COMP6925: APPLIED OPERATIONS RESEARCH

Lab #3

Transportation and Assignment Problems

EXAMPLE #1

- Three manufacturing centres:
    - Los Angles - can produce up to 1000 cars
    - Detroit - can produce up to 1500 cars
    - New Orleans - can produce up to 1200
- Two retail centres
    - Denver - needs 2300 cars
    - Miami - needs 1400 cars
- Different costs of transporting cars between a specific manufacturing centre and a specific retail centre
- What to satisfy demands while minimising cost

EXAMPLE #1

Manufacturing/Retail	Denver	Miami
Los Angles	80	215
Detroit	100	108
New Orleans	102	68

EXAMPLE #1

Min $80x_{11} + 100x_{21} + 102x_{31} + 215x_{12} + 108x_{22} + 68x_{23}$

subject to

$$x_{11} + x_{12} \leq 1000$$
$$x_{21} + x_{22} \leq 1500$$
$$x_{31} + x_{32} \leq 1200$$
$$x_{11} + x_{21} + x_{31} = 2300$$
$$x_{12} + x_{22} + x_{33} = 1400$$
$$x_{12}, x_{22}, x_{33}, x_{11}, x_{12}, x_{13} \geq 0$$

EXAMPLE #2

***5-18.** The demand for a perishable item over the next four months is 400, 300, 420, and 380 tons, respectively. The supply capacities for the same months are 500, 600, 200, and 300 tons. The purchase price per ton varies from month to month and is estimated at $100, $140, $120, and $150, respectively. Because the item is perishable, a current month's supply must be consumed within 3 months (starting with current month). The storage cost per ton per month is $3. The nature of the item does not allow back-ordering. Solve the problem as a transportation model, and determine the optimum delivery schedule for the item over the next 4 months.