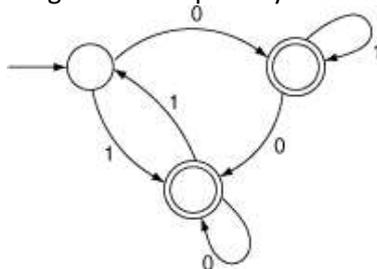


Automata Theory Sample Questions for End Semester Assessment

1. Let S and T be language over $\Sigma = \{a,b\}$ represented by the regular expressions $(a+b^*)^*$ and $(a+b)^*$, respectively. Which of the following is true?
 - (a) $S \subset T$ (S is a subset of T)
 - (b) $T \subset S$ (T is a subset of S)
 - (c) $S = T$
 - (d) $S \cap T = \emptyset$

2. Which string is not accepted by the following DFA?

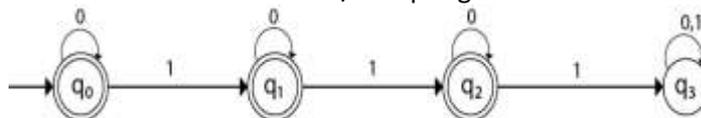


- a) 00111 b) 01010 c) 00110 d) 11010
3. For every NFA there exists an equivalent DFA
 - a) No
 - b) Yes
 - c) not sure
 4. Given the language $L = \{ab, aa, baa\}$, which of the following strings are in L^* ?
 -1) abaabaaabaa
 -2) aaaabaaaa
 -3) baaaaabaaaab
 -4) baaaaabaa

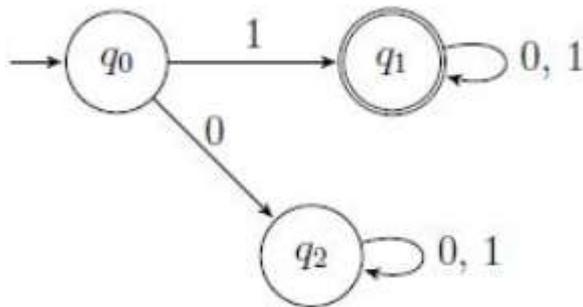
(A) 1, 2 and 3
 (B) 2, 3 and 4
 (C) 1, 2 and 4
 (D) 1, 3 and 4

5. Which of the following is an example of Finite State Machines.
 - a) Text Editor
 - b) Elevator
 - c) Control Unit of a Computer
 - d) All of the above

6. Which of the states are final/Accepting state of the following automata



- a) q_0, q_1
 - b) q_0, q_1, q_2
 - c) q_0
 - d) q_0, q_1, q_2, q_3
7. The given DFA accepts which of the following



- a) All strings starts with 1
- b) All Strings ends with 0
- c) All Strings starts with 0
- d) All Strings ends with 1

- 8 Which of the following is TRUE?
- A Every subset of a regular set is regular.
 - B Every finite subset of a non-regular set is regular
 - C The union of two non-regular sets is not regular
 - D Infinite union of finite sets is regular
- 9 The regular expression $0^*(10)^*$ denotes the same set as:
- (a) $(1^*0)^*1^*$ (b) $0 + (0 + 10)^*$
 - (c) $(0 + 1)^*10(0 + 1)^*$ (d) None of the above.
- 10 While applying Pumping lemma over a language, we consider a string w that belong to L and fragment it into _____ parts.
- a) 2
 - b) 5
 - c) 3
 - d) 6
- 11 Which of the following statements is correct?
- a) The intersection of two regular languages is a regular language
 - b) The complement of a regular language is never a regular language
 - c) The Union of two regular languages is not necessarily regular language
 - d) None of these
- 12 Given the language $L=\{ab,aa,baa\}$, which of the following strings are in L^*
- I. abaabaaabaa
 - II. aaaabaaaa
 - III. baaaaabaaaab
 - IV. baaaaabaa
- a) I ,II and III
 - b) I ,II and IV
 - c) II ,III and IV
 - d) I ,III and IV
- 13 Which of the following statements is true?
- a) Every subset of a regular set is regular
 - b) Every finite subset of a regular set is regular
 - c) The Union of two non-regular sets is not regular

d) The infinite union of finite sets is regular

14 Let w be any string of length n in $\{0,1\}^*$. Let L be the set of all substrings of w . What is the minimum number of states in a non-deterministic finite automaton that accepts L ?

- a) $n-1$
- b) n
- c) $n+1$
- d) $2n-1$

15 The production of the form $A \rightarrow B$, where A and B are non terminals is called

- a) Null production
- b) Unit production
- c) Greibach Normal Form
- d) Chomsky Normal Form

16 The productions

$E \rightarrow E+E$

$E \rightarrow E-E$

$E \rightarrow E^*E$

$E \rightarrow E/E$

$E \rightarrow id$

- a) generate an inherently ambiguous language
- b) generate an ambiguous language but not inherently so
- c) are unambiguous
- d) can generate all possible fixed length valid computation for carrying out addition, subtraction, multiplication and division, which can be expressed in one expression

17 Following context free grammar

$S \rightarrow aB \mid bA$

$A \rightarrow b \mid aS \mid bAA$

$B \rightarrow b \mid bS \mid aBB$

generates strings of terminals that have

- a) equal number of a's and b's
- b) odd number of a's and odd number b's
- c) even number of a's and even number of b's
- d) odd number of a's and even number of a's

18 If L_1 and L_2 are context free language and R a regular set, then which one of the languages below is not necessarily a context free language?

- a) $L_1 L_2$
- b) $L_1 \cap L_2$
- c) $L_1 \cap R$
- d) $L_1 \cup L_2$

19 A PDA behaves like an FA when the number of auxiliary memory it has, is

- a) 0
- b) 1
- c) 2

d) . None of these

20 If N1 is a NDPDA accepting L, then which of the following is true:

- a) There always exist a DPDA accepting L
- b) There does not exist a DPDA accepting L
- c) There may exist a DPDA accepting L
- d) None of the above.

21 Turing machine is more powerful than:

- a) Finite automata
- b) Push down automata
- c) Both (a) and (b)
- d) None of these

22 In one move the turing machine:

- a) May change its state
- b) Write a symbol on the cell being scanned.
- c) Move the head one position left or right
- d) All of the above

23 Universal TM influenced the concept of

- A. stored program computers
- B. interpretative implementation of programming language
- C. computability
- D. all of these

24 Number of external states of a UTM should be atleast

- a) 1
- b) 2
- c) 3
- d) . 4

25 Recursively enumerable language (problem) is

- a) Computable
- b) Turing recognizable
- c) Turing enumerable
- d) All of these