

C022611(022)

B. Tech. (Sixth Semester) Examination,

April-May 2022

(AICTE-Scheme)

(Computer Science & Engg. Branch)

COMPILER DESIGN

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : All questions are compulsory. Part (a) is compulsory and answer any two parts from (b), (c) & (d) of each question. Part (a) carries 4 marks and part (b), (c) & (d) carries 8 marks each.

Unit-I

1. (a) Differentiate between single and multi-pass compiler?
- (b) Explain in brief different phases of the compiler.
How the following statement is processed in different phases.

Amount = Amount + 50 * Cost

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(c) Find the minimum state DFA for the following regular expression :

(i) $ab(a/b)^*abb$

(ii) $a(a/b)^*b$

(d) Write short notes on :

(i) Compiler writing tools

(ii) Role of Lexical Analyzer

Unit-II

2. (a) Differentiate between top down parsing and bottom up parsing?

(b) Consider the following grammar :

$$S \rightarrow AS/b$$
$$A \rightarrow SA/a$$

(i) List all the $LR(0)$ items for the above grammar

(ii) Is the grammar SLR? If so construct the SLR parsing table.

(c) Why there is a need to eliminate left recursion in top down parsing. Construct predictive parsing table for

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$$S \rightarrow (L)/a$$
$$L \rightarrow L, S/S$$

(d) Write the algorithm for operator precedence parsing.

Unit-III

3. (a) Differentiate between inherited and synthesized attributes with an example.

(b) Using the given grammar, write the syntax directed definitions to evaluate an expression. Construct the annotated parse tree for the sentence $2+3*7$.

$$E \rightarrow E + T/T$$
$$T \rightarrow T * F/F$$
$$F \rightarrow (E)/\text{num}$$

(c) Write the syntax directed definition to translate Boolean expressions into three-address code.

(d) Translate the expression $-(a+b)*(c+d)+(a+b+c)$ into

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- (i) Quadruples
- (ii) Triples
- (iii) Indirect Triples
- (iv) Postfix Notations

Unit-IV

4. (a) When call by name is preferred than other parameter passing techniques.
- (b) What is activation record? Explain different fields in the activation record.
- (c) Differentiate between stack, static and heap allocation strategies.
- (d) What is the use of symbol table? Explain different ways to implement symbol table and explain various fields of symbol table.

Unit-V

5. (a) Define the term loop optimization.
- (b) Explain in brief issues in the design the code generator.

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- (c) Write in detail the steps of code generation algorithm including the function 'getreg' with an example. Generate assembly code for the following 'C' statement.

$$x = a / (b + c) - d * (e + f)$$

- (d) Write a short note on :
- (i) Global data flow analysis
 - (ii) Peephole optimization