ECE 468
Problem Set 1: Regular expressions and finite automata

1. Write a regular expression that captures the set of strings composed of ‘a’, ‘b’, and ‘c‘, where any string uses *at most* two of the three letters (for example,“abbab” is a valid string, or “bccbb”, or “ccacaa”, but not “abccba”; strings that contain only one of the three letters are also fine).

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. Repeat the previous three steps for strings composed of ‘a’, ‘b’, ‘c’, and ‘d’, where any string uses at most *three* of the *four* letters.