

Doremy's Swapping Trees

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 1024 megabytes

Consider two undirected graphs G_1 and G_2 . Every node in G_1 and in G_2 has a label. Doremy calls G_1 and G_2 similar if and only if:

- The labels in G_1 are distinct, and the labels in G_2 are distinct.
- The set S of labels in G_1 coincides with the set of labels in G_2 .
- For every pair of two distinct labels u and v in S , the corresponding nodes are in the same connected component in G_1 if and only if they are in the same connected component in G_2 .

Now Doremy gives you two trees T_1 and T_2 with n nodes, labeled from 1 to n . You can do the following operation any number of times:

- Choose an edge set E_1 from T_1 and an edge set E_2 from T_2 , such that $\overline{E_1}$ and $\overline{E_2}$ are similar. Here \overline{E} represents the graph which is given by only reserving the edge set E from T (i.e., the edge-induced subgraph). In other words, \overline{E} is obtained from T by removing all edges not included in E and further removing all isolated vertices.
- Swap the edge set E_1 in T_1 with the edge set E_2 in T_2 .

Now Doremy is wondering how many distinct T_1 you can get after any number of operations. Can you help her find the answer? Output the answer modulo $10^9 + 7$.

Input

The input consists of multiple test cases. The first line contains a single integer t ($1 \leq t \leq 2 \cdot 10^4$) — the number of test cases. The description of the test cases follows.

The first line contains an integer n ($2 \leq n \leq 10^5$) — the number of nodes in the trees T_1 and T_2 .

Each of the following $n - 1$ lines contain two integers u, v ($1 \leq u, v \leq n$), representing an undirected edge in T_1 . It is guaranteed these edges form a tree.

Each of the following $n - 1$ lines contain two integers u, v ($1 \leq u, v \leq n$), representing an undirected edge in T_2 . It is guaranteed these edges form a tree.

It is guaranteed that the sum of n does not exceed $2 \cdot 10^5$.

Output

For each test case, you should output a single line with an integer, representing the number of distinct T_1 after any number of operations, modulo $10^9 + 7$.

Example

standard input	standard output
3	1
2	2
1 2	4
2 1	
3	
1 3	
2 3	
2 3	
2 1	
4	
1 2	
2 3	
3 4	
4 2	
2 1	
1 3	

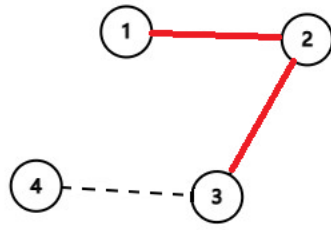
Note

In the first test case, there is at most one distinct T_1 having the only edge $(1, 2)$.

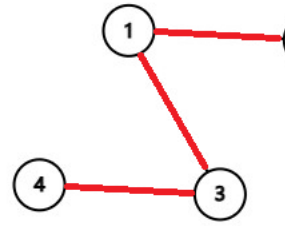
In the second test case, you can choose the edge set $\{(1, 3), (2, 3)\}$ in T_1 , the edge set $\{(1, 2), (2, 3)\}$ in T_2 and swap them. So T_1 can be $1 - 3 - 2$ or $1 - 2 - 3$.

In the third test case, there are 4 distinct T_1 , as the following pictures.

T_1



Choosing edge set $\{(1, 2), (2, 3)\}$

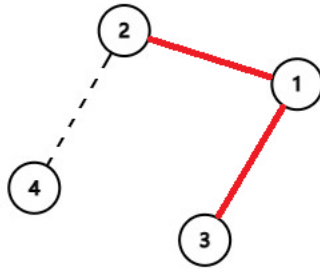


Choosing edge set $\{(1, 2), (2, 3)\}$

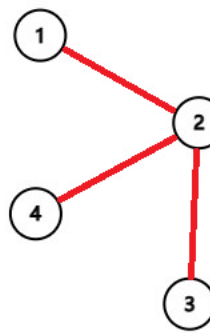
Swap



T_2



Choosing edge set $\{(1, 2), (1, 3)\}$



Choosing edge set $\{(1, 2), (1, 3)\}$