

D. Sum of LDS

time limit per test: 2 seconds
memory limit per test: 256 megabytes

You're given a permutation* p_1, \dots, p_n such that $\max(p_i, p_{i+1}) > p_{i+2}$ for all $1 \leq i \leq n - 2$.

Compute the sum of the length of the longest decreasing subsequence[†] of the subarray $[p_l, p_{l+1}, \dots, p_r]$ over all pairs $1 \leq l \leq r \leq n$.

*A permutation of length n is an array consisting of n distinct integers from 1 to n in arbitrary order. For example, $[2, 3, 1, 5, 4]$ is a permutation, but $[1, 2, 2]$ is not a permutation (2 appears twice in the array), and $[1, 3, 4]$ is also not a permutation ($n = 3$ but there is 4 in the array).

[†] Given an array b of size $|b|$, a decreasing subsequence of length k is a sequence of indices i_1, \dots, i_k such that:

- $1 \leq i_1 < i_2 < \dots < i_k \leq |b|$
- $b_{i_1} > b_{i_2} > \dots > b_{i_k}$

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10\,000$). The description of the test cases follows.

The first line of each test case contains a single integer n ($3 \leq n \leq 500\,000$).

The second line of each test case contains n integers p_1, p_2, \dots, p_n ($1 \leq p_i \leq n$, p_i are pairwise distinct).

It is guaranteed that $\max(p_i, p_{i+1}) > p_{i+2}$ for all $1 \leq i \leq n - 2$.

The sum of n over all test cases does not exceed 500 000.

Output

For each test case, output the sum over all subarrays of the length of its longest decreasing subsequence.

Example

input	Copy
4 3 3 2 1 4 4 3 1 2 6 6 1 5 2 4 3 3 2 3 1	
output	Copy
10 17 40 8	

Note

For any array a , we define $\text{LDS}(a)$ as the length of the longest decreasing subsequence of a .

In the first test case, all subarrays are decreasing.

In the second one, we have

Codeforces Round 1039 (Div. 2)

Finished

Practice



→ Virtual participation

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Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++17 7.3.0

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
336063378	Aug/29/2025 01:25	Time limit exceeded on test 4
336061511	Aug/29/2025 00:40	Memory limit exceeded on test 4

→ Contest materials

- Announcement (en)
- Tutorial (en)

$$\text{LDS}([4]) = \text{LDS}([3]) = \text{LDS}([1]) = \text{LDS}([2]) = 1$$

$$\text{LDS}([4, 3]) = \text{LDS}([3, 1]) = 2, \text{LDS}([1, 2]) = 1$$

$$\text{LDS}([4, 3, 1]) = 3, \text{LDS}([3, 1, 2]) = 2$$

$$\text{LDS}([4, 3, 1, 2]) = 3$$

So the answer is $1 + 1 + 1 + 1 + 2 + 2 + 1 + 3 + 2 + 3 = 17$.

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