Problem G
Grid Game

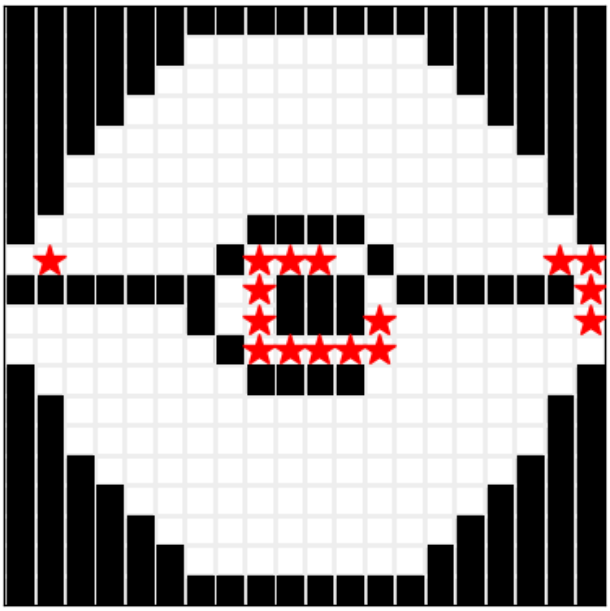
Time limit: 3 seconds

Problem Description

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 to each *line* as 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 $c_0, c_1, \ldots, c_k$ with $k > 1$ such that $c_0 = x$, $c_k = y$, and for every $i \in \{1, 2, \ldots, k\}$ 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 $i \in \{1, 2, \ldots, q\}$. 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 Format

The first line contains exactly one integer t, indicating the number of test cases. Each test case 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 $i \in \{1, 2, \ldots, q\}$, the i-th line among the q lines contains exactly three integers y_i, s_i, and f_i.

Output Format

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.

Technical Specification

- $1 \leq t \leq 125$
- $2 \leq n \leq 10^9$
- $q \geq 1$; 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.

Sample Input 1

```
2
3 1
2 1 2
5 2
2 1 4
4 2 5
```

Sample Output 1

```
5
15
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