# CSCI\_570 Exam 3 2007 Summer

[ FALSE ]

If A is linear time reducible to B (A \_ B), and B is NP-complete, then A must be NP-complete.

[ FALSE ]

If B is linear time reducible to A (B \_ A), and B is NP-complete, then A must be NP-complete.

[ TRUE ]

If any integer programming optimization problem can be converted in polynomial time to an equivalent linear programming problem, then P = NP.

[ FALSE ]

It has been determined that NP Complete problems cannot be solved in polynomial time.

[ FALSE ]

If P = NP, then there are still some NP complete problems that cannot be solved in polynomial time.

[ TRUE ]

When we say that a problem X is NP Complete, then it means that every NP complete problem can be reduced to X.

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[ TRUE/FALSE ]FALSE

In a flow network whose edges have capacity 1, the maximum flow always corresponds to the maximum degree of a vertex in the network.

[ TRUE/FALSE ]FALSE

If all edge capacities of a flow network are unique, then the min cut is also unique.

[ TRUE/FALSE ]TRUE

A minimum weight edge in a graph G must be in one minimum spanning tree of G.

[ TRUE/FALSE ]TRUE

When the size of the input grows, any polynomial algorithm will eventually become more efficient than any exponential one.

[ TRUE/FALSE/UNKNOWN ]FALSE

NP is the class of problems that are not solvable in polynomial time.

[ TRUE/FALSE/UNKNOWN ]FALSE

If a problem is not solvable in polynomial time, it is in the NP-Complete class.

[ TRUE/FALSE/UNKNOWN ]TRUE

Linear programming can be solved in polynomial time.

[ TRUE/FALSE ] FALSE

is O(n).

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[ TRUE ]

If NP = P, then all problems in NP are NP hard

[FALSE ]

L1 can be reduced to L2 in Polynomial time and L2 is in NP, then L1 is in NP

[FALSE ]

The simplex method solves Linear Programming in polynomial time.

[FALSE ]

Integer Programming is in P.

[ FALSE ]

If a linear time algorithm is found for the traveling salesman problem, then every problem in NP can be solved in linear time.

[ TRUE ]

If there exists a polynomial time 5-approximation algorithm for the general traveling salesman problem then 3-SAT can be solved in polynomial time.

[ FALSE ]

Consider an undirected graph G=(V, E). Suppose all edge weights are different. Then the longest edge cannot be in the minimum spanning tree.

[ FALSE ]

Given a set of demands D = {dv} on a directed graph G(V,E), if the total demand over V is zero, then G has a feasible circulation with respect to D.

[ TRUE ]

For a connected graph G, the BFS tree, DFS tree, and MST all have the same number of edges.

[ FALSE ]

Dynamic programming sub-problems can overlap but divide and conquer sub-problems do not overlap, therefore these techniques cannot be combined in a single algorithm.