**Algorithm Final Exam** 19th, Dec.

1. (10 pts) True/False. Justify your answer briefly.  
a) Dynamic programming uses a top-down approach.

b) There exists a good greedy algorithm for the 0-1 Knapsack Problem.

c) NP stands for Not Polynomial.  
d) Topological sort is possible when graph G is DAG.  
e) In a weighted graph G, the minimum spanning tree is always unique.

2. (10 pts) Demonstrate the insertion of keys 5, 28, 19, 15, 20, 33, 12, 17, 10 into a hash

table with collisions resolved by chaining. Let the hash table have 7 slots, and let the

hash function be h(k) = k mod 7.

3. (10 pts) Draw the Binary Search Tree (BST) after inserting the following sequence of elements. 6, 4, 8, 1, 12, 3, 19, 5, 20

4. (10 pts)Determine the Huffman code for the string STEREOTELEMETER by building a

Huffman coding tree. Your solution must show both the Huffman tree and the

corresponding Huffman code.

5.(20 pts) Give the visited node order for each type of graph search, starting with s.



a) Breadth First Search

b) Depth First Search

6. (20 pts) Find the Minimum Spanning Tree of the following weighted graph.  


a) Prim’s algorithm  
(starting node is d)

b) Kruskal’s algorithm

7. (10 pts) Write pseudocode to detect a negative weight cycle in Bellman Ford algorithm.

8. (10 pts) Given pattern P = “aabaaabaabab”, construct π function