General Note:

- Read and understand the question carefully.
- For implementation, you are permitted to use the code that you have submitted as an assignment.
- You are not permitted to use global variables and/or static variables.
- Assume that all the inputs in the test cases are valid.

2. In a criminal case, n persons are suspected by the police. Police started interrogating these suspects and came to know that some of them are friends. For each of the suspects, police maintains a list.

   Each person is identified by his/her file number $file\_nbr$. File numbers are consecutive integers from 1 to n. On interrogating the persons P, Q and R, any of the following procedures has to be done.

   - If P and Q are friends, include P in the list of Q and Q in the list of P.
   - If it is found that P and Q are not friends anymore, remove P from the list of Q and Q from the list of P.
   - If P is found to be innocent, delete his/her list and remove him/her from all the other lists.
   - Replace Q in P's list with R by removing Q from P's list and adding R in P's list.

   You are given the details of the suspects in the order they were collected by the police. Your program should implement the following functions as per the given function prototypes, by maintaining an array L of n singly linked lists.

   - $main()$: Repeatedly read a character 'f', 'r', 'u', 'p' or 'd' from the console and perform the corresponding operations given in the section Input/Output Format, using the following functions, until character 't' is encountered. [1 Mark]
   - $add\_person(L, P, Q)$: Add Q at the end of P's list. Time complexity of this function should be $(O(1))$. [1 Mark]
   - $remove\_person(L, P, Q)$: Remove Q from P's list. [1 Mark]
   - $replace\_person(L, P, Q, R)$: Remove Q from P's list and add R at the end of P's list. Also update the lists of Q and R accordingly. [1 Mark]
   - $delete\_person(L, P)$: Delete the list of P and remove P from all the other lists. [1 Mark]
   - $print\_person(L, P)$: Print the $file\_nbr$ of all the persons in the list of P, starting from the head of the list, separated by a space. If P is not present in L, print $NULL$. Print -1 if P's list is empty. [1 Mark]

Input/Output Format

The input consists of multiple lines. First line of the input contains an integer $n \in [1, 10^4]$ representing the number of suspects.

Each subsequent line starts with a character from $\{f, r, d, u, p, t\}$ followed by at most three integers $\in [1, n]$.

- Character 'f' : Character 'f' will be followed by the $file_nbr$s of two persons P and Q who are friends. Include P in the list of Q and Q in the list of P, using $add\_person()$ function.
- Character 'r' : Character 'r' will be followed by the $file_nbr$s of two persons P and Q. Remove P from the list of Q and Q from the list of P, using $remove\_person()$ function.
- Character 'u' : Character 'u' will be followed by the $file_nbr$s of three persons P, Q and R, respectively. Replace Q in P's list with R by removing Q from P's list and adding R at the end of P's list, using $replace\_person()$ function.
- Character 'd' : Character 'd' will be followed by the $file\_nbr$ of a person P who is found to be innocent. Delete the list of P and remove P from all the other lists, using $delete\_person()$ function.
- Character 'p' : Character 'p' will be followed by the $file\_nbr$ of a person P. Print the $file\_nbr$ of all the persons in the list of P, using $print\_person()$ function.
- Character 't' : Terminate the program.

Sample Input and Output

Input 1

```
6
f 1 2
f 2 3
f 5 6
f 4 3
p 2
p 5
r 5 6
p 5
p 6
u 3 2 5
p 3
p 2
p 5
d 3
p 3
p 5
t
```

Output 1

```
1 3
6
-1
-1
4 5
1
3
NULL
-1
```

Input 2

```
6
f 3 2
f 5 4
f 5 3
f 5 1
f 3 1
p 5
p 6
p 1
r 3 5
p 5
d 1
p 3
p 5
p 1
p 3
f 6 3
f 3 4
u 3 6 5
p 5
p 6
p 3
t
```

Output 2

```
4 3 1
-1
5 3
4 1
2
4
NULL
2
4 3
-1
2 4 5
```