

# Aryan's Thirst for Virat

Time Limit: 3 seconds

Memory Limit: 256MB

It's no secret Aryan *bhaiya* is obsessed with Virat Kohli. The *hot tea* is that he has publicly stated he would "do *anything*" for an autograph.

Today is his chance. Aryan is at a match it's CSK vs RCB IPL 2026 final, and Virat is on the field for the last over, but a valley of fans ( $n \times n$  matrix) stands between them. At position  $(i, j)$  is a fan with a "vibe level" of  $a_{i,j}$ .

If  $a_{i,j} < 0$ , it's a "**vibe hole**" (a hater, or worse, someone wearing a Dhoni's jersey). Aryan *cannot* proceed if there's any hater energy in his path.

To clear the way, Aryan focuses his intense "anything for him" energy. He can pick a **square** area of fans and unleash a "King Kohli!" chant. This chant is so powerful it increases the "vibe" of everyone on the **main diagonal** of that square by exactly one.

More formally, he can choose a submatrix with the upper left corner at  $(i, j)$  and the lower right at  $(p, q)$ , such that  $p - i = q - j$  (a square). He can then add one to each element at  $(i + k, j + k)$ , for all  $k$  such that  $0 \leq k \leq p - i$ .

Determine the **minimum number of times** Aryan must unleash his chant to clear all the hater energy, so he can finally get his autograph.

## Input Format

- The first line contains a single integer  $T$  — the number of test cases.
- Each test case is described as follows:
  - The first line of each test case consists of a single number  $n$ .
  - Each of the following  $n$  lines consists of  $n$  integers separated by spaces, which correspond to the vibe levels  $a$ .

## Constraints

- $1 \leq T \leq 200$
- $1 \leq n \leq 500$
- $-10^9 \leq a_{ij} \leq 10^9$

**NOTE** :- There is no limit in the sum of  $n$  across all test cases

**Tip** :- The constraints are really high, I would suggest you to use fast i/o to read 20 times of the standard cin inputs at once (if using other language then compare with standard input) which may save your solution some time. If you don't know what fast i/o is I have already added that in your hackerank snippet

but still you may contact one of the problem setter. I will also suggest you not to code in python for this specific question , you may use pypy3 instead.

**Output Format**

- For each test case, output the minimum number of chants Aryan will have to use.

**Sample Input 0**

```
4
1
1
2
-1 2
3 0
3
1 2 3
-2 1 -1
0 0 -1
5
1 1 -1 -1 3
-3 1 4 4 -4
-1 -1 3 0 -5
4 5 3 -3 -1
3 1 -3 -1 5
```

**Sample Output 0**

```
0
1
4
19
```

**Explanation 0**

**Test Case 1 ( $N = 1$ ):**

- The grid is:  

1
- The value is positive (**1**). No "vibe holes" to fix.
- **Total chants: 0.**

**Test Case 2 ( $N = 2$ ):**

- The grid is:  

-1 2  
3 0
- **Cell (0,0):** Value is  $-1$ . We need **1 chant**.
- This adds  $+1$  to **(0,0)** and propagates to **(1,1)**.
- New value at **(1,1)** becomes  $0 + 1 = 1$ .

- All other cells are now non-negative.

- **Total chants: 1.**

### Test Case 3 ( $N = 3$ ):

- The grid is:

1 2 3

-2 1 -1

0 0 -1

- **Cell (1,0):** Value is  $-2$ . We need **2 chants**.
- This propagates  $+2$  to cell  $(2, 1)$ .
- New value at  $(2, 1)$  becomes  $0 + 2 = 2$ .
- **Cell (1,2):** Value is  $-1$ . We need **1 chant**.
- Propagates out of bounds.
- **Cell (2,2):** Value is  $-1$ . We need **1 chant**.
- **Total chants:  $2 + 1 + 1 = 4$ .**

### Test Case 4 ( $N = 5$ ):

- This is a larger grid. Following the same logic (fixing negative values from top-left to bottom-right and propagating the fix diagonally), the total number of chants required sums up to **19**.