CS311:	**Homework 7**	Due in class, 11:15 am, Tuesday, Oct. 28, 2008

Not to hand in: Please do both parts of problem 5.2, p. 148, i.e., by hand run Prim and Kruskal on the given example to make sure you understand these algorithms in detail.

Problems to Hand in:

1. [25 pts.] Write a clear and correct proof that an undirected graph on n vertices with exactly k connected components has at least $n - k$ edges. You should also prove that if this graph is acyclic, i.e., it is a forest, then it has exactly $n - k$ edges.

2. [25 pts.] Question 5.5, p. 148: adding 1 to edge weights. [Hint: think about how Dijkstra's algorithm and Prim or Kruskal's algorithm would change.]

3. [25 pts.] Prove or disprove: "Prim's Algorithm" works correctly even if edge weights may be negative. If true, then prove it, if false, then give a counterexample, i.e., a graph with negative edge weights on which Prim's algorithm gets the wrong answer.

4. [25 pts.] Question 5.26, p. 152: equality and disequality constraints. As always, give a clear algorithm sketch, show that it is correct, and analyze its running time.