ECE 468
Problem Set 1: Regular expressions and finite automata

1. For strings containing the letters ‘a’, ‘b’, ‘c’, and ‘d’ give a regular expression that captures all strings that use their letters in reverse alphabetical order, but use at most three of the four possible letters (note that the strings themselves can be longer than 3 letters long, since letters can repeat).

2. Give a non-deterministic finite automaton that captures the regular expression from above. Show the automaton in graphical form.

3. Using the construction described in class, give a deterministic version of the automaton. You only need to show the transition table.

4. Give a reduced version of the finite automaton, using the algorithm we used in class. You only need to show the state transition diagram.

5. Build a reduced, deterministic automaton for the following regular expression:

   \((a^*(b|c)^*d^*)|((a|b)^*c^*d^*)\)