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110507 The Stern-Brocot Number System

The *Stern-Brocot tree* is a beautiful way for constructing the set of all non-negative fractions $\frac{m}{n}$ where m and n are relatively prime. The idea is to start with two fractions $\left(\frac{0}{1}, \frac{1}{0}\right)$ and then repeat the following operation as many times as desired:

Insert $\frac{m+m'}{n+n'}$ between two adjacent fractions $\frac{m}{n}$ and $\frac{m'}{n'}$.

For example, the first step gives us one new entry between $\frac{0}{1}$ and $\frac{1}{0}$,

$$\frac{0}{1}, \frac{1}{1}, \frac{1}{0}$$

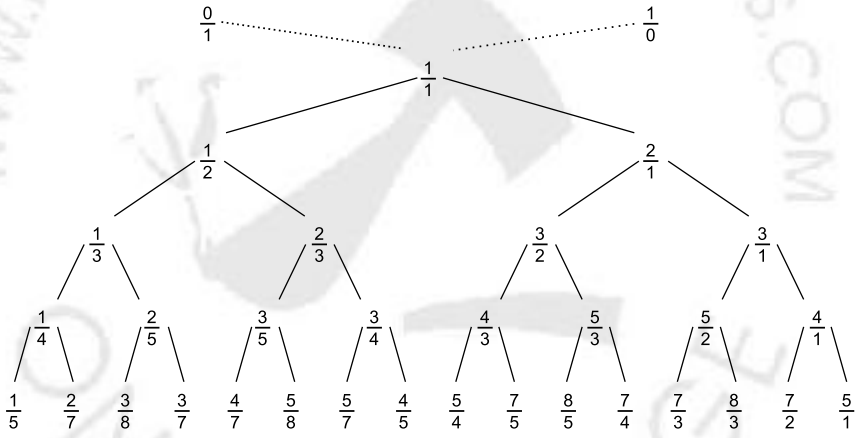
and the next gives two more:

$$\frac{0}{1}, \frac{1}{2}, \frac{1}{1}, \frac{2}{1}, \frac{1}{0}$$

The next gives four more:

$$\frac{0}{1}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{1}{1}, \frac{3}{2}, \frac{2}{1}, \frac{3}{1}, \frac{1}{0}$$

The entire array can be regarded as an infinite binary tree structure whose top levels look like this–



This construction preserves order, and thus we cannot possibly get the same fraction in two different places.

We can, in fact, regard the *Stern-Brocot tree* as a *number system* for representing rational numbers, because each positive, reduced fraction occurs exactly once. Let us use the letters "`L`" and "`R`" to stand for going down the left or right branch as we proceed from the root of the tree to a particular fraction; then a string of `L`'s and `R`'s uniquely identifies a place in the tree. For example, `LRRL` means that we go left from $\frac{1}{1}$ down to $\frac{1}{2}$, then right to $\frac{2}{3}$, then right to $\frac{3}{4}$, then left to $\frac{5}{7}$. We can consider LRRL to be a representation of $\frac{5}{7}$. Every positive fraction gets represented in this way as a unique string of `L`'s and `R`'s.

Well, almost every fraction. The fraction $\frac{1}{1}$ corresponds to the empty string. We will denote it by I, since that looks something like 1 and stands for "identity."

In this problem, given a positive rational fraction, represent it in the *Stern-Brocot number system.*

Input

The input file contains multiple test cases. Each test case consists of a line containing two positive integers m and n, where m and n are relatively prime. The input terminates with a test case containing two `1`'s for m and n, and this case must not be processed.

Output

For each test case in the input file, output a line containing the representation of the given fraction in the *Stern-Brocot number system*.

Sample Input

```
5 7
878 323
1 1
```

Sample Output

```
LRRL
RRLRRLRLLLLRLRRR
```