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Course: CSE 331

Section: 08

Assignment: 3

Ans to the Q: N: 1

(a)

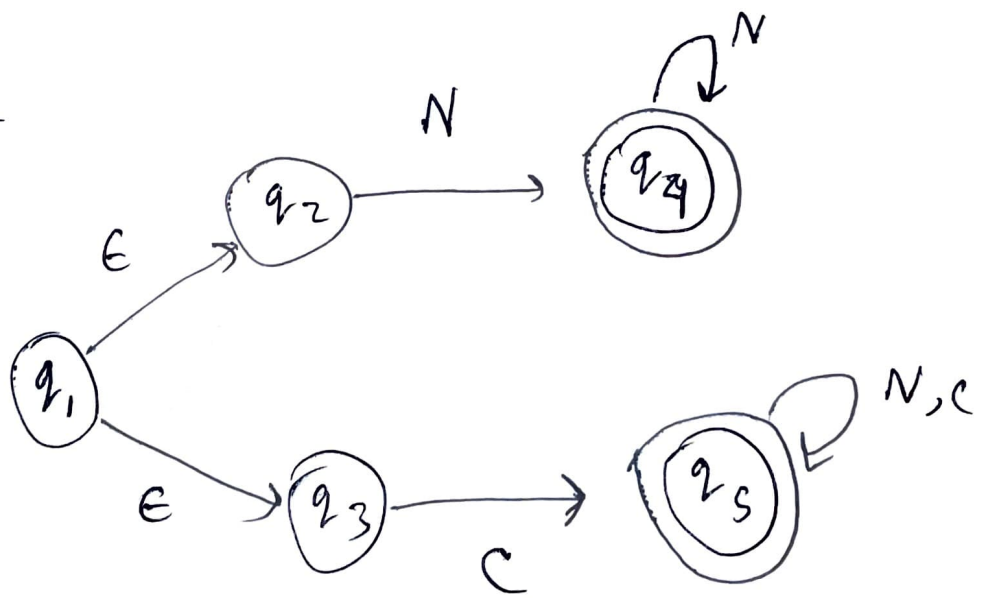
$L = \{ w : w \in \Sigma^* ;$ w does not start with a digit or contains only digits $\}$

