Math 3401 (Ng/Spring 2009)
Handout 7
April 8-15, 2009.

1. On a particular day during the tourist season Molson-Rent-A-Car Company must supply cars to four destinations according to the following schedule given in Table 1.

Destinations	Cars required
Morris	2
Benson	3
Glenwood	5
Alexandria	7

Table 1 : Cities requiring cars

The company has three branches from which cars may be supplied. On the day in question, the inventory status of each of the branches is given in Table 2.

Branches	Cars Available
Wilmar	6
Fargo	1
St. Cloud	10

Table 2 : Inventory available

The costs for shipping between branches and destinations are given in Table 3.

	Destinations			
Branch	Morris	Benson	Glenwood	Alexandria
Wilmar	2	3	7	11
Fargo	10	8	15	18
St. Cloud	15	9	8	5

Table 3 : Table of costs

Plan the day's activity for Molson-Rent-A-car in such a way that requirements are satisfied at the destinations and all the inventory is exhausted at the branches, and to do at a minimum total cost.

2. A compressor company has plants in three locations: Cleveland, Chicago and Boston. During the past week the total production of a special compressor unit out of each plant has been 35, 50, and 40 units respectively. The company wants to ship 45 units to a distribution center in Dallas, 20 units to Atlanta, 30 units to San Francisco, and 30 units to Philadelphia. The unit production and distribution costs from each plant to each distribution center are given in Table 4. We would like to know what is the best shipping strategy to follow, i.e. one that yields minimum total production and distribution costs while at the same time making sure that distribution centers receive their required amounts and the plants exhausted all their inventory.

	Distribution Centers				
Plants	Dallas	Atlanta	San Fran.	Philly	*Units Available*
Cleveland	8	6	10	9	35
Chicago	9	12	13	7	50
Boston	14	9	16	5	40
Units Required	45	20	30	30	

Table 4 : Data for Compressor problem

3. The National Association of Securities Dealers Automated Quotation Systems, (NASDAQ), is a network system in which quotation information in over-the-counter operations is collected. Users of the system can, in a matter of seconds, receive buying and selling prices, the exact bid, and also the asking price of each market-maker that deals in a particular security. There are 1700 terminals in 1000 locations in almost 400 cities. The central processing center is in Trumbull, Conn., with concentration facilities in New York, Atlanta, Chicago, and San Francisco. On this particular day, the market is quiet, so there are only a few terminal being used. the information they have had to be sent to one of the main processing facilities. Table 5 gives terminals (supply centers), processing facilities (demand centers), and the time that it takes to transfer a message.

	Destinations					
Terminals	Trumbull	N.Y.	Atlanta	Chicago	San Fran.	*Supply*
Cleveland	14	7	9	8	10	45
Boston	4	3	5	6	13	90
Houston	22	18	19	20	21	95
Los Angeles	17	15	16	12	11	75
Washington, D.C.	6	4	8	10	14	105
Demand	120	80	50	75	85	

Table 5 : Data for NASDAQ problem

We would like to determine the fastest way to transfer all the required messages from the possible terminals to the processing facilities so that demands are met.