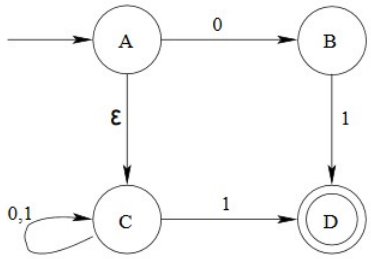
TOC Question Bank 4

a. Find the Regular Expression over {0, 1).
   1. Even number of 0's followed by odd number of 1's
   2. Two 0's do not come together
   3. Even length strings and starting with 0
   4. Strings containing at least two 0's.
   5. Strings that begin and end with either 0 or 1.
   6. Strings containing the substring 00.
   7. Strings containing at most two 0's.
   8. Strings are of odd length and have a 1 at every odd position.
   9. Strings have a 1 at every even position.
   10. Strings that do not contain single 0

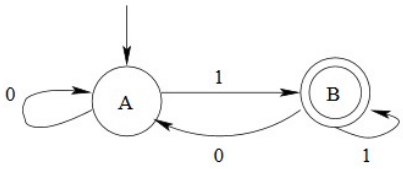
b. Simplify the Regular Expression
   1. aa((b*+a)a(ab*+aa)
   2. (a*b*)*+a*

c. Find the NFA for the regular expression
   1. ab*((c+d) +c*)
   2. (0+1)*(00 + 11)
   3. L = (01 + 2*)1
   4. bc(ab+c)*a
   5. 00(01+10)*11

d. Find the Regular Expression for
   1.



   2.



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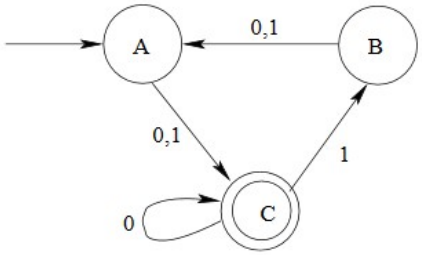
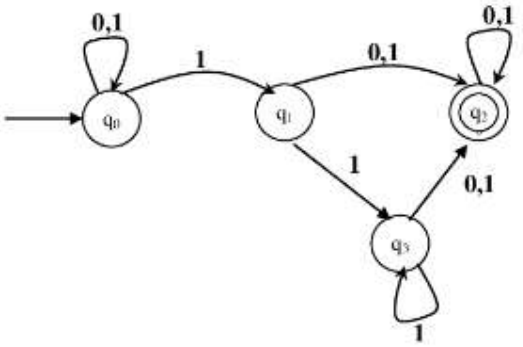
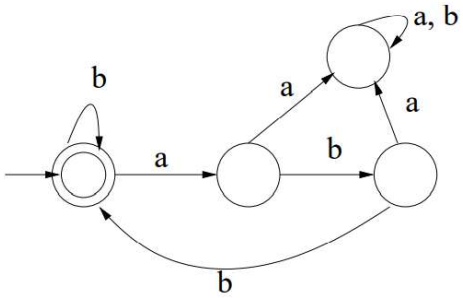


4.



5.



e. Find the complement RE for L={ ε, a} over {a, b}

f. Prove that L is not regular.

1. L = $\{a^i b^i \mid i \geq 0\}$
2. L = $\{a^i b^j \mid i > j\}$
3. L = $\{ww \mid w \text{ in } \{a,b\}^*\}$
4. L = $\{w_1 w_2 : w_1, w_2 \in \{a,b\}^*, |w_1| = |w_2|\}$
5. L= $\{ a^n b^n c^n \mid n \geq 0\}$
6. $\{ a^n b a^m b a^{n+m} \mid n, m > 1\}$
7. L= {w| w has an equal number of 0s and 1s}
8. L = $\{ 1^{n^2} \}$
9. L = $\{ a^i b a^j \mid i > j >= 0 \}$
10. L = $\{ a^i b a^j \mid 0 <= i < j \}$
11. L = {a | k is a prime number}
12. L = $\{a^n b^{n+1}\}$
13. L = $\{a^n b 2^n\}$
14. { all words in PALINDROME that have even length}
15. L = { w | w 0 {a, b}*, w = w^R }
16. L = { 0^n | n is a power of 2 }
17. L = $\{ba^n ba^m \mid m > n\}$