ZOJ Problem Set - 3638

Fruit Ninja

Time Limit: 4 Seconds Memory Limit: 65536 KB

Fruit Ninja is a famous game all over world and Edward seems to be good at it. However, after broke the record many a time, Edward thought that it's too easy to get high score in that game, and that it must be more challenging to write a game like Fruit Ninja. Soon, Edward began his new program *Fruit Ninja made in China*.

According to Edward's design, there are exactly *n* kinds of fruit in the game, and exactly *m* fruits will appear on the screen at the beginning of a new game. What's more, to make the display of the game more colorful, for some kinds of fruits, there are limits to their amount. For example, Edward may make a rule that the amount of apple displayed on the screen should be less than 3, and that of peach should be greater than 1.

As a math-lover at the same time, Edward wants to know the total number of combination of the fruits displayed on the screen at the beginning of a game.

Input

The input contains multiple test cases, seperated by an empty line.

The first line of each test case contains two positive integer *n*, the number of different kinds of fruit, and *m*, the number of fruits that will appear on the screen at the beginning of a game. Then follows *k* ($k \le n$) lines describe the limits to some fruits. The decription is a line in certain format "[*FruitName*]: [less|greater] than [*x*]", which means the amount of [*FruitName*] should be less(greater) than [*x*] ([*x*] is an integer in range [0, 10000000]).

For all tests cases, $0 \le n \le 16$, $1 \le m \le 10000000$, and we ensure that fruitnames in the decriptions will be all different and make up of only lower case latin latters, and its length is less than 10. $n = 0$ indicates the end of input, and you should output nothing for this case.

Output

For each case, output an integer in a single line: total number(mod 100000007) of combination of the fruits displayed on the screen at the beginning of a game.

Sample Input

```
2 5
apple: less than 3
peach: greater than 1

1 18
apple: less than 0

4 10
fan: less than 1
rou: less than 7
tang: less than 6
cai: greater than 4

0 1
```

Sample Output

```
3
0
21
```

Hint

For the first case, there are 3 combinations: 0 apple and 5 peaches, 1 apple and 4 peaches, 2 apples and 3 peaches.

For the second case, apparently, it's impossible that the amount of apple is below zero. So the answer is 0.

Author: **LI, Dinghua**
Contest: **ZOJ Monthly, August 2012**

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