Assignment 5, CS 6363

no late homework would be accepted

1 (Exercise 34.4-5) Show that the problem of determining the satisfiability of Boolean formula in disjunctive normal form is polynomial-time solvable.

2 (Exercise 34.5-1) The subgraph-isomorphism problem takes two graphs G_1 and G_2 and asks whether G_1 is isomorphicv to a subgraph of G_2. Show that the subgraph-isomorphism problem is NP-complete.

3 (Exercise 34.5-7) The longest-simple-cycle problem is the problem of determining a simple cycle (no repeated vertices) of maximum length in a graph. Show that this problem is NP-hard.

4 Show that the following problem is NP-complete: Given a graph G, determine whether G contains a Hamiltonian path where a path is Hamiltonian if it passes every vertex exactly once.

5 Show that the following problem is NP-hard: Given a graph, find a spanning tree to minimize the number of leaves.

6 Let HALF-CLIQUE denote the problem of determining for a graph G with n vertices whether G contains a clique of size at least $n/2$. Prove that HALF-CLIQUE is NP-complete.

7 Show that the following problem is NP-hard: Given a graph, find the minimum dominating set. (A subset of vertices is called a dominating set if every vertex not in the subset is adjacent to a vertex in the subset.)