

Spiral Pattern

Input file: **standard input**
Output file: **standard output**
Time limit: 5 seconds
Memory limit: 1024 megabytes

As time passed, the people grew fascinated by spiral patterns. They began to notice them in the flow of light, etched into stones, and embedded in the floors of structures.

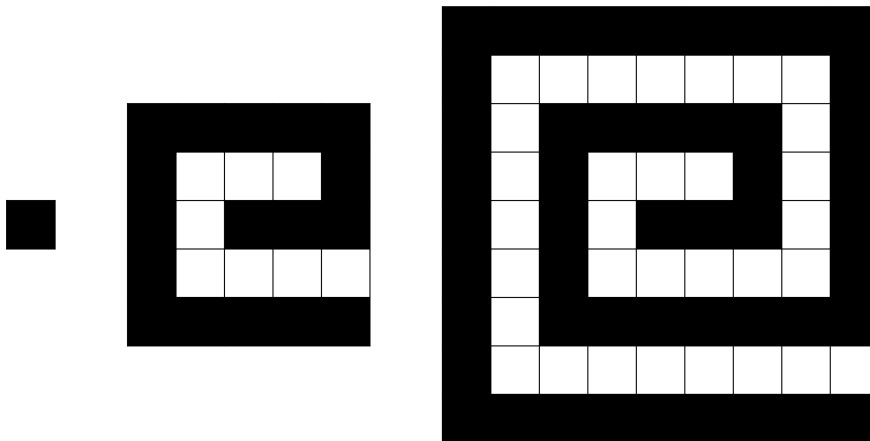
At first, these spirals appeared as subtle signs—but before long, they were seen all across the island.

Follow the traces of these lingering spirals, and restore the forms they once revealed.

The floor of the square plaza is engraved with a grid of size $N \times M$. The cell at the r -th row from the top and c -th column from the left is denoted as (r, c) .

Recently, a total of K spiral patterns have been observed on this grid.

Each spiral is centered at a specific position and has a certain radius. The illustration below shows examples of spiral patterns with radii 0, 2, and 4:



(The grid lines are shown for clarity; only the colored cells represent the actual spiral patterns.)

Determine, for each cell in the grid, how many spiral patterns include that cell.

Input

The first line contains three integers N , M , and K : the number of rows and columns of the grid, and the number of spiral patterns.

The second line contains two integers p and q .

The following K lines each contain three integers r_i , c_i , d_i . This means that the i -th observed spiral pattern is centered at cell (r_i, c_i) with a radius of d_i .

- $2 \leq N \leq 2000$
- $2 \leq M \leq 2000$
- $1 \leq K \leq 10^6$
- $0 \leq p \leq 10^6$
- $0 \leq q \leq 10^6$

- $0 \leq d_i$ ($1 \leq i \leq K$)
- d_i is an even number. ($1 \leq i \leq K$)
- $1 \leq r_i - d_i$ ($1 \leq i \leq K$)
- $r_i + d_i \leq N$ ($1 \leq i \leq K$)
- $1 \leq c_i - d_i$ ($1 \leq i \leq K$)
- $c_i + d_i \leq M$ ($1 \leq i \leq K$)

Output

For all (r, c) where $1 \leq r \leq N$ and $1 \leq c \leq M$, let A_{rc} be defined as the number of spiral patterns that include cell (r, c) . Since outputting all values of A_{rc} would take a lot of time, instead output the following value:

Let A_{rc} be the number of spiral patterns that include the cell at position (r, c) , for all $1 \leq r \leq N$, $1 \leq c \leq M$. Printing all values of A_{rc} would take a lot of time; instead, output a single integer:

$$\sum_{r=1}^N \sum_{c=1}^M ((r \times p) \oplus (c \times q) \oplus A_{rc})$$

Here, \oplus denotes the bitwise XOR operation.

Scoring

- Subtask 1 (2 points): $d_i = 0$ ($1 \leq i \leq K$)
- Subtask 2 (7 points): $K = 1$
- Subtask 3 (4 points): $p = q = 0$
- Subtask 4 (6 points): $N \leq 100, M \leq 100, K \leq 100$
- Subtask 5 (27 points): $K \leq 2000$
- Subtask 6 (16 points): $2d_i + 1 = M$ ($1 \leq i \leq K$)
- Subtask 7 (38 points): No additional constraints.

Examples

standard input	standard output
11 9 3 1 2 5 6 2 7 5 4 1 1 0	1063
37 28 1 79 1101 14 11 8	16529317

Note

The precise definition of the spiral pattern is as follows.

A spiral pattern with a radius of 0 is defined as a single cell of size 1×1 .

For all even integers $d \geq 2$, a spiral pattern with radius d can be created as follows:

- Prepare a grid of size $(2d + 1) \times (2d + 1)$.
- Color the spiral pattern with radius $d - 2$ in the center of the grid.
- Starting from the bottom right cell of the colored cells above, color two more cells to the right.
- From the last colored cell, color $2d - 2$ cells upwards, $2d$ cells to the left, $2d$ cells downwards, and $2d$ cells to the right in order.

Using this method, a spiral pattern with $d = 4$ would look like this:

