
Problem C. Moving Cells

Time limit: 1 second
Memory limit: 512 megabytes

Little Alice has got a modern pixel picture for her birthday.

The picture is a rectangular grid of size $n \times m$. Each column of the grid has one or more consecutive cells colored black, all the other cells are colored white.

Alice considers the picture *beautiful* if there is a path between any two black cells u and v that runs only through the black cells, each time going from a cell to a side-adjacent cell — begin in the black cell u , then go to a side adjacent to u black cell w , then go to a side adjacent to w black cell, and so on, eventually reaching the black cell v .

Since the picture is modern, it can be changed. In one *action* you may select any column and move all black cells in that column one cell in the same direction — up or down. Cells can be moved only if they do not go outside the picture.

Alice wonders what is the minimum number of actions it would take to get a *beautiful* black picture.

Input

The first line of input has two integers n and m — the number of rows and the number of columns in the picture, respectively ($1 \leq n, m \leq 100\,000$). It is guaranteed that the total number of the picture cells does not exceed 10^6 ($1 \leq n \cdot m \leq 1\,000\,000$).

The next m lines contain two integers s_i and t_i each — the starting and the ending positions of black cells in the i -th column of the grid ($1 \leq s_i \leq t_i \leq n$).

Output

Output a single integer — the minimum number of actions you need to make the given picture *beautiful*.

Example

standard input	standard output
9 3 1 2 4 5 7 9	4