

Assignment I
LEX Program
[15th July to 15th August]

Knowledge: Basic of Finite Automata.

Regular Expression.

Basic of Compiler Design

Lexical Analysis

C programming

- 1. Write a LEX program to calculate number of vowels and consonants in a text entered by user.**
2. Write a LEX program to calculate number of positive integer, negative integer, positive fraction and negative fraction from a list of numbers entered by user.
- 3. Write a LEX program to count number of printf and scanf statement in a given C program.**
- 4. Re write the program 3 and replace print by 'read' and scanf by 'write' and display the final outcome.**
- 5. Write a LEX program to count number of characters, words, spaces, lines in a file.**
6. Write a LEX program to count numbers (integer and fraction) greater than 42 from a list of numbers.
- 7. Write a LEX program to count comment lines and remove comment lines from a given C program.**
8. Write LEX program to find the following regular expressions
 - a)Any string beginning with abb and ending with ccd.
 - b)A string with one or more occurrence of ab.
9. Write a LEX program to find number of identifiers and number of integers and number of string which are neither identifier nor integer.
- 10. If a statement contains the word AND/and, OR/or, BUT/but then it is treated as compound statement. Write a LEX program to check whether a statement is simple or compound.**

[Comments: Program 1,3,4,5,7 and 10 are in BASIC category

Program 2,6,8 and 9 are in INTELLECTUAL category]

Assignment II

Conversion of RE to NFA and DFA

[16th August to 23rd September,2014]

Knowledge: Basic of Finite Automata.

Regular Expression.

Basic of Compiler Design

Lexical Analysis

C programming

1. Write a C program to represent a Finite Automata.

Input: Set of States, Set of Input alphabets , State transition,

Output: A table representing a Finite automata.

2. Write a C program to check whether a string is accepted by a FA or not.

Input: The FA, The input string.

Output: Yes or No.

[Denote the initial and Final state.]

3. Consider the FA as NFA . Now implement program 2.

4. Write a C program to implement Thompson construction of NFA from a RE.

[Mention ab as a**dot**b,alb as a**OR**b.]

[Hints: First try it by excluding star]

5. Write a C program to find out ϵ closure of all the states.

Input : The Finite Automata with input symbols=Number of input alphabet+1

Output: ϵ closure of all the states.

6. Write a C program to convert a NFA to a DFA by ϵ closure method.

7. Write a C program to Minimize a DFA.

Input: The DFA with Final and Non-Final states.

Output: The minimized DFA.

[Program 1,2,5,7 are in BASIC category and

Program 3, 4 and 6 are in INTELLECTUAL category]

Assignment III

FIRST, FOLLOW, LL(1) Table Construction

[7th October to 21st October, 2014]

Required Knowledge: Regular Expression.

Syntax Analysis

C programming

Assumption: The grammars are not left recursive and it is left factored.

1. Write a C program to represent a Grammar in (V_N, Σ, P, S) format.

Input: Set of Terminals

Set of Non Terminals

Set of Production Rules

Start Symbol

Output: The Grammar in (V_N, Σ, P, S) format.

Also check a) whether production exists for all non terminals

b) Terminals used in productions are in Σ

2. If there exist multiple productions from a single non-terminal group them into one and represent as $N \rightarrow \alpha_1 / \alpha_2 / \dots / \alpha_n$
3. Write a C program to check whether a string exist at RHS of production rule can be represented in the form of $\alpha\beta$ or not.
4. Write a C program to Calculate the FIRST for each non-terminal symbol in the grammar.
5. Write a C program to check whether a production rule can be represented as $A \rightarrow \alpha B \beta$ and/or $A \rightarrow \alpha B$ or not.
6. Write a C program to Calculate the FOLLOW for each non-terminal symbol in the grammar.
7. Construct a table with row label by Non-Terminal and column label as terminal symbols of a grammar.
8. Write a C program to construct a LL(1) parsing table with the help of program 4 and 6.

[Program 1,2,3,5 and 7 are in BASIC category and Program 4, 6 and 8 are in INTELLECTUAL category]

Assignment IV

YACC

[28th October to 11th November, 2014]

Knowledge Required : *Syntax Analysis*
 SLR parsing, LALR Parsing
 LEX programming
 C programming

1. Write a YACC program evaluate an arithmetic expression involving operating +, -, * and /. Please take care for division by '0' error.
2. Write a YACC program which will determine whether a string is accepted by the following grammar or not
 $S \rightarrow aSblab$.
3. Write a yacc program to recognize nested if statements and display the number of levels of nested if.