A fantastic sequence a_i is defined in the following way: $a_0, \ldots, a_{k-1}$ are given integers, and the subsequent elements are defined by the linear recurrence relation

$$a_n = \left(\sum_{i=1}^{k} c_i a_{n-1} \right) + c_{k+1} \cdot (n \geq k)$$

Here $c_1, \ldots, c_{k+1}$ are known integers.

You have to find $a_n \bmod m$, where n and m are given.

Input

The first line of the input contains the number of the test cases, which is at most 20. The descriptions of the test cases follow. The first line of a test case description contains three integers k $(0 \leq k \leq 20)$, m $(1 \leq m < 2^{31})$, and n $(0 \leq n < 2^{31})$ separated by spaces. The second line contains the integers $c_1, \ldots, c_{k+1}$ separated by spaces $(-2^{31} \leq c_i < 2^{31})$. The third line contains the integers $a_0, \ldots, a_{k-1}$ separated by spaces $(-2^{31} \leq a_i < 2^{31})$. The test cases are separated by blank lines.

Output

For each test case in the input, output one nonnegative integer: $a_n \bmod m$. Print a blank line between test cases.

Sample Input

```
1

2 10 10
1 1 0
1 1
```

Sample Output

```
9
```