7224 Amplified Energy

Fikri created a new and powerful energy source called the Amplifier Cube Model (ACM). As the name suggests, this energy source packed in a cube and each cube has its own power. Interestingly, if you connect 2 or more cubes together, the energy will be multiplied by each other. For example, let there be 3 energy cubes with the power of 2, 3, and 5, respectively. If you connect all of them, you will have the total energy of $30(2*3*5)$.

There are a total of N cubes that were placed in sequence, numbered from 1 to N. These cubes are still in development, they're not finished products and they have some limitations. One of the crucial limitations is each cube can only be connected to its direct neighbors. In the other words, a cube number x can only be connected with cube number $(x-1)$ and $(x+1)$.

Fikri's head researcher asked him to provide a continuous subsequence of cubes with the highest energy if they are being connected together. This task shouldn't be that hard. However, Fikri has K special cubes which can be used to replace any existing cube in the sequence. One special cube can be used to replace only one cube. The same limitation applies to these special cubes, i.e. if a special cube replace a cube number x, then it can only be connected to cube number $(x-1)$ and $(x+1)$. Moreover, these special cubes cannot be used as "new" cubes, i.e. to be used without replacing existing cubes. The existence of these K special cubes makes the problem more interesting. Which cubes should he replace? Which subsequence which produce the highest energy?

Fikri asked for your help. It's not like he cannot solve this problem, but he has many other important things to do, like completing his time-travel machine and to-anywhere-door. As a senior problem solver in this lab, surely you don't want to disappoint him.

Input

The first line of input contains an integer T ($T \leq 100$) denoting the number of cases. Each case begins with two integers N and K ($1 \leq N \leq 10,000$; $1 \leq K \leq 10$) in a line. The next line contains N numbers in fraction format a_i/b_i representing the energy of each cube, for cube number 1 to N respectively. The next line contains K numbers, also in fraction format, c_i/d_i , representing the energy of each special cube. All numbers in the fractions (a_i, b_i, c_i, d_i) will be at most 1,000 and greater than 0. Consult the sample input for clarify.

Output

For each case, output 'Case #X:' (without quotes) in a line where X is the case number (starts from 1). The next line contains two integers L and R indicating that the output subsequence is $[L, R]$, i.e. cubes numbered from L to R. The next line contains exactly K integers (separated by single space) indicating which cube is replaced by the respective special cube as in input order to produce the highest energy in the subsequence. If a special cube is used to replace cube number x, then output x for that special cube. If a special cube is not used, then output '0' for that special cube. All these numbers should be in the range of $[L, R]$ or '0', and distinct. If multiple solutions exist, output any.

Note:

- Explanation for 1st sample case

  Replacing 1st special cube with cube number 3, we'll get: `2/1 3/1 1/1 2/1 2/1`. If we take all the cubes, then we'll get the energy of $2*3*1*2*2 = 24$, and this is the highest possible energy.

- Explanation for 3rd sample case

  There are two special cubes, but we only need to use one. Replace the 1st special cube with cube number 3, producing the sequence: `1/1000 100/3 2/1 2/1 1/1000`. Subsequence $[2, 4]$ will produce the highest possible energy ($33.33 * 2 * 2 = 133.33$). There are other two correct outputs:

    ○ $L = 1$, $R = 4$, replacement: 3, 1.
    ○ $L = 2$, $R = 5$, replacement: 3, 5.

  You may output any of them.

- Explanation for 4th sample case All cubes and special cubes have the maximum possible energy, thus choosing all cubes will give the highest possible energy. Changing the special cubes is not necessary (since the energies are the same), but it can be done and will also be considered as correct.

Sample Input

```
4
5 1
2/1 3/1 1/2 2/1 2/1
1/1
5 1
1/1000 100/3 2/1000 2/1 1/1000
2/1
5 2
1/1000 100/3 2/1000 2/1 1/1000
2/1 1/1
4 2
1000/1 1000/1 1000/1 1000/1
1000/1 1000/1
```

Sample Output

```
Case #1:
1 5
3
Case #2:
2 4
3
Case #3:
2 4
3 0
Case #4:
1 4
0 0
```