

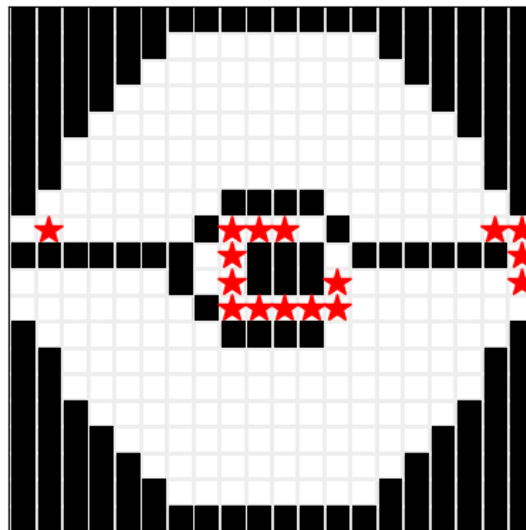
Grid Game

Input file: **standard input**
Output file: **standard output**
Time limit: 4 seconds
Memory limit: 1024 megabytes

Claire loves drawing lines. She receives a sheet of paper with an $n \times n$ grid and begins drawing “lines” on it. Well—the concept of a “line” here is not what we usually think of. Claire refers each line to be a set of consecutive vertical grid cells. When she draws a line, these cells are all covered with black ink. Initially, all the cells are white, and drawing lines turns some of them black. After drawing a few lines, Claire wonders: how many ways she can color an additional white cell black so that the remaining white cells do not form a single connected component.

Two cells are directly connected if they share an edge. Two cells x and y are indirectly connected if there exists a sequence of cells c_0, c_1, \dots, c_k with $k > 1$ such that $c_0 = x$, $c_k = y$, and for every $i \in \{1, 2, \dots, k\}$ the cells c_i and c_{i-1} are directly connected. A set of cells forms a single connected component if each pair of cells in the set is either directly or indirectly connected.

The grid has n rows and n columns, both indexed from 1 to n . Claire will draw q lines. The i -th line is drawn in the y_i -th column, from the s_i -th row to the f_i -th row, where $s_i \leq f_i$ for each $i \in \{1, 2, \dots, q\}$. Note that the cells that are passed by at least one of the q lines are colored black. The following figure shows an example of a 20×20 grid with $q = 67$ lines. The grid cells marked with red star symbols refer to the cells such that, if Claire colors that cell black, all white cells no longer form a single connected component.



You may assume that, after drawing the q lines, the remaining white cells form a single connected component with at least three white cells.

Input

The first line contains exactly one integer t , indicating the number of test cases. For each test case, it begins with a line containing exactly two integers n and q . This indicates that the grid is n by n and that Claire draws q lines on it. Then q lines follow. For each $i \in \{1, 2, \dots, q\}$, the i -th line among the q lines contains exactly three integers y_i , s_i , and f_i .

- $1 \leq t \leq 125$
- $2 \leq n \leq 10^9$
- $q \geq 1$; the sum of all q values is at most 10^5 .

- $1 \leq y_i \leq n$
- $1 \leq s_i \leq f_i \leq n$
- There are at least three white cells and all white cells form a connected component.

Output

Print an integer on a line, indicating how many ways Claire can color an additional white cell black so that the remaining white cells do not form a single connected component.

Example

standard input	standard output
2	5
3 1	15
2 1 2	
5 2	
2 1 4	
4 2 5	