



BRAINWARE UNIVERSITY
Term End Examination 2020 - 21
Programme – Master of Computer Applications
Course Name – Compiler Design
Course Code - MCA503

Semester / Year - Semester V

Time allotted : 85 Minutes

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 70=70

1. *(Answer any Seventy)*

(i) Number of states of FSM required to simulate behaviour of a computer with a memory capable of storing “m” words, each of length ‘n’

- | | |
|-------------------|-----------------|
| a) $m \times 2^n$ | b) $2^{(mn)}$ |
| c) $2^{(m+n)}$ | d) All of these |

(ii) An FSM with

- | | |
|---|---|
| a) M can be transformed to Numeral relabeling its states | b) M can be transformed to N, merely relabeling its edges |
| c) M can be transformed to Numeral relabeling its states and M can be transformed to N, merely relabeling its edges | d) None of these |

(iii) Which of the following is right?

- | | |
|---|---|
| a) A Context free language can be accepted by a deterministic PDA | b) union of 2 CFLs is context free |
| c) The intersection of two CFLs is context free | d) The complement of CFLs is context free |

(iv) Which of the following pairs of regular expressions are equivalent?

- | | |
|----------------------------|----------------------------|
| a) $1(01)^*$ and $(10)^*1$ | b) $x(xx)^*$ and $(xx)^*x$ |
|----------------------------|----------------------------|

c) x^+ and $x^+x^*(x^+)$

d) All of these

(v) Given a NFA with N states, the maximum number of states in an equivalent minimized DFA is at least.

a) N^2

b) 2^N

c) $2N$

d) $N!$

(vi) Let L denotes the language generated by the grammar $S \rightarrow OSO/00$. Which of the following is true?

a) $L = O$

b) L is regular but not O

c) L is context free but not regular

d) L is not context free

(vii) Which of the following are not regular?

a) String of 0's which has length that is a perfect square

b) Palindromes Consisting of 0's 1's

c) String of 0's whose length is a prime number

d) All of these

(viii) If $? = \{a, b, c, d, e, f\}$ then number of strings in $?$ of length 4 such that no symbol is used more than once in a string is

a) 35

b) 360

c) 49

d) 720

(ix) All _____ are automatically treated as regular expressions.

a) Programmatic description

b) Window

c) Win Object

d) Collection

(x) _____ was developed from the beginning as a cross compiler

a) Free Pascal

b) GCC

c) Pascal

d) None of these

(xi) If we compile the sam.c file with the command “gcc -o sam sam.c”, then the executable file will be

- a) a.out
- b) sam
- c) sam.out
- d) None of these

(xii) Compiler translates the source code to

- a) Executable code
- b) Machine code
- c) Binary code
- d) Both Machine code and Binary code

(xiii) Compiler should report the presence of _____ in the source program, in translation process.

- a) Classes
- b) Objects
- c) Errors
- d) Text

(xiv) How many parts of compiler are there?

- a) 1
- b) 2
- c) 4
- d) 8

(xv) Grammar of the programming is checked at _____ phase of compiler.

- a) Semantic analysis
- b) Syntax analysis
- c) Code optimization
- d) Code generation

(xvi) Compiler can check _____ error.

- a) Logical
- b) Syntax
- c) Content
- d) Both Logical and Syntax

(xvii) A grammar that produces more than one parse tree for some sentence is called as

- a) Ambiguous
- b) Unambiguous
- c) Regular
- d) All of these

(xviii) A compiler program written in a high-level language is called

- a) Source Program
- b) Object Program
- c) Machine Language Program
- d) None of these

(xix) A language L from a grammar $G = \{ VN, \Sigma, P, S \}$ is

- a) Set of symbols over VN
- b) Set of symbols over Σ
- c) Set of symbols over P
- d) Set of symbols over S

(xx) The transitional function of a DFA is

- a) $Q \times \Sigma \rightarrow Q$
- b) $Q \times \Sigma \rightarrow 2^Q$
- c) $Q \times \Sigma \rightarrow 2^n$
- d) $Q \times \Sigma \rightarrow Q^n$

(xxi) The transitional function of a NFA is

- a) $Q \times \Sigma \rightarrow Q$
- b) $Q \times \Sigma \rightarrow 2^Q$
- c) $Q \times \Sigma \rightarrow 2^n$
- d) $Q \times \Sigma \rightarrow Q^n$

(xxii) Maximum number of states of a DFA converted from a NFA with n states is

- a) n
- b) n^2
- c) $2n$
- d) None of these

(xxiii) Basic limitations of finite state machine is

- a) It cannot remember arbitrarily large amount of information
- b) It cannot remember state transitions
- c) It cannot remember grammar for a language
- d) It cannot remember language generated from a grammar

(xxiv) A finite automaton recognizes

- a) Any Language
- b) Context Sensitive Language
- c) Context Free Language
- d) Regular Language

(xxv) Which is true for Dead State?

