

Problem F: Frightful Formula

Time limit: 10 s

Memory limit: 512 MiB

A *frightful matrix* is a square matrix of order n where the first row and the first column are explicitly specified, while the other elements are calculated using a *frightful formula* which is, actually, a simple recursive rule.

Given two integer sequences l and t , both of size n , as well as integer parameters a , b and c , the frightful matrix F is defined as follows:

- The first column of the matrix is the sequence l :

$$F[k, 1] = l_k.$$

- The first row of the matrix is the sequence t :

$$F[1, k] = t_k.$$

- Other elements are calculated using a recursive formula:

$$F[i, j] = a * F[i, j - 1] + b * F[i - 1, j] + c.$$

Given a frightful matrix, find the value of the element $F[n, n]$ modulo $10^6 + 3$.

Input

The first line contains four integers n , a , b and c ($2 \leq n \leq 200\,000$, $0 \leq a, b, c \leq 10^6$) – the size of the matrix and the recursion parameters, as described in the problem statement.

The two following lines contain integers l_1, \dots, l_n and t_1, \dots, t_n , respectively ($l_1 = t_1$, $0 \leq l_k, t_k \leq 10^6$).

Output

Output a single integer – the value of $F[n, n]$ modulo $10^6 + 3$.

Example

input

```
3 0 0 0
0 0 2
0 3 0
```

output

```
0
```

input

```
4 3 5 2
7 1 4 3
7 4 4 8
```

output

```
41817
```