

Contest Duration: 2025-10-18(Sat) 23:30 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251018T2130&p1=248>) - 2025-10-19(Sun) 01:10 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251018T2130&p1=248>) (local time) (100 minutes)

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## E - Farthest Vertex

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 475 points

### Problem Statement

There is a tree with  $N$  vertices numbered 1 to  $N$ . The  $i$ -th edge connects vertices  $A_i$  and  $B_i$ .

Define the distance between vertices  $u$  and  $v$  as the number of edges in the path with endpoints at vertices  $u$  and  $v$ . (This path is uniquely determined.)

Solve the following problem for  $v = 1, 2, \dots, N$ .

- Among vertices  $1, 2, \dots, N$ , output the number of the vertex that has the maximum distance from vertex  $v$ . If there are multiple vertices that satisfy the condition, output the vertex with the largest number.

### Constraints

- $2 \leq N \leq 5 \times 10^5$
- $1 \leq A_i < B_i \leq N$
- The graph given in the input is a tree.
- All input values are integers.

### Input

The input is given from Standard Input in the following format:

2026-01-02 (Fri)  
05:31:54 +11:00

$$\begin{matrix} N \\ A_1 & B_1 \\ A_2 & B_2 \\ \vdots \\ A_{N-1} & B_{N-1} \end{matrix}$$

## Output

Output  $N$  lines. The  $i$ -th line should contain the answer for  $v = i$ .

### Sample Input 1

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```
3
1 2
2 3
```

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### Sample Output 1

[Copy](#)

```
3
3
1
```

[Copy](#)

The vertex with the maximum distance from vertex 1 is vertex 3.

The vertices with the maximum distance from vertex 2 are vertices 1 and 3. Among them, vertex 3, which has the larger number, is the answer.

The vertex with the maximum distance from vertex 3 is vertex 1.

### Sample Input 2

[Copy](#)

```
5
1 2
2 3
2 4
1 5
```

[Copy](#)

### Sample Output 2

[Copy](#)[Copy](#)

4  
5  
5  
5  
4

/#telegram)

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