AGTA Tutorial Sheet 2

Please attempt these questions before coming to the tutorial.

1. Consider the finite 2-player zero-sum game given by the following payoff matrix, A, for Player 1 (the row player):

$$A = \begin{bmatrix} 4 & 2 & 9 & 2 & 5 \\ 6 & 3 & 5 & 9 & 7 \\ 1 & 4 & 8 & 5 & 7 \\ 5 & 1 & 3 & 5 & 6 \end{bmatrix}$$

   Specify the linear programming problem you could use to "solve" this game, meaning to compute the minimax value of this game, and to compute a minmaximizer strategy for Player 1.

   Next, describe a different linear program whose optimal solution yields a maxminimizer strategy for player 2.

   Next, try to actually compute, by hand if you can, the minimax value, minmaximizer strategy for player 1, and maxminimizer strategy for player 2, by solving the linear programs you have constructed.

   (Hint: first try to simplify the game to the extent possible, by eliminating redundant pure strategies, then solve the linear programs by hand.)

2. Consider the 2-player finite strategic form game (i.e., bimatrix game), specified by the following *bimatrix*:

$$\begin{bmatrix} (7,3) & (6,4) & (5,5) & (4,7) \\ (4,2) & (7,9) & (8,6) & (8,8) \\ (6,1) & (9,7) & (2,4) & (6,9) \end{bmatrix}$$

   Compute all Nash equilibria in this game, and compute the expected payoff to each player in each Nash equilibrium. (Hint: first, simplify the game by eliminating redundant pure strategies. Then use the fact, proved in class, that in any Nash equilibrium, each pure strategy that is played with positive probability by any player is necessarily a best response for that player. Use this to set up linear equations for computing Nash equilibrium for the simplified game.)