Cat Town

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

Ranald, the mayor of Cat Town, has decided that it was time to open Cat Town to tourists, so as to reap a share of precious tourism income. There are N tourist attractions in Cat Town, numbered from 0 to $N-1$, and M one-way roads, where each road i allows any cat to travel from attraction A_i to attraction B_i ($0 \leq A_i, B_i < N$). Cat Town's hub is located at attraction 0, so Ranald wants all attractions to be directly or indirectly reachable from attraction 0.

Also, Ranald has a pet peeve, and does not like cycles. He believes in getting to the point and not beating around the bush, and therefore has reflected that in his town planning. As such, if there is a way to get from attraction x to attraction y, there will be no way to get from attraction y to attraction x. No two roads will have both the same A_i and the same B_i.

To make his town more attractive to tourists, he has decided to designate some of the roads in Cat Town as *tourist roads*, which are reserved for tourists only. This newly created network of *tourist roads* must also satisfy Ranald's condition that all attractions are directly or indirectly reachable from attraction 0 *using tourist roads only*, as Ranald believes it is insulting to the lofty tourists to have to interact with the commoners.

However, after the implementation of such a scheme, Ranald has received complaints that this has caused traffic congestion in many tourist attractions where *tourist roads* diverge, and the cats in the affected areas have threatened to vote him out.

After an extensive amount of research, Ranald has concluded that the amount of traffic congestion present in Cat Town is proportional to the maximum number of *tourist roads* leading out of any attraction. Therefore, he wants you, the urban planner of Cat Town, to select a subset of roads in Cat Town as *tourist roads* such that the maximum number of *tourist roads* leading out of any attraction is as small as possible.

Input

The first line of input will contain two integers, N and M. The next M lines of input will contain two integers each, representing A_i and B_i for each i.

Output

The output should contain one line with one integer, the maximum number of *tourist roads* leading out of any attraction, provided the subset of roads are selected optimally. If Ranald has made a mistake and not all attractions are reachable from attraction 0, output -1 instead.

Examples

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

Note

Your program will be tested on 6 sets of input instances as follows:

Subtask 1 (points: 16)

$1 \leq N \leq 10$, $1 \leq M \leq \frac{N(N-1)}{2}$.

Subtask 2 (points: 17)

$1 \leq N, M \leq 20$.

Subtask 3 (points: 21)

$1 \leq N, M \leq 400$.

Subtask 4 (points: 20)

$1 \leq N, M \leq 3000$, each attraction will have at most 2 roads leading out of it.

Subtask 5 (points: 26)

$1 \leq N, M \leq 10000$.

Subtask 6 (points: 0)

Refer to sample input and output.