

**CIS 435, Spring 2002, Joseph Leung**  
**Homework #9**

**23.2-4** Argue that in a breadth-first search, the value  $d[u]$  assigned to a vertex  $u$  is independent of the order in which the vertices in each adjacency list are given.

**23.3-6** Give a counterexample to the conjecture that if there is a path from  $u$  to  $v$  in a directed graph  $G$ , and if  $d[u] < d[v]$  in a depth-first search of  $G$ , then  $v$  is a descendant of  $u$  in the depth-first forest produced.

**24.1-1** Let  $(u, v)$  be a minimum-weight edge in a graph  $G$ . Show that  $(u, v)$  belongs to some minimum spanning tree of  $G$ .

**24.2-2** Suppose that the graph  $G = (V, E)$  is represented as an adjacency matrix. Give a simple implementation of Prim's algorithm for this case that runs in  $O(V^2)$  time.