Problem 4: Bridge Construction

In a remote area of Canada, a bridge between two islands is being repaired. During the repair process the bridge can only take traffic in one lane. The bridge runs east and west, and there is a flag person with a radio at each end of the bridge to control the traffic flow.

Cars may arrive at the east end of the bridge with their driver wishing to go west. Cars may also arrive at the west end of the bridge with their drivers heading east. This being Canada, all drivers obey the speed limit exactly – it takes precisely 60 seconds to cross the bridge in either direction.

Of course, when the traffic flow is from east to west, any cars arriving on the west end must wait; similarly, if the traffic is moving across the bridge from west to eat, cars arriving at the east end must wait. The very instant that the last car going a certain direction (say, west to east) has crossed the bridge, the traffic can then run in the opposite direction (east to west).

The input data for this problem consists of a sequence of arrival events, each event identifying the time a car arrives and at which end of the bridge it arrives. Your task is to determine when the last of the cars to arrive has left the bridge.

Example

Each event is characterized by the time since the previous event, and the end of the bridge at which the car arrives. For example, suppose the following happens:

Time	End of the bridge
0	E
50	E
15	W

On the bridge, the following happens:

Absolute Time	Description
0	A car arrives at the east end. Since it is the first car it starts to cross, east to west.
50	A second car arrives; since the direction is currently east to west, it also is allowed to cross.
60	The first car leaves the bridge, and the second car is 10 seconds across.
65	A third car arrives at the west end of the bridge. It must wait; the direction right now is east to west. Note that this happens at time 65 because it is 15 seconds later than the previous event in the data.
110	The second car is now across. Since there are no more cars on the east end, the radios are used to instantly reverse the flow to west to east, and the third car starts across.
170	The third car takes 60 seconds to cross, and has reached the end of the bridge. As there are no waiting cars, and no further arrival events to consider, we display the result and proceed to the next set of data.

It is possible to have more than one car waiting at either end of the bridge. Since it is effectively a one lane bridge during the repair, cars can only proceed single file, cars travelling in the same direction across the bridge must maintain at least one second spacing. For example, consider this data:

Time	End of the bridge
0	E
10	W
10	W

On the bridge, the following happens:

Absolute Time	Description
0	A car arrives at the east end. Since it is the first car it starts to cross, east to west.
10	A second car arrives; because it is on the west end it must wait.
20	Another car has arrived at the west end of the bridge. It must wait as well.
60	The first car leaves the bridge; the west to east traffic can proceed, and the second car starts across.
61	One second later the other car on the west end begins to cross.
121	This last car takes 60 seconds to cross, and has reached the end of the bridge.

The program should display "121 seconds" and proceed to the next set of data.

A car must begin crossing the bridge as soon as possible, without violating any of the requirements of the problem.

Input

There will be multiple input cases, sequentially numbered starting with 1. The first line of the input contains a single integer specifying the number of cases. Following this, each case has one event per line specified by an integer ΔT to indicate the time since the previous event, whitespace, and either the character 'E' or the character 'W' to indicate at which end of the bridge the car arrived. The absolute time at which each data set begins is 0, the first event always has $\Delta T = 0$, and ΔT for all other events is greater than 0. There is a line containing the integer –1 after the last line of data for each case.

Output

For each case, display the case number and the number of seconds required for all the cars to cross the bridge. If each allowable sequence of events does not yield the same time required for all cars to cross the bridge, then you should report the minimum of those times. Display the output in a format similar to that shown in the samples. Display a blank line after the output for each case.

Sample Input

```
3
0 E
50 E
15 W
-1
0 E
10 W
10 W
-1
0 W
30 E
10 W
10 W
40 W
-1
```

Output for the Sample Input

```
Case 1. 170 seconds

Case 2. 121 seconds

Case 3. 210 seconds
```