Flavours Galore!

Problem ID: flavoursgalore

Time limit: 5 seconds

Kiki is trying to make a tall tower of scoops of ice cream using various flavours. She always eats ice cream from the top down, and she does not mind if there are multiple scoops of the same flavour in the tower. However, she only accepts some flavours directly on top of other flavours. This is because Kiki finds that some flavours taste bad if you eat them immediately after certain other flavours.

For example, suppose she has three flavours to choose from, x, y, and z where x is acceptable on top of y and y is acceptable on top of z. In this case, no other pairs of flavours are acceptable ((x, x), (x, z), (y, x), (y, y), (z, x), (z, y), and (z, z)). All of the following are ice creams (in top down order) Kiki might make: x, y, z, xy, yz, xyz, or an empty ice cream.

How many scoops are in the tallest ice cream that Kiki can make?

Input

The first line of input contains an integer F ($1 \leq F \leq 10^5$), which is the total number of flavours. The second line of input contains an integer P ($0 \leq P \leq 10^5$), which is the number of pairs of flavours such that one is acceptable on top of the other.

The following n lines of input describe which flavours are acceptable on top of which other flavours. Each line contains two integers x ($1 \leq x \leq F$) and y ($1 \leq y \leq F$), which represent that flavour x is acceptable on top of flavour y. Each of these lines are distinct. Note that $x = y$ is possible.

Output

Display the number of scoops in the tallest ice cream possible, or -1 if the number can be arbitrarily large.

Sample Input 1

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

Sample Output 1

```
-1
```

Sample Input 2

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

Sample Output 2

```
3
```