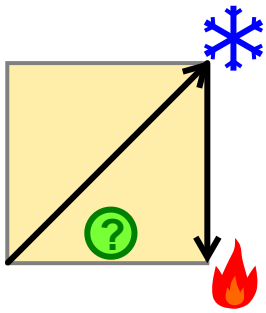
Problem N — Hotter Colder — 100 points



The children's game *Hotter Colder* is played as follows. Player A leaves the room while player B hides an object somewhere in the room. Player A re-enters at position (0,0) and then visits various other positions about the room. When player A visits a new position, player B announces "Hotter" if this position is closer to the object than the previous position; player B announces "Colder" if it is farther and "Same" if it is the same distance.

Your task is to calculate the area of the region in which the object may have been placed.

Input

The first line of input will consist of a single integer n, the number of positions ($1 \le n \le 50$).

The following n lines each contain an x,y coordinate pair and one of the words "Hotter", "Colder", or "Same". Each pair represents a position within the room, which is a square with opposite corners at (0,0) and (10,10).

Output

For each line of input print a line giving the total area of the region in which the object may have been placed based on the information in the lines processed so far, to 2 decimal places. If there is no such region, output `0.00`.

Sample Input

```
4
10.0 10.0 Colder
10.0 0.0 Hotter
0.0 0.0 Colder
10.0 10.0 Hotter
```

Output for Sample Input

```
50.00
37.50
12.50
0.00
```