

Lab Assignment 4

Syntax Analysis/Parsing

NOTE: Refer lecture notes, Chapter 4.

Q1. Write a program to remove left-recursion from grammar G given as input.

Example Input:

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

Example Output:

$E \rightarrow TE'$
 $E' \rightarrow +TE' \mid \epsilon$
 $T \rightarrow FT'$
 $T' \rightarrow *FT' \mid \epsilon$
 $F \rightarrow (E) \mid id$

Q2. Write a program that takes a grammar G as input and produces an equivalent left-factored grammar as output.

Example Input:

$A \rightarrow aAB \mid aBc \mid aAc$

Example Output:

$A \rightarrow aA'$
 $A' \rightarrow AD \mid Bc$
 $D \rightarrow B \mid c$

Q3. We discussed about a basic top-down parsing approach (**Recursive-descent parsing**) that may require backtracking. Implement a recursive descent parser for the following expression grammar:

$E \rightarrow TE'$
 $E' \rightarrow +TE' \mid \epsilon$
 $T \rightarrow FT'$
 $T' \rightarrow *FT' \mid \epsilon$
 $F \rightarrow (E) \mid id$