

E. Special Graph

Time limit : 1 sec

Memory Limit : 256 MB

Problem Statement

Given a directed graph with N vertices and M edges, a special path is a path which starts and ends at the same vertex. Formally, a path $(a_1, a_2, a_3 \dots a_{k-1}, a_k)$ is special iff $a_1 = a_k$ and all $a_i (2 \leq i \leq K - 1)$ are distinct and not equal to a_1 . A vertex is special if there exists at least one special path starting from that vertex. You need to find for each vertex, whether it is a special vertex or not.

Note - A path of length 1 is not considered special.

Input

The first line of the input contains two space separated integers N ($1 \leq N \leq 10^5$) and M ($1 \leq M \leq 2 * 10^5$), the number of nodes and the number of directed edges in the graph. The following M lines contain two space separated integers $u \ v$ ($1 \leq u, v \leq N$) denoting a directed edge in the graph from vertex numbered u to vertex numbered v .

Output

Output N space separated integers where the i th integer is 1 if the vertex numbered i is a special vertex, 0 otherwise.

Sample Input 1

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

Sample output 1

```
0 1 1 1 0
```

Explanation

Vertex 2 is special because the path 2 - 3 - 4 - 2 satisfies the given condition. Similarly, vertex 3 and 4 are special. Vertex 1 and 5 are not special because no such path exists for either of the two nodes.