Before attempting the problem, you are **required** to thoroughly read the reference material - https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/tutorial/.

Statement

Given a binary tree which has T nodes, you need to find the diameter of that binary tree. The diameter of a tree is the number of nodes on the longest path between two leaves in the tree.

Input

First line contains two integers, T and X, the number of nodes in the tree and value of the root node. The following $2 \times (T - 1)$ lines contain details of the nodes.

Each node is described by two lines. The first line contains a string and the second contains an integer, which denote the path to the node from root and the value of the node respectively.

The string consists of the characters L and R only. L denotes left child and R denotes right child.

Output

Print the diameter of the binary tree.

Constraints

- $1 \le T \le 20$
- $1 \le value of nodes \le 20$

Sample

Sample Input	Sample Output
5 1	4
L	
2	
R	
3	
LL	
4	
LR	
5	