Simple File Commands

Alice is writing a program that performs the following terminal commands:

- crt file_name

  1. Create a file named **file_name**.

  2. If **file_name** is already in use, then append (x) to it where x is the lowest positive integer such that the file doesn't already exist. For example, crt a creates file a(2) if a and a(1) already exist.

  3. Print + new_file on a new line, where **new_file** is the new file's name.

- del file_name

  1. Delete the file named **file_name**.

  2. Print - file_name on a new line, where **file_name** is the deleted file's name.

- rnm file_name1 file_name2

  1. Find the file called **file_name1** and change the name to **file_name2** (Follow point 2 of crt command in case of conflict). For the purpose of simplification, you can think this operation as deleting the first file and creating the second file.

  2. Print r file_name1 -> new_file on a new line, where **new_file** is the new file's name.

Assume that the user won't attempt to create a file which contains anything other than lowercase English letters.

Given q commands, execute each command in order.

Input Format

The first line contains an integer, q, denoting the number of commands.
Each of the q subsequent lines contains a command in the format defined above.

Constraints

- $1 \leq q \leq 10^5$

- The given name string for any file to be created consists of a maximum of 10 lowercase English letters.

- It's guaranteed that the del and rnm operations will only attempt to delete or rename files that exist.

Subtasks

- $1 \leq q \leq 500$ for 25% of the maximum score.

- $1 \leq q \leq 5000$ for 50% of the maximum score.

Output Format

For each command, print the appropriate output per the instructions above.

Sample Input 0

```
11
crt phonebook
crt phonebook
crt phonebook
crt todo
```

```
crt phonebook
del phonebook
del phonebook(2)
crt phonebook
crt phonebook
crt phonebook
rnm phonebook(2) todo
```

Sample Output 0

```
+ phonebook
+ phonebook(1)
+ phonebook(2)
+ todo
+ phonebook(3)
- phonebook
- phonebook(2)
+ phonebook
+ phonebook(2)
+ phonebook(4)
r phonebook(2) -> todo(1)
```

Explanation 0

In the diagram below depicting the sequence of $q = 11$ commands, newly created files are italicized:

Input	Output	File Name List
crt phonebook	+ phonebook	*phonebook*
crt phonebook	+ phonebook(1)	*phonebook(1)*
crt phonebook	+ phonebook(2)	*phonebook(2)*
crt todo	+ todo	*todo*
crt phonebook	+ phonebook(3)	*phonebook(3)*

Input	Output	File Name List
del phonebook	- phonebook	phonebook(1)
del phonebook(2)	- phonebook(2)	todo
		phonebook(3)

Input	Output	File Name List
crt phonebook	+ phonebook	phonebook(1)
crt phonebook	+ phonebook(2)	todo
crt phonebook	+ phonebook(4)	phonebook(3)
		phonebook
		phonebook(2)
		phonebook(4)

Input	Output	File Name List
rnm phonebook(2) todo	r phonebook(2) -> todo(1)	phonebook(1)
		todo
		phonebook(3)
		phonebook
		phonebook(4)
		todo(1)