



Tree Diameter

Mouse Stofl loves to live in the forest and hug trees. Sometimes the trees are too large and Stofl's arms are too short to hug a tree. Therefore he wants to know the diameter of a given tree.

The diameter of a tree is defined as the length of the longest path in the tree.

Input

The first line contains n , the number of nodes. The next $n - 1$ lines contain an edge of the tree. It is guaranteed that the graph is a tree.

Output

Print the diameter of the tree.

Limits

There are 2 test groups, each of which is worth 50 points.

- In test group 1: $n \leq 100$.
- In test group 2: $n \leq 100000$.

Examples

Input	Output
7 0 1 1 2 2 3 3 4 1 5 5 6	5

Input	Output
5 0 2 1 2 2 3 2 4	2