

Problem A. Happy Birthday

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Dariga's birthday is coming soon and she wants to invite n different friends to her birthday. There are m pairs of people who, if the first one doesn't come to the birthday, the second one also will not come and in the same way for the second one (unoriented). As far as it's quarantine she wants to minimize the number of people who will come to her birthday, meanwhile she does not want to be alone. Print what is the minimum number of people she can invite to the birthday, so that at least there will be one person in birthday

Input

The first line contains two integers n, m ($1 \leq n \leq 100000, 1 \leq m \leq 100000$) — the number of people and pairs of people who wants to be together in birthday. The next m lines contains two integers ($1 \leq a[i], b[i] \leq n$) that means $a[i]$ and $b[i]$ are close friends

Output

Print the minimum number of people she invite to the birthday

Examples

standard input	standard output
5 4 1 2 2 3 3 1 4 5	2
4 3 1 2 2 3 3 4	4
5 0	1

Problem B. KH₂O - potassium hydroxide???

Input file: standard input
Output file: standard output
Time limit: 1 second
Memory limit: 256 megabytes

One minion is learning chemistry but its going to be so hard. One day when he was doing an experiment with potassium and oxygen, he accidentally blew up the flask. Now this time he wants to be careful with the elements. It has an adjacency matrix where it is written which element can be added with which, and which cannot be added. The teacher gave him q different requests where each request has 3 chemical elements, it is necessary to say whether it is possible to add these 3 elements so that the flask does not explode.

Input

The first line contains two integers n, q ($1 \leq n \leq 1000, 1 \leq q \leq 100000$) — the number of elements and number of queries

The next n lines contains n integers $a[i][j]$, that means element i can be added to element j if $a[i][j] = 1$ and if $a[i][j] = 0$ they cannot be added $a[i][i]$ is equal 1 always

Output

Print "YES" if we can add 3 elements, otherwise print "NO"

Example

standard input	standard output
4 4	YES
1 1 0 1	NO
1 1 1 1	YES
0 1 1 0	NO
1 1 0 1	
1 2 4	
2 3 4	
1 2 2	
3 3 4	

Problem C. Marios War

Input file: standard input
Output file: standard output
Time limit: 2 seconds
Memory limit: 256 megabytes

Here is the field, where each cell can have one of three values:

- "0 an empty cell;
- "1 a cell with the brown mushroom;
- "2 a cell with Mario.

Every minute, Mario crushes any brown mushroom that is adjacent to his position (up, down, top, bottom) and new Mario appears instead of mushroom, Mario does not move to the empty cell.

How many minutes will it take for Mario to kill all brown mushrooms in each cell? The number of Marios can be more than one. If this is impossible, return -1.



Input

The first line contains two integers, m - number of rows of a field, n - number of columns of a field ($1 \leq m, n \leq 1000$). The following m lines contain n values (0, 1, or 2).

Output

Print the minimum time (in minutes) that must elapse until no cell will contain a brown mushroom. If any mushroom is unreachable for every Mario in a field print -1.

Examples

standard input	standard output
3 3 2 1 1 1 1 0 0 1 1	4
3 3 2 1 1 0 1 1 1 0 1	-1
1 3 0 2 0	0

Note

The picture illustrates the procedure of the first example.

In the second example, the mushroom at (3, 1) is unreachable, because Mario can move 4-directionally. So, the output is -1.

In the last example, there are no brown mushrooms, there is nothing to kill, so the answer is 0.

Problem D. Zarobek entered KBTU

Input file: standard input
Output file: standard output
Time limit: 1 second
Memory limit: 256 megabytes

Zarobek is currently first-year student at KBTU University. He just entered the University and he does not yet know which subjects in what order should be taken. He knows for each subject what prerequisites are required to take the subject. He needs to know in what order the subjects should be learned, so when taking the subject all prerequisites should be taken before. Help him to find order so he take diploma at the end

Input

The first line contains two integers n, m ($1 \leq n \leq 100000, 1 \leq m \leq 100000$) — the number of subjects and pairs of prerequisites The next m lines contains two integers id of the subject ($1 \leq a[i], b[i] \leq n$) that means $a[i]$ is prerequisite of $b[i]$

Output

Print one line the order in which the subjects should be learned. Its guaranteed that there wouldn't be any cycle

Examples

standard input	standard output
5 4 1 2 2 3 3 5 5 4	1 2 3 5 4
3 2 3 1 3 2	3 2 1

Problem E. Silent Siren

Input file: standard input
Output file: standard output
Time limit: 1 second
Memory limit: 256 megabytes

There's an oriented graph of n vertices and m edges. There are also two kinds of operations:

Reverse the direction of edges of the graph. This operation takes 1 seconds.

Move from vertex a to vertex b if edge $a \rightarrow b$ exists. This operation takes 1 seconds.

Since I can't process 10^5 vertices in my head, I am once again asking ~~for your financial support~~ you to write program that calculates minimum number of seconds to reach vertex n from vertex 1.

Input

First line contains two integers $1 \leq n, m \leq 10^5$. Next m lines contain two integers $1 \leq a, b \leq n$, which means that there is an edge $a \rightarrow b$ in graph.

Output

Output single integer - minimum time. It's guaranteed that it's possible to reach vertex n from vertex 1 using given operations.

Example

standard input	standard output
5 4 1 2 3 2 3 4 4 5	6