

# ALGOLYMPICS 2023

## Sample Problem Dimensional Elevator Time Limit: 2 seconds

The Science Pub is a busy pub located in one of the mining belts of Orion Beta, where multitudes of people go to experience the infamous Janx Spirit<sup>1</sup>. The pub is composed of multiple dimensions, layered together like floors in a massive tower. On the first floor is a dimensional elevator, transporting people from floor to floor, one dimension at a time. On its first floor are  $N$  customers, and customer  $i$  needs to be seated on floor  $p_i$ . They have not yet boarded the elevator, but they might need to use it to get to the floor they need to be at!

The dimensional elevator is the only way of going between floors in the Science Pub. The elevator takes 3 seconds to go up or down by one floor. People on any floor may choose to enter the elevator, which is instantaneous. However, it takes a single person 3 seconds to leave the elevator, and people can only leave the elevator one-by-one.

With these conditions, what is the minimum amount of time (in seconds) needed for all customers to reach their corresponding floor?

### Input

Input begins with a single line containing an integer  $T$ , the number of test cases.  $T$  test cases follow. Each test case is described in the following manner.

The first line of each case contains a single integer  $N$ , the number of customers.

The next line contains  $N$  space-separated integers, denoting  $p_1$  to  $p_N$ , the corresponding seating floor of each customer.

### Output

For each test case, output a single line containing the minimum amount of time, in seconds, needed for all customers on the first floor to reach their corresponding floor.

### Constraints

$$1 \leq T \leq 100$$

$$1 \leq N, p_i \leq 10^4$$

Sample Input	Sample Output
2	15
3	30
2 2 3	
4	
2 4 2 7	

### Explanation

In the first test case of the sample input, we have  $N = 3$  customers. Customers 1 and 2 want to go to floor 2, while customer 3 wants to go to floor 3. Customers 1, 2, and 3 board the elevator on the first floor, which is instantaneous. The elevator moves up once to the 2nd floor, which takes 3s. It unloads customers 1 and 2, taking 6s. Finally, it goes up another level and then unloads customer 3, adding another 6s. Altogether, it takes 15s to unload all the people to their corresponding floors, which is the minimum.

<sup>1</sup>An excerpt from the Hitchhiker's Guide to the Galaxy is an ancient Orion mining song:  
"Oh don't give me none more of that Old Janx Spirit  
No, don't you give me none more of that Old Janx Spirit  
For my head will fly, my tongue will lie, my eyes will fry and I may die  
Won't you pour me one more of that sinful Old Janx Spirit"