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10IS662

Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Complier Design

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. With a neat diagram, explain the various phases of compiler with example. **(10 Marks)**

b. Explain the input buffering strategy used in lexical analysis phase. **(05 Marks)**

c. Write the regular definition for an unsigned number, also write the transition diagram. **(05 Marks)**

2 a. Define left recursion and left factoring? Consider the Grammar :

$E \rightarrow E + T \mid T$

$T \rightarrow id \mid id [\,] \mid id [X]$

$X \rightarrow E, E \mid E$

i) Eliminate left recursion

ii) For the obtained result of i) do the left factoring. **(10 Marks)**

b. Construct LL(1) parsing table for the grammar

$S \rightarrow aB \mid aC \mid Sd \mid Se$

$B \rightarrow bBc \mid f$

$C \rightarrow g$

and verify the above grammar is LL (1) or not. **(10 Marks)**

3 a. Define Handle and Handle pruning. Consider the grammar :

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

Indicate the handle for the following right sentential form $id_1 * id_2$. **(06 Marks)**

b. With a neat diagram, explain the general structure of LR parser. **(06 Marks)**

c. Consider the grammar :

$S \rightarrow L = R \mid R$

$L \rightarrow *R \mid id$

$R \rightarrow L$

Verify the grammar is SLR (1) or not. **(08 Marks)**

4 a. Given the grammar :

$A \rightarrow (A) \mid a$

Construct LR(1) set of items, parsing table and also parse the input string ((a)) using canonical LR parsing method. **(12 Marks)**

b. Write the procedure used to compute LR(1) items using LALR parser. **(04 Marks)**

c. Write a note on the parser generator - Yacc. **(04 Marks)**

PART – B

5 a. Define synthesized and inherited attributes with examples. **(04 Marks)**

b. Consider the grammar that is used for simple desk calculator. Obtain the semantic action and also the annotated parse tree for the string. (3 + 4) * (5 + 6)n

$L \rightarrow En$
$E \rightarrow E + T$
$E \rightarrow T$
$T \rightarrow T * F$
$T \rightarrow F$
$F \rightarrow (E)$
$F \rightarrow$ digit. **(10 Marks)**

c. Consider the grammar :

$T \rightarrow F\ T^1$
$T^1 \rightarrow * F\ T^1$
$T^1 \rightarrow E$
$F \rightarrow$ digit

Write the semantic action and obtain the dependency graph and the order of execution for the input string 3 * 5. **(06 Marks)**

6 a. Define DAG? Develop SDD to produce DAG for the expression :

$E \rightarrow E + T$
$E \rightarrow E - T$
$E \rightarrow T$
$T \rightarrow (E)$
$T \rightarrow$ id
$T \rightarrow$ num

and show the steps for constructing DAG for the expression $a + a * (b - c) + (b - c) * c$. **(12 Marks)**

b. Explain the quadruples, triples and indirect triples for the example a : = b * – c + b * c. **(08 Marks)**

7 a. Describe the general structure of a activation record. Explain the purpose of each field in the activation record and construct activation tree for Quicksort. **(10 Marks)**

b. Explain Heap management in detail. **(10 Marks)**

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

b. Briefly explain any five kinds of code optimization with an example each. **(10 Marks)**

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