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:

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