Problem B. Bitset Master

Input file:	*standard input*
Output file:	*standard output*
Time limit:	6 seconds
Memory limit:	512 mebibytes

It's well known in China that $O(n^2)$ algorithms can pass in a problem with $n = 10^6$ easily.

You are given a tree with n vertices and $n - 1$ edges $(u_1, v_1), (u_2, v_2), \ldots, (u_{n-1}, v_{n-1})$. For each vertex u, there is a set S_u. Initially $S_u = \{u\}$.

There are two types of operations:

- "1 u": output the number of sets S_v $(1 \le v \le n)$ that contain u.
- "2 p": take the sets S_{u_p} and S_{v_p} and assign $S_{u_p} \cup S_{v_p}$ to both of them.

You need to perform m operations. Output the answer for each operation of the first kind.

Input

The first line contains two integers n, m $(2 \le n \le 2 \cdot 10^5, 1 \le m \le 6 \cdot 10^5)$.

Each of the following $n - 1$ lines contains two integers u_i, v_i describing an edge of the tree $(1 \le u_i, v_i \le n)$.

Each of the following m lines contains two integers t, w describing an operation $(1 \le t \le 2, 1 \le w \le n + 1 - t)$.

Output

For each operation of the first kind, output an integer on a separate line.

Example

standard input	standard output
5 11 1 2 1 3 1 4 1 5 2 4 2 3 2 2 2 1 1 1 1 2 1 3 2 2 2 3 1 4 1 5	5 2 3 4 5