Math 4553, Homework 3, Due on 3/5/2012

1. (8 points) A company is making a special type of office supply. The company has three plants located at Philadelphia, Detroit and Minneapolis. Every week, these three plants produces 450, 500, and 300 pieces of the office supply, respectively. Then, these products need to be shipped to four stores located at New York (450 pieces demanded), Houston (250 pieces demanded), Chicago (250 pieces demanded), and Los Angeles (300 pieces demanded). Notice that the total amount producted (450+500+300=1250) is equal to the total amount demanded (450+250+250+300=1250). The shipping costs (per piece) are given in the following table:

		Shipping costs from each plant			
Plants	Amount produced	New York	Houston	Chicago	Los Angeles
Philadelphia	450	$6	$12	$11	$22
Detroit	500	$8	$10	$4	$12
Minneapolis	300	$12	$16	$7	$10
Store demands		450	250	250	300

Draw a directed graph to illustrate this problem. Then, formulate a minimum cost network flow problem to determine the best shipping strategy. (You do not need to solve the optimization problem.)

2. (12 points) Find the shortest route from node 1 to node 8. You need to formulate it as a linear programming problem and then solve it using the simplex method.