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COURSE: CS4402 Formal Languages and Automata Theory
Date: 6/3/2021

ASSIGNMENT

1. Draw the DFA for following languages

i) $L_1 = \{ \text{The set of strings that either begin or end (or both) with 01 over the alphabet } \{0,1\} \}$

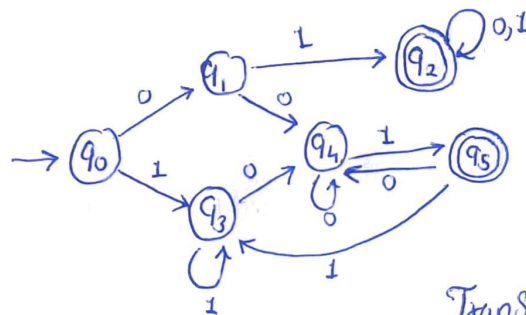
$$Q = \{q_0, q_1, q_2, q_3, q_4, q_5\}$$

$$\Sigma = \{0,1\}$$

$$q_0 = q_0$$

$$F = \{q_2, q_5\}$$

$$\delta = Q \times \Sigma \rightarrow Q$$



Transition Diagram.

ii) $L_2 = \{ \text{The set of the strings such that the number of 0's is divisible by Five and number of 1's is divisible by 3 over the alphabet } \{0,1\} \}$

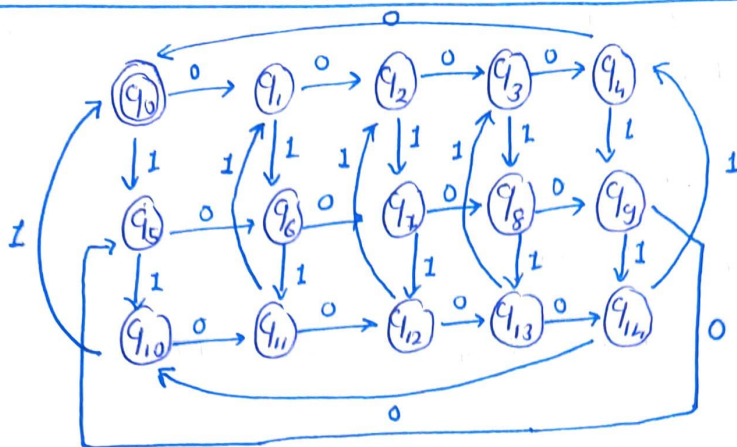
$$Q = \{q_0, q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9, q_{10}, q_{11}, q_{12}, q_{13}, q_{14}\}$$

$$\Sigma = \{0,1\}$$

$$q_0 = q_0$$

$$F = \{q_0\}$$

$$\delta = Q \times \Sigma \rightarrow Q$$



Transition Diagram.

2. Design ϵ -NFA that language accept set of strings that consists of either 01 repeats one or more times or 010 repeats one or more times.

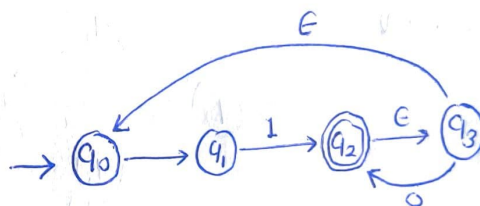
$$Q = \{q_0, q_1, q_2, q_3\}$$

$$\Sigma = \{0, 1, \epsilon\}$$

$$q_0 = q_0$$

$$F = \{q_2\}$$

$$\delta = (Q \times \Sigma \cup \epsilon) \rightarrow 2^Q$$



3. Write the Regular Expression for following language.

Let $R(L_1)$ be a set of regular expression that accept 0 only and $R(L_2)$ accept 1's only. Then the expression.

$$R(L) = R(L_1) R(L_2)$$

$$R(L_1) = (0+10)^* (1+\epsilon)$$

$$R(L_2) = (1+01)^* (0+\epsilon)$$

$$R(L) = (0+10)^* (1+\epsilon) (1+01)^* (0+\epsilon)$$

$$= (0+10)^* (1+01)^* (0+\epsilon)$$

So regular Expression is $(0+10)^* (1+01)^* (0+\epsilon)$