CS402- THEORY OF AUTOMETA
(SOLVED MCQs)
FROM MIDTERM PAPERS
LECTURE (1-22)

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1.Which of the following steps replaces multiple incoming transition edges with a single one proving Kleene's theorem part II?

a. Step 1
b. Step 2
c. Step 3
d. Step 4

2. Let FA1 accepts many strings and FA2 accepts no strings, then FA1+FA2 will be equal to:

a.FA1

b.FA2

C.FA2-FA1

d.(FA2)*

3. Let L be the language of all strings, defined over ∑ =(0,1), ending in 10. Which of the following strings are indistinguishable w.r.t L with z being 0?

a.100.101

b.111.101

c. 110 .101

d.010.101

4. If r1=(aa+bb)and r2=(a+b) then the language (aa+bb)(a+b) will bhe generated by_____

a.(r1)(r2)

b.(r1 +r2)

c.(r2)(r1)

d.(r1)*

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5. Introducing a new start state in the case of multiple states is step no._____ of proving Kleen's theorem part II.

a.1

b.2

c.3

d.4

6. The language having even numbers of a's and even number of b's defined over S={a,b} is called _____

a. EVEN-EVEN

B.ODD-ODD

c. PALINDROME

d. FACTORIAL

7. In NFA having no transition at a certain state, FA can be built by introducing :

a.Empty state

b. Combination of states

c .initial state

d. final state

8. For every three regular expression R, S, and T. the language denoted by R(S U T) and (RS)U(RT) are the _____

a .same

b. Different

c. R(SUT)is greater

d. none of the given options

9. Which of the following string belongs to the language of the regular expression (aa*b)?

a. baabab

b. abbbaa

c.aaaaaa

d.aabaab

10. If L1' and L2' are regular languages, then L1, L2 will be

a. non regular

b. may be regular

c. Regular

d. none of the mentioned

11. Suppose the language L1 has 2 L2 has 2 states. If we have a machine M that accepts L1∩L2. Then the total number of states in M is equal to_____

a. 2

b. 4

c. 6

d. 8

12. If L is a regular language, then (L')' U L will be:

a. L

b.

c.

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d.

13. In Mealy machine, the output depends on_____

a. Only present state

b. Present state and Present output

c. Nothing

d. Type of input

14. Strings x,y,z belongs to $\sum^*$ such that $xz \in L$ but $yz \notin L$ where $L \subseteq \sum^*$ are:

a. indistinguishable

b. Undetermined

c. Both distinguishable and indistinguishable

d. Distinguishable

15. Melay machine to increase the output string in magnitude by 1 is called:

a. Complementing machine

b. Decrementing machine

c. Incrementing machine

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d. Converting machine

16. Suppose we have FA3 (which is to FA1+FA2) then the final state of FA3 will be declared final if:

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a. it corresponds to final states of both FA1 and FA2

b. it corresponds to final states FA1 only

c. it corresponds to final states FA2 only

d. It corresponds to any of the final states of FA1 or FA2

17. If we have the finite language and the number of states in the FA is n then the maximum number of letter in each word of the language that will be accepted by the given FA will be :

a. 1

b. n+1

c. n-1

d. n

18. Which of the following state is introduced while developing NFA for the closure of FA?

a. An initial state which should be final as well

b. simply an initial AL-JUNAID INSTITUTE OF GROUP

c. Final states

d. An initial state with loop for all letters

19. Length of EVEN-EVEN language is_____

a. Odd

b. such language doesn't exist

c. Even

d. sometimes even & sometimes odd

20. If FA1 corresponds to (a+b)* then FA1 must accept_____ strings/strings.

a. No

b. Odd length

c. Every

d. Even length

21. In FA, initial stage is represented by :

a. leaventh state empty

b. drawing a circle in that state

c. drawing '+'sign in transtate

d. Drawing an arrowhead before the state

22. Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

a. Moore machine

b. Finite state machine

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c. Mealy machine

d. Deterministic finite state machine

23. Length of machine "AbBAbcd" defined over ∑=(Ab,B,c,d) is_____.

a. three

b. four

c. five

d. six

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24. An FA is a collection of:

