SSN COLLEGE OF ENGINEERING, KALAVAKKAM
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Compiler Design Lab – CS1602
Programming Assignment-3   - Implementation of Left Recursion Elimination

Write a program to find whether the given grammar is left recursive or not.

Eliminate the left recursion using the following rule

$$A \rightarrow A\, \alpha \mid \beta \qquad \text{where } \beta \text{ does not start with A}$$

$$\Downarrow \qquad \text{eliminate immediate left recursion}$$

$$A \rightarrow \beta\, A'$$
$$A' \rightarrow \alpha\, A' \mid \varepsilon \text{ an equivalent grammar}$$

Sample

Input

$$E \rightarrow E+T \mid T$$
$$T \rightarrow T*F \mid F$$
$$F \rightarrow id \mid (E)$$

Output

$$E \rightarrow T\, E'$$
$$E' \rightarrow +T\, E' \mid \varepsilon$$
$$T \rightarrow F\, T'$$
$$T' \rightarrow *F\, T' \mid \varepsilon$$
$$F \rightarrow id \mid (E)$$