$\Sigma = N \cup C$

$N = \{0, 1, 2, \ldots 9\}$

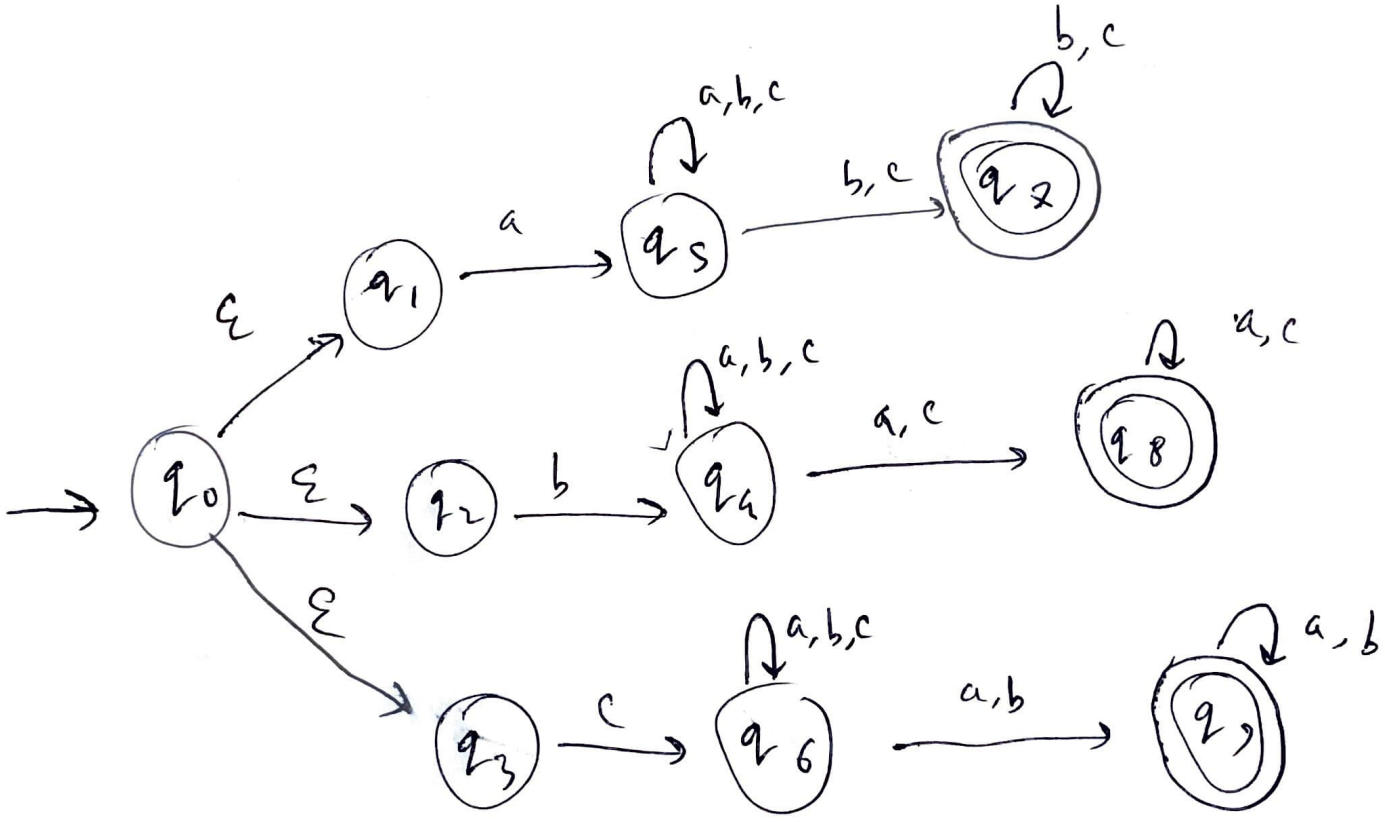
$C = \{a, b, c, \ldots x, y, z\}$

ϵ-NFA:



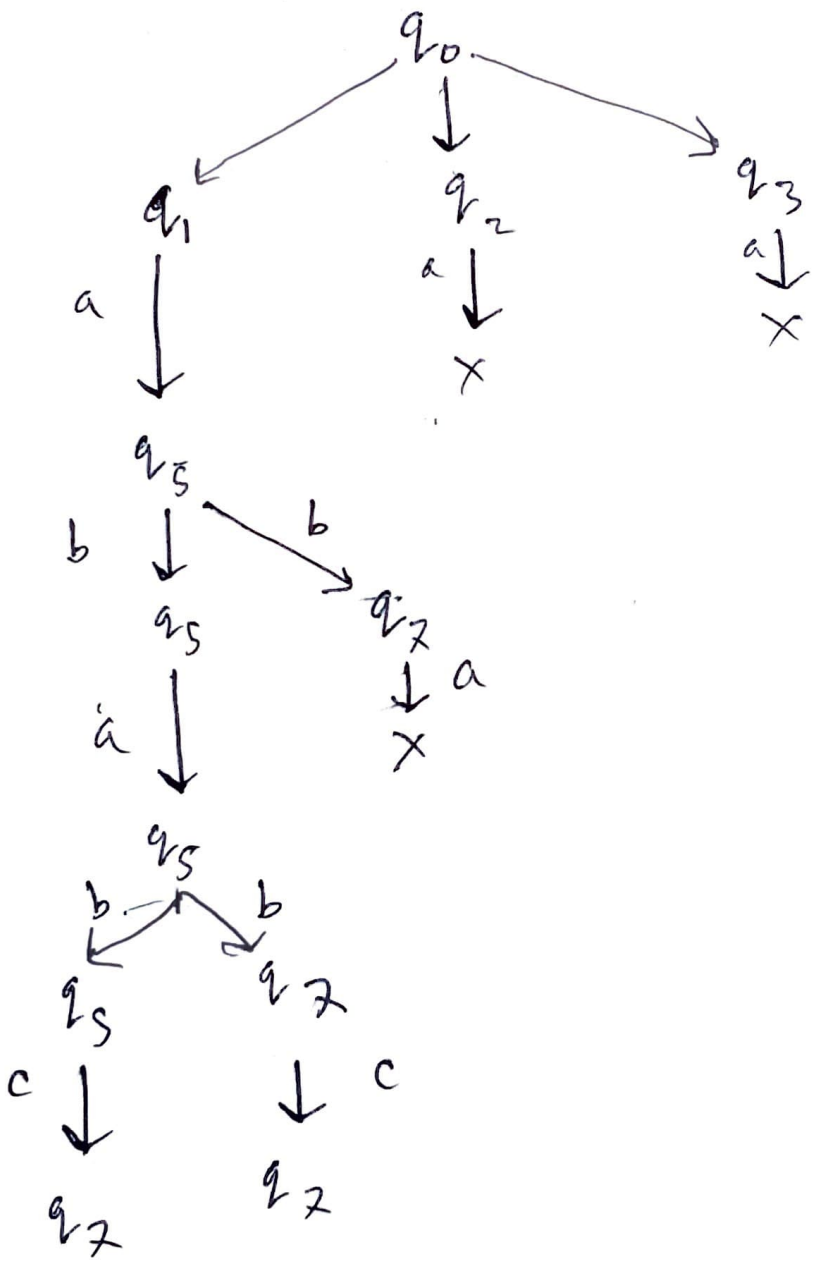
(b)

