Range Messaging

Time Limit	Memory Limit
1 second	512 MB

Statement

Your friend Sid is a teacher at a local primary school and Lia is his assistant. His class consists of N students who are sitting in a line and are numbered 1 to N.

Sid has a very important message to convey to the students in his class. He knows that he can't announce the message to the class as a whole and needs to individually tell the message to each student so that they properly understand. Luckily for Sid, If one student receives the message, they will convey the message to all of their friends, who will further convey the message to all of their friends, and so on.

While Sid was trying to control the class, Lia had observed M friendships between the students. If student u and v are friends, we can say that a friendship exists between them.

Sid, being lazy, wants to only tell the message to students in a continuous range $[L, R]$, L being the first student he tells the message to, and R being the last student he tells the message to. A range $[L, R]$ is said to be valid if the message will be conveyed to all the students in the class after Sid tells the message to students in the range $[L, R]$.

What is the size of the smallest valid range?

Input

The first line contains two integers: N and M, the number of students in Sid's class and the number of friendships observed by Lia.

The following M lines contain two integers: u_i and v_i, stating a friendship exists between the students numbered u_i and v_i. All pairs of u_i and v_i are unique.

Output

Output a single integer: The size of the smallest valid range.

Sample Input 1

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

Sample Input 2

```
3 1
1 3
```

Sample Output 1

3

Sample Output 2

2

Explanation

- For Sample Input 1, we can achieve a valid range of size 3 with $L = 2$ and $R = 4$. After Sid tells the message to students numbered $[2, 4]$, student 2 will convey the message to student 1 and student 6, and student 4 will convey the message to student 5. A valid range of size less than 3 is not possible.

Constraints

- $1 \leq N \leq 10^5$

- $0 \leq M \leq \min(N \times (N-1)/2, 10^5)$

Subtasks

Number	Points	Other constraints
1	10	$M = 0$
2	17	$N \leq 100$
3	25	$N \geq 3$ (see below)
4	15	$N \leq 1000$
5	33	No further constraints.

Additionally, for Subtask 3, each student (excluding 1, 2 and N) has a friendship with exactly one of student 1, student 2 or student N, either directly or indirectly.