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10CS63

Sixth Semester B.E. Degree Examination, June/July 2019
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. Write a brief note on Language Processing System. **(04 Marks)**

b. Explain with a neat diagram, the phases of compiler. **(10 Marks)**

c. Construct the transition diagram to recognize the tokens given below :
i) Relational operation ii) Unsigned number. **(06 Marks)**

2 a. Define Left recursion and Left factoring and apply the same for the Grammar
$E \rightarrow E * T / T$; $T \rightarrow id + T / id$ **(06 Marks)**

b. Given the Grammar
$S \rightarrow XS \mid dS \mid \in$
$X \rightarrow Y \mid Zb \mid aY$
$Y \rightarrow cZ$
$Z \rightarrow e$
i) Construct FIRST and FOLLOW sets.
ii) Construct the Predictive parsing table.
iii) Show the moves made by the predictive parser on the input "dace". **(10 Marks)**

c. How to verify whether grammar is LL(1) or not, show that
$S \rightarrow |AB| \in$
$A \rightarrow |AC|OC$
$B \rightarrow OS$
$C \rightarrow 1$ is LL(1) without constructing any table. **(04 Marks)**

3 a. What is handle pruning? Explain with the help of the grammar
$S \rightarrow (L) \mid a$
$L \rightarrow L, S \mid S$ and input string (a , (a, a)). **(04 Marks)**

b. Explain the conflicts that may occur during shift reduce parsing , consider dangling – else grammar. **(04 Marks)**

c. Given the grammar
$S \rightarrow (S)\ S \mid \in$ or can be written as
$S \rightarrow (S)\ S$
$S \rightarrow \in$
i) Find LR(0) items
ii) Construct SLR(1) parsing table and show the parsing steps for the input ( ) ( ) $. **(12 Marks)**

4 a. Given the grammar $S \rightarrow CC$; $C \rightarrow cC|d$
i) Construct sets of LR(1) items.
ii) Construct Canonical LR(1) Parsing table. **(14 Marks)**

b. Write the face specification of a simple desk calculator with the following grammar for arithmetic expressions
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid$ digit. **(06 Marks)**

PART - B

5 a. Write annotated parse tree for 3 * 5 + 4n using top down approach. Write semantic rules for each. **(08 Marks)**

b. Write a brief note on dependency graph. **(04 Marks)**

c. Construct a dependency graph for the declaration float id_1 , id_2 , id_3 , **(08 Marks)**

6 a. What is DAG? Construct a DAG for the following expression

a + a * (b – c) + (b – c) * d **(05 Marks)**

b. Write annotated parse tree for C + a [i] [j] and derive 3 – address code for the same expression. **(08 Marks)**

c. Write S.D translation for Switch statement. **(07 Marks)**

7 a. Explain run – time storage scheme for C++ language. Give the structure of activation record and explain the purpose of each item. **(10 Marks)**

b. What are access links? Explain how are access links determined for finding non local data, what is its drawback. **(06 Marks)**

c. Discuss the performance metrics to be considered while designing a garbage collector. **(04 Marks)**

8 a. Discuss the issues in the design of a code - generator. **(10 Marks)**

b. Apply the Code – Generation algorithm to translate the basic block shown below

t = a – b
u = a – c
v = t + u
a = d
d = v + u

Assume t , u , v are temporaries , local to the block while a , b , c , d are variables that are line on exit from the block. **(10 Marks)**

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