Problem A
Tom and Jerry
Time Limit: 3 seconds

Tom and Jerry are playing hide-and-seek in a magical castle with *N* rooms. Each room has a unique label from 1 to *N*, and has at least one magic portal to other rooms. Both Tom and Jerry know the map of the castle, including all rooms and magic portals.

Initially, Jerry can randomly choose a room to hide. Of course, Tom does not know where Jerry is.

In each turn, Tom uses a magic mirror to scan the room *k* to find Jerry. If Jerry is in room *k*, the game is over. Otherwise, Jerry can use a magic portal in his current room to teleport to another room.

Your task is to help Tom to determine the shortest sequence of rooms to scan with his magic mirror so that Tom can always find Jerry.

Input

The first line of input contains two positive integer numbers *N* and *M*, where *N* is the number of rooms, and *M* is the number of magic portals ($1 < N \le 20$; $0 \le M \le (N-1)*N$).

Each of the next *M* lines contains two different numbers, the labels of the source and target rooms of a magic portal.

Output

Display the minimum number of rooms to scan to find Jerry. If there is no solution, simply display `-1`.

Sample Input

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

Sample Output

```
3
```

Explanation: Tom can use the following sequence to scan rooms: `1 1 1`. By this way, Tom can always find Jerry with at most 3 turns.