CSC364 **Problem Set 2** **Winter/2002**

This problem set is worth 5% of your mark, and it is important to do your own work. You may consult with others concerning the general approach for solving problems on assignments, but you must write up all solutions entirely on your own. Anything else is *cheating* and is subject to prosecutuion under the University's Code of Behavior. This homework is due at the beginning of tutorial on Wednesday, March 13. Late assignments will receive a grade of 0. This homework will help to prepare you for the second test, which will take place during tutorial on March 27.

1. Suppose the runtime of an algorithm is $T(n)$. Circle the expressions below for $T(n)$ which would make the algorithm polytime.

   a) 2^{n^2} b) $n \log_2 n$
   c) $3^{\log_2 n}$ d) $n^{\log_2 n}$

2. True or False:
   (a) $2^n \in O(3^n)$
   (b) $3^n \in O(2^n)$
   (c) $n + 100n \log n \in O(n)$
   (d) $n + 100n \log n \in O(n^2)$

3. Prove that the version of 3SAT in which each clause contains appearances of three distinct variables is NP-complete.

4. Sipser, Problem 7.16

5. Sipser, Problem 7.21

6. Sipser, Problem 7.28

7. Sipser, Problem 7.33