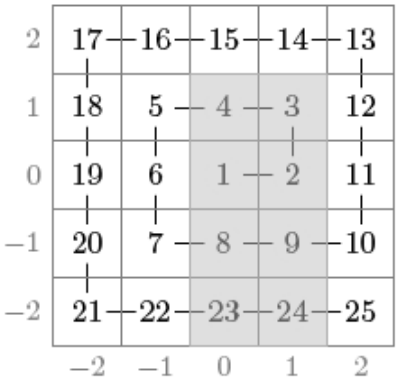
C Spiral

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
14
```

Subtasks

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

Subtask 1 (12 points)

- $1 \leq n \leq 1000$

Subtask 2 (15 points)

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

Subtask 3 (17 points)

- $1 \leq n \leq 10^5$

Subtask 4 (31 points)

- $1 \leq n \leq 10^9$
- $x_1 = y_1 = 1$

Subtask 5 (25 points)

- $1 \leq n \leq 10^9$