USA  Tutor

Stuck in a Rut Silver

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Statement Summary

We now have N<=1000 cows

They are still only going in the East direction or the North direction

Instead of the bronze “find travelled distance”, you now need to find the number of cows stopped.

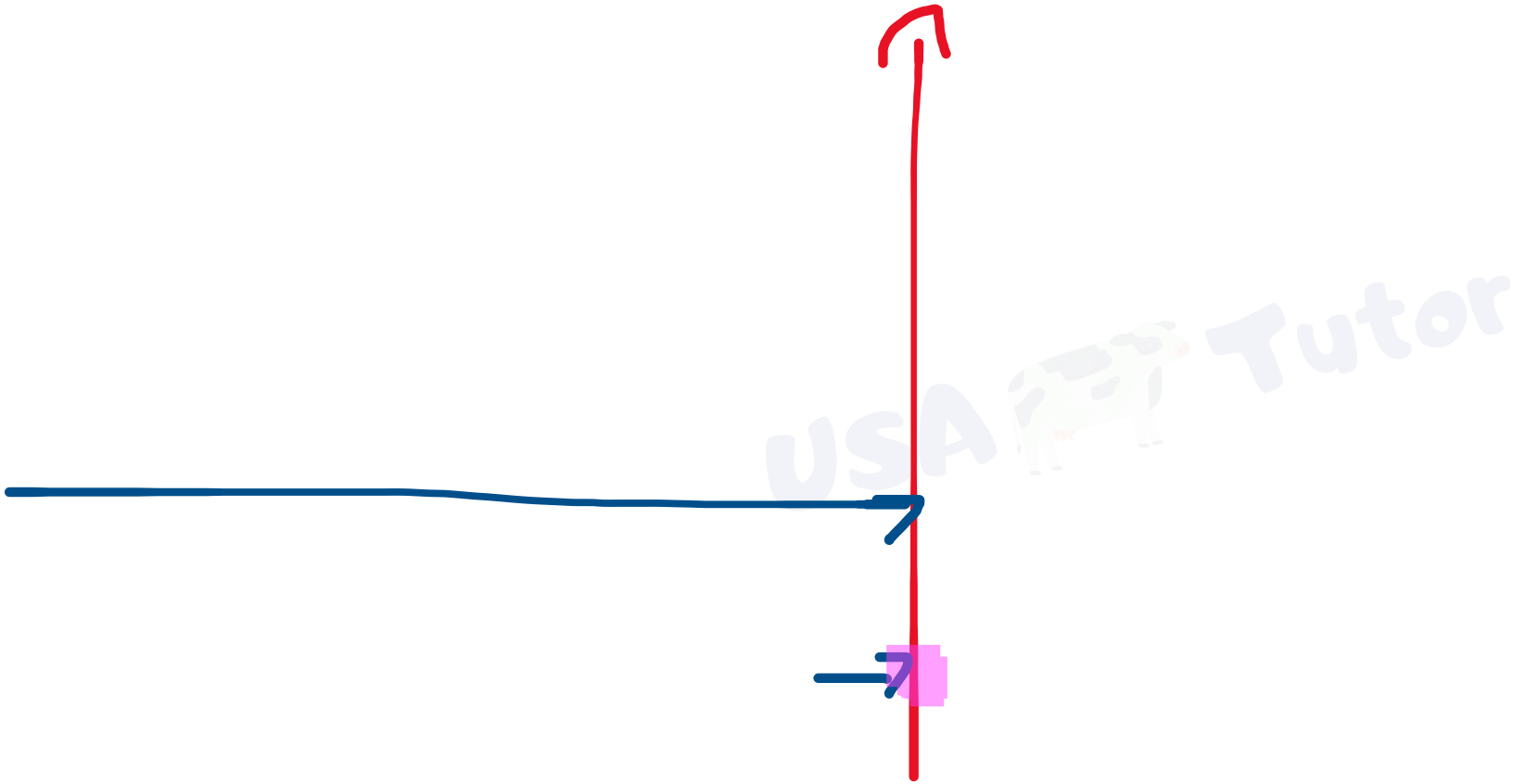
The stopping relationship is transitive — if cow 1 stopped cow 2 stopped cow 3, cow 1 stopped 2 cows.

