

F. Mani and Segments

time limit per test: 3 seconds
memory limit per test: 256 megabytes

An array b of length $|b|$ is *cute* if the sum of the length of its Longest Increasing Subsequence (LIS) and the length of its Longest Decreasing Subsequence (LDS)* is **exactly** one more than the length of the array. More formally, the array b is cute if $\text{LIS}(b) + \text{LDS}(b) = |b| + 1$.

You are given a permutation a of length n^\dagger . Your task is to count the number of non-empty subarrays[‡] of permutation a that are cute.

*A sequence x is a subsequence of a sequence y if x can be obtained from y by the deletion of several (possibly, zero or all) element from arbitrary positions.

The longest increasing (decreasing) subsequence of an array is the longest subsequence such that its elements are ordered in strictly increasing (decreasing) order.

[†]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).

[‡]An array x is a subarray of an array y if x can be obtained from y by the deletion of several (possibly, zero or all) elements from the beginning and several (possibly, zero or all) elements from the end.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10^4$). The description of the test cases follows.

The first line of each test case contains a single integer n ($1 \leq n \leq 2 \cdot 10^5$) — the length of permutation a .

The second line of each test case contains n integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq n$) — the elements of permutation a .

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output the number of cute non-empty subarrays of permutation a .

Example

input	Copy
<pre> 5 3 3 1 2 5 2 3 4 5 1 4 3 4 1 2 7 1 2 3 4 5 6 7 10 7 8 2 4 5 10 1 3 6 9 </pre>	
output	Copy
<pre> 6 15 9 28 36 </pre>	

Note

In the first test case, all of the 6 non-empty subarrays are cute:

- $[3]$: $\text{LIS}([3]) + \text{LDS}([3]) = 1 + 1 = 2$.
- $[1]$: $\text{LIS}([1]) + \text{LDS}([1]) = 1 + 1 = 2$.
- $[2]$: $\text{LIS}([2]) + \text{LDS}([2]) = 1 + 1 = 2$.
- $[3, 1]$: $\text{LIS}([3, 1]) + \text{LDS}([3, 1]) = 1 + 2 = 3$.
- $[1, 2]$: $\text{LIS}([1, 2]) + \text{LDS}([1, 2]) = 2 + 1 = 3$.
- $[3, 1, 2]$: $\text{LIS}([3, 1, 2]) + \text{LDS}([3, 1, 2]) = 2 + 2 = 4$.

Codeforces Round 1024 (Div. 2)

Finished

Practice



→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms)

Choose file: Choose File No file chosen

Submit

→ Last submissions



Submission	Time	Verdict
321887242	May/29/2025 11:15	Accepted

→ Problem tags

data structures greedy *2500

No tag edit access

→ Contest materials

- Announcement (en) 
- Tutorial (en) 

In the second test case, one of the cute subarrays is $[2, 3, 4, 5, 1]$ as $LIS([2, 3, 4, 5, 1]) = 4$ and $LDS([2, 3, 4, 5, 1]) = 2$, which satisfies $4 + 2 = 5 + 1$.

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