a. Finite states , finite transition and finite input letters

b. infinite states , infinite transition and infinite input letters

c. Only finite states , finite transition

d. Only infinite states , infinite transition

25. Given the language L={ab, aa, baa}, which of the following strings are in L*?

i) abaabaaabaa
ii) aaaabaaaa
iii)baaaaabaaaab
iv)baaaaabaa

a. 1,2 & 3

b. 2, 3&4

c. 1,2 & 4

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d. 1, 3&4

26. In the context to make NFA for the concentration of FA1 and FA2 (FA1 accepting null string) which of the following option is correct?

a. initial states in both FAs

b. FA2 having initial state only

c. FA2 having final state only

d. Final states in both FAs

27. Every ___ is a ___ as well, but the converse may not be true.

a. TG ,FA

b. TG, GTG

c. FA ,GTG

d. FA, TG

28. NFA with null string has ____ initial state(s).

a. One

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b. Two

c. Three

d. Many

29. While finding RE corresponding to a TG, we connect the new start state with the old start state by____ transition.

a. a

b. b

c. Null

d. Re

30. If S=(x). then S* will be_____.

a. {^,x,xxx,xxxx,xxxx….}

b. {^,x,xxx,xxxx,xxxxx.…}

c. {^,x,xx,xxx,xxxx….}

d. {^,x,xxxx,xxxxx,xxxxxx.…}

31. The minimum length of string (except null string) of a language that starts and ends in the same letter will be:

a.1 AL-JUNAID INSTITUTE OF GROUP

b. 2

c.3

d. 4

32. If S={ab, bb} , then S* will not contain_____.

a. abbbab

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b. bbbbab

c. ababbb

d. bbba

33. Which of the following machine has only one initial state?

a. Moore machine

b. Finite state machine

c. Deterministic finite state machine

d. Non deterministic finite state machine

34. Which of the following diagram is very rigid in order to express any language?

a. TG

b NFA

c GTG

d FA

35. Let L be the language of all strings, defined over ∑ =(0,1), ending in 111. Which of the following strings are indistinguishable w.r.t L with z being 11?

a 111, 101

b 100, 101

c110, 101

d 010, 101

36. Mealy machine can have _____ final states.

a. One

b More than one but finite

c More than one but infinite

d. Zero

37. In Moore machine , output is produced over the change of:

a. transition

b. transition and states

c. States

d. None of the mentioned

38. Lets we have two regular expressions R1 ={xx+yy}and R2={x+y} . Which one of the following is the correct regular expression for the union of R1 and R2?

a. (xx +yy) (x +y)

b. (xx +yy) +(x +y)*

c. (xx+ yy) +(x+ y)

d. ((xx +yy)+(x+ y))*

39. FA corresponding to an NFA can be built by introducing a state corresponding to the combination of states, for a letter having

a. no transition at certain state AL-JUNAID INSTITUTE OF GROUP

b. one transition at certain state

c. more than one transitions at certain state

d. none of the given options

40. The situation there is no way to leave after entry is called

a Davey John locker

b. initial state

c. finial state

d. non- final state

41. Which one of the following word is not accepted by the given regular expression?

a. aaabab

b. aaaababb

c. abbaab

d. aabbabb

42. According to the theory of automata, there are _____ types of languages.

a. one

b. Two

c. three

d. four

43. Which of the following word is not accepted by the given regular expression?

a. ababaaaab

b. bababbbba

c. baabaabba

d. abbaaabba

44. Regular languages are closed under the following operations.

a. Union only

b. Concatenation, closure only

c. Union, Concatenation and closure

d. Regular languages are not closed under any operation.

