KazHackStan

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

Aisultan and Batyr decided to participate in KazHackStan conference. They took a computer network problem. There are given N different computers and $N-1$ bidirectional connections, two connected computers called neighbours. Computers numbered from 1 to N. It's guaranteed that there's a way to send data via connections from any computer to any other.

Sometimes some computers can be infected with viruses, that transfers to neighbour computers. Each virus in one second will infect all neighbour computers. There are given Q queries. Each of the queries can be one of the two types:

1. Appearance of new virus: will be given computer number v and time t when the virus appears, the ID of the new virus will be the minimum positive integer number that's not used before as virus ID.
2. For given l, r, t they need to calculate the number of different computers that will be infected with all viruses with ID in a range from l to r (inclusively) by time t. It's guaranteed that all viruses from l up to r exists.

In all queries t **not necessarily sorted**. For better understanding see the explanation of the sample test.

Aisultan and Batyr couldn't solve this problem. Help them with this problem.

Input

First line of the input contains two positive integer numbers N, Q ($1 \le N, Q \le 10^5$) — the number of computers in network and the number of queries. Each of the next $N-1$ lines contains two integers u_i, v_i ($1 \le u_i, v_i \le N$, $u_i \ne v_i$) — i-th connection. In the next Q lines given description of queries. Query starts with integer *type*. If $type = 1$, then given two integers v, t ($1 \le v \le n$, $1 \le t \le 10^9$) — computer ID that will infect by new virus and the time when this appears, the ID of the new virus will be the minimum positive integer number that's not used before as virus ID. If $type = 2$, then given three integers l, r, t ($1 \le l \le r$, $1 \le t \le 10^9$) — the start and end range of virus IDs and the time point at which the number of infected computers must be calculated. It's guaranteed that IDs from l to r exist. Also guaranteed that there're at least one query of type 2.

Output

For each query of type 2 print one integer — answer to the problem.

Scoring

This problem contains 8 subtasks:

1. $1 \le N, Q \le 100$. Worth 8 points.
2. $1 \le N, Q \le 1000$. Worth 7 points.
3. $1 \le N, Q \le 10^4$, $t_i \le t_{i+1}$ for all $1 \le i \le Q-1$ — all times comes in non-decreasing order. Worth 9 points.
4. $u_i = 1$, $v_i = i+1$ for all $1 \le i \le N-1$. Worth 11 points.
5. $u_i = i$, $v_i = i+1$ for all $1 \le i \le N-1$. Worth 20 points.
6. All viruses will apear in computer 1. Worth 10 points.
7. $1 \le N, Q \le 10^4$. Worth 15 points.
8. Constraints from statement. Worth 20 points.

Example

standard input	standard output
5 5 1 2 2 3 2 4 4 5 1 1 5 2 1 1 7 1 4 5 2 1 2 6 2 1 2 1	4 1 0

Note

In first query new virus comes in computer 1 on 5th second. Minimum positive integer number that's not used in virus IDs equals to 1. First virus will infect:

- Computer 1 will infect on 5-th second
- Computer 2 will infect on 6-th second
- Computer 3 will infect on 7-th second
- Computer 4 will infect on 7-th second
- Computer 5 will infect on 8-th second

Second query: we need to calculate number of computers which are infected by virus 1 on 7th second. Total such different computers 4 with numbers: 1, 2, 3, 4.

In third query new virus comes in computer 4 on 5th second. Minimum positive integer number that's not used in virus IDs equals to 2. Second virus will infect:

- Computer 4 will infect on 5-th second
- Computer 5 will infect on 6-th second
- Computer 2 will infect on 6-th second
- Computer 1 will infect on 7-th second
- Computer 3 will infect on 7-th second

Fourth query: we need to calculate number of computers which are infected by virus 1 and virus 2 on 6th second. Total such different computers 1 with number: 2.

Fifth query: we need to calculate number of computers which are infected by virus 1 and virus 2 on 1st second. No computer infected on 1st second.