$L = \{ w \in \Sigma^* : w$ starts and ends with different symbols$\}$ where $\Sigma = \{a, b, c\}$



Suppose,

A = a b a b c



∴ A is accepted, as q_7 is a ~~final~~ final state

Ans to the Q: N: 2

ε -Closure (A) = {A, C}

= Q_0

$Move_{DFA} = (Q_0, 0)$

= ε closure ($Move_{NFA}$ $(Q_0, 0)$)

= ε closure ({A, E})

= {A, C, E}

= Q_1

$Move_{DFA}(Q_0, 1)$

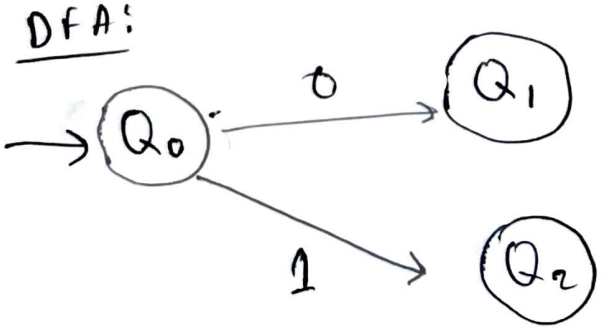
$= \varepsilon\text{-Closure}(Move_{NFA}(Q_0, 1))$

$= \varepsilon\text{-Closure}(\{B, D\})$

$= \{B, D\}$

$= Q_2$

DFA:



$Move_{DFA}(Q_1, 0)$

$= \varepsilon\text{-Closure}(Move_{NFA}(Q_1, 0))$

$= \varepsilon\text{-Closure}(\{A, E, C\})$

$= \{A, C, E\}$

$= Q_1$

$Move_{DFA}(Q_1, 1)$

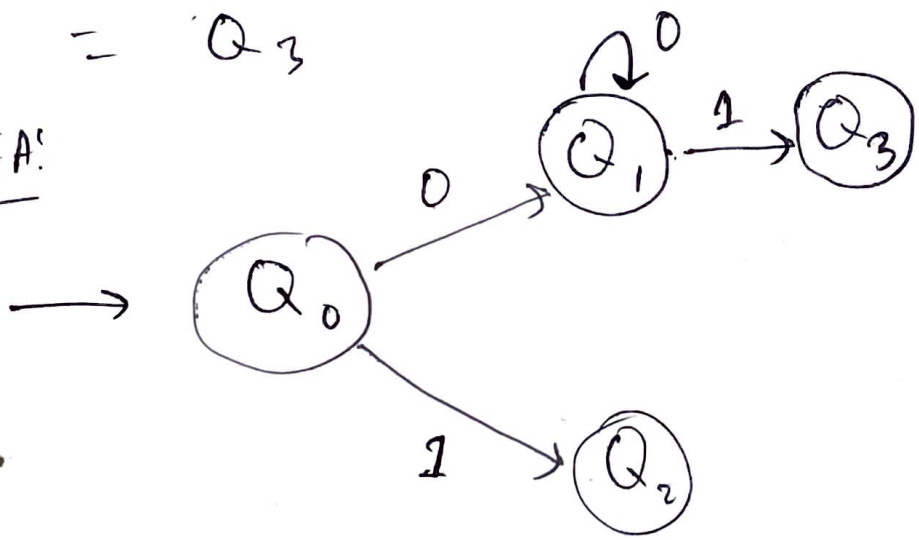
$= \varepsilon\text{-Closure}(Move_{NFA}(Q_1, 1))$

