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06IS662

Sixth Semester B.E. Degree Examination, December 2012
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 the various phases of a compiler with the help of a neat block diagram. **(10 Marks)**

b. What is meant by input buffering? Explain the use of sentinels in recognizing tokens. **(06 Marks)**

c. Write the transition diagrams to recognize the following tokens:
i) Relational operators. ii) Unsigned numbers. **(04 Marks)**

2 a. Show that the following grammar is ambiguous: S → iEtS|iEtSeS|a, E → b. Also, write an equivalent unambiguous grammar for the same. **(06 Marks)**

b. Write an algorithm to eliminate left recursion from a grammar. **(04 Marks)**

c. Given the grammar, S→(L)|a, L→L, S|S
i) Make necessary changes to make it suitable for LL(1) parsing.
ii) Construct FIRST and FOLLOW sets for non-terminals.
iii) Construct the predictive parsing table.
iv) Show the moves made by the parser on the input (a, (a, a)). **(10 Marks)**

3 a. Explain the various conflicts that may occur during shift – reduce parsing with examples. **(06 Marks)**

b. Construct the simple LR(1) parsing table for the following grammar:
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid a$
Also, show the moves made by the parser on the input a * a + a. **(14 Marks)**

4 a. Write an algorithm to construct canonical LR(1) parsing table. **(06 Marks)**

b. Given the grammar, S→AA, A→Aa | b
i) Construct sets of LR(1) items.
ii) Draw the GOTO graph. **(08 Marks)**

c. Explain the working of YACC parser generator with a suitable example. **(06 Marks)**

PART – B

5 a. Explain the concept of syntax-directed definition with a suitable example. **(06 Marks)**

b. Write an SDD to construct syntax trees for simple expressions. Using this, construct the syntax tree for the expression a – 4 + c. **(07 Marks)**

c. Explain the parser – stack implementation of postfix SDT's by taking simple desk calculator as an example. **(07 Marks)**

6 a. Explain the following with suitable examples:
   i) Quadruples.
   ii) Triples.
   iii) Indirect triples. **(08 Marks)**
   b. Write an SDD for flow-of-control statements. **(06 Marks)**
   c. Explain the syntax-directed translation of switch statements. **(06 Marks)**

7 a. Describe the structure of a general activation record. **(08 Marks)**
   b. Write a note on Heap management. **(06 Marks)**
   c. Explain the various performance metrics to be considered while designing a garbage collector. **(06 Marks)**

8 a. Discuss the various issues involved in the design of a code generator. **(10 Marks)**
   b. Write short notes on:
   i) Basic blocks.
   ii) Flow graphs. **(10 Marks)**

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