CSE680 Homework 6

Due Friday, May 29, by class time

1. Give a counterexample to the conjecture that if there is a path from u to v in a directed graph G, and if $vn(u) < vn(v)$ in a depth-first search of G, then v is a descendant of u in the depth-first forest produced.

2. A directed graph $G = (V, E)$ is said to be *weakly connected* if, for all pairs of vertices $u, v \in V$, we have a path from u to v **or** a path from v to u. Give an $O(n^2)$ algorithm to determine whether G is weakly connected. (Hints: (1) for simplicity, you may assume G to be acyclic; (2) pre-process the graph using topological sort.)