
Problem A. Matrix Recurrence

Input file: standard input
Output file: standard output
Time limit: 4 seconds
Memory limit: 512 megabytes

Bobo invents a new series of matrices $M_0, M_1, \dots, M_n$ defined as follows:

- $M_0 = A$,
- $M_i = \left(\prod_{j=c_i}^{i-1} M_j \right) \times B$.

Given $m \times m$ matrices A, B and integers $c_1, c_2, \dots, c_n$, compute M_n under $\mathbb{Z}_{\text{mod}}$ (that is, addition and multiplication of numbers are carried out modulo mod).

Input

The input contains zero or more test cases, and is terminated by end-of-file. For each test case:

The first line contains three integers n, m and mod ($1 \leq n \leq 10^6$, $1 \leq m \leq 5$, $2 \leq \text{mod} \leq 10^9$).

The i -th of the next m lines contains m integers $A_{i,1}, A_{i,2}, \dots, A_{i,m}$, and the i -th of the following m lines contains m integers $B_{i,1}, B_{i,2}, \dots, B_{i,m}$ ($0 \leq A_{i,j}, B_{i,j} < \text{mod}$).

The last line contains n integers $c_1, c_2, \dots, c_n$ ($0 \leq c_i < i$, $c_1 \leq c_2 \leq \dots \leq c_n$).

It is guaranteed that the sum of n does not exceed 10^6 .

Output

For each test case, output m lines. On the i -th line, output m integers $C_{i,1}, C_{i,2}, \dots, C_{i,m}$ where $C_{i,j} = M_{n,i,j}$.

Example

standard input	standard output
2 2 1000000000 1 1 0 1 1 0 0 1 0 0 2 2 2 1 1 0 1 1 0 0 1 0 0 5 2 1000000000 1 1 0 1 1 0 0 1 0 1 2 3 4	1 2 0 1 1 0 0 1 1 1 0 1