Problem D. Random Permutation

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

Little Cyan Fish is engaged in an online competitive programming course called "Big-God-Live-Class" taught by Prof. **B**. In a recent lesson, Prof. **B** introduced a trick for finding the median in a sequence using two priority queues. Inspired by this method, Little Cyan Fish decides to implement it for practice.

Specifically, Little Cyan Fish has written a program that reads a permutation $p_1, p_2, \ldots, p_n$ of length n from an input file. The program's objective is to calculate the sum of the medians of all consecutive subsequences $p_l, p_{l+1}, \cdots, p_r$ for every $1 \le l \le r \le n$.

To test if his program is correct, Little Cyan Fish would like to **uniformly generate a random permutation** of $1, 2, \cdots, n$, and calculate the sum. He plans to compare the sum calculated by his program with the correct answer. Now, your task is to help him to find the correct answer.

Recall that the median of a list of numbers $a_1, a_2, \cdots, a_t$ is defined as the $\lfloor \frac{t}{2} \rfloor$-th smallest number in the list. For instance, the median of $[1, 5, 4]$ is 4, and the median of $[11, 4, 5, 14]$ is 5.

Input

The first line of the input contains a single integer n ($1 \le n \le 3 \times 10^5$).

The next line of the input contains n integers $p_1, p_2, \cdots, p_n$ ($1 \le p_i \le n$), indicating the permutation. It is guaranteed that p is generated by uniformly choosing one of the $n!$ permutations (by a pseudorandom number generator).

There are at most 20 test files. (Note that each test file contains only a single test case as described above.)

Output

Output a single line containing a single integer, indicating the answer.

Example

standard input	standard output
4 1 4 2 3	22

Note

- The median of $[p_1] = [1]$ is 1.
- The median of $[p_2] = [4]$ is 4.
- The median of $[p_3] = [2]$ is 2.
- The median of $[p_4] = [3]$ is 3.
- The median of $[p_1, p_2] = [1, 4]$ is 1.
- The median of $[p_2, p_3] = [4, 2]$ is 2.
- The median of $[p_3, p_4] = [2, 3]$ is 2.
- The median of $[p_1, p_2, p_3] = [1, 4, 2]$ is 2.
- The median of $[p_2, p_3, p_4] = [4, 2, 3]$ is 3.

- The median of $[p_1, p_2, p_3, p_4] = [1, 4, 2, 3]$ is 2.

Therefore, the answer equals $1 + 4 + 2 + 3 + 1 + 2 + 2 + 2 + 3 + 2 = 22$.