

Problem A: Assembly Required

Princess Lucy broke her old reading lamp, and needs a new one. The castle orders a shipment of parts from the Slick Lamp Parts Company, which produces interchangeable lamp pieces.

There are m types of lamp pieces, and the shipment contained multiple pieces of each type. Making a lamp requires exactly one piece of each type. The princess likes each piece with some value, and she likes a lamp as much as the sum of how much she likes each of the pieces.

You are part of the castle staff, which has gotten fed up with the princess lately. The staff needs to propose k distinct lamp combinations to the princess (two lamp combinations are considered distinct if they differ in at least one piece). They decide to propose the k combinations she will like the least. How much will the princess like the k combinations that the staff proposes?

Input

The first line of input contains a single integer T ($1 \leq T \leq 10$), the number of test cases. The first line of each test case contains two integers m ($1 \leq m \leq 100$), the number of lamp piece types and k ($1 \leq k \leq 100$), the number of lamps combinations to propose. The next m lines each describe the lamp parts of a type; they begin with n_i ($2 \leq n_i \leq 100$), the number of pieces of this type, followed by n_i integers $v_{i,1}, \dots, v_{i,n_i}$ ($1 \leq v_{i,j} \leq 10,000$) which represent how much the princess likes each piece. It is guaranteed that k is no greater than the product of all n_i 's.

Output

For each test case, output a single line containing k integers that represent how much the princess will like the proposed lamp combinations, in nondecreasing order.

Sample Input	Sample Output
2	2 3
2 2	4 5 5 6 6 7 7 7 7 7
2 1 2	
2 1 3	
3 10	
4 1 5 3 10	
3 2 3 3	
5 1 3 4 6 6	

Explanation

In the first case, there are four lamp pieces, two of each type. The worst possible lamp has value $1 + 1 = 2$, while the second worst possible lamp has value $2 + 1 = 3$.