

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 a 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:

2	17	16	15	14	13
1	18	5	4	3	12
0	19	6	1	2	11
-1	20	7	8	9	10
-2	21	22	23	24	25
	-2	-1	0	1	2

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 ($-n \leq x_1 \leq x_2 \leq n, -n \leq y_1 \leq y_2 \leq n$). 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 $1 \leq q \leq 100$.

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)

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