

# Free Goodies

Petra and Jan have just received a box full of free goodies, and want to divide the goodies between them. However, it is not easy to do this fairly, since they both value different goodies differently. To divide the goodies, they have decided upon the following procedure: they choose goodies one by one, in turn, until all the goodies are chosen. A coin is tossed to decide who gets to choose the first goodie. Petra and Jan have different strategies in deciding what to choose. When faced with a choice, Petra always selects the goodie that is most valuable to her. In case of a tie, she is very considerate and picks the one that is least valuable to Jan. (Since Petra and Jan are good friends, they know exactly how much value the other places on each goodie.) Jan's strategy, however, consists of maximizing his own final value. He is also very considerate, so if multiple choices lead to the same optimal result, he prefers Petra to have as much final value as possible. You are given the result of the initial coin toss. After Jan and Petra have finished dividing all the goodies between themselves, what is the total value of the goodies each of them ends up with?

## Input

The first line of the input contains an integer  $t$ .  $t$  test cases follow, each of them separated by a blank line.

Each test case starts with a line containing an integer  $n$ , the number of goodies. The next line contains a string, either "Petra" or "Jan", the person that chooses first.  $n$  more lines follow, each containing two integers  $p_i$  and  $j_i$ , the values that Petra and Jan assign to the  $i$ -th goodie, respectively.

## Output

For each test case, print a line containing "Case # $i$ :  $x$   $y$ " where  $i$  is its number, starting at 1,  $x$  is the value Petra gets, and  $y$  is the value Jan gets. Both values must be according to their own valuations. Each line of the output should end with a line break.

## Constraints

- $1 \leq t \leq 100$
- $1 \leq n \leq 1000$
- $0 \leq p_i, j_i \leq 1000$  for all  $1 \leq i \leq n$

**Sample Input 1**

```
3
4
Petra
100 80
70 80
50 80
30 50
```

```
4
Petra
10 1
1 10
6 6
4 4
```

```
7
Jan
4 1
3 1
2 1
1 1
1 2
1 3
1 4
```

**Sample Output 1**

```
Case #1: 170 130
Case #2: 14 16
Case #3: 9 10
```