



Problem K: Matrix Operations

Time limit: 1s; Memory limit: 256 MB

Given a matrix A of size $(n + 1) \times (m + 1)$ with zero-based indexing. Initially all the elements in the matrix A_{ij} are assigned the value 0 for all $i \in [0, \dots, n]$ and $j \in [0, \dots, m]$. Next you have k operations, each operation you are given 4 integers x_l, y_l, w_l, h_l and your task is to perform increment by 1 for all A_{ij} satisfying $i \in [x_l, \dots, x_l + w_l]$ and $j \in [y_l, \dots, y_l + h_l]$.

The question for you is after finishing all the operations, answer the following 3 questions:

- Count the number of odd elements in the matrix?
- Find the smallest value of $j \times (n + 1) + i$ that satisfy the condition that A_{ij} is odd number?
- Find the largest value of $j \times (n + 1) + i$ that satisfy the condition that A_{ij} is odd number?

Input

The first line contains 3 integers n, m and k . ($0 \leq n, m \leq 10^6, 1 \leq k \leq 20$).

Next k lines: each line contains 4 integers x_l, y_l, w_l, h_l ($0 \leq x_l \leq n, 0 \leq y_l \leq m, 0 \leq w_l \leq n - x_l, 0 \leq h_l \leq m - y_l$).

Output

Print out 3 integers representing the answers. If the number of odd elements in the matrix is 0, please print out "0 -1 -1".

Sample

Input	Output
2 2 1 0 0 1 0	2 0 1
2 3 3 0 0 2 3 0 0 1 0 1 1 1 2	4 2 9
2 3 2 0 0 2 3 0 0 2 3	0 -1 -1