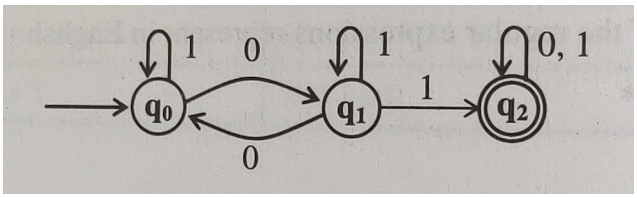
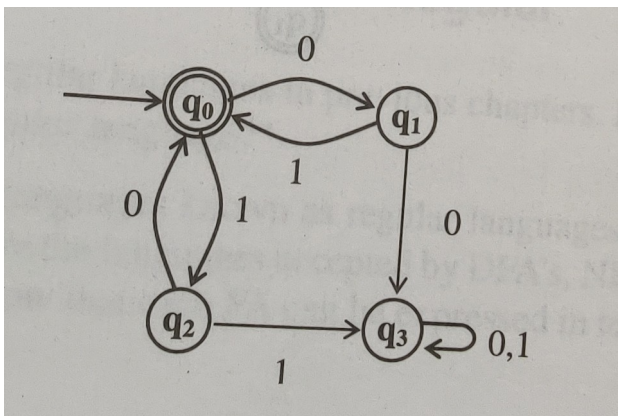
PRACTICE SET - 1

1. Construct regular expression, and convert to ∈-NFA, NFA and DFA for the following languages.
   a) Let Σ = {a, b} and let L = {baa}.
   b) Let Σ = {a, b} and let L = { w ∈ Σ* | w ≠ ε and the first and last character of w are the same }.
   c) Let Σ = {a, b} and let L = { w ∈ Σ* | w is a nonempty string whose characters alternate between a's and b's }.
   d) L = { w | w is a C-style comment }
   e) Let Σ = {a, b, c} and let L = { w ∈ Σ* | w ends in *cab* }.
   f) Let Σ = {a, b, c} and let L = { w ∈ Σ* | some character in Σ appears at most twice in w }.
   g) Let Σ = {a, b} and let L = { w ∈ Σ* | the third-from-last character of w is a }.
2. Draw an ∈-NFA which accepts 00 and 11 at the end of a string containing 0, 1 in it, e.g., 01010100 but not 000111010. Convert the ∈-NFA to a minimized DFA by using the concept of distinguishable states.
3. Draw an ∈-NFA which accepts a string containing "*the*" anywhere in a string of {*a-z*}, e.g., "*there*" but not "*those*". Convert the ∈-NFA to a minimized DFA by using the concept of distinguishable states.
4. Prove that L={ww} is not a regular language.
5. Prove that L={w|w=a^n, n is prime}is not regular.
6. Show that theses two REs do not represent the same language:
   *a) aa(a*U*b)** U *(bb)*a**
   *b) (ab*U *ba* U*a)**
7. Explain what each of the Res represent in English:
   a) (a+b)*aa(a+b)*
   b) a*b*c*
   c) aa*bb*cc*
   d) (aa)*(bb)*b
   e) (0+1)*000
8. Obtain RE for the following FA:

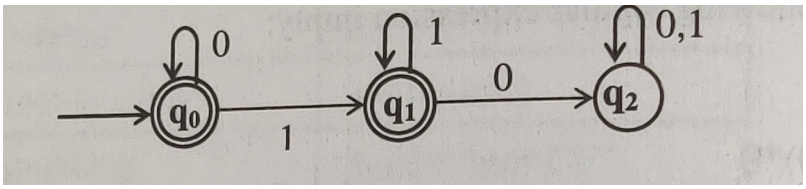
a)



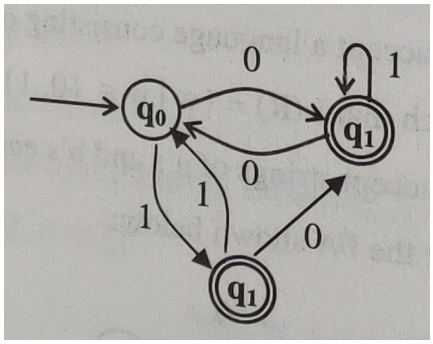
b)



9. What is the language accepted by the following FA?



10. Convert the following DFA to a RE.



11. Obtain ∈-NFAs for the following REs using Ken Thomson algorithm.

    a) a*+b*+c*
    b) (a+b)*aa(a+b)*

    Convert those ∈-NFAs into minimized DFA by tabular method.

********** ALSO SOLVE THE EXERCISES OF THE PRESCRIBED BOOKS*********