Problem I. Composition of Polynomials

Input file:	`polycomp.in`
Output file:	`polycomp.out`
Time limit:	2 seconds (*3.5 seconds for Java*)
Memory limit:	256 mebibytes

You are given polynomials $f(x)$, $g(x)$, $h(x)$ over field $\mathbb{Z}/2\mathbb{Z}$.

Find the polynomial $f(g(x)) \bmod h(x)$.

Input

The first three lines of input contain polynomials f, g and h, one per line. Each polynomial p is descibed as $n\ p_0\ p_1\ p_2\ \ldots\ p_n$ ($1 \le n \le 4000$, $p_i \in \{0, 1\}$ for all i, and $p_n = 1$). The polynomial $p(x)$ is then equal to $p_0 + p_1 x + p_2 x^2 + \cdots + p_n x^n$.

Output

Print the resulting polynomial in the same format.

If the answer is the null polynomial, print it as "`0 0`".

Examples

polycomp.in	polycomp.out

`5 0 1 0 1 0 1`
`2 1 1 1`
`4 0 1 1 0 1`
	`1 1 1`

`2 1 1 1`
`3 0 0 1 1`
`4 1 0 1 0 1`
	`3 1 0 0 1`

Note

Let us recall some definitions.

The field $\mathbb{Z}/2\mathbb{Z}$ is a set of two elements 0 and 1 where results of addition, subtraction, multiplication and division are remainders modulo 2 of the corresponding results for ordinary integers.

A polynomial $f(x)$ over this field is an expression of the form $f_n \cdot x^n + f_{n-1} \cdot x^{n-1} + \ldots + f_1 x + f_0$, where coefficients f_n, …, f_0 are integers from $\mathbb{Z}/2\mathbb{Z}$, and the variable x can hold values from $\mathbb{Z}/2\mathbb{Z}$ too. The maximum integer n such that $f_n \neq 0$ is called the degree of the polynomial $p(x)$.

Polynomials $a(x) = \sum\limits_k a_k x^k$ and $b(x) = \sum\limits_k b_k x^k$ are equal if a_k и b_k are equal for all k.

Addition and subtraction of polynomials are performed component-wise: $a(x) \pm b(x) = \sum\limits_k (a_k \pm b_k) \cdot x^k$.

The product of polynomials $a(x)$ and $b(x)$ is $c(x) = \sum\limits_k c_k x^k$ where $c_s = \sum\limits_{t=0}^{s} (a_t \cdot b_{s-t})$.

Polynomials can be divided by each other. For a non-null polynomial $b(x)$, we say that $a(x)/b(x) = q(x)$ and $a(x) \bmod b(x) = r(x)$ if $q(x) \cdot b(x) + r(x) = a(x)$ and the degree of $r(x)$ is strictly less than the degree of $b(x)$. It can be shown that $q(x)$ and $r(x)$ are uniquely defined.

Composition $a(b(x))$ is the polynomial $\sum\limits_k a_k (b(x))^k$ where the power of a polynomial is defined via multiplication: $(b(x))^0 = 1$, $(b(x))^1 = b(x)$, $(b(x))^p = b(x) \cdot (b(x))^{p-1}$ for $p > 1$. To find the coefficients, expand the expression and sum the coefficients for the same powers of x.