Math 3401 (Ng/Spring 2009)
Assignment 7
Due date: Fri, April 17, 2009.

1. (60pts). Consider the Transportation Problem (NASDAQ) given in **Handout 7, Number** 3.
   (a) (8pts.) Set up the network model for the problem; make sure you identify the directed graph, the given information, and what you want to find.
   (b) (10pts.) Find an initial basic feasible solution and its cost via the Northwest corner rule.
   (c) (10pts.) Find an initial basic feasible solution and its cost via the Minimum cost method.
   (d) (10pts.) From your initial basic feasible solution in **part (c)** (minimum cost method), find the optimal solution and value to the problem using the network simplex method used in class.
   Clearly identify the optimal solution and the optimal value as related to the Nasdaq problem.
   (e) (8pts.) Set up the LP model or formulation (**linear programming model**) for this particular problem.
   (f) (6pts.) Use TORA to solve the LP; identify your optimal solution (based on the problem) and the optimal value.
   (In TORA, choose the LP module to solve the LP problem. Also, you may, in TORA, choose the Transportation module and double-check your optimal value, but do NOT use the transportation module to solve this LP problem.)
   (g) (8pts.) Does the optimal solution from the LP yield integer values even though we solved an LP and NOT an ILP? Explain *why* or *why not*?

2. (40pts). Colonel Cutlass, having just taken command of the brigade, has decided to assign men to his staff based on previous record of, for a lack of a better term, screw-ups. His list of major staff positions to be filled is *adjutant* (personnel officer), *intelligence officer*, *operations officer*, *supply officer*, and *training officer*. He has short-listed five of his men whom he feels could occupy these five positions. Below are their number of screw-ups in the several fields. Colonel Cutlass would like to know who should be placed in which positions so that the overall *possible* screw-ups is minimized.

	Adjutant	*Intelligence*	*Operations*	*Supply*	*Training*
Major Muddle	3	5	6	2	2
Major Whiteside	2	3	5	3	2
Captain Kid	3	50	4	2	2
Captain Klutch	3	60	3	2	2
Lt. Whiz	55	3	65	1	70

   (a) Formulate the above task as an Assignment Problem, i.e. an ILP.
   (b) Set up the LP-relaxation model for the aforementioned problem.
   (c) Solve the LP-relaxation using TORA. Identify optimal solution and value.
   (d) Did the LP-relaxation yield an integer optimal solution? Explain why.
   (e) Based on your optimal solution, identify each person to his/her job and state the minimum number of screw-ups possible.