

In one land there were two teams of pirates, X and Y. It can happen that one team attacked the other team, and some pirates were taken away to the other pirate team. Suddenly, a magician appeared in the land and he could change the pirates from one team to another team. The number of pirates was N and each of them has a unique identifier starting from 0 to N-1. Let us assume that all 100 pirates were in the Y team, and then the magician change the pirates with identifiers from 10 to 33 to X team. After that, there were 24 pirates in X and 76 in Y. Since the magician preformed very fast the changing form one team to another, God started to dislike this because he was biased to the X team. Then the God asked the magician:

How many pirates from 2 to 30 are in X team?

The magician did not know to answer because he was good in changing, but not in counting. For this reason, the magician found a person to help him, and that person is you! Please answer the questions.

### Input

The first line of input is the number of test cases T.

For each test case:

First, there is a description of the land, which is populated by pirates ( $1 \leq N \leq 1024000$ ). Each pirate can belong to X or Y. X pirates are presented as '1' and Y as '0'.

You have to build pirates string description. Each test case starts with an integer  $M \leq 100$ , which is the number of pair lines that is following. Each pair of lines consists of an integer  $T \leq 200$ , which is in the first line. The second line is pirates sting consisting of 0 and 1 with maximum length of 50. Further, to build the pirates string description you should concatenate the pirates string T times, for each pair of lines separately. After that, you should concatenate the resulting pirates' strings from all M pairs. The final pirates string description describes the pirates from index 0 to end (N-1 for N pirates).

The next part of the input will contain queries. The first line is an integer Q, which is the number of queries. The next Q lines ( $1 \leq Q \leq 1000$ ) describes each query. Each query starts with a string F, E, I, or S followed by two integers a and b, which point to indexes. The queries are:

- F a b – change the pirates form index a to b to X team.
- E a b – change the pirates from index a to b to Y team.
- I a b – change the pirates from index a to b to inverse pirates (X to Y, and Y to X).
- S a b – How many X pirates are from index a to b?

### Output

For each test print the case number as the sample output suggests. Then for each query, output the query number, colon (:) and a space and the answer to the query as the sample suggest.

Case 1: N = 18  
101010101010001000

Case 2: N = 9  
111000000

### Input

2  
2  
5  
10  
2  
1000  
5  
F 0 17  
I 0 5  
S 1 10  
E 4 9  
S 2 10  
3

3  
1  
4  
0  
2  
0  
2  
I 0 2  
S 0 8

Output  
Case 1:  
Q1: 5  
Q2: 1  
Case 2:  
Q1: 0