

Coding Arena

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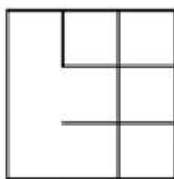
Problem : Counting Squares

Mr Smith, the Mathematics teacher for Standard VI, is an exasperated person. He wants to device a way to keep his class of excited students quiet, so he can catch a bit of sleep (he went to late night showing of Baahubali 2 the previous night).

He drew ten equally spaced horizontal lines and ten equally spaced vertical lines so that they formed 100 1×1 squares. He then erased at random various segments of lines joining points of the grid, and asked the class to count squares of all sizes with sides along the lines that are remaining on the board. He believed that this would take at least an hour.

The class had been taught programming in the summer, and so some students quickly wrote some code to count the squares, and Mr Smith did not get much sleep !

Can you emulate the students? You will be given a set of N horizontal and vertical lines with some missing segments. You need to count the number of squares of all sizes (1×1 , 2×2 , ... $N \times N$) with sides fully present in the remaining lines.



The above, for example is a set of 4 horizontal and 4 vertical equally spaced lines with a number of segments removed. We need to count squares of all sizes with sides along the remaining lines

Input

The first line of the input is a positive integer N giving the number of horizontal and vertical lines.

The second line is a non-negative number m giving the number of segments removed.

Then there are m lines, each containing V,i,j or H,i,j , where i and j are positive integers. H,i,j indicates a horizontal gap in the i^{th} horizontal line between the j^{th} and $(j+1)^{\text{th}}$ point on the line. V,i,j represents a gap in the i^{th} vertical line between the j^{th} and $(j+1)^{\text{th}}$ point on the line.

Output

The output is a single line giving the total number of squares in the figure, with sides along the remaining lines in the figure

Constraints

$$4 \leq N \leq 20$$

$$0 \leq m \leq 40$$

$$1 \leq N$$

$$J \leq (N-1)$$

Example 1

Input

4

4

 $H,2,1$ $H,3,1$ $V,2,2$ $V,2,3$

Output

5

Explanation

There are 4 vertical and horizontal lines, and 4 line segments missing. The first missing horizontal segment is on the second horizontal line, between the first and second point, and the other missing horizontal segment is on the third horizontal line at the same position. The two missing vertical segments are on the second vertical line, and between the second and third, and

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the third and fourth points respectively.

It can be seen that this describes the above figure. There is one 3 x 3 square, zero 2 x 2 squares and four 1 x 1 squares, a total of 5 squares. Hence the output is 5.

Example 2

Input

4

2

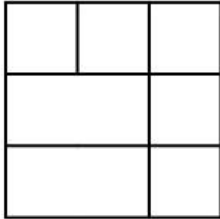
V,2,2

V,2,3

Output

8

Explanation



It has four vertical lines and four horizontal lines. Two vertical segments are missing, on the second line, between the second and third point and the third and fourth point. There is one 3x3 square, two 2 x 2 squares and five 1 x 1 squares with sides along the remaining lines. Hence there are a total of 8 squares remaining, and the output is 8.

Note:

Please do not use package and namespace in your code. For object oriented languages your code should be written in one class.

Note:

Participants submitting solutions in C language should not use functions from <conio.h> / <process.h> as these files do not exist in gcc

Note:

For C and C++, return type of main() function should be int.

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