Final Exam

Description

Today, YP, Nonamefour, and Yen-Jen talk about a mathematics problem.

YP: Yen-Jen, is there any interesting problem you recommend us to do? I want to pratice some problem for final exam.

After few minutes later…

Yen-Jen: YP, Nonamefour, I find an interesting problem you all must know how to solve, and I think you two will like this problem. Given an N^{th} degree polynomial $F(x)$, you need to find an N^{th} degree polynomial $G(x)$, which satisfies $G^2(x) = F(x)(\mod x^{N+1})$, and each coefficient needs to modulo 7340033.

Nonamefour: Well, it looks like a math problem, however, I think the problem is too hard for me and I don't have any idea about it.

YP: Really? I think it's quite easy!

Because Nonamefour does not have any idea for this problem, can you help him to solve this problem? If there are many possible solutions, anyone is accepted.

Hint: 998244353(today's CRyptoGRapheR) is a great team at National Taiwan University, even though it is not the modulo number for this problem.

Input

The first line of the input contains one integer N denotes the degree of $F(x)$ and $G(x)$.

In the next line, there are $N+1$ integers $c_0, c_1, \ldots, c_N$, c_i is the coefficient of x_i of $F(x)$. That is, $F(x) = \Sigma_{i=0}^{N} c_i x^i$.

- $0 \leq N \leq 2 \times 10^5$
- $0 \leq c_i < 7340033$
- $c_N \neq 0$

Output

Output $N+1$ space-separated integers $d_0, d_1, \ldots, d_N$ in one line. d_i is the coefficient of x_i of $G(x)$. That is, $G(x) = \Sigma_{i=0}^{N} d_i x^i$. Also, $G(x)$ must meet the requirement in the description.

If there are many possible solutions, anyone is accepted.

If there are no solutions, please output $N+1$ space-separated number in a row, and these all $N+1$ numbers are -1. That is $d_i = -1$ for each i.

Note that, your output must satisfy the following condition:

- $-1 \leq d_i < 7340033$

Sample Input

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2
4 4 1
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Sample Output

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2 1 0
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