Homework 4  
Computer Science 511  
Fall 2010  
Due on Friday, October 22

Reading  
Chapter 8 of K & T.

Problem Set  
1. (10 points) Exercise 1, p. 505 of K & T.  
2. (10 points) Exercise 2, p. 505 of K & T.  
3. (10 points) Exercise 3, pp. 505–506 of K & T.  
4. (10 points) Exercise 4, p. 506 of K & T.  
5. (10 points) Search versus decision. Suppose you have a procedure that runs in polynomial time and tells you whether or not a graph has a Hamiltonian cycle. Show that you can use it to develop a polynomial time algorithm that constructs a Hamiltonian cycle, if one exists.  
6. (10 points) Show that an otherwise polynomial-time algorithm that makes at most a constant number of calls to polynomial-time subroutines runs in polynomial time, but that a polynomial number of calls to polynomial-time subroutines may result in an exponential-time algorithm.  

Note. This problem shows why we must be careful when defining the notion of polynomial-time reduction.

Note. We reserve the right to grade only a subset of the problems assigned. Which problems will be graded will be decided after the submission deadline.