

Exam Preparation

Lea heard that at TUM (Thomas Underwood University Markistan - Thomas Underwood was a famous scientist, but he never got well-known beyond the borders of Markistan) students are not allowed to take any material to their exams except a hand-written single-sided sheet of paper. Therefore, all students try to write as much as possible on their cheat sheets. There is obviously a limit in font size which means they have to decide which information helps the most. To make things more complicated, each professor allows different sizes of the cheat sheets: Some of them are very generous, whereas others only allow for stamp-sized sheets.

Lea is unsure whether she wants to apply at TUM, but if she does, she wants to master the cheat sheet system. For each lecture she knows all topics covered and the number of characters that fit on a cheat sheet of the allowed size. For each topic, she also knows the number of characters one piece of information needs and how useful they are (Lea has an integer score system where a higher score means more useful). For each topic Lea will find an unlimited supply of information units and each of them will have the same length and score. It would be sufficient to add many pieces of information for only a few topics, but Lea wants the overall score of her cheat sheet to be as big as possible.

After all, Lea knows that understanding the lectures is much more useful than a perfect cheat sheet. That is why she does not want to spend too much time creating the cheat sheets. Lea is happy if she has information with at least half of the best possible score on her cheat sheet. Help her to choose what to add to it.

Input

The first line of the input contains an integer t , the number of lectures. t lectures follow, each of them separated by a blank line.

Each lecture starts with a line containing two integers: m , the number of characters that fit on the allowed cheat sheet, and n , the number of topics covered. n lines describing the topics follow. The i -th line contains two integers l_i and s_i where l_i is the length of a piece of information for this topic and s_i is its score.

Output

For each test case, output one line containing "Case # i : x " where i is its number, starting at 1, and x is a space-separated list of topics to be added (topics may appear several times in this list). The sum of their lengths should be at most m and the sum of their scores should be at least half of the optimal value.

Constraints

- $1 \leq t \leq 20$
- $1 \leq n \leq 100$
- $1 \leq m \leq 10000$
- $1 \leq l_i \leq 10000$ for all $1 \leq i \leq n$
- $1 \leq s_i \leq 10000$ for all $1 \leq i \leq n$

Sample Input 1

```
6
10 2
3 5
1 1

10 3
3 7
2 8
7 5

17 4
2 4
3 3
5 2
4 7

8 2
2 4
3 9

25 1
2 1

15 5
2 1
4 5
6 7
8 9
10 11
```

Sample Output 1

```
Case #1: 1 1 1 2
Case #2: 2 2 2 2 2
Case #3: 1 1 1 1 1 1 1
Case #4: 2 2 1
Case #5: 1 1 1 1 1 1 1 1 1 1 1 1
Case #6: 2 2 2 1
```

Sample Input 2

```
5
80 3
2 1
40 20
20 11

10 3
100 10000
50 100
20 300

16 4
8 8
3 1
7 5
8 7

50 3
17 70
15 35
13 33

13 4
2 1
8 3
5 4
7 6
```

Sample Output 2

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