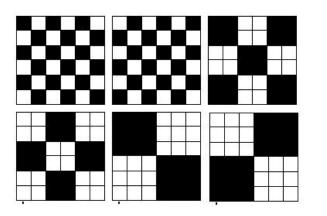# Problem A. Chessboard

Input file:	standard input
Output file:	standard output
Time limit:	2 seconds
Memory limit:	256 megabytes

Tima has $N \times N$ sized checkered board, where K sub-rectangles are painted black and the rest of board in white. The sub-rectangle of the board is a rectangular area with sides parallel to the sides of the board, and whose corners are in integer coordinates. Lines are numbered from top to bottom, columns are numbered from left to right, both from 1 to N.

We call the board *chess* if it can be divided into several identical squares (with side greater than or equal to 1 and **strictly** less than N), and inside of each of these squares all cells are of the same color, and two adjacent squares are of different colors. Two squares are called adjacent if they have a common side. Below we show all possible *chess* boards for $N = 6$:

At one repainting, Tima may change the color of only one cell. If the cell was white, then the cell will be black after repainting, and vice versa. What is the minimal number of repaintings Tima needs to get *chess* board?

Input

The first line of input contains two integers N, K ($2 \leq N \leq 10^5$, $0 \leq K \leq min(N^2, 10^5)$ — the length of the board and the number of black sub-rectangles. In the following K lines there are four integers $x1_i, y1_i, x2_i, y2_i$ ($1 \leq x1_i, y1_i, x2_i, y2_i \leq N$, $x1_i \leq x2_i$, $y1_i \leq y2_i$) — the indices of the upper left and the bottom right corners of the i'th black sub-rectangle, it is guaranteed that no two sub-rectangles intersect.

Output

Output a single integer — the minimal number of repaints to get a *chess* board.

Scoring

This task contains six sub-tasks:

1. $2 \leq N \leq 100$, $K = 0$. Scored 8 points.

2. N — prime number and area of each sub-rectangle is equal to 1. Scored 8 points.

3. $2 \leq N \leq 100, 0 \leq K \leq min(N^2, 1000)$. Area of each sub-rectangle is equal to 1. Scored 15 points.

4. $2 \leq N \leq 1000, 0 \leq K \leq min(N^2, 10^5)$. Area of each sub-rectangle is equal to 1. Scored 16 points.

5. $2 \leq N \leq 10^5, 0 \leq K \leq min(N^2, 10^5)$. Area of each sub-rectangle is equal to 1. Scored 23 points.

6. $2 \leq N \leq 10^5, 0 \leq K \leq min(N^2, 10^5)$. Scored 30 points.

Examples

standard input	standard output
2 0	2
6 8 3 3 3 3 1 2 1 2 3 4 3 4 5 5 5 5 4 3 4 3 4 4 4 4 2 1 2 1 3 6 3 6	14
4 1 4 1 4 4	8

Note

1)

2)

3)