Educational DP Contest AtCoder G - Longest Path

Time limit: 1.0s **Memory limit:** 1G

There is a directed graph G with N vertices and M edges. The vertices are numbered $1, 2, \ldots, N$, and for each i $(1 \leq i \leq M)$, the i-th directed edge goes from Vertex x_i to y_i. G **does not contain directed cycles.**

Find the length of the longest directed path in G. Here, the length of a directed path is the number of edges in it.

Constraints

- All values in input are integers.
- $2 \leq N \leq 10^5$
- $1 \leq M \leq 10^5$
- $1 \leq x_i, y_i \leq N$
- All pairs (x_i, y_i) are distinct.
- G **does not contain directed cycles.**

Input Specification

The first line will contain 2 space separated integers N, M.

The next M lines will contain 2 space separated integers, x_i, y_i.

Output Specification

Print the length of the longest directed path in G.

Sample Input 1

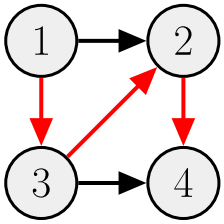
```
4 5
1 2
1 3
3 2
2 4
3 4
```

Sample Output 1

```
3
```

Explanation For Sample 1

The red directed path in the following figure is the longest:



Sample Input 2

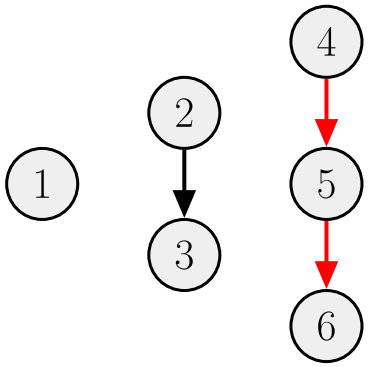
```
6 3
2 3
4 5
5 6
```

Sample Output 2

```
2
```

Explanation For Sample 2

The red directed path in the following figure is the longest:



Sample Input 3

```
5 8
5 3
2 3
2 4
5 2
5 1
1 4
4 3
1 3
```

Sample Output 3

```
3
```

Explanation For Sample 3

The red directed path in the following figure is one of the longest: