

### A. Topological Order

Given a directed acyclic graph (DAG) find a valid topological order.

Input

First line:  $N$  ( $0 < N \leq 100000$ ), number of nodes.

Second line:  $M$  ( $0 < M \leq 300000$ ), number of edges.

Next  $M$  lines, each:  $U\ V$  ( $0 \leq U, V < N$ ), defines an edge from  $U$  to  $V$ .

Output

Topological Order. See sample for clarification

Sample

Input	Output
6	0
5	1
1 3	2
1 2	5
0 1	3
3 4	4
2 5	

## B. Counting Topological Orders

Given a directed acyclic graph (DAG) find the number of valid topological orders.

Input

First line:  $N$ , number of nodes.

Second line:  $M$ , number of edges.

Next  $M$  lines, each:  $U\ V$  ( $0 \leq U, V < N$ ), defines an edge from  $U$  to  $V$ .

Output

Number of topological orders. See sample for clarification

Sample

Input	Output
4 4 3 1 3 2 1 0 2 0	2

### C. Articulation Points

Given an undirected graph find all of its articulation points.

Input

First line:  $N$  ( $0 < N \leq 100000$ ), number of nodes.

Second line:  $M$  ( $0 < M \leq 300000$ ), number of edges.

Next  $M$  lines. each:  $U\ V$  ( $0 \leq U, V < N$ ), defines an edge between  $U$  and  $V$ .

Output

List all the articulation points in increasing order. See sample for clarification.

Sample

Input	Output
6	1
5	2
1 3	3
1 2	
0 1	
3 4	
2 5	

#### D. Grid Component

Given an  $N \times M$  grid. with blocked cells, find the number of connected empty areas. For each empty cell, it is connected with four cells (if empty): Up, Down, Left and Right You can never step into a blocked cell.

Input

First line:  $N$  ( $0 < N \leq 100$ ).  $M$  ( $0 < M \leq 100$ ).

Next  $N$  lines, each contains  $M$  characters “.” indicates an empty cell. “#” indicates blocked cells.

Output

One line with the number of different connected areas. See sample for more clarification.

Sample

Input	Output
5 3 ... ### ... .#. ...	2

## E. Removable Devices

Mr. John is in charge of a network that connects  $n$  devices. Each device in the network is capable of connecting to another device directly or indirectly through a path containing other devices. A device is a removable device if that can be turned off or removed from the network without hampering the connectivity among other devices.

### Input

First line:  $N$  ( $0 < N \leq 100000$ ), number of devices.

Second line:  $M$  ( $0 < M \leq 300000$ ), number of direct connections.

Next  $M$  lines. each:  $U\ V$  ( $0 \leq U, V < N$ ), defines a direct connection between devices  $U$  and  $V$ .

### Output

The number of devices removable devices.

### Sample

Input	Output
6	3
5	
1 3	
1 2	
0 1	
3 4	
2 5	