Problem O. New School Term

Time limit: 3 seconds
Memory limit: 1024 megabytes

There are $2N$ students at NPCA School, and each student is assigned a unique number from 1 to $2N$. Napuka-kun is a teacher at NPCA School and needs to divide the students into **two classes of N students each**.

The dissatisfaction of the class division is defined as follows:

- For each integer i ($1 \leq i \leq M$), if student A_i and student B_i are in the same class, add 2^i to the total dissatisfaction.

Construct one way of class division that minimizes the dissatisfaction for Napuka-kun.

Constraints

- $1 \leq N \leq 5000$
- $0 \leq M \leq 10^6$
- $1 \leq A_i < B_i \leq 2N$
- If $i \neq j$, then $(A_i, B_i) \neq (A_j, B_j)$
- All input values are integers

Input

The input is given from standard input in the following format:

N M
A_1 B_1
A_2 B_2
$\vdots$
A_M B_M

Output

Output should be in the following format:

$S_1 S_2 \ldots S_{2N}$

Here, S_i is either '0' or '1', indicating which class student i belongs to.

If there are multiple valid class divisions, you may output any one of them.

Examples

standard input	standard output
2 4 1 3 2 4 1 4 1 2	0101
3 7 2 5 1 3 4 6 2 6 4 5 2 4 5 6	001101

Note

For the first sample case:

When dividing into a class consisting of students 1 and 3, and another class consisting of students 2 and 4, the dissatisfaction is calculated as follows:

- For $i = 1$, students 1 and 3 are in the same class.
- For $i = 2$, students 2 and 4 are in the same class.
- For $i = 3$, students 1 and 4 are in different classes.
- For $i = 4$, students 1 and 2 are in different classes.

Thus, the total dissatisfaction for this division is $2^1 + 2^2 = 6$, which is the minimum. You may output '1010'.

If you divide as '0111', the dissatisfaction is 4, but the classes do not have exactly N students each, so it does not satisfy the conditions.