Task: HYD
Hydrocontest

Byteasar's and Bythony's plumbing crews are to connect the village of Lower Bits to the water supply pipe network. The pipes are to be laid beneath the streets of the village. There are exactly m streets and n intersections in Lower Bits. Every pair of intersections are connected via the street network.

To make the dull pipe-laying work entertaining, Byteasar and Bythony have agreed to play the following game. Initially, both crews are located at a single intersection, and they will remain together throughout the game. From there, the crews make alternating moves, starting with Byteasar's. A move consists in choosing a street segment that is adjacent to the current intersection and has no pipes beneath it. Then the moving crew lays the pipes along the chosen street segment, both crews following it to the other end, where the opposing team gets to make their move.

A crew that cannot make a move loses, and has to lay all the remaining pipes. Byteasar is wondering which intersection should the game begin at so that he can win regardless of Bythony's moves. More to the point, he has asked you to prepare a list of all such intersections. To aid you, he shared his observation about the village's street network: *starting in the middle of any street segment, there is a unique way to "make a loop" and return to this point neither turning back nor visiting any intersection twice along the loop.*

Input

The first line of the standard input contains two integers n and m, separated by a single space, which specify the number of intersections and of street segments respectively. The intersections are numbered from 1 to n. The m lines that follow describe the street network: each holds two integers a, b ($1 \le a, b \le n$, $a \neq b$), separated by a single space, which indicate that the intersections no. a and b are directly linked by a single street segment. You may assume that no pair of intersections is linked by more than one street segment.

Output

Exactly n lines should be printed to the standard output, the i-th of them containing the number 1 if Byteasar can always win when the game begins at the intersection no. i; otherwise it should hold the number 2.

Example

For the input data:

```
6 7
1 2
2 3
3 1
3 4
4 5
5 6
6 3
```

the correct result is:

```
1
1
1
2
1
2
```

Sample grading tests:

1ocen: $n = 9$, $m = 12$, the street network consists of four "loops": 1–2–3–1, 1–4–5–1, 1–6–7–1, and 1–8–9–1.

2ocen: $n = 998$, $m = 999$, for each j such that $1 \le j < n$, there is a street segment linking the j-th and the $(j+1)$-th intersection; moreover, there are street segments linking the intersections 1 and 499, as well as 499 and 998.

3ocen: $n = 500\,000$, $m = 500\,000$, the street network forms a single "loop".

Grading

The set of tests consists of the following subsets. Within each subset, there may be several test groups.

Subset	Property	Score
1	$3 \leq n, m \leq 20$	21
2	$3 \leq n, m \leq 1000$	39
3	$3 \leq n, m \leq 500\,000$	40