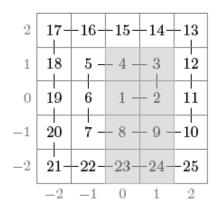
C Spiral

A grid of size $(2n+1) \times (2n+1)$ has been constructed as follows. Number 1 has been placed in the center square, number 2 has been placed to the right of it, and the following numbers have been placed along the spiral counterclockwise.

Your task is to calculate answers for q queries where the sum of numbers in an rectangular region in the grid is requested (modulo 10^9+7). For example, in the following grid n=2 and the sum of numbers in the gray region is 74:



Input

The first input line contains two integers n and q: the size of the grid and the number of queries.

After this, there are q lines, each containing four integers x_1 , y_1 , x_2 and y_2 ($-n \le x_1 \le x_2 \le n$, $-n \le y_1 \le y_2 \le n$). This means that you should calculate the sum of numbers in a rectangular region with corners (x_1,y_1) and (x_2,y_2) .

Output

You should output the answer for each query (modulo $10^9 + 7$).

Example

Input:

2 3 0 -2 1 1

-1 0 1 0

1 2 1 2

Output:

74

9

9 14

Subtasks

In all subtasks $1 \le q \le 100$.

Subtask 1 (12 points)

• $1 \le n \le 1000$

Subtask 2 (15 points)

- $1 \le n \le 10^9$
- ullet $x_1=x_2$ and $y_1=y_2$

Subtask 3 (17 points)

• $1 \le n \le 10^5$

Subtask 4 (31 points)

- $1 \le n \le 10^9$
- $\bullet \ x_1 = y_1 = 1$

Subtask 5 (25 points)

• $1 \le n \le 10^9$