Problem set A

1. Use JFLAP to construct the transition graph for the DFA that accepts all strings (and only those strings) on the alphabet \{a, b, c\} that have an odd number of a’s.

2. Use JFLAP to construct the transition graph for the DFA that accepts all strings (and only those strings) on the alphabet \{a, b, c\} that have the symbols in alphabetical order.

3. Describe in words the strings that the following DFA accepts:

   Use JFLAP to demonstrate your answer with some sample strings, and create a screen shot.
4. Describe in words the strings that the following DFA accepts:

Use JFLAP to demonstrate your answer with some sample strings, and create a screen shot.

5. Describe in words the strings that the following NFA accepts:

Use JFLAP to demonstrate your answer with sample strings, and create a screen shot.

6. Convert the NFA in Problem 5 to a DFA using JFLAP. Explain how you arrived at each node of the DFA. Test your DFA with the same sample strings, and create a screen shot.
7. Use JFLAP to draw the NFA specified by the following state transition matrix. The alphabet is \( \{0, 1\} \), the starting state is \( q_0 \), and the single final state is \( q_2 \).

\[
\begin{array}{ccc}
0 & 1 \\
q_0 & q_0, q_1 & q_2 \\
q_1 & q_2 & q_1 \\
q_2 & q_1 & q_2 \\
\end{array}
\]

Try some sample strings to see what the NFA will accept or reject, and create a screen shot.

8. Convert the NFA in Problem 7 to a DFA using JFLAP. Explain how you arrived at each node of the DFA. Test your DFA with the same sample strings that you used for Problem 7, and create a screen shot.

9. Use JFLAP to draw the DFA specified by the following state transition matrix. The alphabet is \( \{a, b\} \), the starting state is \( q_0 \), and the single final state is \( q_2 \).

\[
\begin{array}{ccc}
a & b \\
q_0 & q_2 & q_2 \\
q_1 & q_2 & q_2 \\
q_2 & q_3 & q_3 \\
q_3 & q_3 & q_1 \\
\end{array}
\]

Try some sample strings to see what the DFA will accept or reject and create a screen shot.

10. Minimize the DFA in Problem 9 by reducing the number of states. Show the step-by-step partitioning of the states. Draw the minimal equivalent DFA in JFLAP. Test it using the same sample strings that you used for Problem 9. Create a screen shot.

**What to submit to Canvas**

Zip your answers and the screen shots together, and submit the zip file into Canvas: **Assignment #2**