Problem D. Balanced Array

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

Mr. Ham likes balance. He applies the concept of balance to integer arrays.

A *balanced array* is defined as an integer array $a_1, a_2, \ldots a_l$ that satisfies the following condition:

- There exists an integer k, such that $1 \le k \le \frac{l-1}{2}$.
- $a_i + a_{i+2k} = 2a_{i+k}$ for each i in $1, 2, \ldots l - 2k$.

Given an array $a_1, a_2, \ldots a_n$, Mr. Ham wants to determine whether $a_{1\ldots i}$ is a balanced array for each i in $1, 2, \ldots n$.

Please help Mr. Ham to solve the task.

Input

The first line contains an integer n ($1 \le n \le 2 \times 10^6$), denoting the length of the array A.

The second line contains n integers $a_1, a_2 \ldots a_n$ ($1 \le a_i \le 2 \times 10^8$).

To minimize the size of the input file, a_i **was encoded in base-62**, where the characters `0`...`9a`...`zA`...`Z` correspond to the numerical values $0 \ldots 61$ for each digit. For example, `Aa0` represents $36 \times 62^2 + 10 \times 62 + 0 = 139004$.

Output

Output a binary string $s_{1\ldots n}$, such that $s_i =$ `1` if $a_{1\ldots i}$ is balanced, $s_i =$ `0` otherwise.

Examples

standard input	standard output
3 1 2 3	001
9 1 2 3 2 5 4 3 8 5	001010111
9 1C 3f 4S 3h 88 6x 4W d1 8c	001010111