Problem J: Palm Island Neighbours

The Palm Jumeirah is a man-made archipelago in Dubai. It is located on the coast of Dubai, United Arab Emirates. The shape of the island makes it so that two inhabitants close in geographical space may still need to traverse a large path to visit each other. Unless they travel by boat, which is not allowed in this problem. We shall only consider paths that can be traversed on foot or by car. Preferably by car, because Dubai is usually extremely hot and it is unpleasant to go anywhere without air conditioning.

The exact distances are also not very relevant. We are only interested in how many neighbours we need to pass by until we reach a specific one. Note that the street connecting two neighbours always works both ways. Thus good neighbours make a huge difference in the quality of life.

Task

To determine how exotic the topology of this island is our goal is to compute what is the largest smallest path between two inhabitants. The input describes the topology of the island.

Input

The first input line contains the number n of inhabitants. The inhabitants are numbered from 1 to n. Each of the remaining $n-1$ lines has two different inhabitants, which indicates that there is a connection between them. Note that the island topology can not contain cycles, since it is a palm tree. Also, there is always a path between any two inhabitants, since each input considers only an island not the archipelago.

Constraints

$1 \leq n \leq 50\,000$ Number of inhabitants

Output

The output has a single integer, representing the number of connections on the shortest path between two inhabitants that are furthest away.

Sample Input 1

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

Sample Output 1

```
8
```

Sample Input 2

```
1
```

Sample Output 2

```
0
```