M.C.A. 1st Semester (MCA 2 Year Programme)
w.e.f. 2020-2021 Examination, November–2023
COMPILER DESIGN
Paper–20MCA21C2

Time allowed : 3 hours] *[Maximum marks : 80*

Note: *Attempt **five** questions in all. **Question No.1 is compulsory.** In addition to compulsory question, attempt **four** more questions selecting **one** question from each unit.*

1. Compulsory question:

(a) What do you mean by system programming? Explain the components of system programming.

(b) What do you understand by cross compiler?

(c) What are the two types of conflicts in shift reduce parsing? Give example.

(d) Define parsing. Classify the types of parsing.

(e) What is hashing? Discuss.

(f) Differentiate between Abstract Syntax tree and DAG representation of intermediate code.

(g) List out different object code forms.

(h) What is code optimization? Illustrate with example.

Unit-I

2. (a) Explain the problems faced by a one-pass assembler. Draw and explain the detailed flowchart for pass-2 of a two-pass assembler.

   (b) What are different loading schemes? Explain absolute loader scheme with its advantages and disadvantages.

3. (a) What are the basic functions of loaders? Differentiate absolute, relative and bootstrap loader.

   (b) State the basic tasks a macro instruction processor performs. Explain how the nested macro calls are executed with example?

Unit-II

4. (a) Differentiate between:
   (i) Passes and phases of compiler
   (ii) Syntax analysis and semantic analysis

   (b) Construct the canonical LR(l) item sets for the following grammar:
   $S \longrightarrow AA$
   $A \longrightarrow aA/b$

5. (a) Compare and contrast SLR with LALR. Define Kernel items and Non-kernel items.

Show the following grammar is LALR(I)

s-> Aa | bAc | de | bda

A-> d

(b) What are the problems with top down parsing? Write the algorithm to remove left recursion from a grammar with example.

Unit-III

6. (a) Explain quadruples and triples with example. Write three address code for the expression:

a+a * (b-c)+(b-c) * d

(b) With a neat diagram explain the format of the Symbol Table. And discuss the tree structures representation of scope information.

7. (a) Explain various data structure used for implementing symbol table and compare them.

(b) What are different intermediate code forms? Discuss different Three Address code types and implementations of Three Address statements.

Unit-IV

8. (a) Explain the main issues of code generation in detail.

(b) Define peephole optimization. List the characteristics of peephole optimization.

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9. (a) Explain DAG representation of basic blocks with example.

(b) Discuss the following code optimization techniques with examples:

(a) Constant propagation

(b) Strength reduction

(c) Code Motion