$= \varepsilon\text{-Closure}(\{B, D, F\})$

$= \varnothing\{B, D, F\}$

$= Q_3$

DFA:



$Move_{DFA}(Q_2, 0)$

$= \varepsilon\text{-Closure}(Move_{NFA}(Q_2, 0))$

$= \varepsilon\text{-Closure}(\{B, F\})$

$= \{B, D, F\}$

$= Q_3$

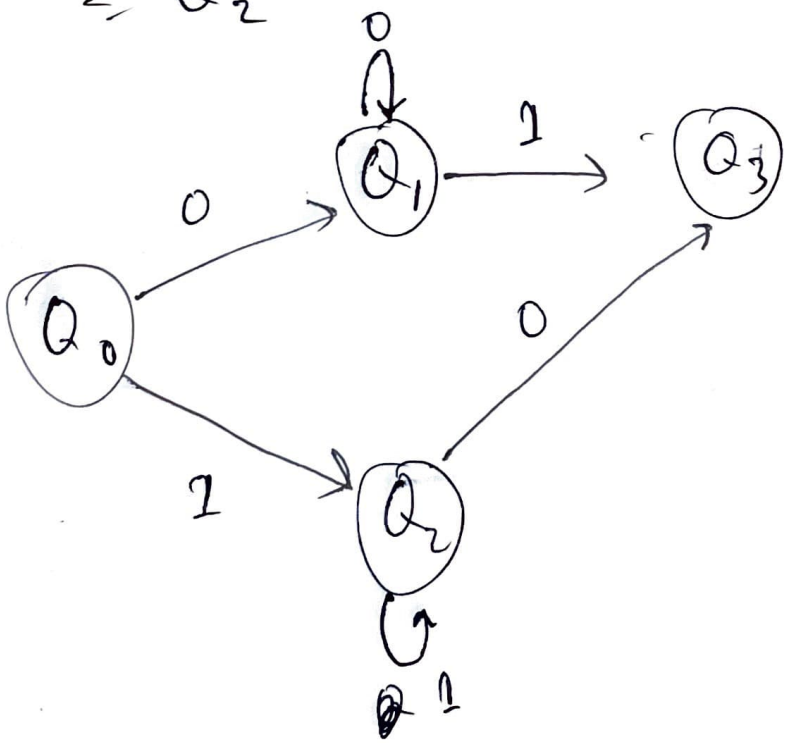
$Move_{DFA}(Q_2, 1)$

$= \varepsilon\text{-Closure}(Move_{NFA}(Q_2, 1))$

$= \varepsilon\text{-Closure}(\{B, D\})$

$= \{B, D\}$

$= Q_2$



$Move_{DFA}(Q_3, 0)$

$= \varepsilon\text{-Closure}(Move_{NFA}(Q_3, 0))$

$= \varepsilon\text{-Closure}(\{B, F, D\})$

$= \{B, D, F\}$

$= Q_3$

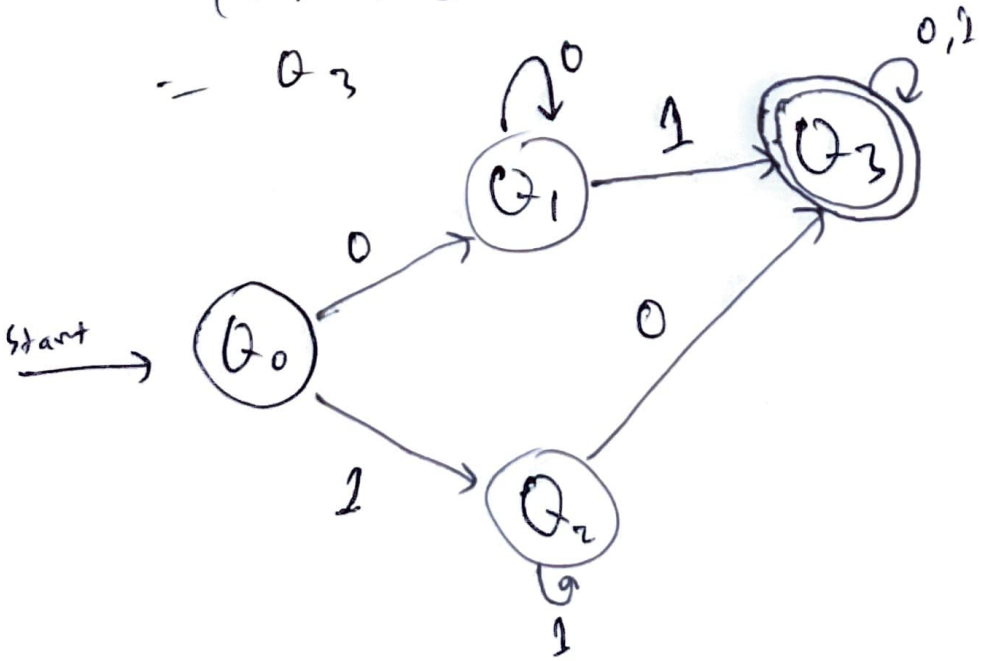
$Move_{DFA}(Q_3, 1)$

$= \varepsilon\text{-Closure}(Move_{NFA}(Q_3, 1))$

$= \varepsilon\text{-Closure}(\{B, D, F\})$

