Problem C. Convolution

Input file:	*standard input*
Output file:	*standard output*
Time limit:	3 seconds
Memory limit:	512 mebibytes

You are given two sequences $a_0, a_1, \ldots, a_n$ and $b_0, b_1, \ldots, b_n$. You want to compute a new sequence $c_0, c_1, \ldots, c_n$ such that

$$c_k = \left(\sum_{i=0}^{k} \binom{k}{i} a_i b_{k-i} \right) \bmod 2^{32}.$$

Here, $\binom{k}{i} = \frac{k!}{i!(k-i)!}$ are binomial coefficients.

Output $c_0, c_1, \ldots, c_n$.

Input

The first line contains an integer n ($1 \le n \le 2 \cdot 10^5$).

The second line contains $n+1$ integers $a_0, a_1, \ldots, a_n$ ($0 \le a_i < 2^{32}$).

The third line contains $n+1$ integers $b_0, b_1, \ldots, b_n$ ($0 \le b_i < 2^{32}$).

Output

Output one line with $n+1$ integers: $c_0, c_1, \ldots, c_n$.

Example

standard input	standard output
5 0 1 2 3 4 5 6 7 8 9 10 11	0 6 26 84 240 640