

Experiment No:6

AIM: To implement a program to eliminate left recursion.

THEORY:Left recursion

A grammar in the form $G = (V, T, S, P)$ is said to be in left recursive form if it has the production rules of the form $A \rightarrow A\alpha \mid \beta$. In the production rule above, the variable in the left side occurs at the first position on the right side production, due to which the left recursion occurs. If we have a left recursion in our grammar, then it leads to infinite recursion, due to which we cannot generate the given string.

How to eliminate left recursion

We can eliminate left recursion by replacing a pair of production with:

$$A \rightarrow \beta A'$$

$$A' \rightarrow \alpha A' \mid \epsilon$$

Algorithm:

1. Declare arrays for input, L, r, temp, pemprod, production
2. Declare variables
3. Input the production in l, r
4. Print r
5. Check for left recursion in string
6. remove by grammar rule
7. update the arrays
8. display the production after elimination of left recursion.

COMPUTING ENVIRONMENT

Platform: ubuntu

Programming Language: C / C++ / Java

Expected Outcome:

Enter the productions: $E \rightarrow E+E \mid T$

The productions after eliminating Left Recursion are:

$$E \rightarrow +EE'$$

$$E' \rightarrow TE'$$

$$E \rightarrow \epsilon$$

Conclusion: Thus the program to eliminate left recursion is implemented.

Viva Voce Questions:

1. What is left recursion?

Answer: A grammar in the form $G = (V, T, S, P)$ is said to be in left recursive form if it has the production rules of the form $A \rightarrow A\alpha \mid \beta$. In the production rule above, the variable in the left side occurs at the first position on the right side production, due to which the left recursion occurs. If we have a left recursion in our grammar, then it leads to infinite recursion, due to which we cannot generate the given string.

2. How to eliminate Left recursion?

Answer: We can eliminate left recursion by replacing a pair of production with:

$$A \rightarrow \beta A'$$

$$A' \rightarrow \alpha A' \mid \epsilon$$