D1. Encrypting Messages

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

The Smart Beaver from ABBYY invented a new message encryption method and now wants to check its performance. Checking it manually is long and tiresome, so he decided to ask the ABBYY Cup contestants for help.

A message is a sequence of n integers $a_1, a_2, ..., a_n$. Encryption uses a key which is a sequence of m integers $b_1, b_2, ..., b_m$ ($m \le n$). All numbers from the message and from the key belong to the interval from 0 to $c - 1$, inclusive, and all the calculations are performed modulo c.

Encryption is performed in $n - m + 1$ steps. On the first step we add to each number $a_1, a_2, ..., a_m$ a corresponding number $b_1, b_2, ..., b_m$. On the second step we add to each number $a_2, a_3, ..., a_{m+1}$ (changed on the previous step) a corresponding number $b_1, b_2, ..., b_m$. And so on: on step number i we add to each number $a_i, a_{i+1}, ..., a_{i+m-1}$ a corresponding number $b_1, b_2, ..., b_m$. The result of the encryption is the sequence $a_1, a_2, ..., a_n$ after $n - m + 1$ steps.

Help the Beaver to write a program that will encrypt messages in the described manner.

Input

The first input line contains three integers n, m and c, separated by single spaces.

The second input line contains n integers a_i ($0 \le a_i < c$), separated by single spaces — the original message.

The third input line contains m integers b_i ($0 \le b_i < c$), separated by single spaces — the encryption key.

The input limitations for getting 30 points are:

- $1 \le m \le n \le 10^3$
- $1 \le c \le 10^3$

The input limitations for getting 100 points are:

- $1 \le m \le n \le 10^5$
- $1 \le c \le 10^3$

Output

Print n space-separated integers — the result of encrypting the original message.

Examples

input
4 3 2 1 1 1 1 1 1 1
output
0 1 1 0

input
3 1 5 1 2 3 4
output
0 1 2

Note

In the first sample the encryption is performed in two steps: after the first step $a = (0, 0, 0, 1)$ (remember that the calculations are performed modulo 2), after the second step $a = (0, 1, 1, 0)$, and that is the answer.