1. (15 points) Give DFA’s accepting the following languages over the alphabet \{0, 1\}:

   (a) The set of all strings that begin or end with 10.
   (b) The set of all strings that have 11 somewhere in the middle and 4 or more symbols long.
   (c) The set of all strings such that every three consecutive contain only one 1 or two 0’s.

2. (10 points) Give NFA’s accepting the following languages over the alphabet \{0, 1\}:

   (a) The set of all strings that contain both 00 and 11.
   (b) The set of all strings starting and ending with 0 and have an even number of symbols.

3. (5 points) Design \(\epsilon\)-NFA’s for the following language. Try to use \(\epsilon\)-transitions to simplify your design. **The set of strings that consist of either 01 repeated one or more times or 010 repeated one or more times.**

4. (10 points) Convert the following \(\epsilon\)-NFA to a DFA, and describe the language accepted by it:

\[
\begin{array}{c|c|c|c}
& \epsilon & 0 & 1 \\
\rightarrow q_0 & \emptyset & \{q_1\} & \{q_1, q_2\} \\
q_1 & \emptyset & \{q_2, q_3\} & \emptyset \\
q_2 & \{q_0\} & \emptyset & \emptyset \\
*q_3 & \emptyset & \{q_4\} & \emptyset \\
*q_4 & \{q_0\} & \emptyset & \emptyset \\
\end{array}
\]