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10CS63

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 three types of software productivity tools. **(06 Marks)**

b. Define sentinels. Give lookahead code with sentinels. **(04 Marks)**

c. Enlist algebraic laws for regular expressions. **(07 Marks)**

d. Give transition diagram for unsigned numbers. **(03 Marks)**

2 a. Write an algorithm to eliminate left recursion from a grammar, also give the syntax of the production. **(05 Marks)**

b. Consider the production:

$S \rightarrow aAb$

$A \rightarrow cd/C.$

Show that recursive-descent parsing fails for the input string "acdb", also explain recursive descent algorithm. **(07 Marks)**

c. Find First and Follow for the given grammars:

i) stmt_sequence → stmt stmt_sequence′

stmt_sequence′ → ; stmt_sequence/∈

stmt → s

ii) S → ,GH;

G → aF

F → bF/∈

H → KL

K → m/∈

L → n/∈ **(08 Marks)**

3 a. What are two types of conflicts during shift reduce parsing? Give examples. **(04 Marks)**

b. For the given grammar E → E + n/n. Construct parsing table of LL(1). Verify 3 + 4 + 5 and show each step of verification with reference to parsing table. **(08 Marks)**

c. How to verify whether grammar is LL(1) or not? Show that:

S → AaAb/BbBa

A → ∈

B → ∈

is LL (1), without constructing any table. **(08 Marks)**

4 a. Construct the DFA of LR(0) items and SLR parsing table for the grammar:

Stmt_sequence → stmt_sequence; stmt/stmt

Stmt → S

Identify Kernel and non Kernal items in state I_4. **(12 Marks)**

b. Discuss the behaviour of the LR parser. **(04 Marks)**

c. For the grammar A → (A)/a, construct LR(1) set of items. **(04 Marks)**

PART – B

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

b. Discuss S-attributes and L-attributes with respect to SDD (Syntax Directed Definition). **(04 Marks)**

c. By considering an array type int[3][3], write syntax directed translation with semantic rules. **(08 Marks)**

6 a. Enlist any four common three address instruction forms. **(04 Marks)**

b. Define quandruples, triples and static single assignment form. **(06 Marks)**

c. Write syntax directed definition for flow of control statements. **(10 Marks)**

7 a. Write a version of quick sort, in ML style using the nested functions. Give any four additional features of ML. **(08 Marks)**

b. "Most programs exhibit a high degree of locality", explain the statement. **(05 Marks)**

c. "Garbage collection is seldom used in real time applications", justify the statement. How language design affects the characteristics of memory usage. **(07 Marks)**

8 a. How register allocation and evaluation order plays an important role in a code generation? Discuss. **(06 Marks)**

b. Write an intermediate code to set a 10×10 matrix to an identity matrix. **(10 Marks)**

c. Define flow graph. How it is constructed? **(04 Marks)**

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