**King Fahd University of Petroleum and Minerals**
**Department of Mathematics and Statistics**
**STAT-361 Operations Research I** [1]
**HomeWork** 2
Three Problems due April $17^{th}$, 2016 [2]

**Problem** 1

The company $Z - Car$ produces a unique model of spare parts for heavy duty transportation vehicles. The manager of the company is asking you to find the optimal solution to its transportation problem. The company has 4 plants supplying 5 customer zones. The following table displays the unit transportation costs, the supplies and the demands.

| Demand Nodes $\rightarrow$ | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Supply Nodes $\downarrow$ | Costs | | | | | Offer |
| 1 | 5 | 4 | 6 | 4 | 7 | 1200 |
| 2 | 4 | 3 | 5 | 8 | 5 | 1000 |
| 3 | 4 | 7 | 6 | 5 | 2 | 800 |
| 4 | 3 | 5 | 2 | 6 | 4 | 1100 |
| 5 | 5 | 1 | 3 | 4 | 9 | 900 |
| Demand | 800 | 800 | 1000 | 1300 | 1100 | |

Table 1: Data for problem 1

**Problem** 2

Solve the following assignment problem.

| Tasks $\rightarrow$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Workers $\downarrow$ | Costs | | | | |
| 1 | 2 | 5 | 5 | 3 | 6 |
| 2 | 7 | 6 | 6 | 3 | 4 |
| 3 | 4 | 3 | 4 | 2 | 5 |
| 4 | 3 | 1 | 2 | 4 | 6 |
| 5 | 4 | 3 | 3 | 3 | 1 |

[1] Dr. Slim Belhaiza (c)
[2] This is NOT a team assignment.

**Problem** 3

A small company operates daily airflights between three different cities' airports A, B and C. The flight time is 1h between A and B, 1.30h between A and C, and 2h between B and C. Given its daily schedule, the company is asking you to find the minimum number of aircrafts to be used and the corresponding schedule for each aircraft.

| Departures from $\rightarrow$ | $A$ | $B$ | $C$ |
|---|---|---|---|
| To $\downarrow$ | Departure Times | | |
| $A$ | - | 8.00; 10.00 | 9.00; 10.30 |
| $B$ | 7.30; 10.00 | - | 8.30; 11.00 |
| $C$ | 9.00; 11.30 | 9.00; 11.00 | - |