Assignment 1 (Theory of Automata)

Draw DFA for the following languages.

1. $L = \{w \in \{a,b\}^* | w \text{ ends with } abb\}$
2. $L = \{w \in \{a,b\}^* | w \text{ contain substring } abbaab\}$
3. $L = \{w \in \{a,b\}^* | w \text{ contains atleast three } a's\}$
4. $L = \{w \in \{0,1,2\}^* | \text{sum of digits in } w \text{ are divisible by three}\}$
5. $L = \{w \in \{0,1,2\}^* | \text{The number is divisible by three}\}$
6. The language of all strings containing no more than one occurrence of the string *aa*. (The string *aaa* contains two occurrences of *aa*.)
7. The language of all strings in which every *a* (if there are any) is followed immediately by *bb*.
8. The language of all strings containing both *bb* and *aba* as substrings.
9. The language of all strings containing both *aba* and *bab* as substrings.
10. $L = \{w \in \{0,1\}^* | \text{every } 0 \text{ in } w \text{ is followed by at least one } 1\}$

Draw DFA for the following languages using closure properties of regular languages.

1. $L = \{w \in \{0,1,2,3\}^* | \text{sum of digits in } w \text{ are either divisible by } 4 \text{ or } 6\}$
2. $L = \{w \in \{0,1,2,3,4,5,6,7,8,9\}^* | w \text{ is divisible by } 5 \text{ and } 6\}$
3. $L = \{w \in \{a,b\}^* | w \text{ contains odd number of } a's \text{ and even number } b's\}$
4. $L = \{w \in \{a,b,c\}^* | n_a(w) \text{ and } n_b(w) \text{ are even but } n_c(w) \text{ are odd}\}$
5. $L = \{w \in \Sigma^* \mid w \text{ contains the substring } 010, \text{ but does not contain the substring } 0101\}$