

A. Cryptography

Time Limit: 1 second

Points: 100

Claude is developing a new system to encrypt information. In his system, a key is a tuple of five integers. The encryption is based on three fundamental operations. Letting $\tilde{a} = (a_1, a_2, a_3, a_4, a_5)$ and $\tilde{b} = (b_1, b_2, b_3, b_4, b_5)$:

- $\text{rotate}(\tilde{a}) = (a_5, a_1, a_2, a_3, a_4)$,
- $\text{multiply}(\tilde{a}, \tilde{b}) = (a_1b_1, a_2b_2, a_3b_3, a_4b_4, a_5b_5)$, where each number in the result is taken modulo 1,000,000,007.
- $\text{combine}(\tilde{a}, \tilde{b}) = \text{multiply}(\tilde{a}, \text{rotate}(\tilde{b}))$.

To encrypt a key, Claude iterates the combine operation n times as follows:

$$\begin{aligned}\text{combine}(\tilde{a}, n) &= \text{combine}(\text{combine}(\tilde{a}, n - 1), \tilde{a}) \\ \text{combine}(\tilde{a}, 0) &= \tilde{a}.\end{aligned}$$

Help Claude produce the encrypted key.

Input

The first line of input consists of one integer, n .

The second line of input consists of five space-separated integers, a_1, a_2, a_3, a_4, a_5 , the integers comprising the original key.

Constraints

All input will satisfy the following constraints:

- $1 \leq n \leq 10^{18}$.
- $0 \leq a_1, a_2, a_3, a_4, a_5 < 1,000,000,007$.

Output

Output five space-separated integers, the result of $\text{combine}((a_1, a_2, a_3, a_4, a_5), n)$.

Subtasks

A1 (30 points): $1 \leq n \leq 100,000$.

A2 (70 points): no restrictions.

Sample Input 1

2
1 2 3 4 5

Sample Output 1

25 2 12 36 80

Sample Input 2

3
6 9 4 18 12

Sample Output 2

10368 1944 2916 1152 69984

Explanation

In sample 1, we let $\tilde{a} = (1, 2, 3, 4, 5)$ and evaluate

$$\begin{aligned}\text{combine}(\tilde{a}, 2) &= \text{combine}(\text{combine}(\tilde{a}, 1), \tilde{a}) \\ &= \text{combine}(\text{combine}(\text{combine}(\tilde{a}, 0), \tilde{a}), \tilde{a}) \\ &= \text{combine}(\text{combine}(\tilde{a}, \tilde{a}), \tilde{a}).\end{aligned}$$