AVL Tree

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

In this lab, you will implement a self-balancing binary tree (AVL Trees).

You will be given Q queries. Each query will be of the following type.

ADD x
Add element x to the tree.

COUNT L
Count the number of Left rotations happened so far.

COUNT R
Count the number of right rotations happened so far.

PARENT x
Print the parent of x. If x is not present in the tree, print -1. Parent of the root is always 0.

Input

First-line contains an integer Q. ($1 \leq Q \leq 10^6$)

Q lines follow with each line having a query described above. ($1 \leq x \leq 10^9$)

Example

standard input	standard output
8 ADD 3 ADD 4 ADD 5 PARENT 3 PARENT 4 PARENT 5 COUNT L COUNT R	4 0 4 1 0

Note

It is guaranteed that all the elements in the tree will be **UNIQUE**.