Problem A. The Expert

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	512 megabytes

We need you to draw seven red lines, all of them strictly perpendicular; some with green ink and some with transparent, and one in the form of a kitten.

Technical specification

You're asked to draw n distinct lines on a plane that are parallel to the coordinate axes. Some pairs of the lines are required to be parallel, and some pairs are required to be perpendicular. All lines must be described by equations $a \cdot x + b \cdot y + c = 0$, where a, b and c are integers. Let the i-th line be described as $a_i \cdot x + b_i \cdot y + c_i = 0$. Your task is to minimize the size of set containing all numbers a_i, b_i and c_i. In other words, you need to minimize the number of different coefficients used in description of all lines.

Calculate the minimum number of different coefficients used to draw the lines, or report that it is impossible. If there is a solution, find any way to do it using the smallest number of different coefficients.

Input

First line contains two integers n and m, number of lines and number of requirements ($1 \le n, m \le 10^6$).

Next m lines describe requirements. The i-th of these lines consists of three integers t_i, p_i and q_i: if t_i is equal to 0, then lines p_i and q_i must be parallel, otherwise, lines p_i and q_i must be perpendicular to each other ($t_i \in \{0, 1\}$; $1 \le p_i, q_i \le n$; $p_i \ne q_i$).

Output

If no solution exists, print -1.

If solution exists, print the minimal number of different coefficient. Each of the next n lines should consist of three integers, a_i, b_i and c_i — the i-th line coefficients. All coefficients mustn't exceed 10^9 by their absolute value.

Scoring

Subtask	Points	Constraints	Scoring	Required subtasks
1	10	$n, m \le 15$	subtask	—
2	20	$n \le 5\,000$, all $t_i = 0$	subtask	—
3	20	$m = n - 1$, $p_i = 1$, $q_i = i + 1$	subtask	—
4	20	$n \le 5\,000$	subtask	1, 2
5	15	$n \le 100\,000$	subtask	1, 2, 4
6	15	No additional constraint	subtask	1, 2, 3, 4, 5

Feedback

In all subtasks you will be able to see the total score for the subtask and the outcome for the first failed test.

Examples

standard input	standard output
3 3 1 3 2 0 1 3 1 1 2	2 -7 0 0 0 -7 -7 -7 0 -7
2 2 1 1 2 0 2 1	-1

Explanations

In the first example one of the ways to draw the lines:

- $-7 \cdot x + 0 \cdot y + 0 = 0$
- $0 \cdot x - 7 \cdot y - 7 = 0$
- $-7 \cdot x + 0 \cdot y - 7 = 0$

In the second example lines 1 and 2 has to be perpendicular and parallel at the same time. No such lines exist.