The Strange Function ☆

Problem	Submissions	Leaderboard	Editorial 🔒

One of the most important skills a programmer needs to learn early on is the ability to pose a problem in an abstract way. This skill is important not just for researchers but also in applied fields like software engineering and web development.

You are able to solve most of a problem, except for one last subproblem, which you have posed in an abstract way as follows: Given an array consisting of n integers $[a_1, a_2, \ldots, a_n]$, define

$$f(l, r) = \gcd(a_l, a_{l+1}, \ldots, a_r) \cdot \left(\left(\sum_{i=l}^{r} a_i \right) - \max(a_l, a_{l+1}, \ldots, a_r) \right).$$

For example, for an input array [10, -5, 5, 20], a subsegment $f(1, 1)$ would be computed as follows:

Input array = [10, -5, 5, 20]

(l, r)	GCD	Sum	Max	f (l, r)
(1, 1)	10	10	10	0

What is $\max\limits_{1 \le l \le r \le n} f(l, r)$, i.e., the maximum value of $f(l, r)$ among all subsegments $[l, r]$?

Complete the function `maximumValue` which takes an integer array as input and returns the maximum value of f among all subsegments $[l, r]$.

Note that:

- $\gcd(x, y) = \gcd(|x|, |y|)$
- $\gcd(x, 0) = \gcd(0, x) = |x|$

Input Format

The first line contains a single integer n

The second line contains n space-separated integers $a_1, a_2, \ldots a_n$

Constraints

$1 \le n \le 50000$

$-10^6 \le a_i \le 10^6$

Output Format

Print a single integer denoting the answer

Sample Input 0

```
4
10 -5 5 20
```

Sample Output 0

```
50
```

Explanation 0

The maximum value occurs at $f(1, 4) = 50$ as shown below.

Input array = [10, -5, 5, 20]

(l, r)	GCD	Sum	Max	f (l, r)
(1, 1)	10	10	10	0
(1, 2)	5	5	10	-25
(1, 3)	5	10	10	0
(1, 4)	5	30	20	50
(2, 2)	5	-5	-5	0
(2, 3)	5	0	5	-25
(2, 4)	5	20	20	0
(3, 3)	5	5	5	0
(3, 4)	5	25	20	25
(4, 4)	20	20	20	0

Sample Input 1

```
5
7  12  24  6  5
```

Sample Output 1

```
144
```

Explanation 1

The maximum value occurs at $f(2, 3) = 144$.

Current Buffer (saved locally, editable)

Java 7

```java
1 ▾ import java.io.*;
2   import java.math.*;
3   import java.security.*;
4   import java.text.*;
5   import java.util.*;
6   import java.util.concurrent.*;
7   import java.util.regex.*;
8
9 ▾ public class Solution {
10
11      // Complete the maximumValue function below.
12 ▾    static long maximumValue(int[] a) {
13          // Return the maximum value of f among all subsegments .
14
15      }
16
17      private static final Scanner scanner = new Scanner(System.in);
18
19 ▾    public static void main(String[] args) throws IOException {
20          BufferedWriter bufferedWriter = new BufferedWriter(new
    FileWriter(System.getenv("OUTPUT_PATH")));
21
22          int n = scanner.nextInt();
23          scanner.skip("(\r\n|[\n\r\u2028\u2029\u0085])?");
24
25 ▾        int[] a = new int[n];
26
27          String[] aItems = scanner.nextLine().split(" ");
28          scanner.skip("(\r\n|[\n\r\u2028\u2029\u0085])?");
29
30 ▾        for (int i = 0; i < n; i++) {
31 ▾            int aItem = Integer.parseInt(aItems[i]);
32 ▾            a[i] = aItem;
33          }
34
35          long result = maximumValue(a);
36
37          bufferedWriter.write(String.valueOf(result));
38          bufferedWriter.newLine();
39
40          bufferedWriter.close();
41
42          scanner.close();
43      }
44 }
45
```

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⬆ Upload Code as File   ☐ Test against custom input   **Run Code**   **Submit Code**