



**ALGERIAN OLYMPIAD IN INFORMATICS
& EUREKA NHSM CLUB**

The first AOI College Cup

December 14th, 2024

*Task 3 - Kheira's Second Board Game
This task is worth 100 points*

Task 3 - Kheira's Second Board Game

Time limit per test : 3 second

Memory limit per test : 256 megabytes

Redhouane and Kheira like to take breaks during their IOI training by playing some games. Kheira presents Redhouane with an infinite board where each cell at position (i, j) (with i, j being positive integers) has a value of $|i - j| + 1$. A portion of the board looks like this:

```
1 2 3 4 5 6 . . .
2 1 2 3 4 5 . . .
3 2 1 2 3 4 . . .
4 3 2 1 2 3 . . .
5 4 3 2 1 2 . . .
6 5 4 3 2 1 . . .
. . . . . . . . .
. . . . . . . . .
```

After showing the board, Kheira asks Redhouane t questions. Each question is of the form (i, j, n) , and for each question, Redhouane must find the sum of the values in the square subgrid of size $n \times n$, delimited by the cells (i, j) in the top-left corner and $(i+n-1, j+n-1)$ in the bottom-right corner. Redhouane must then return the remainder of this sum when divided by $10^9 + 7$.

Your task is to help Redhouane by answering each of these t questions.

Input

The first line contains a single integer t ($1 \leq t \leq 10^6$), the number of questions. Each of the next t lines contains three integers i, j , and n ($1 \leq i, j \leq 10^8, 1 \leq n \leq 10^6$), describing the top-left corner (i, j) of the square and the size n of the subgrid.

Output

- For each question, output the remainder of the sum of the values in the specified subgrid when divided by $10^9 + 7$.

Subtasks Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases

Subtask 1 (20 pts) : $t, n \leq 100, 1 \leq i, j \leq 100$

Subtask 2 (20 pts) : $t, n \leq 1000, 1 \leq i, j \leq 100$

Subtask 2 (30 pts) : $t, n \leq 1000, 1 \leq i, j \leq 10^6$

Subtask 4 (30 pts) : $t, n \leq 2 \times 10^6, 1 \leq i, j \leq 10^8$

Examples

Input	Output
2	2535
14 0 13	4730
7 17 20	

Input	Output
3	4880
14 0 18	0
19 18 0	355
17 19 9	