CSE 331

Assignment 1

1. Give DFA for the following languages, over the alphabet {0,1}.

a) Set of all strings that are at least of length 4 and contains even number of 1's.

b) Set of all strings with number of 0's is divisible by 4 and number of 1's is divisible by 5.

c) The set of all strings such that each block of five consecutive symbols contains at least two 0's.

d) L={w|w has even number of 1's and one or two 0's}

e) L={w|w contains neither the substrings 01 nor 10}

2. Give NFA/ε-NFA for the following languages, over the alphabet {0,1}.

a) All strings containing exactly 4 0s or an even number of 1s.

b) All strings such that the third symbol from the right end is a 0.

c) All strings that contains an even number of 0s or exactly two 1s.

d) L={w|w has even number of 0's and contains exactly two 1's} with six states.

e) The language 0* 1* 0+ with three states (without ε transition).

f) The language 1* (001+)* with three states (without ε transition)

4. Write Regular Expressions for the following languages.

a) The set of strings of 0's and 1's that contain exactly 4 1's.

b) The set of strings of 0's and 1's with odd number of 0's.

c) The set of strings of 0's and 1's with at least two 1's or exactly two 0's.

d) The set of strings of 0's and 1's that contain the substring 10 or substring 01.

e) The set of strings of 0's and 1's whose number of 0's is divisible by 3.

5. For each of the following regular expressions, write down three strings in the language generated by the expression, and give a short English description of the language. Assume P = {0, 1}.

a) 0+ (0 +1) 1+

b) 0*10*10*10*

c) 0*(100*)*1*

d)(0 +10)*1*

e) (0+1)* 10 (0+1)*

6. Convert the following Regular Expressions to ε-NFA. Then convert the resulting ε-NFA to DFA.

a) 01*

b) (0+1)01

c) (1∗00)∗

d) (1+ ε)*(101+010)*(1+0+ ε)*

7. Consider the following DFAs. Write the regular expressions for this DFAs using state elimination for alphabet {a,b}.