# 1264 – Grouping Friends

There were **n** friends. But some of them had problems with others. So, we can say each person has some dissatisfaction with others. And hence we introduce a new term 'Dissatisfaction Factor' and it is described as follows:

You are given all the dissatisfaction factors as $\mathbf{d_{ij}}$. $\mathbf{d_{ij}}$ means the dissatisfaction factor according to person **i** towards **j**. If the value is negative that means $\mathbf{i^{th}}$ person likes $\mathbf{j^{th}}$ person. Positive value means $\mathbf{i^{th}}$ person hates $\mathbf{j^{th}}$ person. 0 means $\mathbf{i^{th}}$ person is neutral about $\mathbf{j^{th}}$ person. Obviously $\mathbf{d_{ij}}$ can be different from $\mathbf{d_{ji}}$ since $\mathbf{i^{th}}$ person may like $\mathbf{j^{th}}$ person, but $\mathbf{j^{th}}$ person may not like $\mathbf{i^{th}}$ person and vice versa.

Now, if you group some people, the dissatisfaction factor is the summation of all the members' dissatisfaction factors towards other people in the group. You have to group them with minimum dissatisfaction factor. You can make as many groups as you like.

## Input

Input starts with an integer **T (≤ 100)**, denoting the number of test cases.

Each case starts with a line containing an integer **n (2 ≤ n ≤ 14)**. Each of the next **n** lines contains **n** space separated integers. The $\mathbf{j^{th}}$ integer in the $\mathbf{i^{th}}$ line denotes $\mathbf{d_{ij}}$. You can assume that $\mathbf{-100 \le d_{ij} \le 100}$ and of course $\mathbf{d_{ii} = 0}$.

## Output

For each case, print the case number and the minimum dissatisfaction factor you can make after grouping them.

| Sample Input | Output for Sample Input |
|---|---|
| 3<br>3<br>0 2 3<br>-3 0 5<br>2 3 0<br>4<br>0 -1 -2 -3<br>1 0 -2 3<br>1 2 0 -1<br>2 -2 1 0<br>2<br>0 5<br>1 0 | Case 1: -1<br>Case 2: -2<br>Case 3: 0 |