CS2223
HW#7

DUE: Tuesday , December 16

1. (8 points) Consider **Problem 6.21** (*b*) on page 217 of our text. In HW#4 we saw that the suggested greedy algorithm does not always yield an optimal solution. Find a dynamic programming algorithm to solve this problem in worst case time in $\Theta(nD)$. (HINT: As always, consider using tools we've already developed.)

2. (5 points) Prove or give a counterexample to the following.

CONJECTURE: Let G be any graph such that every edge has a distinct positive length (no two edges have the same length). For every vertex $v \in N$, if l is the length of a shortest edge incident with v, then the array D returned by *Floyd*'s algorithm has an entry l.

3. (5 points) Prove or give a counterexample to the following.

CONJECTURE: Let G be any graph such that there is an edge between every pair of vertices and every edge has a distinct positive length (no two edges have the same length). For every pair of vertices $v, w \in N$, the array D returned by *Floyd*'s algorithm satisfies $D[v,w]=L[v,w]$.

4. (7 points) Describe an algorithm (precise pseudocode suffices) to check if a graph is a tree. Your algorithm should work in time in $O(n)$.