3x3 Convolution

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 524288/524288 K (Java/Others)
Total Submission(s): 0 Accepted Submission(s): 0

Problem Description

Given an n\times n matrix A and a 3\times 3 matrix K. These two matrices are very special : they are both non-negative matrices and the sum of all elements in matrix K is 1 (In order to avoid floating-point error, we will give matrix K in a special way in input).

Now we define a function C(A,K), the value of C(A,K) is also a n\times n matrix and it is calculated below(we use C to abbreviate C(A,K)):

C_{x,y}=\sum_{i=1}^{min(n-x+1,3)}\sum_{j=1}^{min(n-y+1,3)}A_{x+i-1,y+j-1}K_{i,j}

Now we define C^{m}(A,K)=C(C^{m-1}(A,K),K) and C^{1}(A,K)=C(A,K), Kanade wants to know lim_{t\rightarrow \infty}C^{t}(A,K)

It's guaranteed that the answer exists and is an integer matrix.

Input

There are T test cases in this problem.

The first line has one integer T.

Then for every test case:

The first line has one integer n.

Then there are n lines and each line has n non negative integers. The j-th integer of the i-th row denotes A_{i,j}

Then there are 3 lines and each line has 3 non negative integers. The j-th integer of the i-th row denotes K'_{i,j}

Then K could be derived from K' by the following formula: K_{i,j}=K'_{i,j}/(\sum_{x=1}^{3}\sum_{y=1}^{3}K'_{x,y})

1\leq T\leq 100

3\leq n\leq 50

0\leq A_{i,j}\leq 1000

0\leq K'_{i,j}\leq 1000

\sum_{x=1}^{3}\sum_{y=1}^{3}K'_{x,y}>0

Output

For each test case, output the answer matrix by using the same format as the matrix A in input.

Sample Input

```
2
3
1 2 3
4 5 6
7 8 9
3 0 0
0 0 0
0 0 0
3
1 2 3
4 5 6
7 8 9
1 0 0
0 1 0
0 0 0
```

Sample Output

```
1 2 3
4 5 6
7 8 9
```

```
0 0 0
0 0 0
0 0 0
```

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