Practical 4

Compiler Construction

2CS701

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Aim :

To Implement Left Recursion derivation removal algorithm :

Eliminate direct and indirect Left recursion from given grammar for LL(1) parser.

Input :

E->EA|A

A->AT|a

C code :

```c
#include<stdio.h>
#include<string.h>
#define SIZE 10
int main ()
{
    char non_terminal;
    char beta,alpha;
    int num;
    char production[10][SIZE];
    int index=3; /* starting of the string following "->" */
  printf("Enter Number of Production : ");
    scanf("%d",&num);
    printf("Enter the grammar as E->E-A :\n");
    for(int i=0;i<num;i++)
    {
        scanf("%s",production[i]);
    }
    for(int i=0;i<num;i++)
    {
        printf("\nGRAMMAR : : : %s",production[i]);
        non_terminal=production[i][0];
      if(non_terminal==production[i][index])
      {
            alpha=production[i][index+1];
            printf(" is left recursive.\n");
            while(production[i][index]!=0 && production[i][index]!='|')
                index++;
            if(production[i][index]!=0)
            {
                beta=production[i][index+1];
                printf("Grammar without left recursion:\n");
              printf("%c->%c%c\'",non_terminal,beta,non_terminal);
```

```
                    printf("\n%c\'-
>%c%c\'|E\n",non_terminal,alpha,non_terminal);
                }
                else
                    printf(" can't be reduced\n");
            }
            else
                printf(" is not left recursive.\n");
            index=3;
        }
}
```

Output :

```
PS C:\Users\unnat\OneDrive\Desktop\CC> gcc prac_4.c
PS C:\Users\unnat\OneDrive\Desktop\CC> ./a.exe
Enter Number of Production : 2
Enter the grammar as E->E-A :
E->EA|A
A->AT|a

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
PS C:\Users\unnat\OneDrive\Desktop\CC> []
```

Conclusion :

From this practical, we learnt about elimination of direct and indirect left recursion.