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10IS662

Sixth Semester B.E. Degree Examination, June/July 2013

Compiler Design

Time: 3 hrs. Max. Marks:100

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

PART – A

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

b. Construct the transition diagram to recognize the tokens given below:
i) Identifier
ii) Relational operator
iii) Unsigned number **(10 Marks)**

2 a. What is left-recursion? Eliminate left recursion from the following grammar:
$E \rightarrow E + T/T$
$T \rightarrow T * F/F$
$F \rightarrow (E)/id$ **(08 Marks)**

b. Given the grammar:
$S \rightarrow (L)/Q$
$L \rightarrow L, S/S$
i) Make 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 (a, (a, a)). **(12 Marks)**

3 a. What is shift reduce parser? Explain the conflicts that may occur during shift reduce parsing. **(04 Marks)**

b. Given the grammar:
$A \rightarrow (A)/a$
i) Find LR (0) items
ii) Construct SLR parsing table.
iii) Write SLR parsing algorithm.
iv) Show the parsing of input string ((a)). **(16 Marks)**

4 a. Given the following grammar:
$S \rightarrow CC$
$C \rightarrow cC/d$
i) Construct sets of LR (1) items.
ii) Construct canonical LR (1) parsing table. **(12 Marks)**

b. Construct LALR parsing tables for the grammar shown in Q.No.4(a) using LR (1) items. **(08 Marks)**

PART – B

5 a. Explain the concept of syntax directed translation, with examples. **(06 Marks)**

b. Define inherited and synthesized attributes. **(04 Marks)**

c. Give SDD of a simple desk calculator. **(04 Marks)**

d. Write the annotated parse tree for 3*5 + 4n. **(06 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. Translate the arithmetic expression a + –(b + c) into quadruples, triples and indirect triples. **(06 Marks)**

c. Write the tree address code for switch statement. **(04 Marks)**

7 a. What is an activation record? Explain the purpose of each item in the activation record, with an example. **(08 Marks)**

b. What is meant by calling sequence and return sequence? List calling sequence design principles. **(08 Marks)**

c. Write a note on Garbage collection. **(04 Marks)**

8 a. List and explain design issues of a code generator. **(10 Marks)**

b. With an example, explain common sub-expression and dead code elimination methods. **(10 Marks)**

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