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10CS63

Sixth Semester B.E. Degree Examination, June / July 2014
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 neat diagram. **(08 Marks)**

b. Give the formal definations of operations on languages with notations. **(04 Marks)**

c. Write the transition diagram to recognize the token below:
i) relop (relational operations)
ii) unsigned number. **(08 Marks)**

2 a. Give the rules for constructing FIRST and FOLLOW sets. **(06 Marks)**

b. Construct the predictive parsing table by making necessary changes to the grammar given below:
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid id$ **(10 Marks)**

c. Give the formal defination of CFG with an example. **(04 Marks)**

3 a. What is a shift-reduce parser? Explain the conflicts that may occur during shift-reduce parsing. List the actions of shift-reduce parser. **(06 Marks)**

b. Form the Action / Goto table for the following grammar:
$S \rightarrow Aa \mid bAc \mid Ba \mid bBa$
$A \rightarrow d$
$B \rightarrow d$
Justify whether the grammar is LR(0) or not. **(14 Marks)**

4 a. Construct the canonical LR(1) Item sets for the following grammar:
$S \rightarrow AA$
$A \rightarrow aA \mid b$ **(10 Marks)**

b. Construct LALR parsing table for the grammar shown in Q4 (a) using LR(1) items. **(10 Marks)**

PART – B

5 a. Define inherited and synthesized attributes. Give examples. **(06 Marks)**

b. Give the SDD for simple desk calculator and draw dependency graph for expression, $1*2*3*(4+5)n$ **(10 Marks)**

c. Write SDD that generates either a basic type or an array type. **(04 Marks)**

6 a. Draw the DAG for the expression, $a + a*(b-c) + (b-c)*d$. Show the steps for constructing the same. **(10 Marks)**

b. Explain the following with examples: i) Quadraples ii) Triples. **(06 Marks)**

c. Write the three address code for the expression:
$a + a*(b-c) + (b-c)*d$ **(04 Marks)**

7 a. Give the general structure of an activation record. Explain the purpose of each component. **(08 Marks)**

b. Explain the performance metrics that must be considered while designing garbage collector. **(08 Marks)**

c. Give the memory hierarchy configurations of modern computer highlighting size and access times. **(04 Marks)**

8 a. Explain the main issues in code generation. **(10 Marks)**

b. For the following program segment:

```
for i = 1 to 10 do
    for j = 1 to 10 do
        a[i, j] = 0 . 0
    for i = 1 to 10 do
    a[i, i] = 1.0
```

Generate intermediate code and identify basic blocks. **(10 Marks)**

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