Pseudo-random

*** Rami *** always was fond of random numbers, he always wonders how randomness arises from the deterministic nature of mathematics.

Wanting to impress his friends, he created a new pseudo-random number generation scheme, that he proudly called Rami Scheme

a *** Rami scheme *** consists of the following steps:

1. choose 4 integer parameters: m, a, b such that $0 \leq a, b, < m$
2. choose 2 seeds u_0, u_1
3. for $k > 1$, u_k will be generated with the following rule:

$$u_k = (au_{k-1} + bu_{k-2}) \bmod m$$

4. using the rule above, he will calculate many such numbers and use them to generate the following random numbers $(v_k)_{k\in\mathbb{N}}$:

$$v_k = \left(\sum_{i=0}^{k} iu_i\right) \bmod m$$

5. Finally, after calculating many terms $v_0, \ldots, v_{10^{18}}$, he will choose s numbers $v_{n_1}, \ldots, v_{n_s}$. those final numbers will be the chosen random numbers

Rami wants you to test his scheme, so he asks you for help.

- First of all, he wants you to measure the robustness index R of this scheme, which is defined as the eventual fundamental period of the sequence $(v_k)_{k\in\mathbb{N}}$. In other words,he wants the smallest strictly positive integer R such that:

$$\exists N \in \mathbb{N} / \quad \forall k \in \mathbb{N}_{\geq N}, v_{k+R} = v_k$$

- After calculating R, **Rami** wants you to calculate the periodicity offset index N of this scheme, which is defined as the first index on which the sequence $(v_k)_{k\in\mathbb{N}}$ will become periodic. In other words, he wants the smallest positive integer N such that:

$$\forall k \in \mathbb{N}_{\geq N}, v_{k+R} = v_k$$

- After that, he knows that he cannot calculate all terms of the sequence $(v_k)_{k\in\mathbb{N}}$, and he only needs s terms $v_{n_1}, \ldots, v_{n_s}$ of the sequence. So he asks your help for it

Input

1. The first line contains 6 integers, m, a, b, u_0, u_1, s:
    1. m, a, b : the parameters of the scheme
    2. u_0, u_1 : the seeds
    3. s : the number of terms to calculate
2. the second line contains s integers, $n_1, \ldots, n_s$ representing the terms to calculate

Output

1. The first line contains two integers R, N :
    1. R : the robustness index of the selected scheme
    2. N : the periodicity offset index of the selected scheme
2. The second line contains s integers $v_{n_1}, \ldots, v_{n_s}$: the calculated terms

Constraints

$1 \leq$	m	$\leq 10^9$
$1 \leq$	a, b, u_0, u_1	$< m$
$1 \leq$	s	$\leq 10^6$
$1 \leq$	$n_1, \ldots, n_s$	$\leq 10^{18}$

Time Constraint

5 seconds

Notes

- It can be proven that the sequence $(v_k)_{k \in \mathbb{N}}$ is always periodic.