MGMT 651 – Analytics for Managerial Decision-Making

Homework 5

Worth 100 points

**DO NOT FORGET TO TYPE YOUR NAME ON THE FIRST PAGE OF YOUR HOMEWORK SUBMISSION DOCUMENT**

1. (10 points) Chapter 6 Problem 28
2. (15 points) A company is considering 4 locations to open warehouses: *New York*, *Los Angeles*, *Chicago* and *Atlanta*. Each warehouse can ship up to 100 units per week. The weekly fixed cost of keeping each warehouse open is $400 for NY, $500 for LA, $300 for Chicago, and $150 for Atlanta. The company’s customers are spread across three well-defined regions across the country. Region 1 requires 80 units per week, region 2 requires 70 units per week and region 3 requires 40 units per week. The unit transportation costs for each warehouse to a region are shown in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Table of Unit Transportation Costs** | | | |
| **FROM** | **TO** | | |
| *Region 1* | *Region 2* | *Region 3* |
| *New York* | $20 | $40 | $50 |
| *Los Angeles* | 48 | 15 | 26 |
| *Chicago* | 26 | 35 | 18 |
| *Atlanta* | 24 | 50 | 35 |

The company wants to meet weekly demands at minimum cost, subject to the preceding information and he following strategic criteria:

* If the NY warehouse is opened, then the LA warehouse must be opened.
* At most two warehouses can be opened.
* Either the Atlanta or LA warehouse must be opened.

Formulate a mixed integer linear program (MILP) for this problem and **solve using POM/QM (Integer and Mixed Integer Programming)**. Interpret your results: (a) which warehouse locations are selected? (b) What is the transportation schedule and what is the total transportation cost?

1. (15 points) Chapter 7 Problem 8. You may want to review the *Capital Budgeting* example in Chapter 7 of the textbook.
2. (10 points) Chapter 7 Problem 9
3. (20 points) Chapter 7 Problem 11. **Solve part “e” using POM/QM (Integer and Mixed Integer Programming).**
4. (15 points) Chapter 7 Problem 14
5. (15 points) Chapter 9 Problem 6