CSCE 629 Homework 6

Homework 6 is due Monday, July 30 in class

Read chapter 26 sections 1-3 and chapter 34. Turn in the following exercises.

1. Show how to model an extension of the network flow problem if, in addition to capacities on the edges, there are also positive capacities on the vertices: the sum of the flows into a vertex, v, (other than s,t) must be at most the capacity of v. That is, given such a problem , find an equivalent network flow problem as specified in the text.
2. Show that the independent set problem is in P for bipartite graphs by giving an efficient algorithm. Analyze the running time of your algorithm and explain why it gives the correct answer.
3. Show that the following problem is NP-complete: Given a list of positive integers, L, can the list be partitioned into two lists, $L = L_1 \cup L_2$, L_1 and L_2 disjoint, such that the sum of the integers in L_1 equals the sum of the integers in L_2.
4. Show that the following problem is NP-complete. Given a directed graph, G =(V,E), does G have two different Hamiltonian circuits?
5. Prove that if NP is not equal to co-NP, then P is not equal to NP.