Tablica

English Vietnamese

Ivo has an N×N table. The table has the integers 1 through N^2 inscribed in row-major order. The following operations can be done on the table:

1. Rotate a row – all cells in a single row are rotated right, so that the number in the last column moves to the first.

2. Rotate a column – all cells in a single column are rotated down, so that the number in the last row moves to the first.

Ivo occasionally feels the urge to move a number X to cell (R, C) and proceeds as follows:

- While X is not in column C, rotate the row it is in.
- While X is not in row R, rotate the column it is in.

Ivo wants to move K numbers one after another. Write a program that calculates the number of rotations needed.

Input

The first line contains two integers N ($2 \leq N \leq 10\,000$) and K ($1 \leq K \leq 1000$), the table dimension and the number of moves.

Each of the following K lines contains three integers X ($1 \leq X \leq N^2$), R and C ($1 \leq R, C \leq N$), the description of one move Ivo wants to make. Ivo does the moves in the order in which they are given.

Output

Output K lines; for each move, output the number of rotations needed.

Example

Input
4 1
6 3 4

Output
3

Input
4 2
6 3 4
6 2 2

Output
3
5

Input
5 3
1 2 2
2 2 2
12 5 5

Output
2
5
3