CS 3240 : Languages and Computation
Homework I
Due Beginning of Class, Tuesday, January 27th 2009
Total Points : 70

Guidelines:

1. We will be following Georgia Tech Honor Code for this class. You must write the homework solutions completely independently and also report the names of the collaborators with whom you discussed the homework. Please direct clarification questions to the TAs and the instructor. 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: Write regular expressions for: you can only use the meta-operators, the concatenation operator ( ) [] * | + **

1. All integers strictly greater than 512 but less than or equal to 1024 in the binary format. The alphabet of this language is {0, 1} (for example string 111 designates the integer 7 in binary format etc.). (Your regular expression must be as compact as possible – else you will get only half credit for correct but non-compact regular expression for this problem).
2. All strings made from {0} that have a length of $6k + 2$, where $k \geq 0$, k can be any positive integer, i.e. k could take any of the value 0, 1, 2, 3, …
3. A string made out of {0,1} which must have the substring 00100111 repeating one or more times.
4. All positive integers ranging from 150 to 500 that are divisible by 7. (Your regular expression must be as compact as possible – else you will get only half credit for correct but non-compact regular expression for this problem). Alphabet = [0-9]
5. Birthdates of all born in the current millennia until the year 2004 (born on 01/01/2000 or later until and including 12/31/2004) in the format MM/DD/YYYY Note: Birthdates must be realistic, ie., no 01/32/2000 etc. Make sure you take care of other restrictions as well.
6. All strings made from [a-z] of lengths varying from 3 to 7 which must have at least two a's.
7. A string in which the substring abc appears at least 4 times, alphabet = [a-z]