Catmon Go

Lea is playing a new game on her smartphone called **Catmon Go** (**C**rea**t**ures **t**hat **m**ake **o**dd **n**oises). In this game, creatures called Catmon appear, or spawn, randomly at given locations. These locations are arranged in a line from leftmost to rightmost.

Lea can go to a certain location and catch all the Catmon currently in her view, which extends a certain amount to the left and to the right of her current position. Weirdly, this amount changes randomly as the game progresses. Catching the Catmon in her current view adds them to Lea's in-game inventory and makes them disappear from the view.

In addition to these two events, the Catmon can also disappear on their own, or despawn, after a certain time. If the Catmon has been caught in between spawning and despawning, nothing happens and it still considered caught, however otherwise the Catmon is gone and cannot be caught any more.

Lea played this game the whole day. At the end of the day, she wanted to see how many Catmon she had caught today. Unfortunately, the server connection was broken at that point, so she was unable to see her inventory and that number. However, she managed to extract the event logs for that day from the game. This gives her all the spawn events, despawn events and catch events that happened, including their locations and views.

Can you help Lea replay the events of the day and tell her how many Catmon she has caught?

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 two integers n k, where n is the number of locations and k is the number of events to follow. The locations are numbered from 1 through n. k more lines follow. Each is of one of the following forms:

- `s` a: A Catmon spawns at location a, increasing the number of Catmon at location a by one.
- `d` a: A Catmon despawns at location a, reducing the number of Catmon at location a by one if there currently is at least one Catmon at that location.
- `c` l r: Lea catches all the Catmon in the interval l to r (including l and r). The caught Catmon are added to Lea's inventory and the number of Catmon in that interval is reduced to zero.

A despawn event at location a happens only after a spawn event at location a, however there may be a catch event including that location in between.

Output

For each test case, output one line containing "Case #i: x" where i is its number, starting at 1, and x is number of Catmon Lea has caught after all k events have occurred in the given order. Each line of the output should end with a line break.

Constraints

- $1 \leq t \leq 5$
- $1 \leq n \leq 10^6$
- $1 \leq k \leq 10^5$
- $1 \leq a \leq n$
- $1 \leq l \leq r \leq n$

Sample Input 1	Sample Output 1
3 3 5 s 1 s 3 c 1 2 d 3 c 2 3 4 10 s 1 s 2 s 3 s 3 c 1 2 d 3 d 2 d 1 c 3 4 d 3 10 9 s 1 s 5 s 8 c 2 7 d 8 c 5 8 d 1 c 1 5 d 5	Case #1: 1 Case #2: 3 Case #3: 1

Sample Input 2

```
3
6 9
s 3
s 1
c 1 3
c 5 6
s 2
s 3
d 1
c 1 2
c 2 4

10 10
s 7
c 3 7
d 7
s 1
c 2 6
d 1
s 7
c 3 7
d 7
s 5

8 10
s 1
s 3
s 4
s 1
d 1
d 3
s 6
s 4
d 4
c 1 5
```

Sample Output 2

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