## C Spiral

A grid of size $(2 n+1) \times(2 n+1)$ 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 $y_{2}$ ( $-n \leq x_{1} \leq x_{2} \leq n,-n \leq y_{1} \leq y_{2} \leq n$ ). 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:
23
$0-211$
-1 010
1212
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)

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

