Problem 2. Santa's List

Its Christmas time and Santa needs your help with creating the list of noisy kids.

Input

You will receive the initial list with noisy kids each of them separated with "&".

After that you will receive 4 types of commands until you receive "Finished!"

- Bad {kidName} adds a kid at the start of the list. If the kid already exists skip this line.
- Good {kidName} removes the kid with the given name only if he exists in the list, otherwise skip this line.
- Rename {oldName} {newName} if the kid with the given old name exists change his name with the newer one. If he doesn't exist skip this line.
- Rearrange {kidName} If the kid exists in the list remove him from his current position and add him at the end of the list.

Constraints

You won't receive duplicate names in the initial list

Output

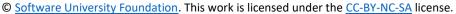
Print the list of all noisy kids joined by ", ".

• "{firstKid}, {secondKid}, ...{nthKid}"

Examples

Input	Output
Peter&George&Mike	Joshua, George, Mike
Bad Joshua	
Good Peter	
Finished!	
Input	Output
Joshua&Aaron&Walt&Dustin&William	Joshua, Paul, Dustin, William, Jon
Good Walt	
Bad Jon	
Rename Aaron Paul	
Rearrange Jon	

















Rename Peter George	
Finished!	











