# 11755   Table Tennis

Table tennis is a two/four player sport that originated in England. The scoring system of this game has changed with time. For this problem we will consider the two-player version of the game that abides by the following scoring rules (note that this rule is significantly different from the usual ones):

- Player 1 makes the first move. The players alternate serve every 5 points. That means serves [1,5] are done by player 1, serves [6, 10] are done by player 2, serves [11, 15] are done by player 1 and so on.

- In each serve, one of the two players wins a point. The first player to reach 21 points wins the game.

- If the scores are 20-20 (deuce), the scores are reset to 15-15.
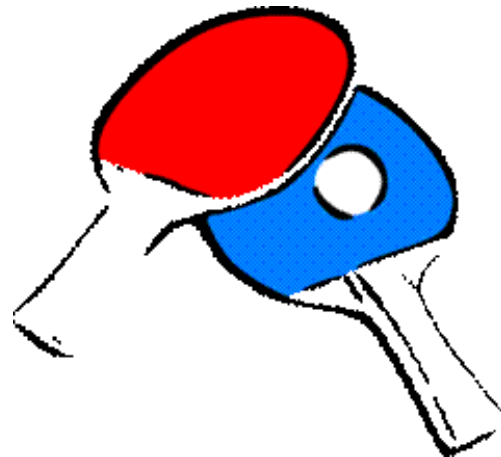
Given a partial game, the probability of player 1 winning a point on his serve and the probability of player 1 winning a point on the opponents serve, can you find out the probability of player 1 winning the game?

Input

The first line of input is an integer T ($T < 1000$) that indicates the number of test cases. Each case consists of two lines. The first line is a string consisting of the letters 'W' and 'L' only. The length of this string is non-negative and can have a maximum value of 100. The string gives the status of the game so far. If the i-th character (1 based) is 'W', that means player 1 won the i-th point. Similarly, 'L' indicates that the player 1 lost that point. The next line consists of two real numbers, P_1 P_2, in the range $[0, 1]$, with at most 3 digits after the decimal point. P_1 is the probability of player 1 winning a point on his serve and P_2 is the probability of player 1 winning a point on player 2's serve.

Output

For each case, output the case number first. Then output the probability of player 1 winning the game rounded to 6 decimal places. If the given partial game is impossible according to any of the rules or data, output '-1.000000' instead. Outputs will be checked with special judge, so small precision errors will be ignored. Look at the samples for exact format.

Illustration:

- Case 1: Player 1 has already won 20 points and next its his serve. To win the next point (which is also the game point) he has a 1.0 probability of winning

- Case 2: Player 1 has already won 21 points and he won the game and so its 1.000000.

- Case 3: The game should stop after 21 points, but the string has an extra 'W' and makes this game invalid, so output is -1.000000.

Sample Input

```
4
WWWWWWWWWWWWWWWWWWW
1.0 0.234
WWWWWWWWWWWWWWWWWWWW
0.3 0.99
WWWWWWWWWWWWWWWWWWWWW
1.0 1.0
WL
0.7 0.3
```

Sample Output

```
Case 1: 1.000000
Case 2: 1.000000
Case 3: -1.000000
Case 4: 0.444026
```