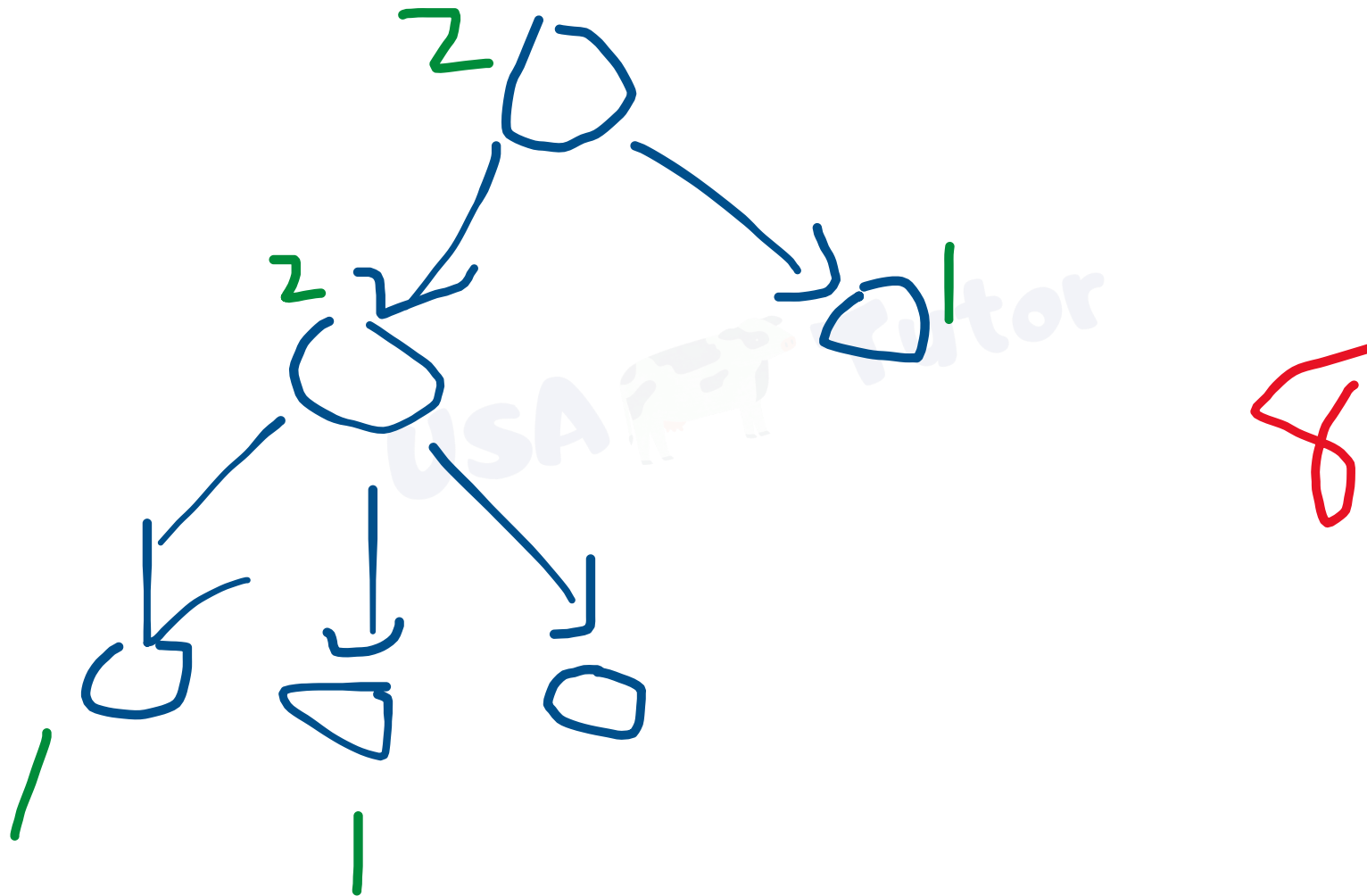
David's Correct and Good solution
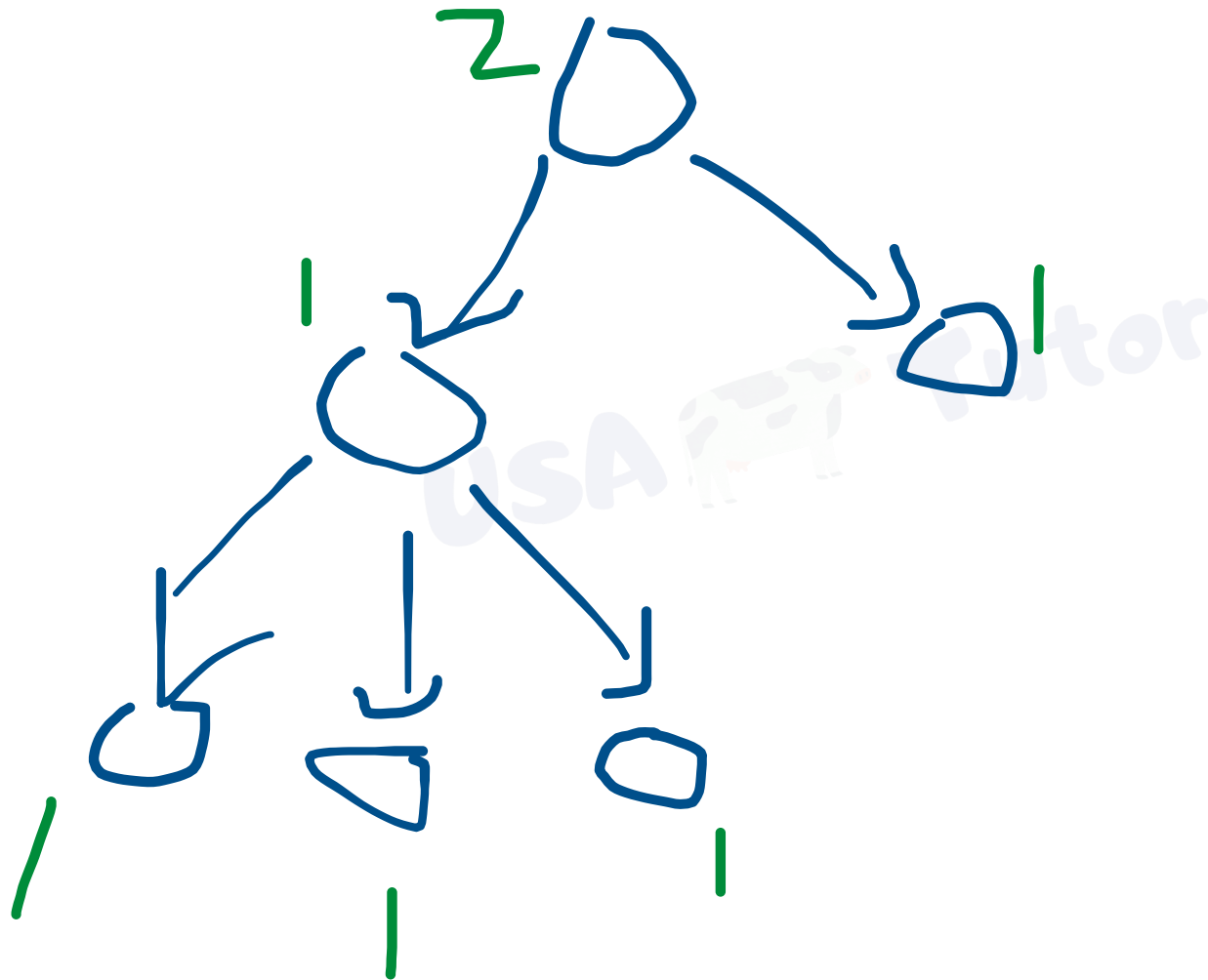
David's Correct and Good solution

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David's cool solution

Double your current node

Until you can give 1 infected cow to each child

And maintain at least 1 cow at the current node

(note that we don't count subchild, just your children)

Elegant Code Explanation

I assume that we only ever move 1 cow down, thus, no need to track number of cows at any given node

  This is valid because this is our algorithm, and why would you move down when you could just double?

I also assume that my parent is the only node visited when I am trying to look at my neighbors

  This is true because we are dealing with a tree.