

Problem E. Embedding Enumeration

Input file: *standard input*
 Output file: *standard output*
 Time limit: 4 seconds
 Memory limit: 512 mebibytes

As you probably know, a *tree* is a graph consisting of n nodes and $n - 1$ undirected edges in which any two nodes are connected by exactly one path. In a *labeled tree* each node is labeled with a different integer between 1 and n . In general, it may be hard to visualize trees nicely, but some trees can be neatly embedded in rectangular grids.

Given a labeled tree G with n nodes, a *2 by n embedding* of G is a mapping of nodes of G to the cells of a rectangular grid consisting of 2 rows and n columns such that:

- Node 1 is mapped to the cell in the upper-left corner.
- Nodes connected with an edge are mapped to neighboring grid cells (up, down, left or right).
- No two nodes are mapped to the same cell.

Find the number of 2 by n embeddings of a given tree, modulo $10^9 + 7$.

Input

The first line contains an integer n ($1 \leq n \leq 300\,000$) — the number of nodes in G . The j -th of the following $n - 1$ lines contains two different integers a_j and b_j ($1 \leq a_j, b_j \leq n$) — the endpoints of the j -th edge.

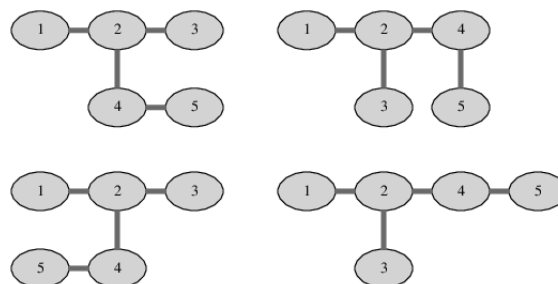
Output

Output the number of 2 by n embeddings of the given tree, modulo $10^9 + 7$.

Example

standard input	standard output
5 1 2 2 3 2 4 4 5	4

Note



All 4 embeddings of the tree in the example input are given in the figure above.