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10CS63

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

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. With the help of a diagram, explain the various phases of a compiler. (10 Marks)
 - b. What is meant by input buffering? Write an algorithm for look ahead code with sentinels. (04 Marks)
 - c. Construct transition diagram to recognize the tokens below
 - i) identifier ii) Relational operator iii) unsigned number. (06 Marks)

- 2
 - a. With a neat diagram explain the role of a parser. (05 Marks)
 - b. Explain different error recovery strategies. (08 Marks)
 - c. Consider the context free grammar $S \rightarrow SS + | SS * | a$
And the string $aa + a^*$
 - i) Give a left most derivation for the string
 - ii) Give a right most derivation for the string
 - iii) Give a parse tree for the string
 - iv) Is the grammar ambiguous or unambiguous? Justify.
 - v) Describe the language generated by this grammar
 - vi) Remove the left recursion from the grammar?
 - vii) Left factor this grammar. (07 Marks)

- 3
 - a. Given the grammar
 $S \rightarrow a | (L), L \rightarrow L, S | S$
 - i) Do the necessary changes to make it suitable for LL(1) parser
 - ii) Check the resultant grammar is LL (1) or not
 - iii) Show the moves made by the predictive parser on the input (a, (a, a)). (12 Marks)
 - b. What is meant by handle pruning? List the actions of a shift reduce parser. Consider the following grammar
 $S \rightarrow TL ;$
 $T \rightarrow int | float$
 $L \rightarrow L, id | id$ parse the input string $int id, id;$ using shift reduce parser. (08 Marks)

- 4
 - a. Given the grammar
 $S \rightarrow AA$
 $A \rightarrow Aa | b$
 - i) Construct sets of LR(1) items
 - ii) Construct canonical LR(1) parsing table (12 Marks)
 - b. How LALR parsing table is constructed? Develop an algorithm for the same. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.



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PART – B

- 5 a. Give the syntax directed definition to process a sample variable declaration in C and construct dependency graph for the input float x, y, z. (10 Marks)
- b. Write the grammar and syntax directed definitions for a simple desk calculator and show annotated parse tree for the expression $3*5 + 4n$. (10 Marks)
- 6 a. Draw the DAG for the arithmetic expression $a + a * (b - c) + (b - c)*d$. Show the steps for constructing the DAG. (10 Marks)
- b. What are three address codes? Explain different ways of representing three address codes, with examples. (10 Marks)
- 7 a. Distinguish between static scope and dynamic scope. Briefly explain access to non – local names in static scope. (10 Marks)
- b. Explain in detail, the strategy for reducing fragmentation in heap memory. (10 Marks)
- 8 a. Discuss the following terms :
i) Basic blocks ii) Next use information iii) Flow graph. (10 Marks)
- b. With example, explain common subexpression and dead code elimination methods. (10 Marks)

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