CA 132301 NR

Roll No. of candidate

22/2/2/2021

MCA. 3rd Semester End-Term Examination

SYSTEM SOFTWARE

(New Regulation (w.e.f 2017–18))

Full Marks – 70   Time – Three hours

The figures in the margin indicate full marks for the questions.

(Answer Question 1 and any four from the rest)

1. Choose the correct answer from the following: (10 × 1 = 10)

   (i) Translator is a low level programming language, which is known as,

   (a) Compiler   (b) Assembler

   (c) Loader   (d) Linker

   (ii) Match the following

Group A	Group B
P. Regular expression	1. Syntax Analysis
Q. Pushdown Automata	2. Code generation
R. Dataflow analysis	3. Lexical analysis
S. Register allocation	4. Code optimization

   (a) P-3, Q-1, R-4, S-2   (b) P-4, Q-1, R-2, S-3

   (c) P-3, Q-4, R-1, S-2   (d) P-2, Q-1, R-4, S-3

   (iii) A static binding is a binding performed _____ the execution of a program begins,

   (a) After   (b) before

   (c) At the same time   (d) none of the above

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(iv) In a shift-reduce parsing, accept action occurs when

    (a) We have the right hand of the handle at the top of the stack

    (b) We have the left end of the handle on the top of the stack

    (c) The parser declares the successful completion of parsing

    (d) The parser finds a syntax error in the input and calls an error recovery routine.

(v) A parser that accommodates some extra information in the form of a terminal symbol, as a second component is known as,

    (a) SLR parser   (b) LALR parser

    (c) LL parser   (d) CLR parser

(vi) In a two-pass assembler, the task of the pass II is to

    (a) Separate the symbol, mnemonic opcode and operand fields

    (b) Build the symbol table

    (c) Construct intermediate code

    (d) Synthesize the target program

(vii) An assembler stores the symbols in?

    (a) Symbol table   (b) Special purpose register

    (c) General purpose register   (d) Status flag

(viii) Top down parser generates,

    (a) Rightmost derivation

    (b) Leftmost derivation

    (c) Rightmost derivation in reverse

    (d) Leftmost derivation in reverse

(ix) Macro can be defined in a program

    (a) After the first statement

    (b) beginning of the program

    (c) Anywhere in a program

    (d) end of the program

(x) An Syntax directed definition is S-attributed if every attribute is

    (a) Inherited

    (b) Synthesized

    (c) Dependent

    (d) None of these

Answer *any four* questions from the following,

2. (a) Discuss the different phases of a compiler with a diagram. (7)

   (b) List the rules to construct a regular expression. What is a regular definition? (5)

   (c) What is a panic mode error recovery and phrase level error recovery technique in compiler? (3)

3. (a) What is a LL(1) grammar? Check whether the grammar defined below is LL(1) or not: (8)

   $$S \rightarrow iEtSH \mid a$$
   $$E \rightarrow eS \mid \varepsilon$$
   $$E \rightarrow b$$

   (b) Consider the following C language statement,

   printf("Total = %d\n", total);

   Identify some tokens, patterns and lexemes in the above statement. (4)

   (c) What is a shift-reduce and reduce-reduce conflict in parsing? (3)

4. (a) Eliminate left recursion for the following grammar, (6)

   $$S \rightarrow S+E \mid E$$
   $$E \rightarrow E*F \mid F$$
   $$F \rightarrow (S) \mid id$$

   (b) What do you mean by the term ambiguity in a grammar? (3)

   (c) Prove that the grammar, (6)

   $$E \rightarrow E+E \mid E*E \mid (E) \mid id$$

   is ambiguous.

5. (a) What is a forward reference problem? How it can be solved? (4)

   (b) Explain the tasks performed by the Pass I and Pass II of a two pass assembler. (5)

   (c) Explain the Role of Mnemonic table, Symbol table, Literal Table and POOL Table in assembling process of a assembly language program. (6)

6. (a) Find the FIRST and FOLLOW sets for the following grammar (6)

        $S \rightarrow aABb$

        $A \rightarrow c \mid \varepsilon$

        $B \rightarrow d \mid \varepsilon$

  (b) What is LALR parsing? Why LALR parsing considered over SLR parsing? (6)

  (c) What are different kinds of assembly language statements? (3)

7. (a) Write short note on (4)

    (i) Debugger

    (ii) Different type of editor

  (b) Consider a grammar whose productions are as follows, (7)

        $S \rightarrow L=R$

        $S \rightarrow R$

        $L \rightarrow *R$

        $L \rightarrow id$

        $R \rightarrow L$

  Find the canonical collection of sets of LR (0) items.

  (c) What is synthesized and inherited attributes? How semantic rules are attached to the productions? (4)