Problem

Given an array A with N elements. Let's denote the i-th element by A(i).

You are asked to process Q queries on the array. For the i-th query, you need to change the value of some element and count the number of inversion of the array (after the change).

An inversion of the array is a pair of indices (i, j) that satisfies the following 2 conditions:

- i < j
- A(i) > A(j)

For example:

```
A = [4, 3, 3, 4]
```

We have 2 inversions:

- 1, 2
- 1, 3

Constraints

- 1 <= N <= 250,000.
- 1 <= A(i) <= 50,000.

Input

- First line: the integer N
- 2nd line: N integers Ai
- 3rd line: Q
- Next Q lines: X, Y: Change A(X) = Y

Output

For each query, print the result in 1 line

Example

Input

```
10
2 6 6 4 7 6 3 5 9 1
7
8 8
5 1
5 6
10 5
7 1
10 10
4 6
```

Output

```
17
18
16
13
14
8
6
```