Pair Sums

HackerRank

Given an array, we define its *value* to be the value obtained by following these instructions:

- Write down all pairs of numbers from this array.
- Compute the product of each pair.
- Find the sum of all the products.

For example, for a given array, for a given array $[7, 2, -1, 2]$,

Pairs	(7, 2), (7, -1), (7, 2), (2, -1), (2, 2), (-1, 2)
Products of the pairs	14, -7, 14, -2, 4, -2
Sum of the products	14 + (-7) + 14 + (-2) + 4 + (-2) = **21**

Note that $(7, 2)$ is listed twice, one for each occurrence of 2.

Given an array of integers, find the largest *value* of any of its nonempty subarrays.

Note: A subarray is a contiguous subsequence of the array.

Complete the function `largestValue` which takes an array and returns an integer denoting the largest *value* of any of the array's nonempty subarrays.

Input Format

The first line contains a single integer n, denoting the number of integers in array A.
The second line contains n space-separated integers A_i denoting the elements of array A.

Constraints

- $3 \leq n \leq 5 \cdot 10^5$
- $-10^3 \leq A_i \leq 10^3$

Subtasks

- $n \leq 5000$ for 20% of the points.
- $n \leq 2 \cdot 10^5$ for 70% of the points.

Output Format

Print a single line containing a single integer denoting the largest *value* of any of the array's nonempty subarrays.

Sample Input 0

```
6
-3 7 -2 3 5 -2
```

Sample Output 0

```
41
```

Explanation 0

In this case, we have $A = [-3, 7, -2, 3, 5, -2]$. The largest-valued subarray turns out to be $[7, -2, 3, 5]$ with value $(7 \cdot -2) + (7 \cdot 3) + (7 \cdot 5) + (-2 \cdot 3) + (-2 \cdot 5) + (3 \cdot 5) = 41$.

Sample Input 1

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

Sample Output 1

```
200
```