

## E. Xenia and Tree

time limit per test: 5 seconds  
 memory limit per test: 256 megabytes  
 input: standard input  
 output: standard output

Xenia the programmer has a tree consisting of  $n$  nodes. We will consider the tree nodes indexed from 1 to  $n$ . We will also consider the first node to be initially painted red, and the other nodes — to be painted blue.

The *distance* between two tree nodes  $v$  and  $u$  is the number of edges in the shortest path between  $v$  and  $u$ .

Xenia needs to learn how to quickly execute queries of two types:

1. paint a specified blue node in red;
2. calculate which red node is the closest to the given one and print the shortest distance to the closest red node.

Your task is to write a program which will execute the described queries.

### Input

The first line contains two integers  $n$  and  $m$  ( $2 \leq n \leq 10^5$ ,  $1 \leq m \leq 10^5$ ) — the number of nodes in the tree and the number of queries. Next  $n - 1$  lines contain the tree edges, the  $i$ -th line contains a pair of integers  $a_i, b_i$  ( $1 \leq a_i, b_i \leq n$ ,  $a_i \neq b_i$ ) — an edge of the tree.

Next  $m$  lines contain queries. Each query is specified as a pair of integers  $t_i, v_i$  ( $1 \leq t_i \leq 2$ ,  $1 \leq v_i \leq n$ ). If  $t_i = 1$ , then as a reply to the query we need to paint a blue node  $v_i$  in red. If  $t_i = 2$ , then we should reply to the query by printing the shortest distance from some red node to node  $v_i$ .

It is guaranteed that the given graph is a tree and that all queries are correct.

### Output

For each second type query print the reply in a single line.

### Examples

input	Copy
5 4 1 2 2 3 2 4 4 5 2 1 2 5 1 2 2 5	
output	Copy
0 3 2	

### Codeforces Round #199 (Div. 2)

Finished

Practice



### → Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

### → Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

### → Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

### → Submit?

Language: GNU G++14 6.4.0

Choose file: Choose File No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

### → Last submissions

Submission	Time	Verdict
<a href="#">81475699</a>	May/26/2020 16:38	Accepted

### → Problem tags

data structures divide and conquer  
 trees \*2400

No tag edit access

### → Contest materials