Movement Directions

You are given n+1 points $A_0, A_1, ..., A_n$ in the plane. First, you are asked to move from A_0 to A_1 . Next, you will move through $A_2, A_3, ..., A_n$ along the line segments.

Compute the directions you will need to turn by and the values of the cosine of the turning angle for each of the points $A_1, A_2, ..., A_{n-1}$.

Input data specification

In the first line, you are given one number $2 \le n \le 1000$, and in the each of the following n+1 lines, two integers:

-1000 <= $x_i y_i$ <= 1000 - the coordinates of the subsequent points.

You can assume that any two consecutive points are different.

Output data specification

In *n*-1 consecutive lines, first print one letter L (if you are turning left) or R (if you are turning right), followed by a space and the value of the cosine of the turning angle with 6 digits' precision. If you do not turn at all but go forward at a particular point, please print just a letter F instead. Also, if you turn around and move back in the opposite direction, print only a letter B.

Example 1

Input: 5

Output:

F B L 0.000000 L -0.948683

Scoring

By solving this problem you score 10 points.