DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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Subject: FLAT　　　　**Assignment- 1**　　　　**Subject Code:** CS 1611

1. Define Formal Language and Automata. List out the types of Automata. Explain DFA and NFA with suitable example.

2. Define the following Terms:

    (a) Alphabet (b) String (c) Substring (d) Kleen Closure (e) Prefix (f) Suffix (g) Regular Expression

3. For each of the following Language Construct DFA that accepts the Language in all cases over the alphabet {0,1}.

    a. {w: the length of w is divisible by 3}

    b. {w: 110 is not the substring of w}

    c. {w: w contains at least five 1's}

    d. {w: w contains the substring 1011}

    e. {w: w contains at least two 1's and at most two 0's}

4. Represents the Language that contains strings over {0,1}and has even number of 0's.

5. Construct an NFA that accepts all strings over {a,b}with exactly two a's.

6. Design FA that accepts set of strings containing exactly four 1's in every string over alphabet {0, 1}.

7. Design an NFA for the Language L= All string over {0, 1}that have at least two consecutive 0's or 1's.

8. Design a DFA which accepts set of string such that every string containing "00" as substring but not "000" as substring.

9. Find the number of Prefix and Suffix of the string "GATE". Also List them.

10. Construct The Min. FA that accepts all the string of a's and b's where every string

    a. Start with 'b'

    b. Start with 'ba'

    c. Start with 'bab'

11. Construct The Min. FA that accepts all the string of a's and b's where every string

    a. Ends with 'a'

    b. Ends with 'ba'

    c. Ends with 'aab'

12. Construct The Min. FA that accepts all the string of a's and b's where every string Starts and ends with same symbol.

13. Construct The Min. FA that accepts all the string of a's and b's where every string Starts and ends with different symbol.

14. Construct The Min. FA that accepts all the string of a's and b's where every string Starts with 'aa' or 'bb' and ends with different symbol.

15. Construct The Min. FA that accepts all the string of a's and b's where every string Contains "DIBIT" as Substring.

16. Construct The Min. FA that accepts all the string of a's and b's where each string
    a. Contain odd occurrences of substring 'ab'
    b. Contain even occurrences of substring 'ab'

17. Construct The Min. FA that accepts all the string of a's and b's where every string contains
    a. Exactly three 'a'
    b. Atmost three 'a'
    c. Atleast three 'a'

18. Construct The Min. FA that accepts all the string of a's and b's where every string contains
    a. Even no. of a's
    b. Odd no. of b's

19. Construct NFA that accepts all the string of a's and b's where every string
    a. Starts with 'a'
    b. Starts with 'abab'
    c. Ends with 'a'
    d. Ends with 'abb'

20. Construct The Min. FA that accepts all the string of a's and b's where
    a. Every string do not contain substring 'ab'
    b. Every string do not end with 'baa'
    c.

21. Construct The Min. FA that accepts all the string of a's and b's where
    a. No. of a's is even and no. of b's even
    b. No. of a's is even or no. of b's is odd.

22. Construct NFA that accepts all the string of a's and b's where every string
    a. Starts and ends with 'a'
    b. Starts and ends with same symbol
    c. Starts and ends with different symbol

23. Consider the following DFA shown in figure.
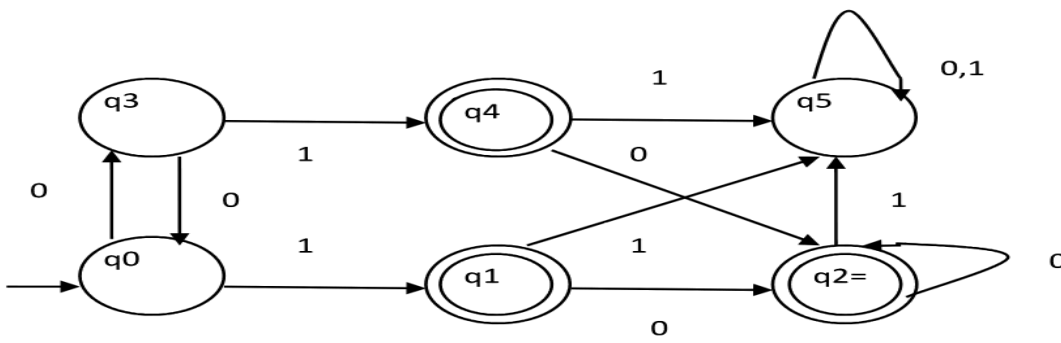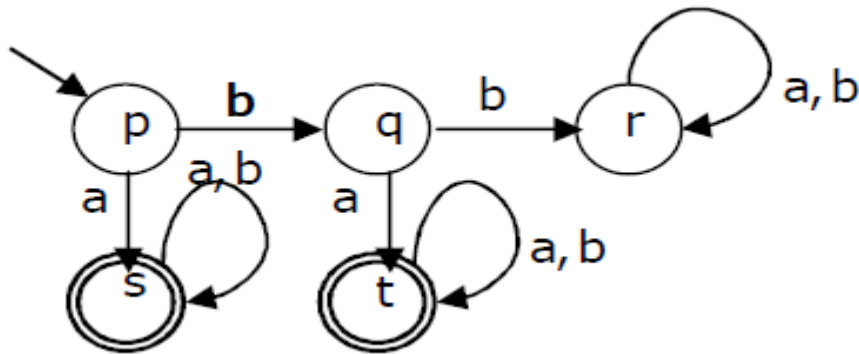

Minimize the Above DFA with minimum number of state.

24. Minimize the number of states of the following DFA.
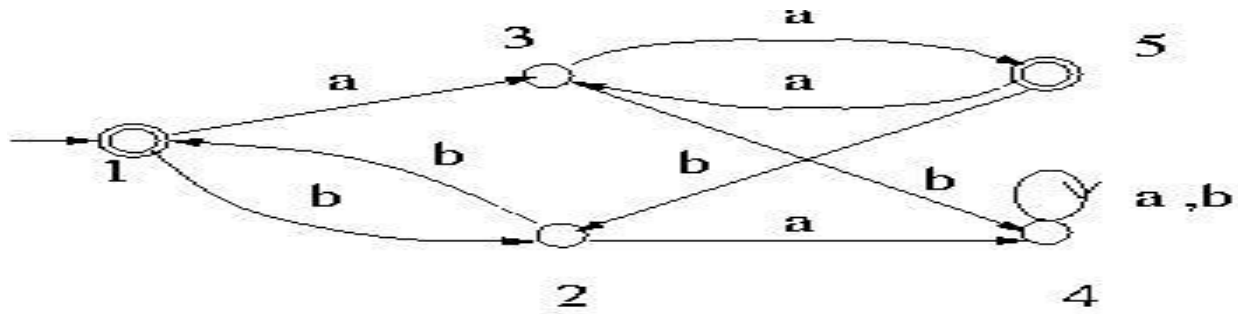
DFA Example 1

25. A deterministic finite automation (DFA)D with alphabet {a,b} is given below

Find The Minimal DFA that accepts the same language as of D.

--BEST OF LUCK--