Problem D. Basis Change

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

You are given sequences $\{a_i\}_{i=1}^k$ and $\{b_i\}_{i=1}^k$. Consider all sequences $\{F_i\}_{i=1}^\infty$ which satisfy the following linear recurrence for all $n > k$:

$$F_n = \sum_{i=1}^{k} a_i F_{n-i}.$$

You have to find a sequence $\{c_i\}_{i=1}^k$ such that, for all such $\{F_i\}_{i=1}^\infty$, the following linear recurrence is satisfied for all $n > b_k$:

$$F_n = \sum_{i=1}^{k} c_i F_{n-b_i}.$$

Input

The first line of input contains a single integer k ($1 \le k \le 128$).

The second line of input contains k integers $a_1, \ldots, a_k$ ($1 \le a_i \le 10^9$).

The third line of input contains k integers $b_1, \ldots, b_k$ ($1 \le b_1 < b_2 < \cdots < b_k \le 10^9$).

It is guaranteed that the solution exists and is unique. Moreover, it is guaranteed that sequences a_i and b_i were uniformly randomly chosen among possible ones with some fixed number k for all test cases except the example.

Output

Output k integers $c_1, \ldots, c_k$ on a single line. If $c_k = \frac{P}{Q}$ such that P and Q are coprime, output $(P \cdot Q^{-1}) \bmod (10^9 + 7)$. It is guaranteed that $Q \not\equiv 0 \pmod{10^9 + 7}$.

Example

standard input	standard output
2 1 1 1 3	2 1000000006

Note

In the example, we have $F_n = F_{n-1} + F_{n-2}$. We can write $F_n - F_{n-1} = (F_{n-1} + F_{n-2}) - (F_{n-2} + F_{n-3})$. Thus $F_n = 2F_{n-1} - F_{n-3}$.