Hard copies of the assignment will be collected during class. You may choose to use a word processor or write the answers by hand. Please write legibly and show work as appropriate.

1. (10 points) Construct regular expressions for the following languages.
   a) Strings with matching quotes. That is, `aba`, `aba`bb, aa’aa’a` are legal strings while ‘a, ‘a’a’aa’ are illegal strings. Σ = {a,b,’}.
   b) All strings of as and bs that do not contain the substring abb.
   (Hint: If you are having difficulty, it may be a good idea to draw a DFA first. Then think about how to convert that DFA to a regular expression.)

2. (10 points) Construct a deterministic finite state transition graph for a string where each character appears at least once. Assume Σ = {0,1,2}.
   (Hint: Think in terms of what each state should represent. For example, you can have a state where you saw 0 and 1 but not yet 2. And so forth.)

3. (10 points) Construct a NFA graph for the following regular expression using the McNaughton-Yamada-Thompson Algorithm.

   $$0(((0|1)1)^*1$$

   Here we have Σ = {0,1}.

4. (10 points) Convert the NFA constructed in problem 3 to a DFA.

5. (10 points) Minimize the DFA of problem 4 after reading Chapter 3.9.6 of the textbook.