1. Give a *detailed* outline of the steps to show that a decision problem D is NP-complete.

2. [Exercise 8.10 from the textbook] Prove that each problem below is NP-complete. For part of your proof, show that the problem is a generalization of a known NP-complete problem.

   (a) SubgraphIsomorphism: Given two graphs G and H, is G a subgraph of H? (In other words, is it possible to map every vertex of G to some vertex of H so that H contains exactly the same edges as G on those vertices?)

   (c) MaxSat: Given a CNF formula F and positive integer k, is there an assignment of truth values that satisfies at least k clauses of F?

   (e) SparseSubgraph: Given a graph G and positive integers a, b, is there a subset of a vertices of G with no more than b edges between them?

   (f) SetCover: Given a set S, subsets S_1,...,S_m of S, and positive integer k, is there a collection of k subsets whose union is equal to S?

3. Construct polytime reductions between any two of VertexCover, IndependentSet, and Clique.