BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Bachelor of Technology in Computer Science & Engineering

Course Name – Formal Language and Automata Theory

Course Code - PCC-CS503

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) Transition function maps.

a) ? * Q -> ?
b) Q * Q -> ?
c) ? * ? -> Q
d) Q * ? -> Q

(ii) Number of states require to accept string ends with 1 0….

a) 3
b) 2
c) 1
d) can't be represented

(iii) Languages of a automata is:

a) If it is accepted by automata….
b) If it halts
c) If automata touch final state in its life time
d) All language are language of automata

(iv) Number of final state require to accept ? in minimal finite automata……..

a) 1,
b) 2
c) 3
d) None of the mentioned

(v) Regular expression for all strings starts with ab and ends with bba is…..

a) aba*b*bba..
b) ab(ab)*bba
c) ab(a+b)*bba
d) All of the mentioned

(vi) How many DFA's exits with two states over input alphabet {0,1} ?

a) 16
b) 26
c) 21
d) 64

(vii) Number of states require to simulate a computer with memory capable of storing '3? words each of length '8?

a) 3*2^8.
b) 2^(3*8).
c) 2^(3+8).
d) None of the mentioned

(viii) A regular language over an alphabet a is one that can be obtained from

a) union.
b) concatenation
c) kleene
d) All of these

(ix) Moore Machine is an application of:

a) Finite automata without input
b) Finite automata with output
c) Non- Finite automata with output
d) None of the mentioned

(x) What is the output for the given language? Language: A set of strings over ?= {a, b} is taken as input and it prints 1 as an output "for every occurrence of a, b as its substring. (INPUT: abaaab)

a) 10001
b) 101010
c) 111010
d) 10000

(xi) Which of the following is a correct statement?

a) Moore machine has no accepting states
b) Mealy machine has accepting states
c) We can convert Mealy to Moore but not vice versa
d) All of the mentioned

(xii) What is the output for the given language? Language: A set of strings over ?= {a, b} is taken as input and it prints 1 as an output "for every occurrence of a, b as its substring. (INPUT: abaaab)…...

a) 101010
b) 10001
c) 111010
d) None of the mentioned

(xiii) It is less complex to prove the closure properties over regular languages using

a) NFA
b) DFA
c) PDA
d) Can't be said

(xiv) Which of the following is an application of Finite Automaton?

a) Compiler Design
b) Grammar Parsers
c) Text Search
d) All of the mentioned

(xv) To derive a string using the production rules of a given grammar, we use:

a) Scanning
b) Parsing
c) Derivation
d) All of the mentioned

(xvi) Which of the following parser performs top down parsing?

a) LALR parser
b) LL parser
c) Recursive Accent parser
d) None of the mentioned

(xvii) Which of the following is true for shift reduce parsers?

a) Scans and parses the input in one forward pass over the text, without any backup
b) A shift command advances in the input stream by one symbol
c) LALR parser
d) All of the mentioned

(xviii) A CFG is not closed under

a) Dot operation
b) Union Operation
c) Concatenation
d) Iteration

(xix) The format: A->aB refers to which of the following?

a) Chomsky Normal Form
b) Greibach Normal Form
c) Backus Naur Form
d) None of the mentioned

(xx) Which of the following is true for a predictive parser?

a) Recursive Descent parser
b) no backtracking
c) Recursive Descent parser and no backtracking
d) None of the mentioned

(xxi) The transition a Push down automaton makes is additionally dependent upon the:

a) stack
b) input tape
c) terminals
d) none of the mentioned

(xxii) A PDA machine configuration (p, w, y) can be correctly represented as

a) (current state, unprocessed input, stack content)
b) (unprocessed input, stack content, current state)
c) (current state, stack content, unprocessed input)
d) none of the mentioned

(xxiii) With reference of a DPDA, which among the following do we perform from the start state with an empty stack?

a) process the whole string
b) end in final state
c) end with an empty stack
d) all of the mentioned

(xxiv) A language accepted by Deterministic Push down automata is closed under which of the following?

