Jeopardy! Fans

Today is the final game of the huge seven-years-long Jeopardy! tournament. Unfortunately, Lea was too busy to participate in the weekly games, so she is in the audience. Each spectator is a fan of one of the three players. Lea didn't have time to ask everyone who supports whom, but she observed some conversations (and participated in some more). Each time she either noticed that two fans are rooting for the same competitor, or that three fans support three different players.

Now it is time to find out how many people have good taste in choosing their heros!

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 begins with a line consisting of two integers n, the number of fans, and m, the number of observations. The fans are numbered from 1 to n, with Lea having the number 1. m lines follow, signaling an observation of support for the same or for different players. The i-th line is either `S` x y, when the spectators from the seats x and y support the **same** player, or `D` x y z, where the fans from the seats x, y, and z represent the full **diversity** of all three possible opinions.

Output

For each test case, output one line containing "Case #i: a b" where i is its number, starting at 1, and a and b are the minimum and the maximum number of fans supporting the same player as Lea.

Constraints

- $1 \leq t \leq 20$
- $1 \leq n \leq 2000$
- $0 \leq m \leq 10000$
- $1 \leq x, y, z \leq n, x \neq y \neq z$
- The given relations will not be inconsistent.
- The number of partitions into three support groups consistent with the input will not be larger than 1025.

Sample Input 1

```
1
8 4
D 1 2 3
D 3 4 5
D 5 6 7
S 1 8
```

Sample Output 1

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

Sample Input 2

```
1
4 2
D 1 2 3
D 2 3 4
```

Sample Output 2

```
Case #1: 2 2
```