45. There can be more than ____ FA for a certain language but for ____FA there is only one language associated with it.

a. one, one AL-JUNAID INSTITUTE OF GROUP

b. one, two

c. two, three

d. two ,one

46. There is no compulsion that each state must have an on outdoing edge for every input variable in:

a. Finite automata

b. Transition graph

c. Both finite Automata and Transition Graph

d. Transition Table

47. FA is also called_____.

a. TG

b. GTG

c. NFA

d. DFA

48. If r1 and r2 are regular expressions then (r1*r2) is_____

a. FA

b. RE (Regular expression

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c. TG

d. GTG

49. Which of the following is the minimal number of states for a finite automaton accepting the language of all strings defined over any alphabet set?

a. 1

b. 2

c. 3

d. 4

50. Keeping view language of all strings ending with ‘a’ for which symbol we will take a loop on the final state of its transition diagram?

a. A

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b. B

c. C

d. D

51. Which of the following statements is true about NFA with Null String?

a. Infinite state

b. Infinite set of letters

c. Infinite set of transitions

d. Transition of null string is allowed at any stage

52. Which one of the following diagrams expresses languages more simply?

a. FA

b. NFA

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c. TG

d. GTG

53. The language of all strings defined over alphabet set={a,b} that does not end with 'a' actually end with:

a. a and ^

b. b

c. b and^

d ^

54. Let S={aa,bb}, then S* will have the _____ string.

a. abba

b. aabbbaa

c. bbaab

d. ^

55. Formal is also known as_____.

a. Syntactic language

b. Semantic language

c. informal language

d. none of these

56. There may be more than one transition for a certain letter on a state in:

a. Non-Deterministic finite automata

b. finite automata

c. transition table

d. Moore Machine

57. A loop at a state is supposed to be____ transition while converting Moore machine into an equivalent Maley machine.

a. incoming

b. outgoing

c. Both Incoming and incoming

d. Complex

58. FA of EVEN language shows null string when_____.

a. initial state is final as well AL-JUNAID INSTITUTE OF GROUP

b EVEN does not accept null

C One state is declared null

d. None of these

59. Which of the following statement is true about GTG?

a Transitions are based on input letters

b Transitions are based on specified substrings

c Transitions are based on regular expressions

d Transitions are based on alphabet set

60. Which of the following is the bypass and state elimination step in the context of Kleene's theorem part II proof?

a.1

b.2

c.3

d.4

61. Which of the following is free of non-determinism?

a. TG

b. NFA

c. NFA-^

d. FA

62. There is no question of accepting any language in:

a. FA

b. TG

c.GTG

d. Moore machine

63. A string will be accepted by an NFA if there exist_____one successful path.

a. Atmost

b. Maximum

c. atleast

d. None of these

64. Kleene's theorem part I expresses the relationship between_____

a. FA and TG

b. TG and RE

c. RE and FA

d. FAand RE

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65. Keeping in view the discussion by Martin, how any states are required to recognize the language of all strings of length 2 or more defined over ∑={a,b} with 'b' being the second letter from right?

a. 6

b. 7

c. 8

d. 9

66. FA and _____ are same excepts that _____has unique symbol for each transition.

a. FA, TG

b. NFA, TG

c. GTG, NFA

d. NFA,FA

67. Subtraction of binary number is possible through.

a. Both complementing and incrementing machine

b. incrementing machine

c. complementing machine

d. Converting machine

68. Which of the following is the bypass and state elimination step in the context of Kleene's theorem part II proof?

a. 1

b. 2

c. 3

d. 4

69. Keeping in view the discussion by Martin, how any states are required to recognize the language of all strings of length 2 or more defined over ∑={a,b} with 'b' being the second letter from right?

a.6

b. 7

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c. 8

d.9

70.let L be the language of all strings. Defined over ∑ (0,1) ,ending in 10.which of the following strings

