MA 440 Homework 7

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1. Gintis, problem 4.31 (a) and (c). To begin, ignore the sentence that says "We can normalize ...," and derive the payoff matrix, explaining each entry. Your matrix should look just like the one in the text, except that the payoff to player 1 in the lower right box will be $(1-\alpha)b-\alpha p = 1-\alpha(b+p)$. The matrix in the book is obtained by taking your matrix, dividing all of player 1's payoffs by $b+p$, replacing each term $\frac{b}{b+p}$ in the resulting expressions by a new variable, say b', and then "simplifying" by changing b' to b. Now do parts (a) and (c) using the payoff matrix in the text.

2. Gintis, problem 4.25. Player 1 has three strategies (pick 1, pick 2, pick 3). Player 2 has five strategies:

   (1) Guess 1. If told it is low, guess 2.

   (2) Guess 1. If told it is low, guess 3.

   (3) Guess 2. If told it is high, guess 1. If told it is low, guess 3.

   (4) Guess 3. If told it is high, guess 1.

   (5) Guess 3. If told it is high, guess 2.

   (a) For part (a), just do the following.

      i. Construct the payoff matrix, and check your work on p. 420.

      ii. Show that there are no pure strategy Nash equilibria.

      iii. To look for mixed strategy Nash equilibria, let $\sigma_1 = (p_1, p_2, p_3)$ be a mixed strategy for player 1, and let $\sigma_2 = (q_1, q_2, q_3, q_4, q_5)$ be a mixed strategy for player 2. Find a Nash equilibrium in which all player 1's strategies are active, and only player 2's second, third, and fourth strategies are active.

iv. Determine whether there is a Nash equilibrium in which all player 1's strategies are active, and only player 2's first, third, and fifth strategies are active.

(b) For part (b), find the expected payoff to player 2 from the mixed strategy Nash equilibrium you found in part (a)(iii).

3. Gintis, problem 4.36. **Don't turn in.**

4. Gintis, problem 4.41. **Don't turn in.**