ETH Zurich
Institut für Theoretische Informatik
Prof. Dr. Angelika Steger
Prof. Dr. Emo Welzl
Prof. Dr. Peter Widmayer

HS 2015
Exercise Sheet 0

ACM Programming Challenges Lab

Exercise 1 – *Inversions*

Let $a_1, \ldots, a_N$ be a permutation of numbers from 1 to n. A pair of numbers (a_i, a_j) form an *inversion* of the permutation if $a_i > a_j$ and $i < j$. E.g. In permutation $a_1a_2a_3a_4a_5 = 32415$, pairs of numbers $(a_1, a_2), (a_1, a_4), (a_2, a_4), (a_3, a_4)$ form all the inversions. Your task is to count the number of inversions in a given permutation.

Input The first line of the input file contains an integer giving the number of test cases that follow.

First line of every test starts with a line containing the size of the permutation N, $1 \leq N \leq 10^5$. In each of the next N lines there is only one number. The $i + 1$-th line of a test case contains the value of i-th number of the permutation, i.e. a_i.

Output For each test case, on a single line, output the number of inversions modulo 10^4.

Sample Input

```
1
5
3
2
4
1
5
```

Sample Output

```
4
```

(Points)*100