Pafs

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1 Problem Statement

Some time ago, while solving a programming problem, I've came across a strange-looking definition. A tree was defined as a connected graph with n vertices and $n-1$ edges. Nothing weird here, standard stuff. The upcoming definition of a path was strange.

The problem statement defined a path as a nonempty sequence of pairwise different edges, such that each two edges neighboring in the sequence have a common endpoint.

The first weird thing is that edges here are treated without orientation, so we might think that the sequence actually consists of indices of edges. As it turned out that the above definition is broken in a much more complicated way, we can't call such sequences paths. Instead, we'll call them **pafs**.

Here comes your challenge. Prove, that you understand the above definition correctly and given a tree, calculate the number of pafs it contains. As it might turn out to be pretty huge, you should only output the remainder of the division of this number by $10^9 + 7$. **We consider two pafs different if they differ as sequences.**

2 Input

The first line of input contains one integer N ($2 \leq N \leq 200,000$), the number of vertices in the tree. The vertices are numbered from 1 to N.

The next $N-1$ lines describe the tree. The i-th of them contains two space-separated integers a_i and b_i ($1 \leq a_i, b_i \leq N$, $a_i \neq b_i$), denoting that in the tree there is an edge which connects the vertices a_i and b_i.

3 Output

Output one integer, the remainder of the division of the number of pafs in the given tree by $10^9 + 7$.

4 Samples

Sample Input 1	Sample Output 1
4 4 3 3 2 1 2	9

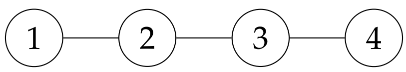
Sample Input 2	Sample Output 2
2 2 1	1

Sample Input 3	Sample Output 3
5 3 4 1 3 1 2 3 5	26

5 Explanation

5.1 Sample 1

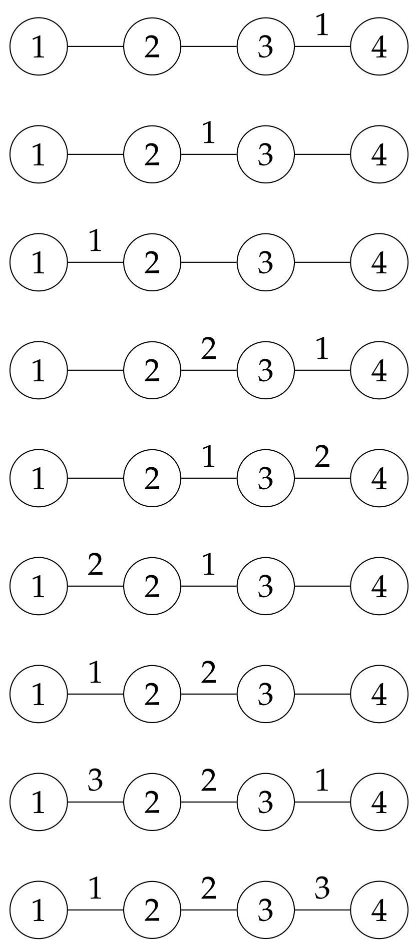
The tree looks as follows:



All pafs are as follows:

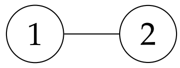
- [(4, 3)]
- [(3, 2)]
- [(1, 2)]
- [(4, 3), (3, 2)]
- [(3, 2), (4, 3)]
- [(3, 2), (1, 2)]
- [(1, 2), (3, 2)]
- [(4, 3), (3, 2), (1, 2)]
- [(1, 2), (3, 2), (4, 3)]

Here are the illustrated pafs, given in the same order. A number on an edge denotes its position in the sequence. Missing number means that the edge is not contained in the paf. Note that as all edges in a paf must be pairwise different, there can be at most one number written on each edge.



5.2 Sample 2

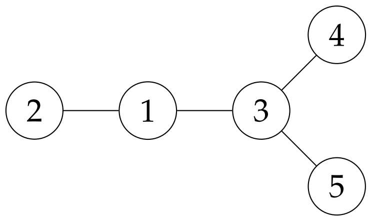
The tree looks as follows:



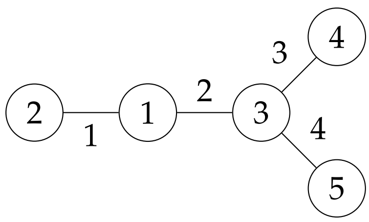
There is only one paf, which contains the only edge in the tree.

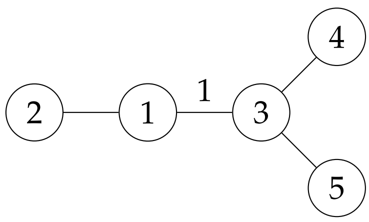
5.3 Sample 3

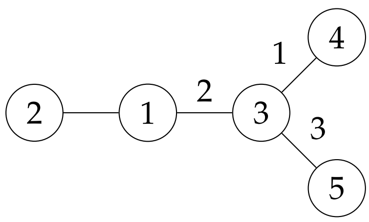
The tree looks as follows:



There are 26 different pafs in this tree, and here are a few examples of them:

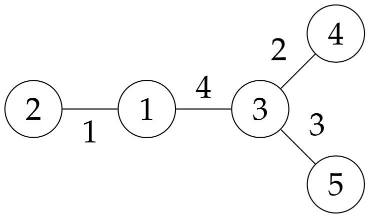


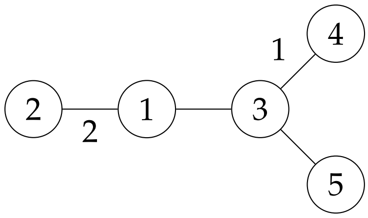




They show pafs [(1, 2), (1, 3), (3, 4), (3, 5)], [(1, 3)] and [(3, 4), (1, 3), (3, 5)] respectively.

Here are two **invalid** pafs:





They show sequences [(1, 2), (3, 4), (3, 5), (1, 3)] and [(3, 4), (1, 2)] respectively. Both are incorrect as they contain neighboring edges which do not have a common endpoint.