

### C. Leafy Distance

time limit per test: 2 seconds  
memory limit per test: 256 megabytes

Sampo is hiding inside a tunnel system. The tunnel can be modeled as a tree\* with  $n$  nodes and  $n - 1$  edges. There is an exit situated at every node with exactly one neighbor.

Sampo wants to decide in which node to hide in. Obviously, he should hide in a node that is the furthest distance away from any exit. Please help Sampo determine which node is the best one to hide in. If there are multiple nodes that are equally as far from an exit, output the node with the **least** index.

\*A tree is a connected graph without cycles.

#### Input

The first line contains an integer  $t$  – the number of test cases ( $1 \leq t \leq 10^4$ ).

The first line of each test case contains an integer  $n$  ( $1 \leq n \leq 2 \cdot 10^5$ ) – the number of nodes in the tree.

The following  $n - 1$  lines each contain two integers  $p$  and  $q$  ( $1 \leq p, q \leq n, p \neq q$ ) – signifying that there is an edge from  $p$  to  $q$  in the tree. It is guaranteed that the given edges form a tree.

It is guaranteed that the sum of  $n$  over all test cases does not exceed  $2 \cdot 10^5$ .

#### Scoring

Partial credits will be given to programs who pass tests with smaller constraints outlined below.

| Group | Points | Constraints   |
|-------|--------|---|
| 1     | 40     | The sum of $n$ does not exceed 1500 over all test cases |
| 2     | 60     | No further constraints                                  |

#### Output

For each test case, output the index of the node furthest away from any exit. If there are multiple nodes that are equally far, output the node with the least index.

#### Example

input

```
4
3
1 3
2 3
4
1 2
2 3
4 2
4
1 2
2 3
3 4
13
1 2
2 3
3 4
4 5
4 6
2 7
7 8
2 9
6 10
5 11
11 12
10 13
```

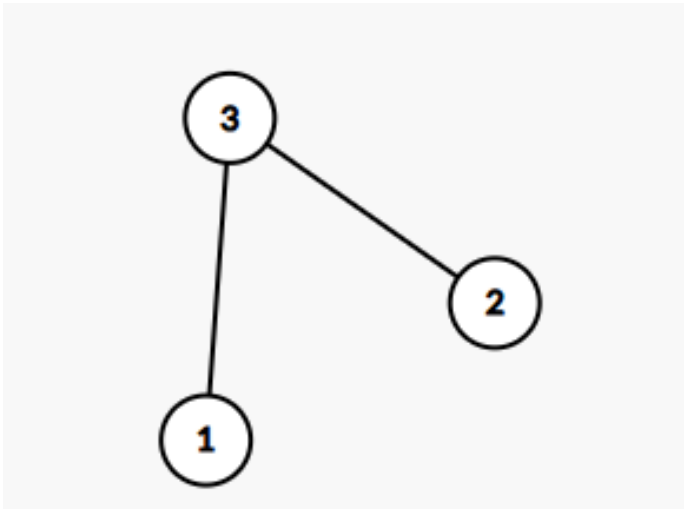
Copy

output

```
3
2
2
4
```

Copy

#### Note



This is the tree in the first test case. Node 3 is distance 1 away from exits, while nodes 1 and 2 are distance 0 away from exits.

PPSC 2025

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

→ 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="#">318353555</a> | May/04/2025 18:59 | Perfect result: 100 points |
| <a href="#">318353002</a> | May/04/2025 18:55 | Partial result: 0 points   |
| <a href="#">318350961</a> | May/04/2025 18:37 | Partial result: 0 points   |
| <a href="#">318349310</a> | May/04/2025 18:23 | Partial result: 0 points   |
| <a href="#">318348260</a> | May/04/2025 18:15 | Partial result: 0 points   |
| <a href="#">318347612</a> | May/04/2025 18:10 | Partial result: 0 points   |
| <a href="#">318346776</a> | May/04/2025 18:03 | Partial result: 40 points  |
| <a href="#">318345857</a> | May/04/2025 17:56 | Partial result: 0 points   |
| <a href="#">318345277</a> | May/04/2025 17:51 | Partial result: 0 points   |
| <a href="#">318272469</a> | May/04/2025 01:28 | Partial result: 0 points   |

→ Contest materials

- Tutorial (en)