Key Points from Bronze

In bronze, we moved the “min dist” because we didn’t want to create a contradiction — this means that some cow is stopped by another cow that should have been in a rut.

How do you deal with contradictions, if you have to do this in N^2?

Contradiction Example



Key Observations

When we as humans read a graph, we process info:

Sorted by x

Sorted by y

So how can we apply this to our own graph?

Key Observations

We can sort North Cows by the X

Sort East Cows by the Y

And loop over each north, for each east, and process them

How do we Process Cows?

Assuming you are from the North Cow's perspective:

The time it would take to get to a point is nextY - curY

Assuming you are from the East Cow's perspective:
The time it would take to get to a point is nextX – curX

How do we Process Cows?

If it takes longer for the North Cow, then we can break out of our loop

If it takes longer for the East Cow, we can remove the East Cow from our arraylist of east cows

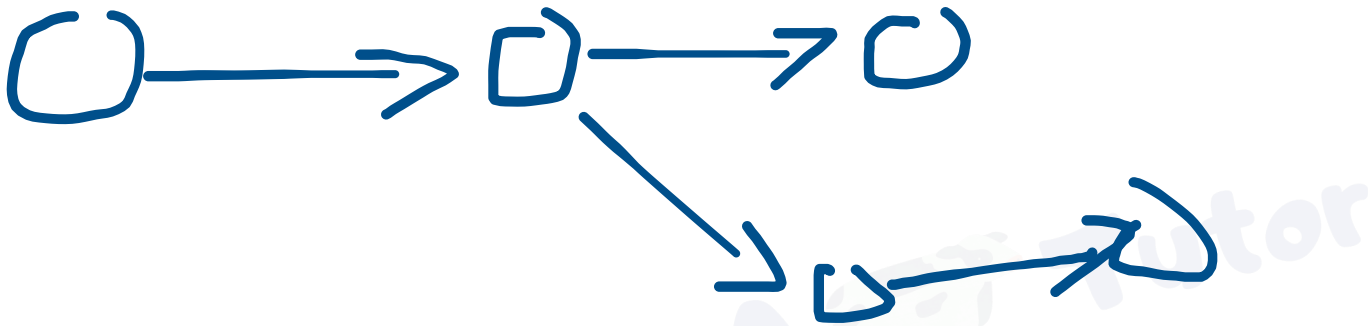
Otherwise we do nothing

Where does DFS come in?

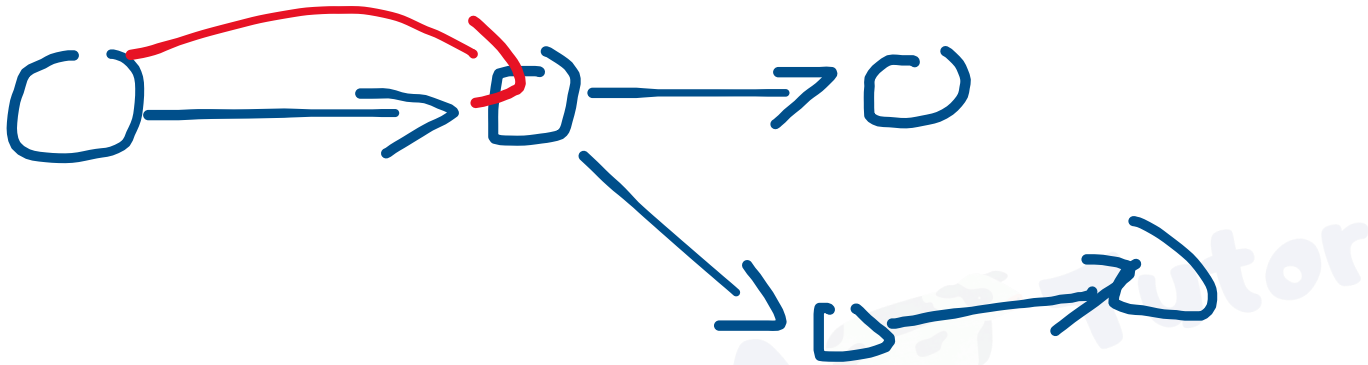
This is how you do the transitive operation:

