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10IS662

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

Compiler Design

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Give the general structure of complier – show the working of different phase of compiler taking an example. **(10 Marks)**

b. Write a regular expression for identifier and keyword and design a transition diagram for it. **(05 Marks)**

c. Explain the applications of compiler Technology. **(05 Marks)**

2 a. Show that following grammar is ambiguous $E \rightarrow E + E \mid E * E \mid (E) \mid id$. Write an unambiguous grammar for the same. **(08 Marks)**

b. Write an algorithm to remove the left recursion from a given grammar? Eliminate the left recursion from the given grammar.

$S \rightarrow aB \mid aC \mid Sd \mid Se$

$B \rightarrow bBc \mid f$

$C \rightarrow g$ **(04 Marks)**

c. Give algorithm for FIRST and FOLLOW set construction. Give the same for the grammar $E \rightarrow TE',\ E' \rightarrow TE' \mid \varepsilon,\ T \rightarrow FT',\ T' \rightarrow *FT' \mid \varepsilon\ \ F \rightarrow (E) \mid id$ **(08 Marks)**

3 a. Explain Handle pruning, for the Grammar S → SS | SS*| a and input string aaa * a++. Give bottom up parser for the given i/p string. **(04 Marks)**

b. Given the grammar $S \rightarrow a \mid (L),\ L \rightarrow L,\ S \mid S$, check whether the given grammar is LL(1) or not. Show the moves made by the predictive parser an the input (a(a, a)). **(10 Marks)**

c. Construct predictive parsing table for the grammar $E \rightarrow E + T \mid T,\ T \rightarrow TF \mid F,\ F \rightarrow F^* \mid a \mid b$ **(06 Marks)**

4 a. Check whether the given grammar is SLR or not $E \rightarrow E{+}T,\ \ E \rightarrow T,\ T \rightarrow T{*}F \mid F,\ F \rightarrow (E) \mid id$ **(08 Marks)**

b. Show that the following grammar is S → Aa | bAc | Bc | bBa A → d, B→ d, is LR(1) but not LALR(1). **(08 Marks)**

c. Write short notes on Parser Generators – YACC. **(04 Marks)**

PART – B

5 a. Considering the given grammar
$S \rightarrow EN, E \rightarrow E + T \mid E - T \mid T, T \rightarrow T * F \mid T / F \mid F, F \rightarrow (E) \mid digit, N \rightarrow ;$ obtain the SDD, construct the parse tree, Syntax tree and Annotated parse tree for the string 5 + 6 + 7. **(10 Marks)**

b. What are the three address codes? Explain different ways of representing three address codes with example. **(10 Marks)**

6 a. Define the following with examples :
   i) Synthesized attribute
   ii) Inherited attribute
   iii) S – attributed definition
   iv) L – alternated definition. **(10 Marks)**

b. Using Backpatching, generate an Intermediate code for following expression.
   $A < B$ or $C < D$ and $P < Q$. **(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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