Problem A. Tree Diameter

Time limit   1000 ms
Memory limit   256MB

Problem Description

You are given an unrooted tree with N nodes and $N - 1$ edges, where the nodes are labeled from 1 to N.

The **diameter** of a tree is defined as the longest path between any two nodes in the tree. The length of the path is measured by counting the edges along this path.

Your task is to calculate the diameter of the given tree.

Let us use the following tree as an example:
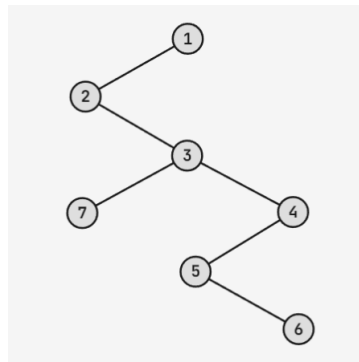
The tree in Sample Input 3.

- The length of the path from node 4 to node 7 is 2 ($4 \rightarrow 3 \rightarrow 7$).

- The length of the path from node 6 to node 1 is 5 ($6 \rightarrow 5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1$).

Since there does not exist a path with length 6 or more, the diameter of the tree is 5.

Input format

The first line contains a single integer N ($2 \leq N \leq 10^5$) — the number of nodes in the tree.

The following $N - 1$ lines each contain two integers u and v ($1 \leq u, v \leq N$), indicating an edge between nodes u and v.

It is guaranteed that the given edges form a tree.

Output format

Output a single integer, the diameter of the tree.

Subtask score

Subtask	Score	Additional Constraints
1	60	$N \leq 5000$
2	40	No constraints

Sample

Sample Input 1

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

Sample Output 1

```
4
```

Sample Input 2

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

Sample Output 2

```
2
```

Sample Input 3

```
7
1 2
2 3
3 4
4 5
5 6
3 7
```

Sample Output 3

```
5
```

Sample Input 4

```
2
1 2
```

Sample Output 4

```
1
```

Notes

One way to find the diameter of a tree is by performing two BFS or DFS operations:

1. Start from any node and find the farthest node from it.

2. From that farthest node, find the farthest node again. The distance of this final path will be the diameter of the tree.