a) Complement
b) Union
c) Both Complement and Union
d) None of the mentioned

(xxv) Every grammar in Chomsky Normal Form is:

a) regular
b) context sensitive
c) context free
d) all of the mentioned

(xxvi) In which of the following, does the CNF conversion find its use?

a) CYK Algorithm
b) Bottom up parsing
c) Preprocessing step in some algorithms
d) All of the mentioned

(xxvii) Regular expression for all strings starts with ab and ends with bba is.

a) aba*b*bba
b) ab(ab)*bba
c) ab(a+b)*bba
d) All of the mentioned

(xxviii) The following denotion belongs to which type of language: G=(V, T, P, S)

a) Regular grammar
b) Context free grammar
c) Context Sensitive grammar
d) All of the mentioned

(xxix) Which of the following is the task of lexical analysis?

a) To build the uniform symbol table
b) To initialize the variables
c) To organize the variables in a lexical order
d) None of the mentioned

(xxx) It is less complex to prove the closure properties over regular languages using:

a) NFA
b) DFA
c) PDA
d) Can't be said

(xxxi) Which of the following do we use to form an NFA from a regular expression?

a) Subset Construction Method
b) Power Set Construction Method
c) Thompson Construction Method
d) Scott Construction Method

(xxxii) Which among the following is not an application of FSM?

a) Lexical Analyser
b) BOT

c) State charts
d) None of the mentioned

(xxxiii) Predict the number of transitions required to automate the following language using only 3 states: L= {w | w ends with 00}

a) 3
b) 2
c) 4
d) Cannot be said

(xxxiv) The total number of states to build the given language using DFA: L= {w | w has exactly 2 a's and at least 2 b's} :-

a) 10
b) 11
c) 12
d) 13

(xxxv) The total number of states to build the given language using DFA: L= {w | w has exactly 2 a's and at least 2 b's}

a) 10
b) 11
c) 12
d) 13

(xxxvi) Which of the following do we use to form an NFA from a regular expression.?

a) Subset Construction Method
b) Power Set Construction Method
c) Thompson Construction Method
d) Scott Construction Method

(xxxvii) L1= {w | w does not contain the string tr } L2= {w | w does contain the string tr} Given ?= {t, r}, The difference of the minimum number of states required to form L1 and L2?

a) 0
b) 1
c) 2
d) Cannot be said

(xxxviii) In Moore machine, output is produced over the change of:

a) transitions
b) states
c) Both
d) None of the mentioned

(xxxix) Statement 1: Null string is accepted in Moore Machine. Statement 2: There are more than 5-Tuples in the definition of Moore Machine…...

a) Statement 1 is true and Statement 2 is true
b) Statement 1 is true while Statement 2 is false
c) Statement 1 is false while Statement 2 is true
d) Statement 1 and Statement 2, both are false

(xl) The output alphabet can be represented as:…

a) ?
b) ?
c) ?
d) None of the mentioned

(xli) In mealy machine, the O/P depends upon?

a) State
b) Previous State
c) State and Input
d) Only Input

(xlii) Which of the given are correct?

a) Moore machine has 6-tuples
b) Mealy machine has 6-tuples
c) Both Mealy and Moore has 6-tuples
d) None of the mentioned

(xliii) Mealy and Moore machine can be categorized as:

a) Inducers
b) Transducers
c) Turing Machines
d) Linearly Bounder Automata

(xliv) The major difference between Mealy and Moore machine is about:

a) Output Variations
b) Input Variations
c) Both
d) None of the mentioned

(xlv) Statement 1: Mealy machine reacts faster to inputs. Statement 2: Moore machine has more circuit delays. Choose the correct option:

a) Statement 1 is true and Statement 2 is true
b) Statement 1 is true but Statement 2 is false

c) Statement 1 is false and Statement 2 is true

d) None of the mentioned is true

(xlvi) RR* can be expressed in which of the forms:

a) R+

b) R-

c) R+ U R-

d) R

(xlvii) Regular grammar is

a) context free grammar

b) non context free grammar

c) english grammar

d) none of the mentioned

(xlviii) Which of the following is not a regular expression?

