

## E. Filthy Rich Trees

time limit per test: 4 seconds  
memory limit per test: 256 megabytes

You may have heard the saying "money doesn't grow on trees." Obviously, whoever came up with it stunk at both botany and programming. You've learned that creating trees which grow obscene amounts of money is so trivial, that it's left as an exercise to the reader. Time for the real challenge: profiting off your invention!

You have rooted your money-tree at node 1, and each node has a specified moola value. The amount of money that some subtree rooted at node  $x$  will produce is equal to the product of the moola values of all nodes in  $x$ 's subtree. Initially, all nodes will have a moola value of 1.

Now,  $q$  times, one of two things happen, given to you in the form of "t x y":

If  $t = 1$ , you give node  $x$  a special fertilizer which sets its moola value to  $y$ .

If  $t = 2$ , a customer comes in and asks "how many times more valuable is subtree  $x$  than subtree  $y$ "? Formally, what is the value of subtree  $x$  divided by the value of subtree  $y$ . Also, you don't like printing massive numbers, so subtree  $x$  is more than  $10^9$  times greater than subtree  $y$ , only print "1000000000".

### Input

The first line will contain a single integer  $n$ , the number of nodes in the tree.  $n - 1$  lines follow, each containing two different integers, describing the edges of the tree. Additional constraint on input: these edges will form a tree.

After that there will be a single integer  $q$ : the number of queries.  $q$  line follow, each of the form  $txy$ , as described above.

$$1 \leq n, q \leq 3 * 10^5$$

$$1 \leq t \leq 2$$

$$1 \leq x, y \leq n$$

### Output

For each query of type 2, print a single line with one real number: how many times more valuable subtree  $x$  is than subtree  $y$ . HOWEVER, if this value is  $\geq 10^9$ , then print just 1000000000 instead.

Your answer will be accepted if your answers to all queries have absolute or relative error of at most  $10^{-6}$ .

### Examples

input	Copy
1 1 1 1 1	
output	Copy

input	Copy
3 3 2 2 1 3 2 2 2 2 1 2 2 3 3	
output	Copy
1.0000000000 1.0000000000 1.0000000000	

input	Copy
5 4 2 1 4 5 4 3 4 5 2 5 2 1 5 4 1 5 5 1 5 4 2 5 4	
output	Copy
1.0000000000 1.0000000000	

### AlgorithmsThread Tree Basics Contest

Finished

Practice



#### → About Contest



AlgorithmsThread Tree Basics contest. Problems written by David Harmeyer (SecondThread), with some data/ideas from Travis Meade.

#### → 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

#### → Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

#### → Submit?

Language: GNU G++20 13.2 (64 bit, win)

Choose file: Choose File No file chosen

Submit

#### → Last submissions

Submission	Time	Verdict
<a href="#">320691870</a>	May/21/2025 22:09	Accepted
<a href="#">317724019</a>	Apr/29/2025 13:09	Accepted
<a href="#">317683439</a>	Apr/29/2025 03:32	Accepted
<a href="#">317683051</a>	Apr/29/2025 03:19	Accepted
<a href="#">317680027</a>	Apr/29/2025 01:49	Wrong answer on test 4
<a href="#">317679984</a>	Apr/29/2025 01:48	Wrong answer on test 4
<a href="#">317679946</a>	Apr/29/2025 01:47	Wrong answer on test 4
<a href="#">317678809</a>	Apr/29/2025 01:16	Wrong answer on test 4
<a href="#">317678475</a>	Apr/29/2025 01:07	Wrong answer on test 2
<a href="#">317678455</a>	Apr/29/2025 01:06	Wrong answer on test 4

#### → Contest materials

- Announcement (en)