Due February 1

1. Give DFAs that recognize the following languages
   (a) \( \{w \in \{0,1\}^* | \text{every 0 in } w \text{ is immediately followed by a 1} \} \).
   (b) \( \{w \in \{0,1\}^* | \text{w contains at most two 1’s} \} \).
   (c) \( \{11,110\}^* \).

2. Using the complementation construction and one of the DFAs from Exercise 1, give a DFA that recognizes the language
   \( \{w \in \{0,1\}^* | \text{there is a 0 in } w \text{ that is not immediately followed by a 1} \} \).

3. Using the union construction and two of the DFAs from Exercise 1, give a DFA that recognizes the language
   \( \{w \in \{0,1\}^* | \text{w contains at most two 1’s or } \text{every 0 in } w \text{ is immediately followed by a 1} \} \).

4. Using the intersection construction and two of the DFAs from Exercise 1, give a DFA that recognizes the language
   \( \{w \in \{0,1\}^* | \text{w contains at most two 1’s and } \text{every 0 in } w \text{ is immediately followed by a 1} \} \).