

Campfire Party

Problem description

Jiajia has just entered high school. In the military training, due to her hard-working, Jiajia got the appreciation of the instructor, became a “little instructor”. At the end of the military training, that night, Jiajia was ordered to organize the students to have a campfire party. There are n students numbered from 1 to n . At the beginning, students follow the order of 1,2... , n to sit in a circle, but in fact everyone has two classmates that he/she would most like to be next to. To adjust the order of the students to form a new circle to satisfy the wishes of the students became a big problem in front of Jiajia.

Jiajia can command the students, each in the form of the following:

$$(b_1, b_2, \dots, b_{m-1}, b_m)$$

Here the value of m is determined by Jiajia, and the value of m can be different each time the command is given. What this command does is move the position of these m students with the number $b_1, b_2, \dots, b_{m-1}, b_m$. Move b_1 to the position of b_2 , b_2 to the position of b_3 ... and b_m to the position of b_1 . There are cost to execute each command. We assume that if a command moves the position of m people, the cost of the command is m . We need Jiajia to satisfy the wishes of the students with the least total cost. Can you help Jiajia?

Input

The first line of the input file is an integer n , indicating that there are n students.

Each of the following n lines contains two different positive integers, separated by a space, which respectively represent the number of the two adjacent students that student 1 wants most, the number of the two adjacent students that student 2 wants most..., the number of the two adjacent students that n wants most.

Output

The output file contains one integer for the minimum total cost. If no matter how Jiajia adjust the positions, it cannot meet the wishes of every student, output -1.

Sample Input

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

Sample Output

```
2
```

Data Size

For 30% of the data, $n \leq 1000$;

For 100% of the data, $3 \leq n \leq 50000$.