

# 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  $a_1, a_2, \dots, a_l$  that satisfies the following condition:

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

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

Please help Mr. Ham to solve the task.

## Input

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

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

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

## Output

Output a binary string  $s_{1..n}$ , such that  $s_i = 1$  if  $a_{1..i}$  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