

CS 3240 : Languages and Computation
Homework II
Due Beginning of Class, Tuesday, February 17th 2009
Total Points : 100

Guidelines:

1. You can discuss the homework problems at a higher level with other students. However, you must write the homework solutions completely independently and also report the names of the collaborators with whom you discussed the homework. Do not copy solutions from any other source under any circumstance.
2. Answers should be concise, complete and precise
3. Return a hard copy of the homework, the homework is due at the beginning of the class; no late homework submission please.

Questions: Give state diagrams of DFAs for the following languages (30 pts)

1. $\{w \mid w \text{ starts with an odd number of consecutive zeroes and ends on an even number of consecutive ones}\}$, alphabet = $\{0, 1\}$
2. $\{w \mid w \text{ contains all the strings that can be generated out of the alphabet except those having even number of 0's}\}$, alphabet = $\{0, 1\}$
3. All the strings of lengths five or higher that start with a vowel [a-e-i-o-u] and ends on a consonant (one which is not a vowel).

From the following regular expressions, generate a NFA first and then convert it into a DFA – please show important steps of conversion from NFA to DFA. You must use primitive NFAs to construct the larger NFA, i.e., start with NFA for ‘a’ for example, then construct NFA for a^* and then $a^* \mid b$ etc. Finally, please minimize the generated DFAs using the DFA minimization procedure discussed in the class. (70 points)

4. $(a \mid b)^* (ab)^* a+b^*$
5. $a \mid (b)^* \mid (ab)^*$