Name: Munna Chauhan

Reg No.: CH.EN.U4CSE22176

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LAB – 3

Aim: To implement eliminate left recursion and left factoring from the given grammar using C program.
Code:
Leftrecursion.c

```c
#include <stdio.h>

#include <string.h>


int main() {

    char gram[100], part1[100], part2[100], modifiedGram[100], newGram[100];

    int i, j = 0, k = 0, pos = 0;


    printf("Enter Production : A->");

    gets(gram);


    // Split input into part1 and part2 at '|'

    for (i = 0; gram[i] != '|' && gram[i] != '\0'; i++, j++)

        part1[j] = gram[i];

    part1[j] = '\0';
```

```c
        j++; // skip '|'


    for (i = j, j = 0; gram[i] != '\0'; i++, j++)

        part2[j] = gram[i];

    part2[j] = '\0';


    // Find longest common prefix

    for (i = 0; i < strlen(part1) && i < strlen(part2); i++) {

        if (part1[i] == part2[i]) {

            modifiedGram[k++] = part1[i];

            pos = i + 1; // position after common prefix

        } else {

            break;

        }

    }


    // Construct newGram with suffixes after the common prefix

    for (i = pos, j = 0; part1[i] != '\0'; i++, j++)

        newGram[j] = part1[i];

    newGram[j++] = '|';

    for (i = pos; part2[i] != '\0'; i++, j++)

        newGram[j] = part2[i];

    newGram[j] = '\0';
```

```c
    // Append 'X' to modifiedGram

    modifiedGram[k++] = 'X';

    modifiedGram[k] = '\0';


    // Print the result

    printf("\nA->%s", modifiedGram);

    printf("\nX->%s\n", newGram);


    return 0;
}
```

Output:

```
asecomputerlab@asecomputerlab-HP-ProDesk-400-G7-Microtower-PC:~$ cd Desktop
asecomputerlab@asecomputerlab-HP-ProDesk-400-G7-Microtower-PC:~/Desktop$ cd 22077
asecomputerlab@asecomputerlab-HP-ProDesk-400-G7-Microtower-PC:~/Desktop/22077$ gcc leftrecursion.c -o leftrecursion
leftrecursion.c: In function 'main':
leftrecursion.c:9:5: warning: implicit declaration of function 'gets'; did you mean 'fgets'? [-Wimplicit-function-declaration]
    gets(gram);
    ^~~~
    fgets
/tmp/ccDE57Ag.o: In function 'main':
leftrecursion.c:(.text+0x5a): warning: the `gets' function is dangerous and should not be used.
asecomputerlab@asecomputerlab-HP-ProDesk-400-G7-Microtower-PC:~/Desktop/22077$ ./leftrecursion
Enter Production : A->abc|abde


A->abX
X->c|de
asecomputerlab@asecomputerlab-HP-ProDesk-400-G7-Microtower-PC:~/Desktop/22077$
```