Are indistinguishable with respect to L with z being 0

a.100.101

b.111.101

c. 110 .101

d.010.101

71.IF r1 =(aa +bb)and r2 =(a+ b) then the language(aa +bb)(a+ b) will be generated by _____

a.(r1)(r2)

b.(r1 +r2)

c.(r2)(r1)

d.(r1)*

72. Indroducing new start state in case of multiple start states in the step no_____

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a.1

b.2

c.3

d.4

73 THE language having even number of a ‘ s and even number of b’ s defined over S=(a, b) is called____

a. EVEN-EVEN

B.ODD-ODD

c. PALINDROME

d. FACTORIAL

74 In NFA having no transition at certain state .FA can be build by introducing.

A .Empty state

b. Combination of states

c .initial state

d. final state

75 .for every three regular expressions R,S. and T. the languages denoted by R(S U T)and (RS)U(RT)are the_____

a .same

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b. Different

c. R(SUT)is greater

d. none of the given options

76. Null strings can be specified on edges in:

a. Finite Automata

b Non-Deterministic Finite Automata

c. Melay Machine

d. Transition graph

77. What is false about the PLAINDROME LANGUAGE?

A Every word is reverse of itself.

B It is an infinite language.

C FA can be build for it.

D None of the given option

78. While finding RE corresponding to a TG, if TG has more than one start state then.

a Eliminate the old start state

b Replace the old start state with final state

c Replace the old final state with new start state

d. Introduce the new start state

79. All possible combination of string of a language including null string is referred as..

Kleene star closure of a languagec.

80.N! will be equal to:

c. n*(n-1)!cfd

81.Every NFA can be considered to be a____ as well, but the converse may not be true.

a. TG

b. FA

c. RE

d. GTG

82.In proving Kleene theorem II , if three statuses are connected then middle state is removed btconnecting first and third and writing corresponding RE in:

a.

b.

c. Concentration

d.

83.In _____ there must be transition for all the letters of the string.

a. NFA

b.GTG

c TG

d. FA

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84.For a given Moore Machine , the input string is '101010' , thus the output string would be of length:
a. |Input|
b. |Input-1|
c. Cannot be predicted
d. Length of input string+1

85.The FA can be drawn for the regular expression (a+b)* with minimum_____ state(s).
a. 1
b.2
c. 3
d. 4

86.Which of the following does not contribute while finding out the length of strings?
^ ANSEWR

87.The language of all strings defined over alphabet set ={x,y} that ends with same letters will have the maximum length of:
a. Finate
b. non of these
c. Infinite
d. Equal

88.Considering FA1 and FA2 having 2 states each. Now FA1+FA2 can have maximum_____ number of states.
a. 2
b. 3
c. More than 3
d. Non of them

89.Which one of the following is RE for the language defined over ∑={a,b} having all the words starting with a?

a(a+b)*

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90.An _____ can be considered to be an intermediate structure between finite automaton and transition graph.
a. RE
b. NFA
c. GTG
d. None

91.In order to make NFA for the union of FA1 and FA2, the new initial state should be liked to:
a. initial state of FA1 only
b. initial and final states of FA1 and FA2 respectively
c. final and initial states of FA1 and FA2 respectively
d. Initial states of both FAs

92.We cannot construct an NFA for the language of _____ defined over alphabet set{a,b}.
a. Palindromes
b. Even
c. Odd
d. Integers

93.The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the …… production trees
a. one
b. Two
c. More then one / Different
d. At most one

94.What do automata mean?
a. something done manually
b. something that works automatically / "something are done automatically
c. something done automatically

95.According to theory of automata there
a. 1
b. 2
c. 3

d. 4

96.The Minimum length of the string (except bull string) of a language that starts and ends in the same letters will be:

a.1

b. 2

c. 3

d. All of above

97. If S= {ab,bb} then S* will not contain_____

a. Babb

b. Bbb

c. Bbba

d abbb

98.Which of the following machines has only one initial state and no final state?

