10IS662

Sixth Semester B.E. Degree Examination, Jan./Feb. 2023
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 the differential phases of a compiler by considering the following statement as input
$a = b + c * 60$ **(10 Marks)**
   b. Explain the concept of input buffering in the lexical analysis phase of a compiler. **(06 Marks)**
   c. Construct transition diagram to recognize the tokens given below:
   (i) identifiers   (ii) Relational operators. **(04 Marks)**

2 a. Briefly explain the problems associated with top-down parser. **(12 Marks)**
   b. Explain the role of the parser in compiler model. **(04 Marks)**
   c. Explain error recovery strategies in parser. **(04 Marks)**

3 a. Given the grammar
$E \rightarrow E + T / T$
$T \rightarrow T * F / F$
$F \rightarrow (E) / id$
   (i) Make the necessary changes to make it suitable for LL(1) parsing.
   (ii) Construct FIRST and FOLLOW sets.
   (iii) Construct the predictive parsing table.
   (iv) Show the moves made by the predictive parser on the input. **(12 Marks)**
   b. What is Handle Pruning? Explain with an example. **(08 Marks)**

4 a. Write an algorithm for constructing the canonical LR(1) parsing table. Construct canonical LR(1) parsing table for $S \rightarrow CC$, $C \rightarrow cC | d$. **(14 Marks)**
   b. Construct the LALR parsing table for the grammar shown in 4(a) using LR(1) items. **(06 Marks)**

PART – B

5 a. Explain the concept of syntax-directed definition with example. **(06 Marks)**
   b. Assuming suitable syntax directed definition, construct a syntax tree for the expression $a - 4 + e$. **(10 Marks)**
   c. Write the annotated parse tree for $3 * 5 + 4n$. **(04 Marks)**

6 a. Draw the DAG for the arithmetic expression,
$a + a * (b - c) + (b - c) * d$.
Show the steps for constructing the DAG. **(10 Marks)**
   b. What are three address codes? Explain different ways of representing three address codes with example. **(10 Marks)**

7 a. Explain the typical subdivisions of Rantime memory. **(10 Marks)**
   b. Explain the following terms :
   i) Basic Blocks
   ii) Next use generation
   iii) flow graphs **(10 Marks)**

8   a.   Explain in detail different dynamic storage allocation strategies.   **(10 Marks)**

       b.   Generate the code for following statements for target machine

           i) $x = x + 1$

           ii) $x = a + b + c$

           iii) $x = a1|(b - c) - d + (e + f)$ **(10 Marks)**

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