We want to build a rectangle where each row is a permutation of 0 to N-1. We want to make this rectangle with as many rows as possible while maintaining the following constraints.

$$\sum_{j=0}^{N-1} E_{i,j} \le A_i \text{ and } \sum_{j=0}^{N-1} E_{i,j} \le B_i, \text{ where } E_{i,j} = \begin{cases} D_{i,j} - C_{i,j} & \text{when } D_{i,j} > C_{i,j} \\ 0 & \text{when } D_{i,j} \le C_{i,j} \end{cases}$$

$D_{i,j}$ is the number of occurrences of integer j in the column i. C is a matrix of N rows and N columns will be given as input. A and B are two sequences of size N will be given as input. Given N, A, B, C build a rectangle with the largest possible number of rows.

Input

First line of the input contains T ($1 \le T \le 50$) the number of test cases. It is followed by T test cases. Each test case starts with an integer N ($1 \le N \le 30$) indicating the number of columns in the rectangle. Next line contains N integers separated by single spaces.

These integers are A_0 to A_{N-1} ($0 \le A_i \le 10$). Next line contains N integers separated by single spaces. These integers are B_0 to B_{N-1} ($0 \le B_i \le 10$). Each of the next N line contains N integers in each line. The integer on row i and column j is $C_{i,j}$ ($0 \le C_{i,j} \le 4$) (i and j starts from zero). A blank line will follow each test case.

Output

For each test case the first line of the output will be in the following format '`Case #`C`:` R'. Quotes are for clarity only. C is the test case number starting from 1. R is the maximum possible rows of the rectangle. Each of the next R lines should contain N integer in each line separated by spaces. Each of these N integers in each line should be a permutation of 0 to $N-1$. The whole $R \times N$ rectangle should maintain the constraints as described in the problem statement.

Sample Input

```
2
3
0 0 0
0 0 0
2 0 0
0 2 0
0 0 2

3
1 2 3
3 2 1
1 2 3
2 3 1
3 1 2
```

Sample Output

```
Case 1: 2
0 1 2
0 1 2
Case 2: 7
0 1 2
1 0 2
1 0 2
2 1 0
2 1 0
2 1 0
0 2 1
```