Competitive Programming SS24

Submit until end of contest

Problem: Aliens Alliance (2 second timelimit)

In the galaxy of **Algoria**, a group of intelligent and peaceful aliens lives in harmony. However, their serene lifestyle will soon be threatened, as they have discovered that humans on Earth are preparing for war against them. To stand a chance in this impending battle, the aliens of Algoria have to form strong alliances.

The challenge lies in the fact that humans have developed a powerful weapon capable of destroying any **Odd Nexus Alliance**. This weapon poses a significant threat to the aliens, so they need to carefully form their alliances in order to avoid annihilation.

In Algoria, two aliens a and b that form an alliance, are denoted as $a \sim b$ and k aliens $a_1, a_2, ..., a_k$ create an Odd Nexus Alliance of size k if $a_1 \sim a_2, a_2 \sim a_3, ..., a_{k-1} \sim a_k$ and also $a_1 \sim a_k$, where k is odd.

The army commander of Algoria, tasked with organizing the defense, would issue alliance orders in the form $i\ j$, meaning aliens i and j should ally together. In the beginning, there is no alliance between any two aliens. As a strategic consultant to the Algoria army, it is your responsibility to determine whether the alliances formed after each order would withstand the human weapon or not. To this end, you have to provide a string of 0's and 1's where the i-th character is:

- 1, if after the ith alliance order there is no Odd Nexus Alliance among the currently formed alliances;
- 0, if after the ith alliance order an Odd Nexus Alliance can be found (and therefore annihilated by the human weapon).

Input The input consists of:

- One line with two integers n and m ($2 \leq n \leq 5 \cdot 10^4$, $1 \leq m \leq 5 \cdot 10^4$), the number of aliens in Algoria and the number of alliance orders issued by Algoria's army commander.
- m lines, each with two integer u and v ($1 \leq u, v \leq n, u \neq v$), describing that an alliance should be formed between alien u and alien v.

Output Output a string of length m, consisting of 0 and 1 characters, where the ith character must be 1 if the alliance formed after the ith order would withstand the human weapon, and 0 otherwise.

Sample Input 1

```
3 3
1 2
2 3
3 1
```

Sample Output 1

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110
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Sample Input 2

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

Sample Output 2

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1100
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