



INOI 30

October – 10 2020

Tehran, Iran

Summer Camp Programming Finals - Day 1

LITTEHFITTEH

en (US)

Liteh and Newfiteh

After Liteh's failure in cooperation with Fiteh, he decided to ask Newfiteh to help him.

Newfiteh was glad to hear this but to avoid others suspicion Liteh has asked Newfiteh to solve a hard problem. Despite Liteh's proficiency and skill in solving algorithmic problems, he needs your help.

You're given a sequence of integer numbers a_1, a_2, \dots, a_n . You have to make all elements zero in minimum possible moves.

In each move you can choose a continuous segment of sequence elements $[l, r)$ and decrease every element in this segment by one. ($1 \leq l < r \leq n + 1$)

- Length of each segment must be a power of 2.
- Each segment can't be chosen more than once.
- In case there exists two **chosen** segments $[l_1, r_1)$ and $[l_2, r_2)$ with intersection, then $\max(l_1 - l_2, l_2 - l_1)$ must be a multiple of $\min(r_1 - l_1, r_2 - l_2)$.

Input

The first line contains integer n - the number of elements of the given sequence. The second line contains n integers as elements of the given sequence, separated by a single space.

Output

On the only line of output, print minimum possible moves needed to make all elements of the sequence zero. If it's impossible to reach this state using the explained movements, print -1 .

Constraints

- $1 \leq n \leq 10^5$
- $0 \leq a_i \leq 10^5$ ($1 \leq i \leq n$)

Subtasks

Subtasks	score	constraints
1	30	$1 \leq n \leq 600$
2	70	No additional constraints.

Examples

Standard input	Standard output
10 1 1 1 1 2 2 2 3 2 1	5
8 2 2 2 0 1 1 2 2	-1