4b. **Aim** : To eliminate left Factoring from given set of grammar rules.

Algorithm :
1. Start
2. Get input rule from user
3. Find index of '|' symbol
4. Check for similar characters before and after '|' symbol
   i) If similar characters not found, print "No left Factoring"
5. For rule 1, search for all similar characters before and after '|' symbol and print them.
5. Mark the index for the points where similar characters end.
7. For rule 2, print the characters from the previously marked index in the format of the rule.
8. Stop.

MANUAL WORKING

Elimination of left Factoring

Left Factoring is of the form:

$$A \rightarrow \alpha \beta_1 \mid \alpha \beta_2$$

To eliminate left Factoring:

Rule 1: $A \rightarrow \alpha A'$

Rule 2: $A' \rightarrow \beta_1 \mid \beta_2$

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Date: 11th February 2022

Compiler Design Lab
Experiment 4b: Elimination of Left Factoring

Code:

Lab 4b: Elimination of Left Factoring

```c
// Elimination of Left Factoring

// Left Factoring: A -> ab1 | ab2
// Elimination:
// A -> aA'
// A' -> b1 | b2

#include<stdio.h>
#include<string.h>
#include<ctype.h>

int main()
{
    int i=0, idx;
    char c,ch,initial;
    char a[10];
    int b1=0,b2=0;
    printf("Enter the production (Using equal sign like A=Ab|a): \n");

    scanf("%s%c",a,&ch);

    initial=a[0];
    c=a[2];
    for(int k=3; k<strlen(a); k++) {
        if(a[k]=='|')
            { idx = k;
            break;
            }
    }

    if(c==a[idx+1]) {
```

```c
        printf("Left Factoring found\n");
        // Rule 1
        printf("%c -> ",initial);
        for(int i=2,j=idx+1; j<strlen(a); i++,j++) {
            if(a[i]==a[j])
                printf("%c",a[i]);
            else
            {
                b1=i;
                b2=j;
            }
        }
    printf("%c'\n",initial);

    // Rule 2
    printf("%c' -> ",initial);

    for(int i=b1;i<idx;i++){
        printf("%c",a[i]);
    }

    printf("|");
    for(int i=b2;i<=strlen(a);i++){
        printf("%c\n",a[i]);
    }
}

    else {
        printf("No left factoring\n");
    }

    return 0;
}
```
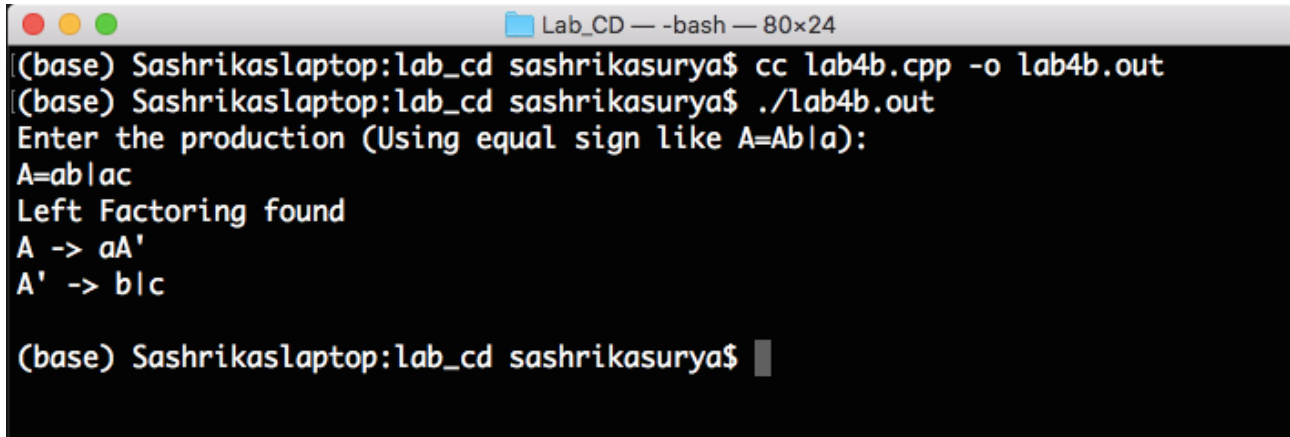
Output:

Lab 4b:

Result:

Hence, Left Factoring was successfully found and removed from the productions by the given program.