Algorithm 1-1

逆序數對

Description:

Arashi87 is addicted to a game called "arashi's craft" recently. All the items in this game are made of blocks. The first thing to do while being a newbie in the game is definitely building a beautiful house, but arashi87 doesn't have too much blocks to use. To cost down, arashi87 hopes that you can write a program to help him see the result of the house after several operations.

We made the problem simple. Now we have number   to   blocks put on   slots in order, with the following operations:

move a onto b, put the blocks stacked on No. a block and No. b block back to the top of their original slots, then put No. a block onto No. b block.
move a over b, put the blocks stacked on No. a block back to the top of their original slots, then put No.a   block on top of the pile that contains No. b block.
pile a onto b, put the blocks stacked on No. b block back to the top of their original slots, then put the whole pile of blocks above No. a block (including a) onto No. b block.
pile a over b, put the whole pile of blocks above No. a block (including a) on top of the pile that contains No. b block.
Please note that when the block a and the block b are in the same pile, the operation get skipped. The final result should be printed after all the operations are done.

Input Format:

First line contains 2 integers N and M, for N blocks and M operations. For the next M line commands, every line is a valid operation according to the description.

- $1 <= N <= 10^3$
- $1 <= M <= 2*10^5$
- $1 <= a,b <= N$

Sample input	Sample Output 1
10 8	1: 1
pile 1 onto 1	2: 2 9
pile 8 over 6	3:
move 3 onto 5	4: 4
move 8 over 8	5: 5
move 4 onto 9	6: 6 8
pile 10 over 10	7: 7 3
move 9 onto 2	8:
pile 3 onto 7	9:
	10: 10

Algorithm 1-2

stack 模擬器

After the intense practice of data structure at the first semester of sophomore, you must be very familiar with compiling data structure with your brain. This problem asks you to become a cold-blood stack machine. You are an empty stack and asked to do the following operations:

PUSH，put the empty set {} into stack

DUP，duplicate the top element of the stack and put it in stack

UNION，pop out two elements, put the union of them back to stack

INTERSECT，pop out two elements, put the intersection of them back to stack

ADD，pop out two elements, add the first as the element of the later, and put the result back to the stack.
For example, if the first element taken out from the stack is X={{}, {{}}}, the second one is Y={{}, {{{}}}}. The result of several operations is:

UNION operation gets {{}, {{}}, {{{}}}}. The number of elements in the set is .
INTERSECT operation gets {{}}. The number of elements in the set is .

ADD operation gets {{}, {{{}}}, {{}, {{}}} }，The number of elements in the set is .

Input Format:
The first line has an integer N, with following lines of N inputs. Each line contains a string as a valid operation

- 1 <= N <= 2*10^5

Sample input	Sample Output 1
10 PUSH PUSH PUSH ADD DUP DUP DUP ADD INTERSECT ADD	0 0 0 1 1 1 1 2 1 2
9 PUSH DUP ADD PUSH ADD DUP ADD DUP UNION	0 0 1 0 1 1 2 2 22 3 5 8 21 34 2 3 5 13 21 34 2 3 8 13 21 34 2 5 8 13 21 34 3 5 8 13 21 34

Algorithm 2-3

Description:

A new semester has started! It is well known that professors in the Arashi87's course like to have pop quiz. However, Arashi87 is a quite lazy student. He invented a "Test Prediction Algorithm" according to an unscientific theory. This allows him to prepare less stuff and get more to time to slack off. The algorithm he invented is described down below:

According to the theory, we can know that professors like to have quiz for the chapter they have mentioned lately. And, Arashi87 can memorize at most N. If professor teach more chapter than N, Arashi87 will forget the earliest chapter that the professor taught and memorize the new chapter. Here we need you to provide two operations like down below:

- `set a b` , means that professor teaches chapter a and the content of it is b. If there are duplicated chapter, update its content and the time of mentioning it.

- `get a` , means that the pop quiz have chapter a. You need to look for it in the content you memorize. If it exists, you need to update time of mentioning it because you have recall it in your mind.

Input Format:

First line contains two integers N andM. This means that Arashi87 can memorize N chapters at most. And, there are totally M operations.
For the next M line commands, every line is a valid operation according to the description. All commands will be given in time order.

- 1 <= N <= 10^5
- 1 <= M <= 10^6
- 1 <= a,b <= 5*10^5

Sample input	Sample Output 1
10 10	-1
get 4	4
set 4 4	-1
set 2 1	-1
get 4	2
get 5	
set 2 3	
set 2 2	
get 3	
set 4 3	
get 2	