

# CyberChallenge.IT 2025

## Programming Test

### Indexes [100 points]

#### Problem Statement

The CyberChallenge.IT authors are tired of finding weird stories for the problems they create. They prefer to write numbers. One of them starts writing a sequence  $(a_1, a_2, \dots, a_N)$  of  $N$  positive integers; each of them is between 1 and  $M$  and each of them can be repeated. You need to help him finding how many pairs of integers  $l < r$  are there such that the sequence  $(a_l, a_{l+1}, \dots, a_{r-1}, a_r)$  contains at least one tuple  $(i, j, k)$  of **distinct** indexes such that  $a_i a_j = a_k^2$ .

#### Problem Details

You are given a  $N$ -long array in the form of space-separated integers. You need to find the number of **distinct** pairs  $(l, r)$  that respect the condition mentioned in the problem statement. Note: given that you only need to consider **distinct** pairs  $(l, r)$ , if there are multiple tuples  $(i, j, k)$  respecting the required property inside the same interval, the interval should be counted once.

#### Input

The input consists of  $2T + 1$  lines:

- Line 1: an integer,  $T$ , representing the number of sequences
- Lines 2, ...,  $2T + 1$ : the length  $N$  of each sequence as an integer followed by the sequence itself as space-separated integers, alternated line by line, so that line 2 contains the length of the first sequence, line 3 contains the first sequence, line 4 contains the length of the second sequence, line 5 contains the second sequence, and so on.

#### Output

The output consists of  $T$  lines. Each of them representing the number of pairs  $(l, r)$  for the corresponding input sequence.

#### Scoring

Your program will be tested on a number of testcases grouped in subtasks. In order to obtain the score associated to a subtask, you need to correctly solve all its testcases.

- **Subtask 1** [20 points]:  $1 \leq N \leq 20, 1 \leq M \leq 10$
- **Subtask 2** [40 points]:  $1 \leq N \leq 10^4, 1 \leq M \leq 10$
- **Subtask 3** [30 points]:  $1 \leq N \leq 10^5, 1 \leq M \leq 100$
- **Subtask 4** [10 points]:  $1 \leq N \leq 10^5, 1 \leq M \leq 10^4$

**Examples**

INPUT	OUTPUT
2	1
4	14
1 4 3 2	
10	
2 9 3 1 3 4 10 8 7 1	

**Explanation**

The input contains 2 testcases. In the first one it is clear that the only possible way to pick indexes is  $4 \cdot 1 = 2^2$ , which can be picked only with  $(l, r) = (1, 4)$ . In the second case we can take again the same combination with  $(l, r)$  in  $(1, 6), (1, 7), (1, 8), (1, 9), (1, 10)$ . Another combination is  $9 \cdot 1 = 3^2$ . This can be done picking the subarrays corresponding to  $(1, 4), (1, 5)$  and again the ones used before, that should not be counted twice. Moreover it can be done with the subarrays corresponding to  $(2, 4), (2, 5), (2, 6), (2, 7), (2, 8), (2, 9), (2, 10)$ . There are no more ways to select indexes.