

E - Farthest Vertex

Time Limit: 2 sec / Memory Limit: 1024 MiB

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AtCoder 对于生成式 AI 的规定 - 20251003 版本 (<https://info.atcoder.jp/entry/l1m-rules-en>)

注意此规则已于 2025 年 10 月 3 日更新。详情请见[这篇文章](https://atcoder.jp/posts/1568) (<https://atcoder.jp/posts/1568>)。

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:

```
N
A1 B1
A2 B2
:
AN-1 BN-1
```

Output

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

Sample Input 1

```
3  
1 2  
2 3
```

Sample Output 1

```
3  
3  
1
```

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

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

Sample Output 2

```
4  
5  
5  
5  
4
```

1

比赛时间: 2025-10-18(Sat) 20:30 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251018T2130&p1=248>) - 2025-10-18(Sat) 22:10 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251018T2310&p1=248>) (当地时间) (100 minutes)

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