The image below will show it

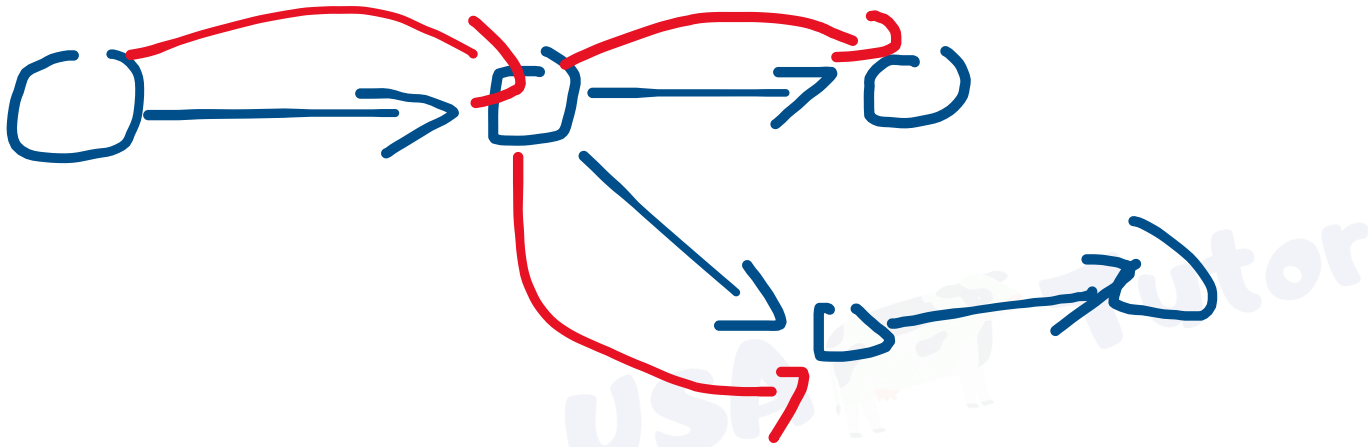
DFS Transitive Example



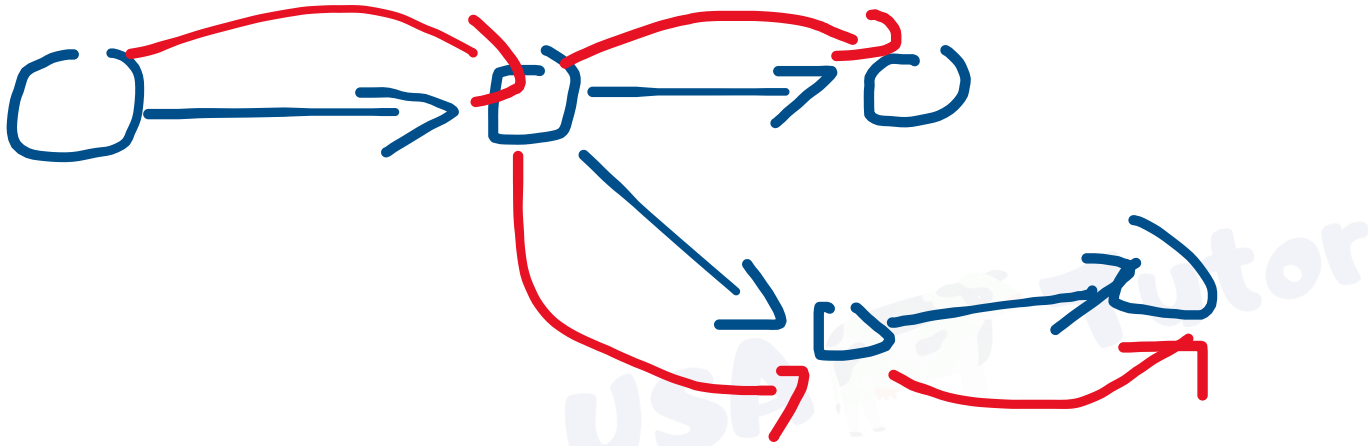
DFS Transitive Example



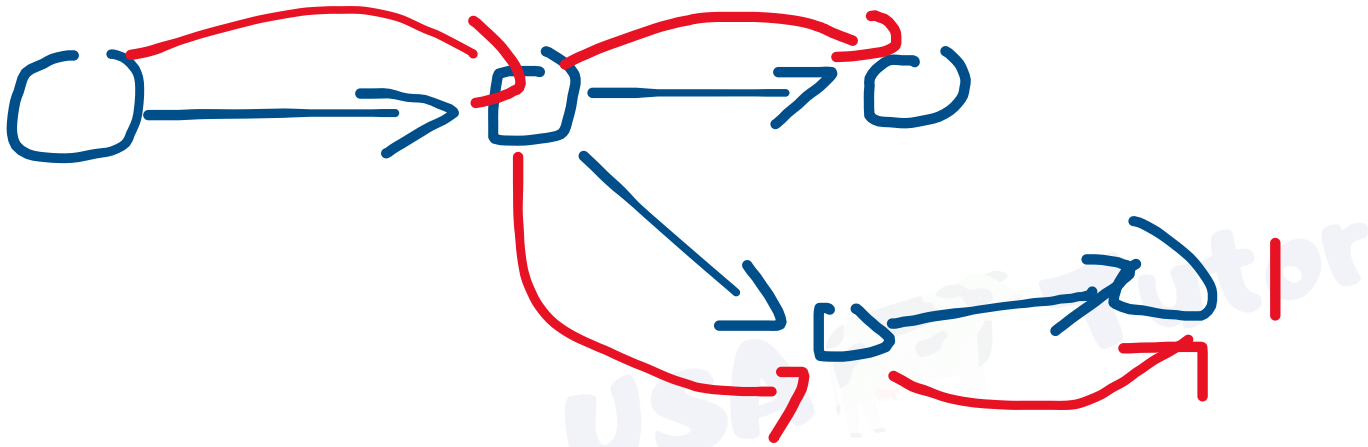
