## The Goal

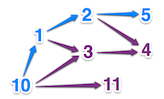
The saying "Dwarfs standing on the shoulders of giants" refers to the importance of being able to build upon the work of our predecessors.

When we read texts, we often only get a small glance of this dependence: this person influenced that person. Thereafter, we learn that the second person, in turn influenced a third and so on. In this exercise we’re interested in the chain of influence and more precisely in finding the longest possible chain.​

## Rules

We choose to represent each person by a distinct integer. If person has influenced persons and and person has influenced then there is a succession of thoughts between , and . In this case, it’s the longest succession and the expected result will be , since it involves 3 people.  


If we were to complete this example when we learn that person also influenced persons and , then the longest succession will still have a length of 3, but there will now be several of them.

If we now add that person influenced person , the result remains 3. However, as soon as we learn that also influenced and , then the result becomes , since there is now a succession involving 4 people, which is , , , . 

**Note:** It takes time for a thought to influence others. So, we will suppose that it is not possible to have a mutual influence between people, i.e. If influences (even indirectly through other people), then will not influence (even indirectly). Also, you can not influence yourself.

## Game Input

Input

Line 1: The number N of relationships of influence.

N following lines: a relationship of influence between two people in the form of X (whitespace) Y, which indicates that X influences Y. The relationships of influence are listed in any order.

Output

The number of people involved in the longest succession of influences.

Constraints

0 < N < 10000  
0 < X, Y < 10000

Examples

Input

3

1 2

1 3

3 4

Output

3



Input

8

1 2

1 3

3 4

2 4

2 5

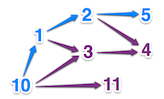
10 11

10 1

10 3

Output

4



Input

4

2 3

8 9

1 2

6 3

Output

3