CS 3240 : Languages and Computation
Homework III
Due Beginning of Class, Tuesday, February 26th 2009
Total Points : 50

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: Show the following languages are non-regular using pumping lemma – show all the details including adversary arguments, choice of strings etc. (10 pts each)

1. {w | w can contain 0's and 1's in any order and number of 1's must be at least three times those of 0's, alphabet = {0, 1}}
2. {w | w can contain 0's and 1's in any order and the total number of 0's and 1's in w is a perfect square of some natural number n, alphabet = {0, 1}}
3. $\{1^m O^k 1^p | \ m > n \geq 0, k > (p+2)\}$
4. $\{w\#w^r \mid$ w is any string that can be made out of {0,1} and # is a special character separating w and its reverse string w^r, alphabet = {0, 1, #}}
5. { w | w can contain 0's and 1's in any order and the number of 0's is equal to the cube of number of 1's in w, alphabet = (0, 1)}