

PROBLEMS

SUBMIT

STATUS

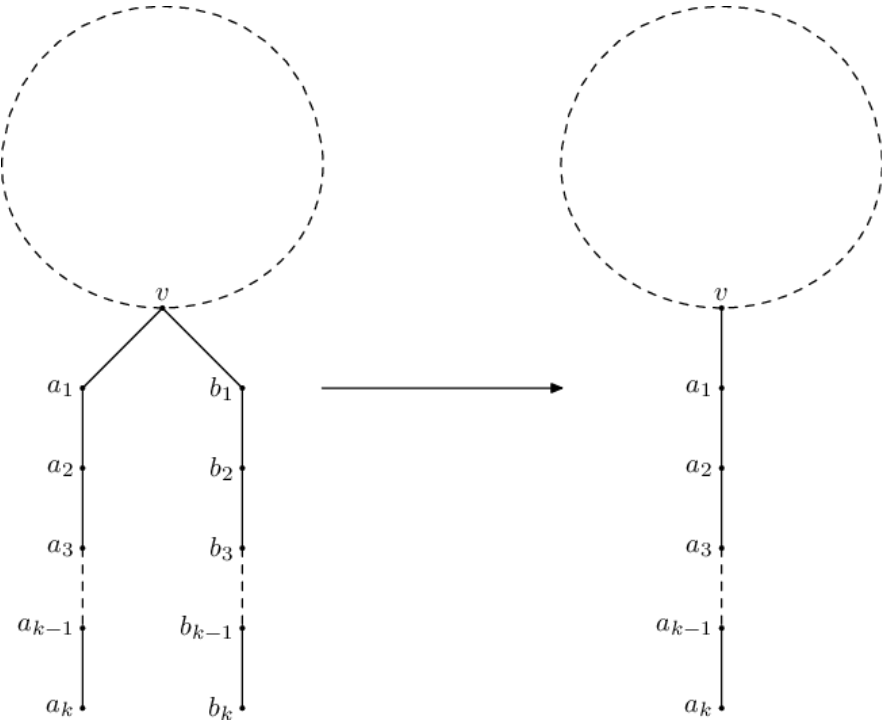
STANDINGS

CUSTOM TEST

### E. Tree Folding

time limit per test: 2 seconds  
memory limit per test: 512 megabytes  
input: standard input  
output: standard output

Vanya wants to minimize a tree. He can perform the following operation multiple times: choose a vertex  $v$ , and two disjoint (except for  $v$ ) paths of equal length  $a_0 = v, a_1, \dots, a_k$ , and  $b_0 = v, b_1, \dots, b_k$ . Additionally, vertices  $a_1, \dots, a_k, b_1, \dots, b_k$  must not have any neighbours in the tree other than adjacent vertices of corresponding paths. After that, one of the paths may be merged into the other, that is, the vertices  $b_1, \dots, b_k$  can be effectively erased:



Help Vanya determine if it possible to make the tree into a path via a sequence of described operations, and if the answer is positive, also determine the shortest length of such path.

#### Input

The first line of input contains the number of vertices  $n$  ( $2 \leq n \leq 2 \cdot 10^5$ ).  
Next  $n - 1$  lines describe edges of the tree. Each of these lines contains two space-separated integers  $u$  and  $v$  ( $1 \leq u, v \leq n, u \neq v$ ) — indices of endpoints of the corresponding edge. It is guaranteed that the given graph is a tree.

#### Output

If it is impossible to obtain a path, print  $-1$ . Otherwise, print the minimum number of edges in a possible path.

#### Examples

input	Copy
6 1 2 2 3 2 4 4 5 1 6	
output	Copy
3	
input	Copy

Codeforces Round #397 by Kaspersky Lab and Barcelona Bootcamp (Div. 1 + Div. 2 combined)

Finished

Practice



#### Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

#### Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

#### Submit?

Language: GNU G++11 5.1.0  
Choose file: 选择文件 未选择任何文件  
Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

#### Problem tags

dfs and similar dp implementation trees

No tag edit access

#### Contest materials

- Announcement
- Tutorial

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

**output**[Copy](#)

```
-1
```

**Note**

In the first sample case, a path of three edges is obtained after merging paths 2 - 1 - 6 and 2 - 4 - 5.

It is impossible to perform any operation in the second sample case. For example, it is impossible to merge paths 1 - 3 - 4 and 1 - 5 - 6, since vertex 6 additionally has a neighbour 7 that is not present in the corresponding path.

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