$= \{B, D, F\}$

$= Q_3$

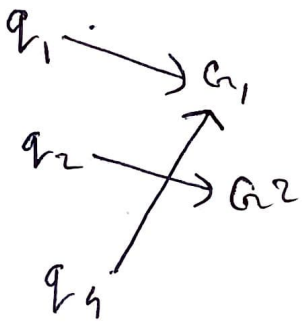


Ans to the Q: N: 3

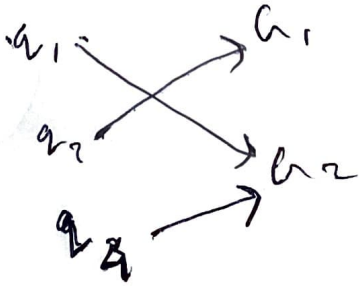
Partion: $(q_1\ q_2\ q_4)\ (q_0\ q_3)$

G_1 G_2

0 transition:



1 transition:



$\therefore$ q_2 breaks apart.

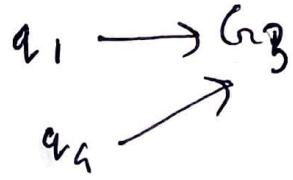
New partition:

$(q_1\ q_4)\ (q_0\ q_3)\ (q_2)$

G_1 G_2 G_3

For G_1,

0 Transition:

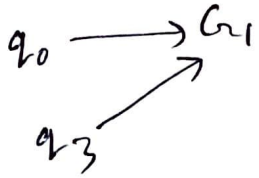


∴ 1 Transition:

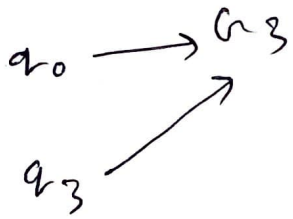
∴ Nothing breaks apart.

For G_2,

0 Transition:



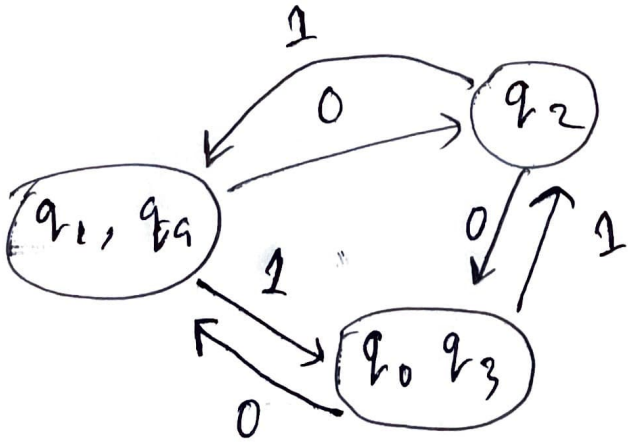
1 Transition:



∴ Nothing breaks apart.

For q_2, nothing will break apart as it is single.

∴ Final partion = (q_1, q_4) (q_0, q_3) (q_3)



Minimized DFA