Problem H
Reflect Sort
Time limit: 2 seconds

You have a sequence of n integers $(a_1, a_2, \ldots, a_n)$, the initial values of which are given to you. You may apply the following operation to the sequence any number of times (possibly zero):

1. Choose an index i ($1 \leq i \leq n$).
2. Choose a set S to be either the prefix $\{1, 2, \ldots, i-1\}$ or the suffix $\{i+1, i+2, \ldots, n\}$.
3. For every $j \in S$, replace a_j with $2a_i - a_j$.

Your goal is to make the sequence *non-decreasing* and all elements *positive*, while minimizing a_n, using the operation above any number of times. That is, $1 \leq a_1 \leq a_2 \leq \ldots \leq a_n$ must hold in the resulting sequence. What is the minimum possible value of a_n in the resulting sequence?

Input

The first line of input contains a single integer n ($2 \leq n \leq 100\,000$).

The second line contains n integers representing the initial values of $a_1, a_2, \ldots, a_n$ ($1 \leq a_i \leq 10^9$).

Output

Output the minimum possible value of a_n in the resulting sequence.

Sample Input #1	Sample Output #1
5 6 3 5 5 2	10

Explanation for the sample input/output #1

You can do the following sequence of operations.

1. Choose $i = 1$ and S as the suffix $\{2, 3, 4, 5\}$: $(6, 3, 5, 5, 2) \to (6, 9, 7, 7, 10)$.
2. Choose $i = 3$ and S as the prefix $\{1, 2\}$: $(6, 9, 7, 7, 10) \to (8, 5, 7, 7, 10)$.
3. Choose $i = 2$ and S as the prefix $\{1\}$: $(8, 5, 7, 7, 10) \to (2, 5, 7, 7, 10)$.

After these operations, the sequence is non-decreasing and all elements are positive. It can be shown that $a_5 = 10$ is the minimum possible value.

Sample Input #2	Sample Output #2
3 2 1 100000	100002

Explanation for the sample input/output #2

The minimum possible value of a_3 is 100002, which can be attained by the following operations.

1. Choose $i = 2$ and S as the suffix $\{3\}$: $(2, 1, 100000) \to (2, 1, -99998)$.
2. Choose $i = 1$ and S as the suffix $\{2, 3\}$: $(2, 1, -99998) \to (2, 3, 100002)$.

Note that the sequence may contain non-positive values during operations.