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10IS662

Sixth Semester B.E. Degree Examination, June/July 2015
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. Explain the various phases of compiler. Show the translations for an assignment statement position = initial + rate * 60, clearly indicate the output of each phase. **(12 Marks)**

b. Construct transition diagram for the following: i) Relational operators; ii) Unsigned number. **(08 Marks)**

2 a. Show that the following grammar is ambiguous: E → E + E / E * E / (E) / id. Write an equivalent unambiguous grammar for the same. **(06 Marks)**

b. Write a recursive descent parser for the grammar: S → cAd A → ab/a and for the input "cad" trace the parser. **(04 Marks)**

c. Consider the grammar:
E → 5 + T / 3 – T
T → V / V * V / V + V
V → a / b
i) Do the left factoring for the above grammar.
ii) Obtain FIRST and FOLLOW table for the above grammar.
iii) Construct predictive parsing table for the above grammar. **(10 Marks)**

3 a. What is handle pruning? Explain with the help of the grammar. S → SS + / SS * / a and input string aaa * a+, give a bottom-up parse of the given input string. **(10 Marks)**

b. For the following grammar S → 0S1 / 01 indicate the handle in the following right sentential form 000011 1. **(04 Marks)**

c. Show that the following grammar is not LL(1) without constructing parsing table:
S → iCtSS' / a
S' → eS / ∈
C → b **(06 Marks)**

4 a. Consider the following grammar
S → CC
C → cC
C → d
i) Obtain canonical collection of LR (0) items.
ii) Construct SLR (1) parsing table.
iii) Show the sequence of moves made by the parser for the string ccdd. **(12 Marks)**

b. Consider the following augmented grammar
S' → S
S → AA
A → Aa/b
Obtain LR(1) items. **(08 Marks)**

PART – B

5 a. Obtain SDD for simple type declaration. Construct a dependency graph for the declaration int a, b, c along with evaluation order. **(08 Marks)**

b. For the given productions shown below, write semantic rules and construct annotated parse tree for

3 * 5 + 4n

$L \rightarrow En$ $E \rightarrow E1 + T$ $E \rightarrow T$

$T \rightarrow T1 * F$ $T \rightarrow F$ $F \rightarrow (E)$ $F \rightarrow$ digit. **(08 Marks)**

c. Define S-attributed and L-attributed definitions with examples. **(04 Marks)**

6 a. Explain how DAG will help in intermediate code generation? Construct a DAG and a 3-address code for the expression a + a * (b – c) + (b – c) * d. **(08 Marks)**

b. Explain the following with an example:

i) Quadruples ii) Triples iii) Indirect triples. **(06 Marks)**

c. Explain syntax directed translation of switch statement. **(06 Marks)**

7 a. Describe the general structure of an activation record. Explain the purpose of each item in the activation record. **(10 Marks)**

b. What is garbage collection? Explain the design goals of garbage collector. **(10 Marks)**

8 a. Briefly discuss the various issues in code generation phase. **(10 Marks)**

b. Explain the following code optimization with examples:

i) Finding local common sub expression.

ii) Dead code elimination. **(10 Marks)**

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