a) [(a+b)*-(aa+bb)]*

b) [(0+1)-(0b+a1)*(a+b)]*

c) (01+11+10)*

d) (1+2+0)*(1+2)*

(xlix) Regular expression are:-

a) Type 0 language

b) Type 1 language

c) Type 2 language

d) Type 3 language

(l) Which of the following is true?

a) Every subset of a regular set is regular

b) Every finite subset of non-regular set is regular

c) The union of two non regular set is not regular

d) Infinite union of finite set is regular

(li) All the regular languages can have one or more of the following descriptions: i) DFA ii) NFA iii) e-NFA iv) Regular Expressions Which of the following are correct?

a) DFA,NFA,Regular Expressions

b) DFA,NFA,e-NFA

c) DFA,Regular Expressions

d) DFA,NFA,e-NFARegular Expressions

(lii) Finite-state acceptors for the nested words can be

a) nested word automata
b) push down automata
c) ndfa
d) none of the mentioned

(liii) The minimum number of states required in a DFA (along with a dumping state) to check whether the 3rd bit is 1 or not for |n|>=3

a) 3
b) 4
c) 5
d) 1

(liv) Generate a regular expression for the given language:l L(x): {xÎ{0,1}*| x ends with 1 nd does not contain a substring 01}

a) (0+01)*
b) (0+01)*1
c) (0+01)*(1+01)
d) All of the mentioned

(lv) A turing machine operates over:

a) finite memory tape
b) infinite memory tape
c) depends on the algorithm
d) none of the mentioned

(lvi) Which of the problems were not answered when the turing machine was invented?

a) Does a machine exists that can determine whether any arbitrary machine on its tape is circular
b) Does a machine exists that can determine whether any arbitrary machine on its tape is ever prints a symbol
c) Hilbert Entscheidungs problem
d) None of the mentioned

(lvii) The ability for a system of instructions to simulate a turing Machine is called _____

a) Turing Completeness
b) Simulation
c) Turing Halting
d) None of the mentioned

(lviii) Turing machine can be represented using the following tools:

a) Transition graph
b) Transition table

c) Queue and Input tape

d) All of the mentioned

(lix) Given Grammar G1: S->aSb S->e Grammar G2: R->cRd R->e If L(G)=L(G1) U L(G2), the number of productions the new starting variable would have:

a) 2

b) 3

c) 4

d) 1

(lx) Which of the following is incorrect? There exists algorithms to decide if:

a) String w is in CFL L

b) CFL L is empty

c) CFL L is infinite

d) All of the mentioned

(lxi) If the start symbol is one of those symbols which produce no terminal through any sequence, the CFL is said to be

a) nullable

b) empty

c) eliminated

d) none of the mentioned

(lxii) Which of the following is an incorrect regular expression identity?

a) R+f=R

b) eR=e

c) Rf=f

d) None of the mentioned

(lxiii) A PDA machine configuration (p, w, y) can be correctly represented as:

a) (current state, unprocessed input, stack content)

b) (unprocessed input, stack content, current state)

c) (current state, stack content, unprocessed input)

d) none of the mentioned

(lxiv) Finite-state acceptors for the nested words can be:

a) nested word automata

b) push down automata

c) ndfa

d) none of the mentioned

(lxv) Which of the following are always unambiguous?

a) Deterministic Context free grammars
b) Non-Deterministic Regular grammars
c) Context sensitive grammar
d) None of the mentioned

(lxvi) In which order are the children of any node ordered?

a) From the left
b) From the right
c) Arbitrarily
d) None of the mentioned

(lxvii) Which among the following is the root of the parse tree?

a) Production P
b) Terminal T
c) Variable V
d) Starting Variable S

(lxviii) IF L1 AND L2 ARE CONTEXT FOR LANGUAGES,L1-L2 CONTAXT FREE

a) ALWASYS
b) SOME TIMES
c) NEVER
d) NONE OF MENTIONED

(lxix) Which of the following is analogous to the following? :NFA and NPDA

a) Regular language and Context Free language
b) Context free language and Context Sensitive language
c) Regular language and Context Sensitive language
d) None of the mentioned

(lxx) Let T={p, q, r, s, t}. The number of strings in S* of length 4 such that no symbols can be repeated.

a) 120
b) 625
c) 360
d) 36