Exercise 1: Drawing DFAs  

Construct DFAs that recognizes the following languages. The alphabet set is \( \Sigma = \{0, 1\} \).

1. \( L_1 = \{ w \mid w \text{ is any string except } 11 \text{ and } 111 \} \).
2. \( L_2 = \{ w \mid w \text{ contains at least two } 0 \text{s and at most one } 1 \} \).
3. Construct a DFA which accepts the language \( L_2 \setminus L_1 = \{ w \mid w \in L_2 \text{ and } w \notin L_1 \} \).

Exercise 2: Closure under Set Difference  

Let \( L, L_1, L_2 \) be regular languages. Show that both \( \overline{L} := \Sigma^* \setminus L \) and \( L_1 \cap L_2 \) are regular as well by constructing the corresponding DFAs. Deduce that \( L_1 \setminus L_2 \) is also regular.

Remark: No need for drawing state diagrams. Show how a DFA for the language in question can be constructed presuming the existence of DFAs for \( L, L_1, L_2 \).

Exercise 3: From NFA to DFA  

Consider the following NFA.

![NFA Diagram]

(a) Give a formal description of the NFA by giving the alphabet, state set, transition function, start state and the set of accept states.

(b) Construct a DFA which is equivalent to the above NFA by drawing the corresponding state diagram.

(c) Explain which language the automaton accepts.