Noise in Numbers

Your team (ION Robotics) has qualified to compete at the world finals of the Vexing Robotics Challenge. Congratulations! You will be representing your country alongside POP, a rival team. The two teams have agreed to hold practice matches on a shared course. Unfortunately, POP's fans are notorious for harassing other teams by shouting and blasting air horns during matches. You have been tasked with inviting spectators to the practice rounds and, more importantly, with keeping them civil.

Whenever you invite someone to spectate, they will also share the news with their followers on social media, who will also attend. The followers of those followers will also attend, and so on. Your team has carefully collected data that identifies any person as an ION or POP fan. Your aim is to discourage POP fans from being obnoxious by ensuring that ION fans outnumber POP fans by the widest possible margin among the spectators.

More formally, suppose that N_I ION fans and N_P POP fans attend. You must invite people in such a way that the difference $(N_I - N_P)$ is maximized.

Input Format

The input will begin with a line containing an integer N, the number of people to be considered for an invitation. The following N lines will each contain the details for a person. The kth line will describe the kth person, with people numbered from 1 to N.

Each person will be described by two integers F_k and T_k separated by a space. This represents that person k follows person F_k on social media and that they are a fan of team T_k. POP will be team 0 and ION will be team 1. Everyone listed will be a POP or ION fan. If a person does not follow anyone on social media, then $F_k = 0$. For convenience, the data will be arranged so that a person's followers will not appear before them on the list. That also means that two people cannot follow each other, even indirectly.
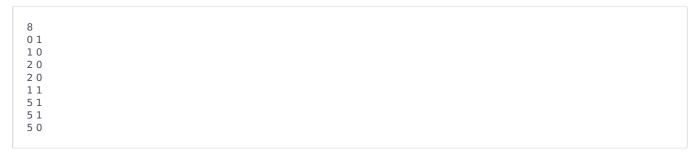
Constraints

$1 \leq N \leq 10^5$
$0 \leq F_k < k$ for $1 \leq k \leq N$

Every chain of followers will span 500 people at most.

Output Format

The output must consist of a single integer - the largest possible difference between the number of ION fans and POP fans spectating, as described above. Note that there may be cases in which it would be preferable not to invite any spectators because POP fans would have a majority.

Sample Input 0

```
8
0 1
1 0
2 0
2 0
1 1
5 1
5 1
5 0
```

Sample Output 0

```
2
```

Explanation 0

You could invite persons 6 and 7 to the competition. Then there would be 2 ION fans and no POP fans. You could also invite person 5, who would invite persons 6, 7, and 8. There would be 3 ION fans and 1 POP fan, giving a 2-fan margin. No selection can give a wider margin.

Sample Input 1

```
10
0 1
0 0
1 1
2 0
1 0
2 1
3 1
3 0
3 1
3 1
```

Sample Output 1

```
4
```

Sample Input 2

```
5
0 1
1 1
2 0
3 0
3 0
```

Sample Output 2

```
0
```