Reading List for Quiz 8 (April 13th): <u>In class, Closed Notes</u>

Module 5

1) Prove that being a directed acyclic graph (DAG) is a necessary and sufficient condition to be able to come up with a topological sort for a directed graph.

2) In the case of Dijkstra algorithm: when a vertex v is picked for relaxation, prove that we have optimized that vertex (i.e., we have found the shortest path from the source s to the vertex v).

3) Prove that the Kruskal's algorithm does find a minimum spanning tree.

4) Prove that for a graph with unique edge weights, there exists only one minimum spanning tree.

Module 6

5) Show that the Hamiltonian Circuit (HC) problem is polynomial-time reducible to the Traveling Salesman problem (TSP). What is the time-complexity of the reduction?

6) Prove that the approximation ratio of the Twice-around-the-tree heuristic for the Traveling Salesman problem (TSP) is 2.0.