USN ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

15CS63

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
System Software and Compiler Design

Time: 3 hrs.   Max. Marks : 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Define system software. Distinguish between system software and application software.
                                                                               (06 Marks)
   b. List out registers used in SIC/XE machine architecture along with their use.   **(10 Marks)**

OR

2 a. Explain the data structures and pass-1 algorithm of SIC assembler.   **(08 Marks)**
   b. Define Macro. Give the features of macro processors and explain the data structures used in macro processors.   **(08 Marks)**

Module-2

3 a. Define loader? Write an algorithm for absolute loader.   **(05 Marks)**
   b. Write SIC/XE source code for a simple bootstrap loader.   **(06 Marks)**
   c. Explain the facilities available in MS-DOS linker for program linking.   **(05 Marks)**

OR

4 a. Define program relocation? Explain the different ways of doing program relocation.
                                                                               (05 Marks)
   b. With an algorithm, explain Pass – 1 of linking loader.   **(06 Marks)**
   c. Explain how loading and calling of a subroutine done using dynamic linking.   **(05 Marks)**

Module-3

5 a. Explain the different phases of a compiler, with an example.   **(09 Marks)**
   b. What is input buffering in lexical analysis? List the different methods of input buffering explain any one of them.   **(07 Marks)**

OR

6 a. List and explain the reasons for separating the analysis portion of a compiler into lexical and syntax analysis phases.   **(06 Marks)**
   b. Construct the transition diagram to recognize the tokens of
      i) Identifier   ii) Relational operators   iii) Unsigned numbers.   **(06 Marks)**
   c. Define Tokens, patterns, lexemes.   **(04 Marks)**

Module-4

7 a. Give the rules for constructing FIRST and FOLLOW sets.   **(06 Marks)**
   b. Construct predictive parsing table for the following grammar.
      $S \rightarrow aABb$
      $A \rightarrow Ac/\varepsilon$
      $B \rightarrow d/\varepsilon$ **(08 Marks)**
   c. Enlist the conditions to test whether a given grammar is LL(1).   **(02 Marks)**

OR

8 a. Define shift reduce parser? Explain its actions and conflicts by taking on example. **(06 Marks)**

b. Write an algorithm for computation of CLOSURE of LR(0). **(02 Marks)**

c. Consider the grammar A → (A)/a construct the DFA of sets of LR(0) items. Show the parsing actions for i/p string ((a)). Clearly show states and symbols on the stack. **(08 Marks)**

Module-5

9 a. Discuss S-attributed and L-attributed SDD. **(06 Marks)**

b. Write 3-address code syntax tree and DAG for the expression a + a * (b – c) + (b – c) * d. **(10 Marks)**

OR

10 a. Obtain the SDD and construct annotated parse tree for the input string 6 * 5 + 3, for the grammar

S → EN
E → E + T/T
T → T * F/F
F → (E)/digit
N → ; **(10 Marks)**

b. Discuss the issues in the design of code generator. **(06 Marks)**

* * * * *