1. The assignment problem is usually stated this way: There are \( n \) people to be assigned to \( n \) jobs. The cost of assigning the \( i^{th} \) person to the \( j^{th} \) jobs is \( cost(i,j) \). You are to develop a branch and bound algorithm that assigns every job to a person and at the same time minimizes the total cost of the assignment.

2. This problem is called the postage stamp problem. Envision a country that issues \( n \) different denominations of stamps but allows no more than \( m \) stamps on a single letter. For given values of \( m \) and \( n \), write values, from one on up, and all possible sets of denominations that realize that range. For example, for \( n=4 \) and \( m=5 \), the stamps with values \((1, 4, 12, 21)\) allow the postage values 1 through 71. Are there any other sets of four denominations that have the same range. Use a backtracking algorithm.

3. Given two graphs \( G_1 \) and \( G_2 \) and check if \( G_1 \) is a subgraph of \( G_2 \) (Subgraph Isomorphism Problem). Show that this problem is NP-complete. (Hint: Consider using Clique Problem for your reduction).

   http://en.wikipedia.org/wiki/Graph_isomorphism_problem

4. An instance of the dominating set problem consists of: a graph \( G \) with a set \( V \) of vertices and a set \( E \) of edges, and a positive integer \( K \) smaller than or equal to the number of vertices in \( G \).

   The problem is to determine whether there is a dominating set of size \( K \) or less for \( G \). In other words, we want to know if there is a subset \( D \) of \( V \) of size less than or equal to \( K \) such that every vertex not in \( D \) is joined to at least one member of \( D \) by an edge in \( E \).

   Prove that Dominating set problem is NP-complete. (Hint: Consider using Vertex Cover for your reduction)

5. Show that 4-SAT problem is NP-complete. Generalize this to m-SAT, any \( m \geq 4 \).