

E. Cyclic Cipher

time limit per test: 5 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Senor Vorpall Kickass'o invented an innovative method to encrypt integer sequences of length n . To encrypt a sequence, one has to choose a secret sequence, that acts as a key.

Vorpall is very selective, so the key should be such a sequence b_i , that its cyclic shifts are linearly independent, that is, there is no non-zero set of coefficients x_0, x_1, \dots, x_{n-1} , such that for all k at the same time.

After that for a sequence you should build the following cipher:

In other words, you are to compute the quadratic deviation between each cyclic shift of b_i and the sequence a_i . The resulting sequence is the Kickass's cipher. The cipher is in development right now and Vorpall wants to decipher a sequence after it has been encrypted. You are to solve this problem for him. You are given sequences c_i and b_i . You are to find all suitable sequences a_i .

Input

The first line contains a single integer n ().

The second line contains n integers b_0, b_1, \dots, b_{n-1} ().

The third line contains n integers c_0, c_1, \dots, c_{n-1} ().

It is guaranteed that all cyclic shifts of sequence b_i are linearly independent.

Output

In the first line print a single integer k — the number of sequences a_i , such that after encrypting them with key b_i you get the sequence c_i .

After that in each of k next lines print n integers a_0, a_1, \dots, a_{n-1} . Print the sequences in lexicographical order.

Note that k could be equal to 0.

Examples

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|---------------|
| input |
| 1 1 0 |
| output |
| 1 1 |

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|----------------|
| input |
| 1 100 81 |
| output |
| 2 91 109 |

| |
|--------------|
| input |
|--------------|

3
1 1 3
165 185 197

output

2
-6 -9 -1
8 5 13