CS 2210 – Homework 1
Due: Wednesday, January 23, 2013 at the start of class

Please submit a typewritten document. I'd prefer you draw your finite state machines on the computer, but if this is a challenge, you may hand draw them neatly on the paper by hand.

1.) Write the following regular expressions:

      a.) Binary numbers that are multiples of eight.

      b.) Valid C/Java integer constants that can be negative or positive, in decimal, octal, or hexadecimal.

2.) Convert the following regular expression to an NFA (alphabet is {a,b}):

$$a(a|b)*a+b?$$

3.) Convert your NFA from question 2 into a DFA using Thompson's construction.

4.) Construct the minimal DFA from question 3 using the algorithm from class.

5.) Prove that the regular expressions `(a|b)*` and `(a*|b*)*` are equivalent (recall that for every regular language, there will be a unique minimal DFA).