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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Computer Science and Engineering

Semester End Examination; May/June - 2018

Compiler Design

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. With a neat diagram, explain the phases of a compiler. Show the translation made by each of the phases for the statement $a = b + c * 10$ where a, b and c are real. 12

b. Explain the input buffering strategy used in lexical analysis phase. 8

2 a. With neat diagram, explain the role of lexical analyzer. 6

b. Define the term Token, Pattern and Lexeme. Find the same for the following program fragment : 8

printf("Total = %d\n average = %f \n", score, area);

c. Define regular expression and write transition diagram to recognize the tokens given below : 6

i) Identifier ii) Unsigned number

UNIT - II

3 a. Define Left Recession and Left Factoring. Give the algorithm used for eliminating Left Recursion. 8

b. Construct the predictive parsing table for the given grammar and show the parsing steps for the string "*uvuvx2*" 12

$S \rightarrow uB2$

$B \rightarrow Bv \mid vuE \mid vxuE \mid ByE$

$E \rightarrow v \mid vx$

4 a. Briefly explain the problem associated with Top Down Parsing. 6

b. Explain Non-recessive Predictive Parsing algorithm. 6

c. Compute First( ) and Follow( ) symbols for the following grammar and check whether grammar is LL(1) : 8

$S \rightarrow iEtSS' \mid a$

$S' \rightarrow eS \mid \varepsilon$

$E \rightarrow b$

UNIT - III

5 a. Explain the working of shift reduce parser and also conflicts that may arise during shift reduce parsing with an example. 6

b. Write LR parsing algorithm. 6

Contd…2

c. Construct LR(0) item for given grammar : $A \rightarrow (A) \mid a$ 8

6 a. Write the algorithm for constructing set of LR(1) items. 8

b. Construct LALR parsing table for the following grammar :

$S \rightarrow CC$

$C \rightarrow cC \mid d$ 12

UNIT - IV

7 a. Define the following terms with an example :

i) Syntax directed definition

ii) Inherited attribute

iii) Synthesized attribute

iv) Annotated parse tree 10

b. Give the syntax directed definition to process a simple variable declaration in C and draw dependency graph for *int* id_1, id_2, id_3. 10

8 a. Explain in detail different dynamic storage allocation strategies. 10

b. Describe an activation record. Explain the purpose of each item in an activation record with an example. 10

UNIT - V

9 a. What is DAG? Write DAG for the expression :

*((x+y) – ((x+y) * (x – y))) + ((x+y) * (x – y).* 4

b. Name the different types of representation of 3-address code and translate the given arithmetic expression into each type.

*a – b * c + d – a + b* 6

c. Describe the method of generating intermediate code for the branching statement (if/if-else). 10

10 a. Briefly explain main issues in code generation. 10

b. Explain the code generation algorithm and generate code for the following expression :

x = (a - b) + (a + c). 10

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