Maximum Topological Sort

Assignment 5
Data Structures and Algorithms

Problem Statement: Given a tree G with N nodes and N-1 undirected edges .
Among all nodes, you can pick a node u and give a direction to each edge in G in a way that all the nodes in G are reachable from node u , to obtain a digraph G' . It can be proved that the digraph G' is a DAG . Report the node in G corresponding to whose pick the digraph G' obtained has maximum no. of topological sort orderings and also the maximum no. of topological sort orderings modulo $1e9 + 7$. If multiple possible such nodes exist report the maximum among them .

Input
Each test contain multiple test cases. First line contains T, the number of test cases.
Each test case begins with N, the number of nodes in G.
It is followed by $N - 1$ lines containing 2 integers u,v, denoting an undirected edge between u and v.
Output
Print 2 space separated integers, the node which is the optimal pick and maximum no. of topological sort orderings possible modulo $1e9 + 7$.
Constraints
$1 \leq T \leq 10$
$1 \leq N \leq 10^6$
$1 \leq u, v \leq N$
It is guaranteed that total no. of nodes across all test cases $\leq 10^6$.
Time Limit: 4 seconds
Memory Limit: 256 MB

Sample Test Case

Input	Output
2 3 1 2 2 3 5 1 2 1 3 3 4 3 5	2 2 3 12

Explanation
In the first test case of sample,
orientation $w.r.t$ 1 is $1 \rightarrow 2 \rightarrow 3$, only 1 topological sort ordering possible.
orientation $w.r.t$ 2 is $1 \leftarrow 2 \rightarrow 3$, 2 topological sort orderings possible.
orientation $w.r.t$ 3 is $1 \leftarrow 2 \leftarrow 3$, only 1 topological sort ordering possible.
Hence optimal pick is node 2 and max possible topological sort orderings is 2.