Array Pairs

HackerRank

Consider an array of n integers, $A = [a_1, a_2, \ldots, a_n]$. Find and print the total number of (i, j) pairs such that $a_i \times a_j \leq max(a_i, a_{i+1}, \ldots, a_j)$ where $i < j$.

Input Format

The first line contains an integer, n, denoting the number of elements in the array.
The second line consists of n space-separated integers describing the respective values of $a_1, a_2, \ldots, a_n$.

Constraints

- $1 \leq n \leq 5 \times 10^5$
- $1 \leq a_i \leq 10^9$

Scoring

- $1 \leq n \leq 1000$ for 25% of the test cases.
- $1 \leq n \leq 10^5$ for 50% of the test cases.
- $1 \leq n \leq 5 \times 10^5$ for 100% of the test cases.

Output Format

Print a long integer denoting the total number (i, j) pairs satisfying $a_i \times a_j \leq max(a_i, a_{i+1}, \ldots, a_j)$ where $i < j$.

Sample Input

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

Sample Output

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8
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Explanation

There are eight pairs of indices satisfying the given criteria: $(1, 2)$, $(1, 3)$, $(1, 4)$, $(1, 5)$, $(2, 3)$, $(2, 4)$, $(2, 5)$, and $(3, 5)$. Thus, we print 8 as our answer.