B: Badminton Bunny Buddies

Time Limit: 2 second(s)

Four cute little bunny friends are all playing a friendly match of badminton. These bunnies are very good at playing badminton, but they are very bad at remembering the score and who should be serving. This is where you come in, we need you to write a program to tell them who is serving, what the score is and if they are serving from the left or the right side of the court.

The rules for bunny badminton are slightly different to the badminton rules that we (humans) play with, so you may not assume anything from human badminton.

Bunny badminton is played with 2 teams of 2 bunnies each. The match consists of a series of rounds. To start each round, one bunny serves the ball across the net. Before they serve the ball, they must announce the current score of the game. At the end of the round, one team is awarded a point. The team that was awarded the point gets to serve in the next round. The first team to earn W points wins.

Each side of the court is divided into two halves (*Left* and *Right*). The side a bunny serves from depends on how many rounds their team has already served in the match. The first time your team serves, the ball is served from the left side; the next 2 times your team serves, the ball is served from the right side; the next 2 times your team serves, the ball is served from the left side, etc. This forms this pattern:

$$LRRLLRRLLRRLL...$$

Note that what side you serve from is only dependent on how many times your team has served, not the other team.

Determining which of the two bunnies serves is done in a similar way (but with a different pattern). Let's say that your two team members are X and O. The first time the team serves, bunny X serves; the next 3 times your team serves, O serves; the next 3 times your team serves, X serves, etc. This forms this pattern:

$$XOOOXXXOOOXXXOOO...$$

Which player serves is independent of the other team and of which side you are serving from.

You must simulate the match and give information about each of the rounds.

Input

The input will contain 4 lines.

The first two lines contain 2 strings each, the names of bunnies on each team. Each name consists only of uppercase and lowercase letters (no whitespace). The first line is Team A and the second line is Team B. On each line, the first name will be the first bunny to serve for their team. The four names will all be different.

On the third line, there will be two items: either an `A` or a `B` determining which team serves first and an integer W ($1 \le W \le 1000$), the winning threshold for the match.

The final line will contain $2W - 1$ characters denoting who will win each round. Each character will be either an `S` or an `R`. If the ith character is an `S`, then the team that served on the ith round wins that point. If the character is an `R`, then the other team wins that point. Note that you may not need all $2W - 1$ characters, as there may not be $2W - 1$ rounds in the match.

Output

For each round, you must output 3 pieces of information: which bunny is serving, which side of the court they are serving from and the current score of the match. The side of the court they are serving from must be either the string Left or Right. When announcing the score, you must write it in the format x-y, where x is the score of the serving team and y is the score of the other team.

Once one team wins the match, you must stop processing the rounds and output a line stating who wins (either Team A wins! or Team B wins!).

Sample Input and Output

Sample Input	Output for Sample Input
Anita Ada Billy Bob A 3 SSRSS	Anita Left 0-0 Ada Right 1-0 Ada Right 2-0 Billy Left 1-2 Bob Right 2-2 Team B wins!

Sample Input	Output for Sample Input
Anita Ada Billy Bob B 5 RRRRRRRR	Billy Left 0-0 Anita Left 1-0 Bob Right 1-1 Ada Right 2-1 Bob Right 2-2 Ada Right 3-2 Bob Left 3-3 Ada Left 4-3 Billy Left 4-4 Team A wins!