

FIFTH SEMESTER-B. TECH
MID-SEMESTER EXAMINATION, September, 2024

Course Code: COCSC14/ CACSC14/ CDCSC14
Course Title: Principles of Compiler Construction

Time: 1 hr 30 mins.

Note: - Attempt all questions. Missing data/information (if any), may be suitably assumed and mentioned in the answer.

Max.Marks:15

Q1	<p>a) Explain what is Compiler and how it is different from language preprocessor.</p> <p>b) Explain phases of compiler with the help of an example</p>	(1+2)	CO1
Q2	<p>a) What possible error recovery actions can be taken during lexical analysis phase?</p> <p>b) Explain the role of input buffering scheme in lexical analyzer. Represent the regular expression $(a b)^*bba c^+$ in form of a tree.</p>	(1+2)	CO2
Q3	<p>a) Using Thompson's algorithm construct Non deterministic finite automata for the regular expression $(ab^* c)^*d$.</p> <p>b) Convert the NFA constructed in part a) to DFA and Minimized DFA.</p>	(1+2)	CO2
Q4	<p>Consider the following Context Free Grammar G:</p> <p>$S \rightarrow a ^ (T)$</p> <p>$T \rightarrow T, S S$</p> <p>a) Eliminate left recursion and perform left factoring, if any, to transform grammar G to G'</p> <p>b) Find the First and Follow set and derive the predictive parsing table for the grammar G'.</p>	(1+2)	CO3
Q5	<p>a) For the grammar G' in question 4 b) show the moves of the predictive parser for the string $((a), (a))$.</p> <p>b) Consider the following Context Free Grammar :</p> <p>$S \rightarrow a B b A$</p> <p>$A \rightarrow a a S b A A$</p> <p>$B \rightarrow b b S a B B$</p> <p>Write the leftmost derivation for the string aabbab. Draw the parse tree and find whether this grammar is ambiguous or not, justify.</p>	(1+2)	CO3

B. TECH-FIFTH SEMESTER
END-SEMESTER EXAMINATION, Nov-Dec, 2024

Course Title: Principles of Compiler Construction

Course Code: CACSC14/ CDCSC14/ COCSC14

Time: 3hrs.

Max. Marks: 40

Note: -Attempt all questions. Assume missing data/information and mention in the answer (if any)

Q1	Attempt any 2 parts of the following a) Describe analysis synthesis model of compiler. What is the need for separating the analysis phase into lexical analysis and parsing? b) How error handling is done during the compilation of a program. c) What is symbol table in compiler design. Describe its importance? Describe how symbol table is used by different phases of compiler.	(4+4)	CO1 CO2
Q2	Attempt any 2 parts of the following a) For the regular expression $(aa b)^*(a c)^*$ construct NFA using Thompson's construction and describe the language this regular expression denotes. Give an example of a valid string for this regular expression. b) What tokens are generated for the following statement by the lexical analyzer count = count + increment; Write regular definition for identifier, relational operators and if then else statement of C/C++. Show tokens and attribute values by taking relational operators. c) Describe compiler construction tools in short. Which automata is constructed by the LEX tool and which parser is implemented by YACC tool.	(4+4)	CO2 CO3
Q3	Attempt any 2 parts of the following a) Explain the purpose of semantic analysis in compiler design. How type checking is performed. Identify an error that semantic analysis would detect in the code int x = 10; x = "Hello"; b) Construct SLR parsing table for the following grammar $S \rightarrow A$ $A \rightarrow BC DBC$ $B \rightarrow Bb \epsilon$ $C \rightarrow c \epsilon$ $D \rightarrow a d$ Show the stack moves for the input abbc c) Consider the following grammar $S \rightarrow Aa bAc dc bda$ $A \rightarrow a$ Show that this grammar is LALR(1) but not SLR(1)	(4+4)	CO2 CO3
Q4	Attempt any 2 parts of the following a) Explain the functions of a parser. How bottom-up parsing overcomes the drawbacks of top-down parsing. What is shift-reduce conflict in bottom-up parsing. b) What is intermediate code generation, and why is it used? Write a three-address code as Quadruples, Triples and Indirect Triples for the following expression $a = b + c * (d - e)$ c) Describe use of Syntax Directed Translation. Explain the difference between S-attribute and L-attribute? Write Syntax directed definition to produce three address code for booleans.	(4+4)	CO3 CO4
Q5	Attempt any 2 parts of the following a) What is the importance of code optimization in compiler construction. Describe types of code optimization techniques with example. How DAG is used for code optimization. b) Write pseudo code for binary search. Find basic blocks and draw flow graph for the same. c) Generate code for the following expression using labelling algorithm and code generation for labelled tree (Sethi Ullman algorithm). $(X+Y) + ((Z-U) + (V/W))$	(4+4)	CO4 CO5