

Faulty Towers

You are working in the reception of a big, luxurious, and very busy hotel. The hotel has N floors, $2 \leq N \leq 200000$, and an unlimited number of rooms in each floor (the architect was Hilbert). Many things happen in the course of a day. Guests are checking in and out, and every so often your boss asks how many hotel guests are checked in on floors between a and b , $1 \leq a \leq b \leq 200000$. You are fed up with counting hotel guests and decide to write a computer program that will provide the answers to the questions from your boss.



Input

The input consists of several test sets to be handled separately. Each test set starts with a line containing just the number N . Then follows N lines with the number of people checked in on floor i , for floors numbered from 1 to N , for increasing i . The test ends with one or more lines of instructions, in the following format:

I $a\ b$ — b new guests are checking in on floor a ,

U $a\ b$ — b are checking out of floor a ,

T $a\ b$ — you are to count the number of guests checked into rooms on floors between floor a and b and

S — the test set is done.

There will never be more than 2000000000 guests in the hotel (even if Hilbert had designed the hotel to accommodate even more guests). There will never be checked out more guests from a floor than the number of guests checked into that floor. The input ends with a test set where $N = 0$ and this test set should not be processed. There will not be more than 10000 instructions per test set.

Output

For each instruction T you are to write the following sentence on its own "Det er x gjester som bor mellom etasje a og etasje b .", where x is the total number of guests in floors from a to b . There are three special cases. If there is only one guest on these floors, write "gjest" instead of "gjester". If $a = b$ you are to write "som bor i etasje a ." instead of "som bor mellom etasje a og etasje b .". If a is 1 and b is N write "som bor i hotellet." instead of "som bor mellom etasje a og etasje b ." For each instruction S you are to write "Slutt for i dag." on its own line and start the next test set.

Sample Input 1

```
4
1
2
3
4
T 1 3
U 4 2
T 1 4
I 2 1000
T 2 2
T 1 1
S
0
```

Sample Output 1

```
Det er 6 gjester som bor mellom etasje 1 og etasje 3.
Det er 8 gjester som bor i hotellet.
Det er 1002 gjester som bor i etasje 2.
Det er 1 gjest som bor i etasje 1.
Slutt for i dag.
```