

# Query on a tree again!

[English](#)

[Vietnamese](#)

You are given a tree (an acyclic undirected connected graph) with  $N$  nodes. The tree nodes are numbered from 1 to  $N$ . In the start, the color of any node in the tree is white.

We will ask you to perform some instructions of the following form:

- **0 i** : change the color of the  $i$ -th node (from white to black, or from black to white);  
or
- **1 v** : ask for the id of the first black node on the path from node 1 to node  $v$ . if it doesn't exist, you may return -1 as its result.

## Input

In the first line there are two integers **N** and **Q**.

In the next **N**-1 lines describe the edges in the tree: a line with two integers **a b** denotes an edge between **a** and **b**.

The next **Q** lines contain instructions "**0 i**" or "**1 v**" ( $1 \leq i, v \leq N$ ).

## Output

For each "**1 v**" operation, write one integer representing its result.

## Example

**Input:**

```
9 8
1 2
1 3
2 4
2 9
5 9
7 9
8 9
6 8
1 3
0 8
1 6
1 7
0 2
1 9
0 2
1 9
```

**Output:**

```
-1
8
-1
2
```

## **Constraints & Limits**

There are 12 real input files.

For 1/3 of the test cases,  $N=5000$ ,  $Q=400000$ .

For 1/3 of the test cases,  $N=10000$ ,  $Q=300000$ .

For 1/3 of the test cases,  $N=100000$ ,  $Q=100000$ .