BRAC UNIVERSITY
Merul Badda, Dhaka, Bangladesh
CSE331 : Automata and Computability
Assignment 1

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

$L_1(M) \rightarrow \{w \in \Sigma^* \mid w$ 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. $L(M) \rightarrow \{w \in \Sigma^* \mid w$ is any string not in 0*1*$\}$, where $\Sigma = \{0, 1\}$.

E. $L(M) \rightarrow (L_1 \cap L_2)'$

2. Write the RE for the following regular languages:

$L_1(M) \rightarrow \{w \in \Sigma^* \mid$ 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. $L(M) \rightarrow \{w \in \Sigma^* \mid w$ starts and ends with the same symbol$\}$, where $\Sigma = \{0, 1\}$.

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

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

D. $L(M) \rightarrow L1 \cap L2$