# G - Longest Path

Time Limit: 2 sec / Memory Limit: 1024 MB

Score : $100$ points

## Problem Statement

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

Input is given from Standard Input in the following format:

$$
\begin{array}{ll}
N & M \\
x_1 & y_1 \\
x_2 & y_2 \\
: & \\
x_M & y_M
\end{array}
$$

## Output

Print the length of the longest directed path in $G$.

## Sample Input 1 Copy

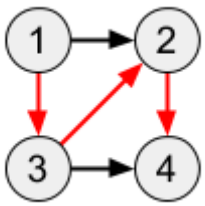
Copy

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

## Sample Output 1 Copy

```
3
```
Copy

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



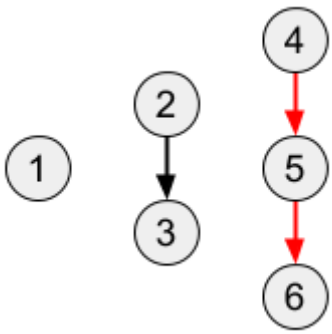

## Sample Input 2 Copy

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

## Sample Output 2 Copy

```
2
```
Copy

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




## Sample Input 3 Copy

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

Copy

## Sample Output 3

Copy

```
3
```

Copy

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