BRAC UNIVERSITY
CSE331 : Automata and Computability
Assignment 1

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1. Draw the state diagram of a DFA for the following RL:

$L_1(M) \rightarrow \{w \in \Sigma^* \mid w$ doesn't contain $00\}$, where $\Sigma = \{0, 1\}$.

$L_2(M) \rightarrow \{w \in \Sigma^* \mid w$ doesn't contain $11\}$, where $\Sigma = \{0, 1\}$.

A. $L(M) \rightarrow \{w \in \Sigma^* \mid$ the length of w is a multiple of 2 or 3$\}$, where $\Sigma = \{0, 1\}$. (use 6 states)

B. $L(M) \rightarrow \{w \in \Sigma^* \mid$ the sum of the symbols of w is a multiple of 3$\}$, where $\Sigma = \{0, 1, 2\}$.

C. $L(M) \rightarrow \{w \in \Sigma^* \mid$ the decimal equivalent of w is a multiple of 5$\}$, where $\Sigma = \{0, 1\}$.

D. $L(M) \rightarrow \{w \in \Sigma^* \mid |w| \% 4 = 2\}$

E. $L(M) \rightarrow \{w \in \Sigma^* \mid$ w is any string not in $0^*1^*\}$, where $\Sigma = \{0, 1\}$.

F. $L(M) \rightarrow \{w \in \Sigma^* \mid$ Every even position letter in w is different from the first letter of w$\}$, where $\Sigma = \{0, 1\}$.

G. $L(M) \rightarrow (L_1 \cap L_2)'$ (use 4 states)

2. Write a RE for the following RL:

$L_1(M) \rightarrow \{w \in \Sigma^* \mid$ every third position in w is 1$\}$, where $\Sigma = \{0, 1\}$.

$L_2(M) \rightarrow \{w \in \Sigma^* \mid$ every 1 in w is followed by at least two 0$\}$, where $\Sigma = \{0, 1\}$.

A. $L(M) \rightarrow \{w \in \Sigma^* \mid |w| \% 3 \neq 1\}$, where $\Sigma = \{0, 1\}$.

B. $L(M) \rightarrow \{w \in \Sigma^* \mid$ w starts and ends with the same symbol$\}$, where $\Sigma = \{0, 1\}$.

C. $L(M) \rightarrow \{w \in \Sigma^* \mid$ w contains equal numbers of 01 and 10$\}$, where $\Sigma = \{0, 1\}$.

D. $L(M) \rightarrow \{w \in \Sigma^* \mid$ w contains at most two 11$\}$, where $\Sigma = \{0, 1\}$.

E. $L(M) \rightarrow \{w \in \Sigma^* \mid$ w does not contain 101$\}$, where $\Sigma = \{0, 1\}$.

F. $L(M) \rightarrow L_1'$

G. $L(M) \rightarrow L_1 \cap L_2$