- a) It cannot be reached anytime
- b) There is no necessity of the state
- c) If control enters no way to come out from the state
- d) If control enters FA deads

(xxvi) Which is true for Moore Machine?

- a) Output depends on present state
- b) Output depends on present input
- c) Output depends on present state and present input
- d) Output depends on present state and past input

(xxvii) Which is true for Mealy Machine?

- a) Output depends on present state
- b) Output depends on present input
- c) Output depends on present state and present input
- d) Output depends on present state and past input

(xxviii) Which is true for in accessible state?

- a) It cannot be reached anytime
- b) There is no necessity of the state
- c) If control enters no way to come out from the state
- d) If control enters FA deads

(xxix) Which concept of FSA is used in the compiler?

- a) Lexical analysis
- b) Parser
- c) Code generation
- d) Code optimization

(xxx) Which concept of grammar is used in the compiler

- a) Lexical analysis
- b) Parser
- c) Code generation
- d) Code optimization

(xxxi) Parsing is also known as

- a) Lexical Analysis
- b) Syntax Analysis
- c) Semantic Analysis
- d) Code Generation

(xxxii) The lexical analysis for a modern language such as Java needs the power of which one of the following machine models in a necessary and sufficient sense?

- a) Finite state automata
- b) Deterministic pushdown automata
- c) Non-deterministic pushdown automata
- d) Turing machine

(xxxiii) In a compiler the module that checks every character of the source text is called

- a) The code generator
- b) The code optimizer
- c) The lexical analyzer
- d) The syntax analyzer

(xxxiv) The context free grammar is ambiguous if

- a) The grammar contains non-terminals
- b) Produces more than one parse tree
- c) Production has two non-terminals side by side
- d) Production has two non-terminals side by side

(xxxv) An individual token is called _____

- a) Lexeme
- b) Lex
- c) Lexeme & Lex
- d) None of these

(xxxvi) Which phase of the compiler is Lexical Analyzer?

- a) First
- b) Second
- c) Third
- d) None of these

(xxxvii) Which one is a type of Lexeme

- a) Identifiers
- b) Constants
- c) Keywords
- d) All of these

(xxxviii) When expression $\text{sum}=3+2$ is tokenized then what is the token category of 3

- a) Identifier
- b) Assignment operator

c) Integer Literal

d) Addition Operator

(xxxix) Find the wrong statement?

a) The language accepted by finite automata are the languages denoted by regular expression

b) Every DFA has a regular expression denoting its language

c) For a regular expression r , there does not exist NFA with L^R and transit that accept

d) None of these

(xl) What goes over the characters of the lexeme to produce a value?

a) Scanner

b) Parser

c) Evaluator

d) Lexical generator

(xli) The output of a lexical analyzer is

a) Machine Code

b) Intermediate Code

c) Stream of Token

d) Parse Tree

(xlii) Which of these is not true about Symbol Table?

a) All the labels of the instructions are symbols

b) Table has entry for symbol name address value

c) Perform the processing of the assembler directives

d) Created during pass 1

(xliii) What does a Syntactic Analyzer do?

a) Maintain Symbol Table

b) Collect type of information

c) Create parse tree

d) None of these

(xliv) Semantic Analyzer is used for?

a) Generating Object code

b) Maintaining symbol table

c) Generating Object code & Maintaining symbol table

d) None of these

(xlv) The process of assigning load addresses to the various parts of the program and adjusting the code and data in the program to reflect the assigned addresses is called

- a) Assembly
- b) Parsing
- c) Relocation
- d) Symbol resolute

(xlvi) Given the following expression grammar: $E \rightarrow E * F \mid F + E \mid F F \rightarrow F - F \mid$ id which of the following is true?

- a) * has higher precedence than +
- b) - has higher precedence than *
- c) + and — have same precedence
- d) + has higher precedence than *

(xlvii) Consider a program P that consists of two source modules M1 (contains reference to a function defined in M2) and M2 contained in two different files.

- a) Edit time
- b) Compile time
- c) Link time
- d) Load time

(xlviii) Which of the following suffices to convert an arbitrary CFG to an LL(1) grammar?

- a) Removing left recursion only
- b) Factoring the grammar alone
- c) Factoring & left recursion removal
- d) None of these

(xlix) Find the TRUE statement? I. There exist parsing algorithms for some programming languages which has $O(3)$ complexity. II. A programming language which allows recursion can be implemented with static storage allocation. III. No L-attributed definition can be evaluated in the framework of bottom-up parsing. IV. Code improving transformations can be performed at both intermediate code level and source Language.

