Assignment 6

Sam was doing a big programming project. He faced this problem where he would declare variables he had already declared by mistake, so he would have to change the literals. He wants you to check whether he can name his variable by a particular character. Basically, you need to keep track of the literals that he has used, and the literals that are available.

Also, remember that a variable is limited only in its scope, so it can become available outside the scope of the function.

Here are the functions he wants you to implement for this task, using a binary search tree:

- **Declare (char x):** Check whether the literal x is present in the BST. If it is not present already, insert it, else display an appropriate message.
- **Delete (char x):** Delete the char x from the BST if present.
- **Display ()**: Print the Preorder, Postorder and Inorder traversal of the BST.

Write a program for this problem in C/C++.

Input

The first line contains an integer N, the number of operations to be performed.

The next N lines can be any of the following

a. DECLARE <Char>
b. DEL <Char>
c. DISPLAY

<Char> will be replaced by a character denoting the variable to be inserted/deleted.

INSERT <Char> should insert the character <Char> in the BST.

DEL <Char> should delete the character <Char> from the BST if present.

Output

For every DISPLAY command, print the preorder, postorder and inorder traversal of the BST in separate lines. If the BST is empty, print a blank line.

Sample Input

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INSERT b
INSERT a
INSERT h
INSERT c
DEL c
DISPLAY

Output

Preorder: b a h

Postorder: a h b

Inorder: a b h