HW 6: Posted April 9, Due April 19 BEFORE 9 AM, Problem 5 algorithmic solution due by April 12 before 11 : 59 p.m., program due April 19 BEFORE 9 AM

April 9, 2002

Problem 1: 10 pts Refer to the exam solution for finding a hamiltonian path in a DAG if one exists. Does it work for any digraph? Prove or give a counter example.

Problem 2: 20 pts Present an algorithm for computing a maximum weighted spanning tree.

Problem 3: 10+30 pts Given a connected graph it is not always possible to add directions to the edges so that the digraph is strongly connected. Give a counter example to prove this. Note that you can not replace one edge by two directed edges. Present an algorithm which obtains such a digraph whenever it is possible to do so.

Problem 4: 30 Consider a graph where edges have weight either 1 or 2. Present an algorithm to compute the MST in $O(V + E)$. (Hint: try modifying one algorithm presented in class).

Problem 5: 20+30 You have N blocks, $1, 2, \ldots, n$. The ith block has length l_i and weight w_i. You can place a block i over another block j if both $l_i < l_j$ and $w_i < w_j$. Present an algorithm to find out the largest number of blocks that can be placed on top of each other. Program your solution.