INTERNATIONAL CENTRE FOR APPLIED SCIENCES
(Manipal University)
IV SEMESTER B.S. DEGREE EXAMINATION – OCT. / NOV. 2017
SUBJECT: LANGUAGE PROCESSORS (CS 244)
(BRANCH: CS)
Tuesday, 31 October 2017

Time: 3 Hours   **Max. Marks: 100**

✓ **Answer ANY FIVE full Questions.**
✓ **Missing data, if any, may be suitably assumed**

1A. Explain the different Compiler Construction Tools that are commonly used.

1B. What is the role of Semantic analysis phase of compilers?

1C. Briefly explain the structure of Lex program. Also, show with necessary block diagram, how the Lexical Analyzer is generated using Lex.

(6+4+10)

2A. Differentiate between a token, a pattern and a lexeme with an example for each.

2B. Construct an NFA for the regular expression (a|b)*abb and convert it to DFA using subset construction method

2C. What is the drawback of having one input buffer scheme in Lexical Analysis? How is it overcome? Explain with the diagram.

(6+8+6)

3A. What is meant by a predictive parser? Compute the FIRST and FOLLOW for the following grammar and construct the LL (1) parsing table.

   S→ VS'
   S'→+VS'| ε
   V→XV'
   V'→*XV'| ε
   X→(S) | z

3B. Write the recursive descent parser for the following grammar:
   P→cQd
   Q→xy|x|xz

(12+8)

4A. Given the grammar, construct LR (0) automaton for the following grammar:
   A →++ AB | id B
   B →++ B| ε
   Note: ++ is a single token

4B. Give the algorithm for construction of SLR parsing table.

4C. What are viable prefixes? List all the viable prefixes for the grammar:

   S → aABe

   A → Abc | b

   B → d

(8+6+6)

5A. What is a type expression? Briefly explain the different *type constructors* used in type expressions.

5B. Write the algorithm for non-recursive predictive parsing. Specify the input, output and initial configuration

5C. Explain the various fields of general Activation record with suitable diagram.

(6+8+6)

6A. With the help of neat diagram, explain the concept of multi pass translation in assemblers.

6B. Discuss briefly the issues in the design of code generator?

(10+10)

7A. What is DAG for expressions? State its properties. Obtain DAG representation for a + a*(b - c) + (b - c)*d

7B. Write the three address code for the following expression and translate it to quadruple, triple and indirect triple: x = a * b + (c * d + a)

7C. Explain the two standard storage allocation strategies with reference to runtime allocation and de-allocation of activation records.

(4+8+8)

8A.   Generate TAC for the following program segment
    while(A<C and B>D)
    do if (A=1 then c=c+1)
    else
    while(A<=D)
    do A=A+B

8B. Give the algorithm for determining the liveness and Next-use information for each statement in a basic block. Also, compute the liveness and Next-Use of following basic block:
    x = y + z
    z = x * 5
    y = z – 7
    x = z + y

(10+10)

꧁꧂꧁꧂꧁꧂꧁꧂