



USN

Library									
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10CS63

Sixth Semester B.E. Degree Examination, Aug./Sept.2020
Compiler Design

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1 a. Explain with a neat diagram the various phases of a compiler. Mention the input and output at each phase. (08 Marks)
b. What are the applications of compiler technology? Explain any one application in detail. (07 Marks)
c. Construct the transition diagram to recognize
(i) Relational operator in 'C' (ii) White space (iii) Keyword. (05 Marks)
- 2 a. With an example explain why left recursive grammar is not suitable for Top down parsing. (05 Marks)
b. Define FIRST and FOLLOW rules used in predictive parsing technique. (06 Marks)
c. Give the grammar
 $S \rightarrow aB \mid aC \mid Sd \mid Se$
 $B \rightarrow bBc \mid f$
 $c \rightarrow g$
(i) Do the necessary changes to make it suitable for LL(1) parsing
(ii) Build the LL(1) parsing table. (09 Marks)
- 3 a. What is meant by handle pruning? Explain with the help of the grammar
 $S \rightarrow SS+ \mid SS* \mid a$ and input string $aaa* a++$. (06 Marks)
b. Construct the LR(0) items for the following grammar
 $S \rightarrow Ac$
 $A \rightarrow AB \mid E$
 $B \rightarrow aB \mid b$
Write an algorithm for constructing SLR parsing table and build the parsing table for the above grammar. (14 Marks)
- 4 a. Given the grammar
 $S \rightarrow L = R \mid R$
 $L \rightarrow *R \mid id$
 $R \rightarrow L$
Find the canonical LR(1) items. (10 Marks)
b. Check whether the following grammar is LALR(1) or not. (10 Marks)

PART – B

- 5 a. Write a SDD for a simple desk calculator and show the annotated parse tree for
 $1 * 2 * 3 * (4 + 5)n$ (08 Marks)
b. Give the L attributed definition for constructing the syntax tree during topdown parsing. Also show the dependency graph for $a - 4 + c$. (08 Marks)
c. Give the SDD for simple type declaration. (04 Marks)

- 6 a. Construct the DAG and identify the value number for the subexpression $a + b + (a + b)$ (08 Marks)
- b. Translate the arithmetic expression $a = b * - c + b * - c$ into
(i) Syntax tree (ii) Quadruples (iii) Triples (iv) Indirect triples. (08 Marks)
- c. Write a note on type checking. (04 Marks)
- 7 a. What is an activation record? Explain the purpose of each item in the activation record with example. Give the general structure of the activation record. (07 Marks)
- b. What do you mean by calling sequence? Explain the actions performed during function call and return. (07 Marks)
- c. Briefly explain time safety and performance metrics to be considered while designing a garbage collector. (06 Marks)
- 8 a. With an example explain common sub expression and deadcode elimination methods. (10 Marks)
- b. What are the basic blocks and how do you partition a three address code into basic block. (05 Marks)
- c. Explain the code generator algorithm. (05 Marks)
