troS XEM

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1.5 seconds
Memory limit:	512 megabytes

Let us define **mex**(S) as the minimal non-negative integer which is not contained in S.

Mayoi Hachikuji has an array a consisting of n elements which she wants to be sorted in non-decreasing order. To do so, she can perform the following operation any number of times (possibly zero):

- Choose integer $i \in [1, \text{length}(a) - 2]$ and replace a_i, a_{i+1}, a_{i+2} with their mex. Notice that after applying this operation, the length of the array decreases by 2.

Find the minimum number of operations Mayoi needs to perform to make the array sorted in non-decreasing order. In case it is impossible to do so, output -1.

Input

First line of the input contains integer n ($2 \le n \le 5 \cdot 10^5$) — length of the array a.

Next line contains n integers a_i ($0 \le a_i \le 10^9$) — elements of the array a.

Output

Output one number — the answer to the problem.

Examples

standard input	standard output
3 4 1 3	1
9 3 0 2 2 3 0 4 7 8	2
2 4 3	-1