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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; August - 2023

Compiler Design

Time: 3 hrs

Max. Marks: 100

Course Outcomes

The Students will be able to:

CO1: Design simple lexical analyzer.

CO2: Construct simple top down parser for a given context free grammar.

CO3: Construct simple bottom up parser for a given context free grammar.

CO4: Apply different syntax directed translation schemes.

CO5: Generate intermediate and machine dependent code.

Note: I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any Two sub questions (from a, b, c) for a Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
I : PART - A		10			
1 a.	Define an Interpreter.	2	L2	CO1	PO1
b.	Define Ambiguity.	2	L2	CO2	PO1
c.	Construct parse tree for the given expression: $-(id + id)$.	2	L4	CO3	PO1
d.	What is symbol table?	2	L1	CO4	PO1
e.	List the three primary tasks of a code generator.	2	L2	CO5	PO1
II : PART - B		90			
UNIT - I		18			
2 a.	With a structure of compiler, explain various phases of it.	9	L2	CO1	PO1
b.	What are tokens, patterns, and lexeme? Identify tokens, patterns, and lexeme for the given statement. <code>printf("Total=%d\n", score);</code>	9	L2	CO1	PO1,2
c.	Explain various operations on language with relevant examples for each.	9	L2	CO1	PO1,2
UNIT - II		18			
3 a.	Explain left recursion. Eliminate left recursion from the following grammar: $E \rightarrow E+T T$ $T \rightarrow T*F F$ $F \rightarrow (E) id$	9	L2	CO2	PO1,2
b.	Compute first and follow for the given grammar: $S \rightarrow ABCDE$ $A \rightarrow a \epsilon$ $B \rightarrow b \epsilon$ $C \rightarrow c$ $D \rightarrow d \epsilon$ $E \rightarrow e \epsilon$	9	L5	CO2	PO2,3

- c. Define context free grammar. Write the grammar for simple arithmetic expressions. 9 L2,5 CO2 PO1,2

UNIT - III**18**

- 4 a. Construct the SLR passing table for the following grammar: 9 L5 CO3 PO2,3
 $A \rightarrow (A)a$
- b. Illustrate the model of LR parser and explain the structure of LR parsing table. 9 L2 CO3 PO1,2
- c. Consider the following grammar and justify whether the grammar has shift | reduce conflict; 9 L5 CO3 PO2,3
 $stmt \rightarrow if\ expr\ then\ stmt$
 $\quad | if\ expr\ then\ stmt\ else\ stmt$
 $\quad | other$

UNIT - IV**18**

- 5 a. Explain inherited and synthesized attributes of SDD. Write SDD for a simple calculator. 9 L2,5 CO4 PO1,2
- b. With a neat sketch, explain the typical subdivision of runtime memory. 9 L2 CO4 PO2,3
- c. What is activation record? Explain the field of general activation record. 9 L3 CO4 PO3

UNIT - V**18**

- 6 a. Construct DAG for the following expression: 9 L5 CO5 PO2,3
 $T_1 = a + b$
 $T_2 = a - b$
 $T_3 = T_1 * T_2$
 $T_4 = T_1 - T_3$
 $T_5 = T_4 + T_3$
- b. Write an algorithm to partition three-address instructions into basic blocks. 9 L2 CO5 PO1,2
- c. Illustrate the register allocation by graph coloring. 9 L3 CO5 PO3

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