Soup Delivery

Lea has invented and patented Vegan Chicken Soup. The soup is biochemically identical to the ordinary chicken soup, but can be produced by genetically modified bacteria in a certified organic and vegan process using solar energy. As organic certification required to exclude any contamination risks, the bacteria are modified to require twice the normal atmospheric pressure to survive. While the process can be run with perfect safety in a cheap ordinary pressure cooker, some anti-progress rental contracts would prohibit such a setup. Lea has also invented a very cheap soup stasis pot keeping the soup perfectly fresh during delivery, but it is expensive to operate with the cost proportional to the time.

Multiple potential customers in Munich want perfectly fresh Vegan Chicken Soup delivered at exactly 10:00 every weekday. Of course, Lea doesn't want to turn any customers away. She has found a few spots suitable for the production points reasonably close to the customer locations. Now Lea needs to rent some of the available production locations to minimise the sum of rent and delivery expenses. Lea hosts her company's website on Amazon Web Services, so paying a few times more than strictly necessary doesn't shock her; still, the cheaper the better. Help Lea optimise the costs without sacrificing on quality!

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 a line containing two space-separated integers N and M. Here N is the number of available production locations and M is the number of customers.

A line containing N space-separated integers $c_1, \ldots, c_N$ follows. The number c_i is the monthly cost of maintaining the i-th production location.

Afterwards N lines follow with the i-th line containing M space-separated integers $d_{i,1}, \ldots, d_{i,M}$ each. The number $d_{i,j}$ is the monthly cost of delivering the soup from i-th production location to the j-th customer.

It is guaranteed that the delivery costs are metric. In other words, one can additionally define delivery costs between the production locations and between the customer locations, such that the resulting pairwise delivery costs are non-negative, zero only for delivery from a point to itself, symmetrical, and satisfy triangle inequality.

Output

For each test case output a line containing "Case #i: v", where v is a 4-optimal value. k lines follow. The i-th line contains space-separated integers $n_i, m_{i,1}, \ldots, m_{i,M_i}$, meaning that facility n_i serves customers $m_{i,1}$ to m_{i,M_i}. Each customer must be served by exactly one location, and the total cost of delivery and maintaining all the locations serving at least one customer must be within the factor of 4 to the minimum possible cost.

Constraints

- $1 \leq t \leq 20$
- $1 \leq N \leq 100$
- $1 \leq M \leq 200$
- $1 \leq c_i \leq 10^6$
- $1 \leq d_{i,j} \leq 10^6$

Sample Input 1	Sample Output 1
1 2 2 2 2 1 10 10 1	Case #1: 6 1 1 2 2

Sample Input 2	Sample Output 2
1 8 9 2 9 6 5 4 4 6 3 12 9 19 19 6 8 7 10 17 1 16 7 7 8 9 15 18 10 9 17 16 16 6 3 15 19 15 11 8 17 18 6 9 6 9 14 6 15 13 13 4 2 14 17 11 7 10 12 13 3 6 9 12 10 15 3 18 19 12 15 9 8 7 12 18 18 19 7 5 17 20 17	Case #1: 67 1 7 2 1 3 4 5 5 6 7 2 8 9