

Problem A

Circular Matrix Product

Input File: *testdata.in*

Time Limit: 5 seconds

Problem Description

Allen designed an encryption algorithm that works as follows.

1. Given a codebook containing M $N \times N$ integer matrices, A_0, A_1, \dots, A_{M-1} .
2. Given a plaintext B of length N , in which each element is an integer, and two parameters S, E , $0 \leq S, E < M$. If $S \leq E$, the cipher text is computed by

$$C = A_S A_{S+1} \dots A_E B.$$

If $S > E$, the cipher text is

$$C = A_S A_{S+1} \dots A_{M-1} A_0 \dots A_E B.$$

The numbers in A_i and B are ranged from 0 to 255, and the multiplication and addition are done under a modular arithmetic (mod 256).

For example, if $M = 3$, $N = 2$, $S = 1$, $E = 0$,

$$A_0 = \begin{bmatrix} 10 & 100 \\ 200 & 255 \end{bmatrix}, A_1 = \begin{bmatrix} 8 & 6 \\ 2 & 3 \end{bmatrix}, A_2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \text{ and } B = \begin{bmatrix} 2 \\ 8 \end{bmatrix},$$

$$C = A_1 A_2 A_0 B = \begin{bmatrix} 208 \\ 0 \end{bmatrix}.$$

Technical Specifications

1. $1 \leq M \leq 850$,
2. $1 \leq N \leq 50$,
3. The number of plaintexts to encrypt is K , $K \leq 2000$.

Input Format

The first line of the input contains 3 integers, M , N , and K , separated by spaces. Followed by M lines specifying M matrices. Each line contains $N \times N$ numbers, ranged $0 - 255$, and separated by spaces. The numbers in each line represent a matrix, in row major. Next are K lines for K plaintexts. Each line contains $N + 2$ numbers, separated by spaces. The first two numbers are S and E , which are ranged from 0 to $M - 1$. The rest N numbers are ranged $0 - 255$.

Output Format

Output K cipher-texts. Each cipher text, containing N numbers, is in a line. The consecutive numbers need to be separated by a space.

Sample Input

```
3 2 1
10 100 200 255
8 6 2 3
1 0 0 1
1 0 2 8
```

Sample Output

```
208 0
```