1286 – Space Shuttle Experiments

Professor Spook is consulting for NASA, which is planning a series of space shuttle flights and must decide which commercial experiments to perform and which instruments to have on board each flight. For each flight NASA considers a set $\mathbf{E = \{E_1, E_2, ..., E_m\}}$ of instruments experiments and the commercial sponsor of $\mathbf{E_j}$ has agreed to pay NASA $\mathbf{p_j}$ dollars for the results of the experiments.

The experiments use a set $\mathbf{I = \{I_1, I_2, ..., I_n\}}$ of instruments; each experiment $\mathbf{E_j}$ requires some of the instruments from the set. The cost of carrying instruments $\mathbf{I_k}$ is $\mathbf{c_k}$ dollars. And an instrument can be used for multiple experiments.

The professor's job is to determine which experiments to perform and which instruments to carry for a given flight in order to maximize the net revenue, which is the total income from the experiments performed minus the total cost of the instruments carried. Since he is not a programmer, he asked your help.

Input

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

Each case starts with a line containing two integers $\mathbf{m\ (1 \le m \le 100)}$ and $\mathbf{n\ (1 \le n \le 100)}$, where **m** denotes the number of experiments and **n** denotes the number of instruments. The next line contains **m** space separated integers, where the $\mathbf{j^{th}}$ integer denotes the commercial sponsor of $\mathbf{E_j}$ paying NASA $\mathbf{p_j\ (1 \le p_j \le 10000)}$ dollars for the result of the experiment. The next line contains **n** space separated integers, where the $\mathbf{k^{th}}$ integer denotes the cost of carrying the $\mathbf{k^{th}}$ instrument, $\mathbf{c_k\ (1 \le c_k \le 10000)}$. Each of the next **m** lines contains an integer $\mathbf{q_i\ (1 \le q_i \le n)}$ followed by $\mathbf{q_i}$ distinct integers each between **1** and **n**, separated by spaces. These $\mathbf{q_i}$ integers denote the required instruments for the $\mathbf{i^{th}}$ experiment.

Output

For each case, print the case number and the maximum revenue NASA can make using the experiments.

Sample Input	Output for Sample Input
2 1 1 10 20 1 1 3 5 20 30 40 1 2 30 4 50 3 1 2 3 3 2 3 4 1 5	Case 1: 0 Case 2: 13