a. More machine

b. Finite state machine

c.Deterministic finite state machine

d.Non deterministic finite state machine

98.Which of the following machines has only one initial state and no final state?

a. More machine

b. Finite state machine

c.Deterministic finite state machine

d.Non deterministic finite state machine

99.Which of the following diagram is very rigid in order to express any language ?

a.TG

b.NFA-^

c.GTG

d.FA

100.If S={a},then S+will be_____

a.{a,aa ,aaa , aaaa…}

b.{a,aa,aaa,aaaa…}

c.{a,aaa,aaaaa,aaaaaaa,…..}

d. {aa, aaaa,aaaaaa,aaaaaaaa,…}

101.Let L be the language of the all string defined over over$\sum = \{0,1\}$ ending in10. Which of the following string are indistinguishable with respect to L with z being 11?

a.111,101

b.001,101

c.010,101

d.111,111

102.Melay machine can have _____final state

1) Zero
2) One
3) More than one but finite
4) More than one but infinite

103.Given the Language L = {ab, aa,baa},which of the following string are in L*?

5) Abaabaaaabaa
6) Aaaabaaaa
7) Baaaaabaaaaab
8) Baaaaabaa

a)1,2 and 3

b)2,3 and 4

c)1,2 and 4

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d)1,3 and 4

104.If L1 and L2 are regular Language L1∩ ($L2 \cup L1$) will be
a.non regular
b.may be regular
c. Regular
d.none of the mentioned
105.In Mealy Machine the out put depends on_____
a. state
b.previous state
c.state and input
d.only input
106.There is no question of accepting any language in.
a.Mealy machine
b. Moore Machine
c.Moore and mealy
d.none of these.ge
107.Thestate where there is no way to leave after entry is called___
a.Davey john Locker
b.Initial State

c.Final state

d.Non-final state

108.FA corresponding to an NFA can be built by introducing an empty state for a letter having
a.No transaction at certain state
b.More than one transition at certain state

c.None of the given option

109.Which of the following diagram express language more simply?
a.Tg
B.Gt
c.GTG
d.All of above
110.Automata is the plural of_____
a.Auto
b. Automation

c.Meta
d.All of above

111.If A and B are regular Language !(AUB) is
a.Regular
b.none regular
c.may be regular
d.none of the mentioned
112.In NFA having no transition at certain state FA can be built by introducing.
a. Empty state.
B.Final state
C.initial state
D none of these

113.Consuming FA1 and FA2 having 2 STATES each. Now FA1+FA2 can have maximum_____number of state
a.2
b.3
c. More then 3
d. None of the given
114.In an FA when there is no path starting from initial state and ending state in final state then that FA_____
a.Reject all
b. Accept all string
c.Reject and accept all
d.None of above
115.According to theory of automation there are_____type if language
a. Two
b.Three
c.One
d.Four
116.In Moore machine if the length of input string is 9 then the length of output string will be.
a.20
b.60
c.10

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d.40

117.When ODD language is expressed by an FA,then it will have minimum _____ state

a. One
b TWO
c THREE
d FOUR

118.[(a+b)(a+b)]*.given RE contact generate the string_____

a. aaabbbbccc
b. Bbbbbb
c. aabbcc
d aaabcbbcbacc

119.Which of the following state is true about GTG?

a. Transaction are based on regular expression

120.Every_____is a _____ as will, but the converts may not be true.

a. FA ,TG
b. TG RE
c. GTG
d TG

121.Which of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

a.TG andRE
b.REand FA
c.FA and RE
d. Mealy Machine

122.The recursive method for defining a language has ____ steps

a. two
b. Three
c. four
d. five

123.Consider the following RE.

.A(a+b)b*

All of the following word are accepted except_____

A Aa

b.Aabb

c.Bbbba

d.None of these

124.Which of the following regular expression represented same language?

