

# Networking

Sometimes, Lea has to attend loud and boring parties. In the beginning of such events, everybody wants to say hello to all the other people attending. This usually creates a big mess, so this year a new system was introduced: The transitive symmetric stationary greeting system (TSSGS). The system works as follows: Greetings are now transitive, that is, if Lea greets Ralph and Ralph greets Tom, then Lea is considered to have greeted Tom (thus transitive). Greetings are also symmetric, thus if Lea greets Tom (directly or via transitivity), Tom is considered to have greeted Lea. As to further reduce work, people do not move through the room but simply shout out to persons they want to greet (thus stationary). Still everybody wants to greet everybody (possibly indirectly).

This system of course reduced the work, but now everybody was shouting through the room and it soon got very loud.

Lea wants to do one more optimization: The sound level should be as low as possible while satisfying all the constraints above. A greeting between two people is as loud as the distance between them, the sound level is the sum of all greetings that take place. Help Lea with that problem by providing the lowest sound level possible.

## Input

The first line of the input contains an integer  $t$ .  $t$  test cases follow, each of them separated by a blank line.

Each test case starts with an integer  $n$ , the number of people at the party,  $n$  lines follow. The  $i$ -th line consists of  $n$  integers  $m_{i,j}$  where  $m_{i,j}$  is the distance of person  $i$  to person  $j$ . It is always the case that  $m_{i,i} = 0$  and  $m_{i,j} = m_{j,i}$ .

## Output

For each test case, output one line containing "Case # $i$ :" where  $i$  is its number, starting at 1.

Starting in the next line, output the greetings that take place, one per line. For each greeting, output its start person  $i$  and end person  $j$ , separated by one space, such that  $i < j$ . Furthermore, order your output lexicographically, that is, greeting  $ab$  should appear before greeting  $ij$  if  $a < i$ , or  $a = i$  and  $b < j$ . Each line of the output should end with a line break.

If there are multiple ways the greetings can take place with minimal sound level, any of them will be accepted.

## Constraints

- $1 \leq t \leq 20$ .
- $1 \leq n \leq 150$ .
- $0 \leq m_{i,j} \leq 10000$  for all  $1 \leq i, j \leq n$
- $m_{i,i} = 0$  and  $m_{i,j} = m_{j,i}$  for all  $1 \leq i, j \leq n$

**Sample Input 1**

```
10
2
0 1
1 0

3
0 1 3
1 0 2
3 2 0

4
0 6 7 4
6 0 5 4
7 5 0 7
4 4 7 0

3
0 3 4
3 0 6
4 6 0

4
0 5 4 3
5 0 7 6
4 7 0 5
3 6 5 0

3
0 3 4
3 0 5
4 5 0

4
0 4 3 5
4 0 5 7
3 5 0 4
5 7 4 0

5
0 6 7 7 3
6 0 5 4 7
7 5 0 7 4
7 4 7 0 7
3 7 4 7 0

3
0 3 3
3 0 5
3 5 0

4
0 4 5 6
4 0 4 7
5 4 0 5
6 7 5 0
```

**Sample Output 1**

```
Case #1:
1 2
Case #2:
1 2
2 3
Case #3:
1 4
2 3
2 4
Case #4:
1 2
1 3
Case #5:
1 2
1 3
1 4
Case #6:
1 2
1 3
Case #7:
1 2
1 3
3 4
Case #8:
1 5
2 3
2 4
3 5
Case #9:
1 2
1 3
Case #10:
1 2
2 3
3 4
```