

Counting inversions

You are given a sequence A of N ($N \leq 250000$) integers between 1 and 50000. On this sequence you have to apply M ($M \leq 10000$) operations of the form: modify the i -th element in the sequence and then say how many inversions are there in the sequence. The number of inversions in a sequence is given by the number of pairs (i, j) with $i < j$ and $A_i > A_j$.

Input

The first line of input contains the number N and the next line contains the numbers that form the sequence. After that follows the number M and then M lines, each containing 2 integers X and Y , meaning that new value of the X -th element of the sequence is Y and that you should count the number of inversions in the modified sequence.

Output

Output must contain M lines, the i -th line of output containing the number of inversions in the sequence after the first i operations.

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
```