

# Exam Preparation Revisited

Do you remember the problem “Exam Preparation” in which Lea tried to put as much information as possible on one sheet of paper that she is allowed to use during an exam? Well, Lea needs your help again since she has changed her mind on three things:

- Lea thought there was an unlimited supply of information for each topic, but that turns out to be wrong: For instance, there is no use writing down more than five pieces of information about the birth date of the university’s patron Thomas Underwood.
- Since Lea surfs the internet a lot, she did not study as much as she planned to. Now, she needs the perfect cheat sheet with the maximum amount of information.
- The allowed size of the cheat sheets is not as big as expected.

Can you help her again?

## 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 three integers  $p_i$ ,  $l_i$  and  $s_i$  where  $p_i$  is the number of pieces of information available,  $l_i$  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 (topic  $i$  may appear at most  $p_i$  times in this list). The sum of their lengths should be at most  $m$  and the sum of their scores should be as big as possible.

## Constraints

- $1 \leq t \leq 20$
- $1 \leq n \leq 100$
- $1 \leq m \leq 3000$
- $1 \leq p_i \leq 100$  for all  $1 \leq i \leq n$
- $1 \leq l_i \leq 100$  for all  $1 \leq i \leq n$
- $1 \leq s_i \leq 10000$  for all  $1 \leq i \leq n$

**Sample Input 1**

```
7
10 2
1 3 5
6 1 1

10 3
2 3 7
1 2 8
3 7 5

10 3
1 5 10
3 1 1
3 2 3

6 2
4 6 10
3 3 5

1 6
4 6 10
3 3 5
2 3 2
7 7 23
9 8 17
4 10 8

7 2
2 2 7
5 3 3

8 4
1 4 7
1 2 3
1 2 1
1 2 2
```

**Sample Output 1**

```
Case #1: 1 2 2 2 2 2 2
Case #2: 1 1 2
Case #3: 1 2 3 3
Case #4: 1
Case #5:
Case #6: 1 1 2
Case #7: 1 2 4
```

**Sample Input 2**

```
4
15 3
1 3 50
2 1 96
2 2 9

19 3
2 3 91
2 3 49
1 3 80

20 3
2 1 20
2 1 39
1 1 71

26 3
1 3 21
1 3 98
1 1 10
```

**Sample Output 2**

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