Inversion Counting (Large)

CITS3001 Advanced Algorithms — Time limit: 5 s

This is exactly the same problem as *Inversion Counting (Small)*: count the pairs of positions $i < j$ with $a_i > a_j$.

The only change is the bound on N, which has increased to 200 000. An $O(N^2)$ algorithm will **not** finish within the time limit — try it and watch the `TIMELIMIT` verdict. You should aim for a time complexity of $O(N \log N)$.

Input

The first line contains an integer N ($1 \le N \le 200\,000$). The second line contains N integers $a_1, \ldots, a_N$ ($0 \le a_i \le 10^9$).

Output

Output a single integer: the number of pairs $i < j$ with $a_i > a_j$. Note that equal elements do *not* form an inversion, and that the answer can be as large as $\approx 2 \times 10^{10}$ — use a 64-bit integer type in languages where this matters.

Sample Input 1

```
5
2 4 1 3 5
```

Sample Output 1

```
3
```

Sample Input 2

```
3
3 3 3
```

Sample Output 2

```
0
```