

B. Dynamic Diameter

time limit per test: 3 seconds
memory limit per test: 256 megabytes

You are given $n + 1$ nodes and $n - 1$ edges where the first n nodes are a tree and node $n + 1$ is in its own component. For each node i from $1 \dots n$, answer the following question:

If an edge was added from node i to node $n + 1$, what would the diameter of the created tree be? (Notice that the $n + 1$ nodes will be a tree if this edge was added).

Input

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

$1 \leq n \leq 3 \cdot 10^5$

Output

Print n integers, each on their own line. The i th is the diameter of the new tree if you were to add an edge from node i to node $n + 1$.

Examples

input	Copy
1	
output	Copy
1	

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

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

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
320691337	May/21/2025 22:02	Accepted
320690472	May/21/2025 21:50	Accepted
317789048	Apr/30/2025 02:57	Accepted
317668685	Apr/28/2025 22:18	Accepted
317667324	Apr/28/2025 22:03	Accepted
317667194	Apr/28/2025 22:02	Runtime error on test 2
317661966	Apr/28/2025 21:05	Accepted
317661919	Apr/28/2025 21:04	Runtime error on test 1