

Consider the following pseudocode, run on an array $A = [a_0, a_1, \dots, a_{n-1}]$ of length n :

```
rep := 0
while A not empty:
    B := []
    for x in A, y in A:
        if x != y: append absolute_value(x - y) to B
    A := B
    rep := rep + 1
```

Given the values of n and array A , compute and print the final value of rep after the pseudocode above terminates; if the loop will never terminate, print `-1` instead.

Input Format

The first line contains a single integer, n , denoting the length of array A .

The second line contains n space-separated integers describing the respective values of a_0, a_1, \dots, a_{n-1} .

Constraints

- $1 \leq n \leq 10^5$
- $1 \leq a_i \leq 5 \times 10^4 \forall 1 \leq i \leq n$

Output Format

Print the final value of rep after the pseudocode terminates; if the loop will never terminate, print `-1` instead.

Sample Input 0

```
3
1 3 4
```

Sample Output 0

```
4
```

Explanation 0

After the first loop, A becomes $[2, 3, 2, 1, 3, 1]$. After the second loop, the array only contains **1**'s and **2**'s. After the third loop, the array only contains **1**'s. After the fourth loop, the array is empty. Because the value of rep is incremented after each loop, $rep = 4$ at the time the loop terminates. Thus, we print `4` as our answer.