IOITC 2020 Practice Test 4

Circuit

You are given a directed graph with N nodes (numbered 1 to N) and M edges. You are currently at node 1. You want to traverse along the edges of the graph and return to node 1. You are allowed to traverse atmost one edge in the opposite direction at most once. (In particular, you can't traverse an edge in the opposite direction more than once). It is allowed to visit a vertex more than once. It is also allowed to traverse an edge (in its direction) more than once. Formally, let $1 = v_1, v_2, \ldots, v_k = 1$ be the sequence of nodes you visited. Then, one of the following must be true:

- For each $1 \leq i < k$, there exists an edge from v_i to v_{i+1}.
- There exists some $1 \leq j < k$, such that there exists an edge from v_{j+1} to v_j, and for all $1 \leq i < k$ with $i \neq j$, there exists an edge from v_i to v_{i+1}.

  You have to maximize the number of distinct nodes visited.

Input

- The first line contains N and M, the number of nodes and the number of edges in the graph respectively.
- The next M lines contain two integers a and b denoting a directed edge from a to b.

Output

Print the maximum possible number of distinct nodes you can visit.

Test Data

In all inputs, $1 \leq a, b \leq N$, $a \neq b$. No edge appears more than once in the input.

Subtask 1 (40 Points): $1 \leq n, m \leq 300$

Subtask 2 (60 Points): $1 \leq n, m \leq 10^5$

Sample Input 1

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

Sample Output 1

```
3
```

The sequence of vertices $1, 2, 4, 1$ has 3 distinct nodes which is the best possible answer. There is a single edge $(1 \to 4)$ traversed in the opposite direction. Note that the same edge can't be traversed in the opposite direction again, otherwise the answer would have been 4 (as the sequence $1, 2, 4, 1, 3, 4, 1$ would be valid).

Sample Input 2

```
7 10
1 2
3 1
2 5
2 4
3 7
3 5
3 6
6 5
7 2
4 7
```

Sample Output 2

```
6
```

The sequence $1, 2, 4, 7, 2, 5, 3, 1$ is valid and has 6 distinct nodes.

Limits

Time: 1 second

Memory: 512 MB