Heavy Light 2 White Falcon

White Falcon was amazed by what she can do with heavy-light decomposition on trees. As a resut, she wants to improve her expertise on heavy-light decomposition. Her teacher gave her an another assignment which requires path updates. As always, White Falcon needs your help with the assignment.

You are given a tree with N nodes and each node's value val_i is initially 0.

Let's denote the path from node u to node v like this: $p_1, p_2, p_3, \ldots, p_k$, where $p_1 = u$ and $p_k = v$, and p_i and p_{i+1} are connected.

The problem asks you to operate the following two types of queries on the tree:

- "1 u v x" Add x to val_{p_1}, $2x$ to val_{p_2}, $3x$ to val_{p_3}, ..., kx to val_{p_k}.
- "2 u v" print the sum of the nodes' values on the path between u and v at modulo $10^9 + 7$.

Input Format

First line cosists of two integers N and Q seperated by a space.

Following $N - 1$ lines contains two integers which denote the undirectional edges of the tree.

Following Q lines contains one of the query types described above.

Note: Nodes are numbered by using 0-based indexing.

Constraints

$1 \leq N, Q \leq 50000$

$0 \leq x < 10^9 + 7$

Output Format

For every query of second type print a single integer.

Sample Input

```
3 2
0 1
1 2
1 0 2 1
2 1 2
```

Sample Output

```
5
```

Explanation

After the first type of query, $val_0 = 1, val_1 = 2, val_2 = 3$. Hence the answer of the second query is $2 + 3 = 5$.

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Difficulty Hard
Max Score 100
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