1. (a+ab)*
2. 2(ba+a)*
3. A*(aa*b)*
4. (a*b)*

a.2 and 1

b.3 and 2

c.1 and 2

d.3 and 4

125 For every there regular expression R,S and T the Language denoted by R(SUT) and (RS) ∪(RT) are the

a.Different

b. Same

c.Equal

d.All of above

126 Alphabet S={a,bc,cc} has____number of letters.

a. two

b. three

c. four

d. five

127 An____can be considered to be an intermediate structure between Finite automation and Transition Graph.

a.FA

b.RE

cBoth a and b

d.NFA

128 Two FAs are said to be equivalent if they_____

a.Simple langue

b.Accept different language

c. Accept same language

d. All of above

129 There may be more then one transition for a certain letter on a state in

a. Finite Automata

b.In finite automata

d. None of these

130 _____can also help in proving Kleene Theorem III.

A. RE

b.Rna

c.FA

d.NFA

131 Kleene Theorem Part II expression the relationship between____

a.TG and FA

b. TG and RE

c.TG and NFA

d.None of these

132 FA corresponding to an NFA can be built by introducing an empty state for a letter having.

a. No transition at certain state

b.Transition at certain state

c.Transition at final state

d. None of these

133 FA is also called

a.FA

b.RE

c. DFA

d.All of above

134 If two Res generated same language then these Res are called ____

a.Equivalent FA

b. Equivalent RE

c.Equivalent DFA

d.none of these

135 We cannot an NFA for the language of ____ defend over alphabet set{a,b}

Palindromes (**answer**)

136 Kleene Theorem Part II expression the relationship between____

a. RE and FA

b.DFA and RE

c.FA and DFA

d.None of these

137 Let FA3 an FA corresponding to FA1 FA2 then the initial state of FA3 must correspond to the initial state of

a.Dfa

b.FA2 only

c. FA1 only

ddnone of these

138 Every FA should be___

a.Simple

b.Accurate

c.Non-deterministic

d. Deterministic

139 The minimum length of string (except null string) of a language that starts and ends in the different letter will be:

a.2

b.3

c.4

d.1

140 Which of the following will be the final state of FA3 obtained from the union of FA1 and FA2?

a.Initial state

B.Final states of FA1 or FA2

c.Initial state of FA1 orFA 2

d.None of the given

141.In concatenation we accept the initial state of FA2 automatically after the final state of FA1 because of:

a.initial state

b.Final state

c.We need just one final state

d.We need just one initial state

142 Let FA1 accepts many strings and FA2 accepts none then FA1+FA2 will be equal to:

a. FA2-FA1 (ANSWER)

143 The language {a ab aba bab} is _____ .

a.Irregular

b.Normal

c. Regular

d.All of above

144 Decomposing a string into its valid units is referred as:

a.Customizing

b. Tokenizing

c. Decomposing

d. Splitting

145 Let FA3 be an FA corresponding to FA1+FA2, then the initial state of FA3Must corresponds to the initial state of

a.NFA

b.DFA

c.RE

d.FA1 or FA2

146 If FA1 corresponds to (a+b)* then FA1 must accept _____ string/strings. Select correct option: No Oddlength

a.Some

b. EVERY

c.Just one

d.None of these

147 A regular language can be:

a. irregular

b. infinite

c. non-deterministic

d. None of the given options

148 N into its valid units is referred as:

d. Tokenizing

149 The strings of FA2 are accepted first before the strings of FA1

a.FA

b.NA

c. Palindromes

d.Non of these

150 There _____ a language for which only FA can be built but not the RE.

a.Is

b.Are

c.Be may

d.None of above

151 Kleene's Theorem part I expresses the relationship between ___

a.TG and Na

b.NA and FA

c.TG and TG

d. FA and TG

152 We can create an equivalent ___ for a language for which we create an ___

a.NA

b.NFA, FA

c.RNA

d.None of these

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