- a) I and II
- b) I and IV
- c) III and IV
- d) I, III and IV

(l) Which of the following describes a handle (as applicable to LR-parsing) appropriately?

- | | |
|--|--|
| a) Position where next reduce or shift operation will occur | b) The next step has use of Non-terminal for reduction |
| c) used for reduction in a coming-up step along with a position in the sentential form where the next shift or reduce operation will occur | d) used in the next step for reduction along with a position in the sentential form where the right hand side of the production may be found |

(li) Which one of the following is a top-down parser?

- | | |
|-----------------------------|-------------------------------|
| a) Recursive descent parser | b) Operator precedence parser |
| c) An LR(k) parser | d) An LALR(k) parser |

(lii) The grammar $A \rightarrow AA \mid (A) \mid e$ is not suitable for predictive-parsing because the grammar is

- | | |
|--------------------|------------------------|
| a) Ambiguous | b) Left recursive |
| c) Right recursive | d) An operator grammar |

(liii) In a bottom-up evaluation of a syntax directed definition its inherited attributes can do which of the following?

- | | |
|--|---|
| a) Always evaluated | b) Can be evaluated if the definition is L attributed |
| c) Can be evaluated if the definition has synthesized attributes | d) Never be evaluated |

(liv) $S \rightarrow C C C \mid c C \mid d$ The grammar is

- | | |
|---------------------------|--------------------------|
| a) LL(1) | b) SLR(1) but not LL(1) |
| c) LALR(1) but not SLR(1) | d) LR(1) but not LALR(1) |

(lv) In the context of abstract-syntax-tree and control-flow-graph. Which one of the following is true?

- | | |
|--|--|
| a) In both AST and CFG if node N2 be the successor of node N1. | b) For any input program, neither AST nor CFG will contain a cycle |
| c) The max no. of successors of a node in | d) None of these |

an AST and a CFG depends on the input program

(lvi) Consider the following grammar G . $S \rightarrow F \mid HF \mid p \mid c \mid H \mid d \mid c$ Which one is true? S1: All strings generated by G can be parsed with help of LL (1). S2: All strings generated by G can be parsed with help of LR (1).

- a) Only S1
- b) Only S2
- c) Both S1 S2
- d) None of these

(lvii) YACC builds up

- a) SLR parsing table
- b) Canonical LR parsing table
- c) LALR parsing table
- d) None of these

(lviii) In an absolute loading scheme, which loader function is accomplished by assembler?

- a) Re-allocation
- b) Allocation
- c) Linking
- d) Loading

(lix) The action of parsing the source program into proper syntactic classes is called

- a) Syntax Analysis
- b) Lexical Analysis
- c) Interpretation analysis
- d) General Syntax Analysis

(lx) Relocating bits used by relocating loader are specified by

- a) Relocating loader itself
- b) Linker
- c) Assembler
- d) Macro Processor

(lxi) The linker

- a) Is similar to interpreter
- b) Uses source code as its input
- c) Is required to create a load module
- d) None of these

- (lxii) _____ is a graph representation of a derivation
- a) The parse tree
 - b) Oct tree
 - c) Binary tree
 - d) None of these
- (lxiii) Which of these is also known as look-head LR parser?
- a) SLR
 - b) LR
 - c) LLR
 - d) None of these
- (lxiv) Which of these is true about LR parsing?
- a) Is most general non-backtracking shift-reduce parsing
 - b) It is still efficient
 - c) Both Is most general non-backtracking shift-reduce parsing and It is still efficient
 - d) None of these
- (lxv) The root directory of a disk should be placed
- a) At a fixed address in main memory
 - b) At a fixed location on the disk
 - c) Anywhere on the disk
 - d) None of these
- (lxvi) The segment base is specified using the register named is
- a) ORG instructions
 - b) TITLE instruction
 - c) ASSUME instruction
 - d) SEGMENT instruction
- (lxvii) Which loader function is accomplished by loader?
- a) Reallocation
 - b) Allocation
 - c) Linking
 - d) Loading
- (lxviii) $S \rightarrow SS \mid S \mid aSb \mid bSa$ which type of grammar is it?
- a) Linear
 - b) Nonlinear
 - c) Both Linear and Nonlinear
 - d) None of these
- (lxix) Compiler can diagnose

- a) Grammatical errors only
- b) Logical errors only
- c) Grammatical and logical errors
- d) None of these

(lxx) A simple two-pass assembler does which of the following in the first pass?

- a) It allocates space for the literals
- b) Calculates total length of the program
- c) Symbol table is built for the symbols and their value
- d) All of these