

12122 Infinite Matrix

You are given a Vector \mathbf{V} and Matrix \mathbf{M} . \mathbf{V} has n variables V_1, V_2, \dots, V_n . \mathbf{M} is lower triangular matrix with n rows numbered from 1 to n . Row i has $i - 1$ column. You can calculate an infinite matrix \mathbf{R} by the following equation.

$$R_{i,j} = \begin{cases} (R_{i-1,j} + \sum_{k=1}^{j-1} i^{M_{j,k}} * R_{i,k}) \% m & \text{if } i > 1 \\ V_j & \text{if } i = 1 \end{cases}$$

The matrix \mathbf{R} has n columns and infinite rows. Now consider about a function $S_{p,a,b,c,d}$. You can calculate this by the following equation.

$$S_{p,a,b,c,d} = \left(\sum_{i=0}^c \sum_{j=0}^d (i+1)^p * R_{i+a,j+b} \right) \% m$$

For our problem the value of m is 1000000007. This is a prime number. Your task is to given \mathbf{V} and \mathbf{M} you have to calculate $S_{p,a,b,c,d}$.

Input

First line contains T ($1 \leq T \leq 5$) the number of test cases. Each test case contains multiple number of lines.

Line 1 contains 1 integer n ($1 \leq n \leq 200$). Line 2 to Line $n + 1$ contains the information about \mathbf{V} and \mathbf{M} .

Among these lines Line $i + 1$ contains i integers.

First integer is the value of V_i ($1 \leq V_i \leq 200$). Subsequent integers are $M_{1,i}, M_{2,i}, M_{3,i}, \dots, M_{i-1,i}$ in order. ($0 \leq M_{i,j} < \min(10, j - i)$).

Line $n + 2$ contains an integer q ($1 \leq q \leq 1000$) the number of queries. Each of the next q lines contains 5 integers p ($0 \leq p \leq 9$), a ($1 \leq a \leq 10^{15}$), b ($1 \leq b \leq n$), c ($0 \leq c \leq 10^{15}$), d ($0 \leq d \leq n - b$) separated by a single space.

Output

For each query output a single integer denoting the value $S_{p,a,b,c,d}$. Output a blank lines after each test case.

Sample Input

```
2
4
1
2 0
3 1 0
4 2 1 0
4
0 1 1 5 3
0 2 2 5 2
1 2 2 10 2
1 2 3 10 1
```

```
4
1
2 0
3 1 0
4 2 1 0
4
0 1 1 5 3
0 2 2 5 2
1 2 2 10 2
1 2 3 10 1
```

Sample Output

```
910
1468
79156
78518
```

```
910
1468
79156
78518
```