

Experiment Number 4

Aim: Elimination of Ambiguity, Left Recursion and Left Factoring.

Algorithm:

Step 1: Start

Step 2: Check for ambiguity, left recursion and then left factoring.

Step 3: Eliminate the above.

Step 4: Create new grammar.

Step 5: Print respective output.

Step 6: Stop.

Code:

```
1: #include<stdio.h>
2: #include<string.h>
3: #define SIZE 10
4: int main () {
5:     char non_terminal;
6:     char beta,alpha;
7:     int num;
8:     char production[10][SIZE];
9:     int index=3; /* starting of the string following "->" */
10:    printf("Enter Number of Production : ");
11:    scanf("%d",&num);
12:    printf("Enter the grammar as E->E-A :\n");
13:    for(int i=0;i<num;i++){
14:        scanf("%s",production[i]);
15:    }
16:    for(int i=0;i<num;i++){
17:        printf("\nGRAMMAR : : : %s",production[i]);
18:        non_terminal=production[i][0];
19:        if(non_terminal==production[i][index]) {
20:            alpha=production[i][index+1];
21:            printf(" is left recursive.\n");
22:            while(production[i][index]!=0 && production[i][index]!='|')
23:                index++;
24:            if(production[i][index]!=0) {
25:                beta=production[i][index+1];
26:                printf("Grammar without left recursion:\n");
27:                printf("%c->%c%c\'",non_terminal,beta,non_terminal);
28:                printf("\n%c\'->%c%c\'|E\n",non_terminal,alpha,non_terminal);
29:            }
30:            else
31:                printf(" can't be reduced\n");
32:        }
```

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33:     else
34:         printf(" is not left recursive.\n");
35:     index=3;
36: }
37: }
```

Output:

```
Enter Number of Production : 4
Enter the grammar as E->E-A :
E->EA|A
A->AT|a
T->A
E->i

GRAMMAR : : : E->EA|A is left recursive.
Grammar without left recursion:
E->AE'
E'->AE'|E

GRAMMAR : : : A->AT|a is left recursive.
Grammar without left recursion:
A->aA'
A'->TA'|E

GRAMMAR : : : T->A is not left recursive.

GRAMMAR : : : E->i is not left recursive.
```

Result: Thus, elimination of Ambiguity, Left Recursion and Left Factoring implemented successfully.