CS321
Lab 4
Syntax analysis

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- This assignment is to be submitted by groups. Each group has two students. Create a readme file where your group name and student information are given.
- Please mention clearly the contribution of the members in the group.
- Zip all the required files in one file and give it a name as group name followed by lab 4 followed by the roll number of one group member. If this naming convention is not followed then there will be a penalty of a few percentage of the marks assigned for this lab.
- Happy parsing :).

We hope you enjoyed Lab 3. You have already learned how to develop a lexical analyzer using Lex and how to achieve functionalities using Yacc. Its time to develop a parser that will take input from a lexical analyzer. The job of your parser is to check that whatever input its getting from the lexical analyzer is a valid input with respect to a context free grammar or not. If its not a valid input please give meaningful messages where it failed. In this lab we will use the FIRST and FOLLOW process discussed in the class to create a LL(1) parser using predictive parsing table [1].

1 EXPRESSION

The language **EXPRESSION** consists of arithmetic expressions as defined in the class. The grammar for EXPRESSION is given below.

1. $E -> E + T$
2. $E -> E - T$
3. $E -> T$
4. $T -> T * F$
5. $T -> T/F$
6. $T -> F$
8. $F -> num$
9. $F -> id$
10. $F -> (E)$

To construct a LL(1) parser for EXPRESSION you need to do the following:

- Find a method to accept the grammar EXPRESSION.
  - Think of an efficient data structure for the same..
- Eliminate left recursion/left factoring if exists.
- Write subroutines for implementing FIRST() and FOLLOW().
- Write a subroutine to construct a predictive parsing table.
- Write a subroutine to construct a predictive parser.

[1] discussed in the lectures before mid semester test

How to test your parser

On running the executable for your parser, it should accept all strings that belong to the language generated by the grammar EXPRESSION.