DFS Transitive Example



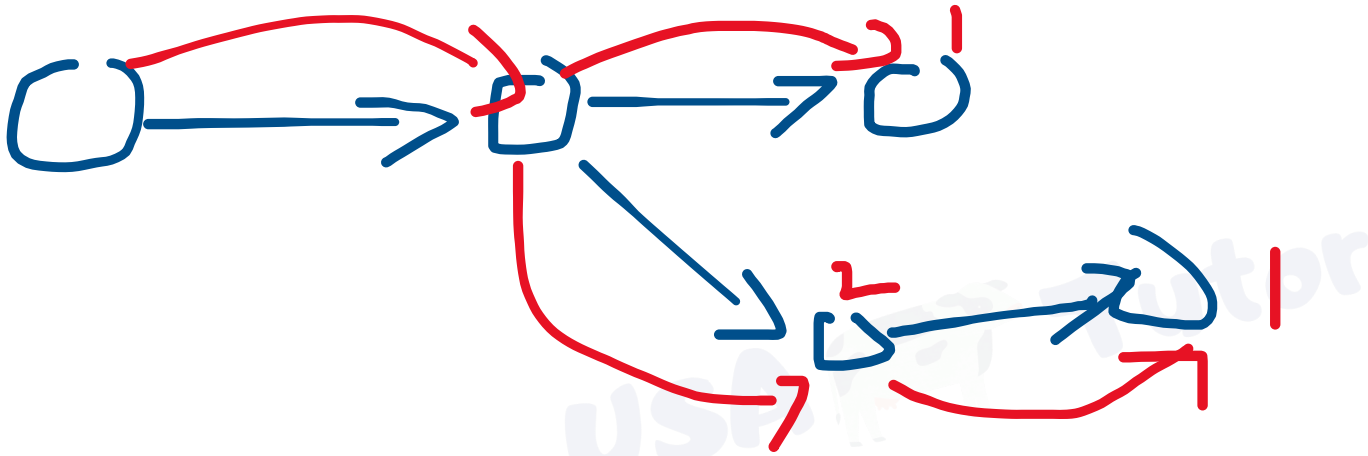
DFS Transitive Example



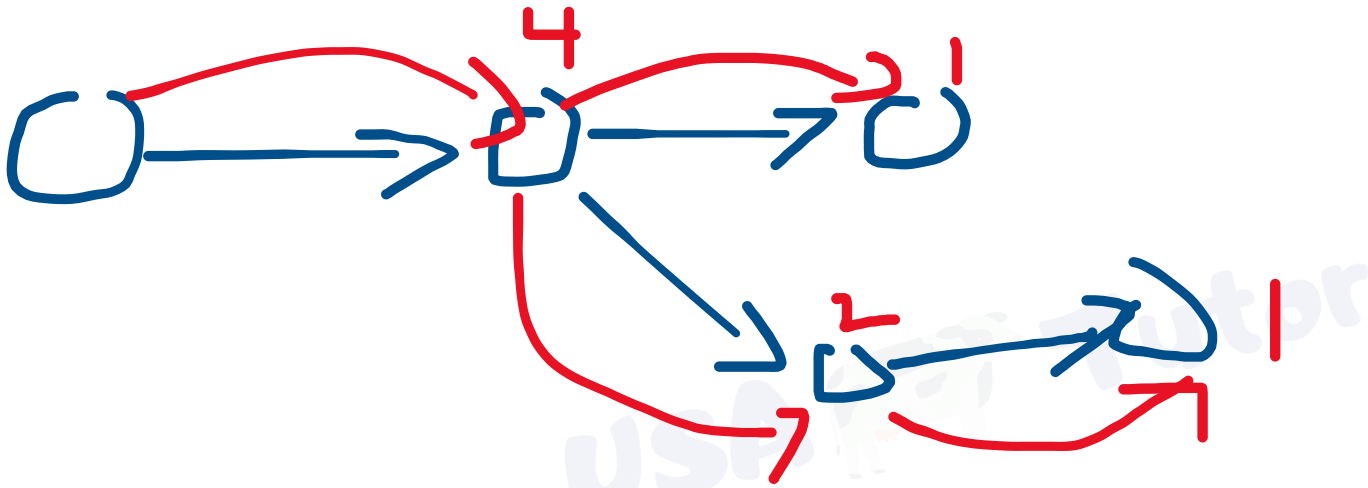
DFS Transitive Example



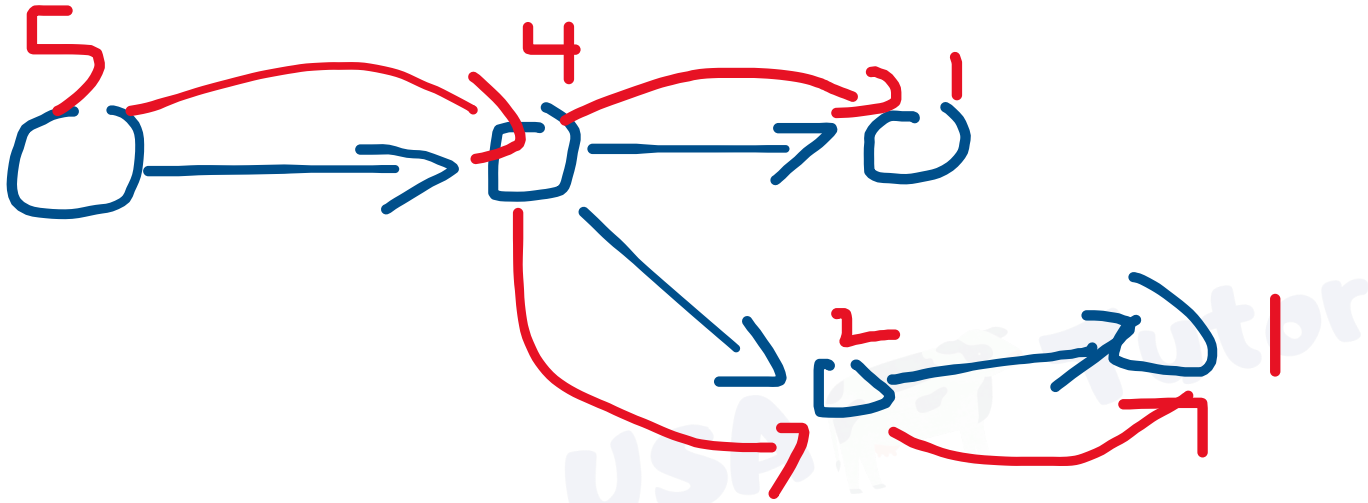
DFS Transitive Example



DFS Transitive Example



DFS Transitive Example



Example Explanation

The numbers on each node describe how many cows each one is responsible for.

Subtract 1 from that number to make sure you don’t count yourself.