CODEFORCES$^\beta$
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HOME TOP CONTESTS GYM PROBLEMSET GROUPS RATING API HELP HONORCUP 🏆 CALENDAR 🔍

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

D. Complete Tripartite

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You have a simple undirected graph consisting of n vertices and m edges. The graph doesn't contain self-loops, there is at most one edge between a pair of vertices. The given graph can be disconnected.

Let's make a definition.

Let v_1 and v_2 be two some nonempty subsets of vertices that do not intersect. Let $f(v_1, v_2)$ be true if and only if all the conditions are satisfied:

1. There are no edges with both endpoints in vertex set v_1.
2. There are no edges with both endpoints in vertex set v_2.
3. For every two vertices x and y such that x is in v_1 and y is in v_2, there is an edge between x and y.

Create three vertex sets (v_1, v_2, v_3) which satisfy the conditions below;

1. All vertex sets should not be empty.
2. Each vertex should be assigned to only one vertex set.
3. $f(v_1, v_2)$, $f(v_2, v_3)$, $f(v_3, v_1)$ are all true.

Is it possible to create such three vertex sets? If it's possible, print matching vertex set for each vertex.

Input

The first line contains two integers n and m ($3 \le n \le 10^5$, $0 \le m \le \min(3 \cdot 10^5, \frac{n(n-1)}{2})$) — the number of vertices and edges in the graph.

The i-th of the next m lines contains two integers a_i and b_i ($1 \le a_i < b_i \le n$) — it means there is an edge between a_i and b_i. The graph doesn't contain self-loops, there is at most one edge between a pair of vertices. The given graph can be disconnected.

Output

If the answer exists, print n integers. i-th integer means the vertex set number (from 1 to 3) of i-th vertex. Otherwise, print -1.

If there are multiple answers, print any.

Examples

input   Copy
```
6 11
1 2
1 3
1 4
1 5
1 6
2 4
2 5
2 6
3 4
3 5
3 6
```

output   Copy
```
1 2 2 3 3 3
```

input   Copy

Sidebar

Codeforces Round #589 (Div. 2)
Finished
Practice
⭐

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest]

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Clone Contest to Mashup

You can clone this contest to a mashup.

[Clone Contest]

→ Submit?

Language: GNU G++11 5.1.0 ▼
Choose file: 选择文件 未选择任何文件

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

[Submit]

→ Problem tags

graphs hashing implementation
No tag edit access

→ Contest materials

- Announcement (en)   ✕
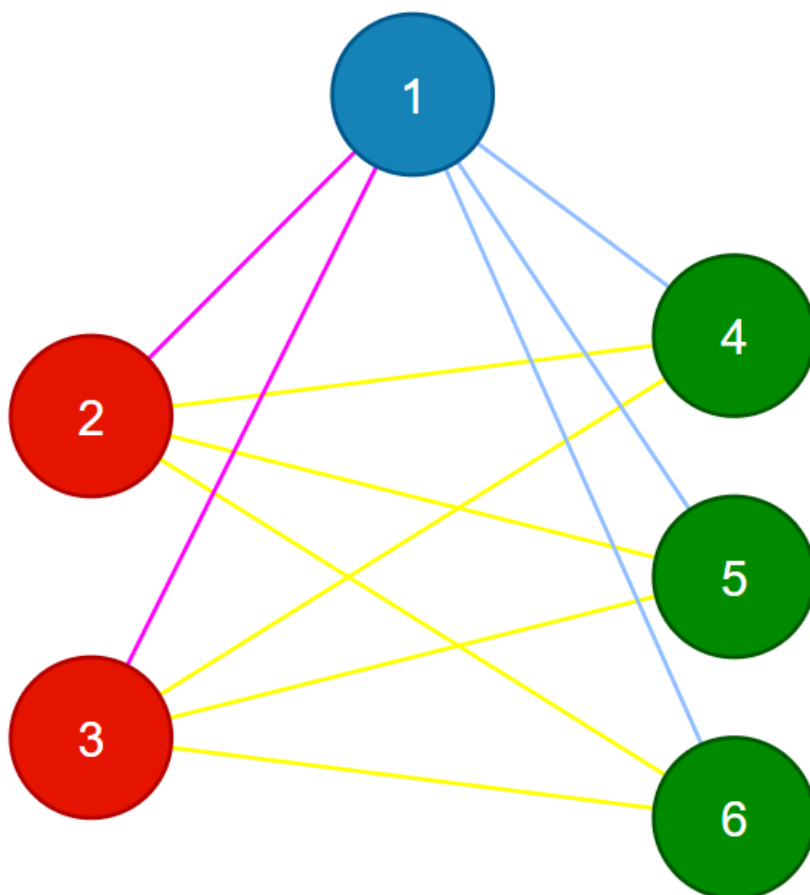- Tutorial (en)   ✕

```
4 6
1 2
1 3
1 4
2 3
2 4
3 4
```

output	Copy

```
-1
```

Note

In the first example, if $v_1 = \{1\}$, $v_2 = \{2,3\}$, and $v_3 = \{4,5,6\}$ then vertex sets will satisfy all conditions. But you can assign vertices to vertex sets in a different way; Other answers like "2 3 3 1 1 1" will be accepted as well.

In the second example, it's impossible to make such vertex sets.