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 $l_1, \ldots, l_n$ and $t_1, \ldots, t_n$, 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
```