Problem A
Artwork
Problem ID: artwork
Time limit: 4 seconds

A template for an artwork is a white grid of $n \times m$ squares. The artwork will be created by painting q horizontal and vertical black strokes. A stroke starts from square (x_1, y_1), ends at square (x_2, y_2) ($x_1 = x_2$ or $y_1 = y_2$) and changes the color of all squares (x, y) to black where $x_1 \leq x \leq x_2$ and $y_1 \leq y \leq y_2$.

The beauty of an artwork is the number of regions in the grid. Each region consists of one or more white squares that are connected to each other using a path of white squares in the grid, walking horizontally or vertically but not diagonally. The initial beauty of the artwork is 1. Your task is to calculate the beauty after each new stroke. Figure A.1 illustrates how the beauty of the artwork varies in Sample Input 1.

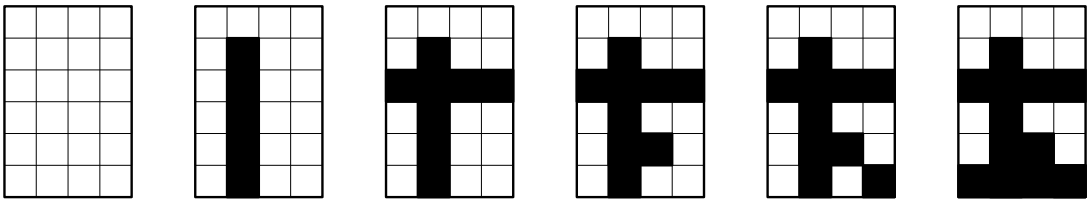


Figure A.1: Illustration of Sample Input 1.

Input

The first line of input contains three integers n, m and q ($1 \leq n, m \leq 1000$, $1 \leq q \leq 10^4$).

Then follow q lines that describe the strokes. Each line consists of four integers x_1, y_1, x_2 and y_2 ($1 \leq x_1 \leq x_2 \leq n$, $1 \leq y_1 \leq y_2 \leq m$). Either $x_1 = x_2$ or $y_1 = y_2$ (or both).

Output

For each of the q strokes, output a line containing the beauty of the artwork after the stroke.

Sample Input 1	Sample Output 1
4 6 5 2 2 2 6 1 3 4 3 2 5 3 5 4 6 4 6 1 6 4 6	1 3 3 4 3

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