CS 154
Formal Languages and Computability

Spring 2016

Department of Computer Science
San Jose State University
Instructor: Ron Mak

## Assignment #2

Assigned: Thursday, February 11
Due: Wednesday, February 17 at 11:59 pm
**Individual assignment**, 100 points max

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.

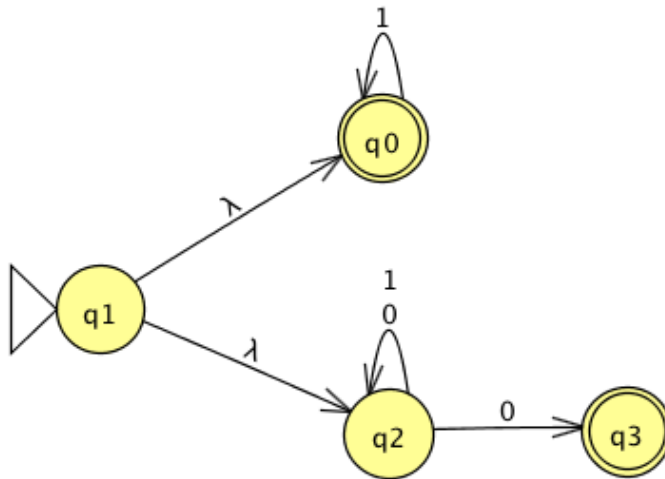3. Describe in words the strings that the following DFA accepts:
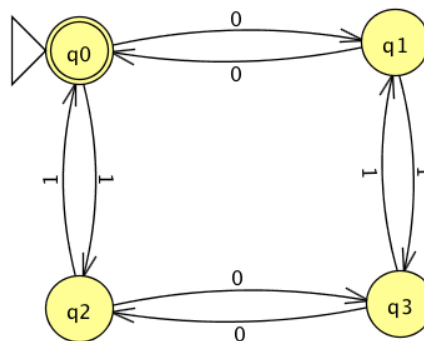
Use JFLAP to demonstrate your answer with some sample strings, and create a screen shot.

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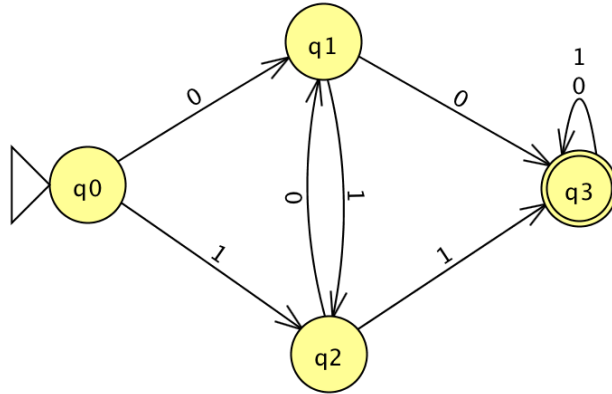
   Use JFLAP to demonstrate your answer with some sample strings, and create a screen shot.

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.

	0	1
q_0	q_0, q_1	q_2
q_1	q_2	q_1
q_2	q_1	q_2

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.

	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

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**