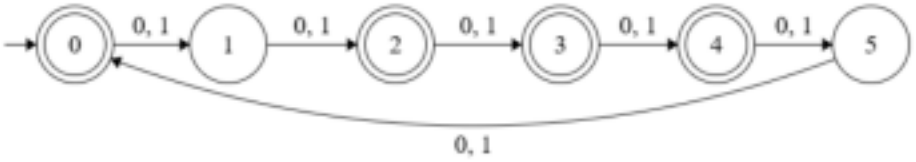
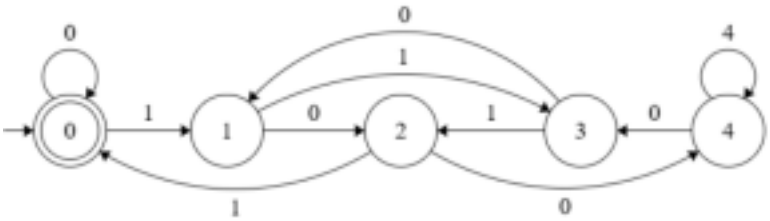
**BRAC UNIVERSITY**
**CSE331 : Automata and Computability**
**Assignment 1**

**1. Draw the state diagram of a DFA for the following regular languages:** A. L(M) → {w ∈ Σ* | the length of w is a multiple of 2 or 3}, where Σ = {0, 1}. (use 6 states)

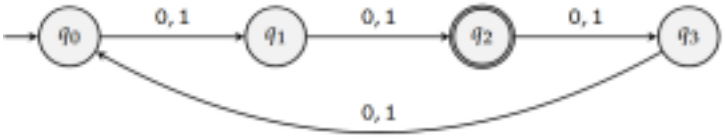



B. L(M) → {w ∈ Σ* | the sum of the symbols of w is a multiple of 3}, where Σ = {0, 1, 2}. See example 1.13 from the book.

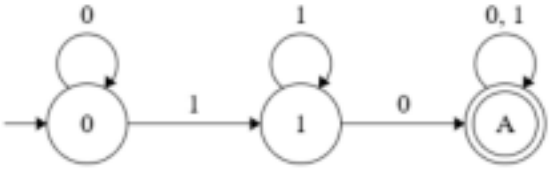
C. L(M) → {w ∈ Σ* | the decimal equivalent of w is a multiple of 5}, where Σ = {0, 1}.



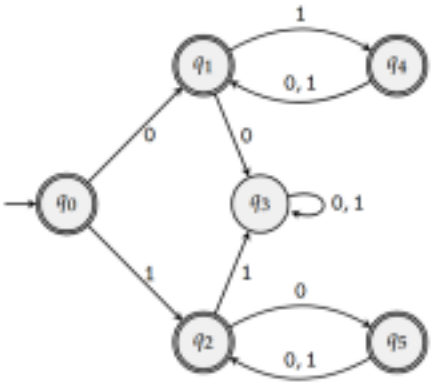

D. L(M) → {w ∈ Σ* | |w| % 4 = 2}



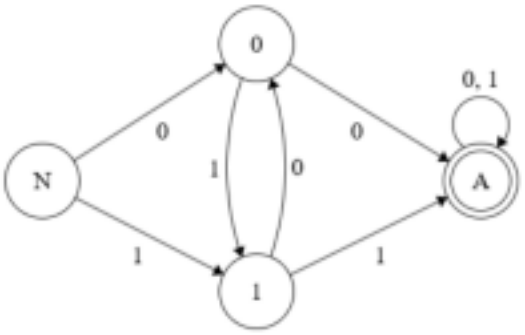

E. L(M) → {w ∈ Σ* | w is any string not in 0*1*}, where Σ = {0, 1}.




F. L(M) → {w ∈ Σ* | Every even position letter in w is different from the first letter of w}



G. L(M) → ( $L_1 \cap L_2$ )′




**2. Write the RE for the following regular languages:**

A. L(M) → {w ∈ Σ* | |w| % 3 ≠ 1}

(ΣΣΣ)*(ε | ΣΣ)

B. L(M) → {w ∈ Σ* | w starts and ends with the same symbol}, where Σ = {0, 1}.

0Σ*0 | 1Σ*1 | 0 | 1

C. L(M) → {w ∈ Σ* | w contains equal numbers of 01 and 10}, where Σ = {0, 1}.

0Σ*0 | 1Σ*1 | 0 | 1 | ε

D. L(M) → {w ∈ Σ* | w contains at most two 11}

(0 | 10)*(11 | ε)(0 | 10)*(11 | ε)(0 | 10)*(1 | ε)

E. L(M) → {w ∈ Σ* | w does not contain 101}, where Σ = {0, 1}.

(1|000*)*| ε | Σ | ΣΣ

F. L(M) → $L_1$′

(ΣΣΣ)*ΣΣ0Σ*

G. L(M) → $L_1 \cap L_2$

(001)*00 | ε | 0 | 00