Tutorial No 2: Finite Automata

Q:1 In each case below, find a string of minimum length in {a, b}* not in the language corresponding to the given regular expression.

a. b* (ab) *a*
b. (a*+b*)(a*+b*)(a*+b*)
c. a*(baa*)*b*
d. b*(a+ba) *b*

Q:2 Consider the two regular expressions

r =a*+b*
s = ab*+ba*+b*a+(a*b) *

a. Find a string corresponding to r but not to s
b. Find a string corresponding to s but not to r
c. Find a string corresponding to both r and s
d. Find a string in { a, b } * corresponding to neither r nor s

Q:3 Find the regular expression and finite automaton for following languages. Σ={a,b}

1. The language of all strings containing exactly two a's.
2. The language of all strings containing at least two a's.
3. The language of all strings that do not end with ab
4. The language of all strings that begin or end with aa or bb
5. The language of all strings not containing the substring aa.

Q:4 Explain in brief any 3 applications of Finite State Machine.

Q.5 For the following sets, write the corresponding regular expression:

a. {1,12,112,1112,11112……}
b. {0,1}
c. {a^2, a^4, a^6, a^8, a^{10},…….}
d. {a^x | x is divisible by 3 or 5}