[1] In the following static game for players 1 and 2, what strategy or strategies (i.e., A, B, C, D, E, or F) survive iterated elimination of dominated strategies? Which are the Nash equilibria?

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4, 2</td>
<td>1, 1</td>
<td>3, 1</td>
</tr>
<tr>
<td>B</td>
<td>1, 1</td>
<td>0, 4</td>
<td>2, 2</td>
</tr>
<tr>
<td>C</td>
<td>2, 2</td>
<td>2, 1</td>
<td>1, 4</td>
</tr>
</tbody>
</table>

Note: Player 1’s payoffs are listed 1st, while player 2’s are listed 2nd.

[2] Imagine two firms, 1 and 2, are competing against each other, with each firm’s profit dependent on their choice of price as well as the price choice of the other firm. Each has the following profit function:

Firm 1’s profit: \( \pi_1 = \left[ 180 - P_1 - \left( P_1 - \frac{P_1 + P_2}{2} \right) \right] \left( P_1 - 20 \right) \)

Firm 2’s profit: \( \pi_2 = \left[ 180 - P_2 - \left( P_2 - \frac{P_1 + P_2}{2} \right) \right] \left( P_2 - 20 \right) \),

where \( P_1 \) and \( P_2 \) are the respective prices charged by firms 1 and 2. Limiting the prices of each firm to either 74, 84, or 94 and assuming that these firms select price at the same time, determine the payoff matrix (with profit being the payoff and the prices representing the 3 strategy choices). Do either of these firms have a strictly dominant strategy? If so, determine it. How many Nash Equilibria does this game have? Determine them (it).

[3] Suppose two siblings, Sara and Brian, must determine how to divide the $10 (i.e., “the pie”) their Uncle Tony has given them. The options available for dividing the pie are: (i) one of the siblings gets 90% of the pie while the other gets 10% of the pie; or (ii) the pie is equally divided among the two siblings.

Sara is first to suggest how the gift should be divided. Brian then gets to either accept or reject Sara’s offer. If Brian accepts Sara’s offer, the game is over, with each receiving their respective portion of the $10. However, if Brian rejects Sara’s offer, then their father will punish them for not getting along with each other by taking half the pie. Their father will then ask Brian to suggest how to divide the remaining pie (with the options being those listed above). Sara then must decide to either accept or reject Brian’s offer. If Sara accepts Brian’s offer, the game is over, with each receiving their respective portion of the remaining pie. However, if Sara rejects Brian’s offer, their father will be totally disgusted with his two children, and punish them by taking all of the remaining pie, thereby ending the game.

A. Depict the game tree corresponding to this game. Note: The father is not a player in this game, for his actions merely affect the payoffs of Sara and Brian.
B. Determine the solution of this game by using backwards induction.
In healthcare, there are acute care providers (e.g., hospitals) and non-acute care providers (e.g., long-term care and rehabilitation centers). Given that merger activity among hospitals has intensified over the past several years, often argued as a means to reduce costs (and therefore prices of medical services), several studies (e.g., Keeler et al. (1999)) find that increased concentration resulting from such mergers actually leads to significant increases in prices of medical services. Accordingly, the Federal Trade Commission (FTC) has scrutinized several proposed hospital mergers of late.

Suppose on the Hawaiian island of Oahu there are 3 hospitals (A, B, and C) and 3 non-acute care providers (1, 2, and 3); while on the Hawaiian island of Maui there are 2 hospitals (D and E) and 2 non-acute care providers (4 and 5). Measuring quantities in terms of numbers of patients, suppose there are 45,000 residents of Oahu who are acute care patients of either Oahu or Maui hospitals (i.e., local hospital consumption) and 25,000 residents of Oahu who are non-acute care patients of either Oahu or Maui non-acute care providers (i.e., local non-acute care consumption). On Maui, suppose there are 13,000 residents who are acute care patients of either Maui or Oahu hospitals (i.e., local hospital consumption) and 12,000 residents who are non-acute care patients of either Maui or Oahu non-acute care providers (i.e., local non-acute care consumption). Consider the following data (NAC = non-acute care):

<table>
<thead>
<tr>
<th></th>
<th>Local Supply (# patients served)</th>
<th>Local Consumption from Local Supply (# patients who are residents of respective island)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oahu:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital A</td>
<td>20,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Hospital B</td>
<td>20,000</td>
<td>19,000</td>
</tr>
<tr>
<td>Hospital C</td>
<td>8,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Total</td>
<td>48,000</td>
<td>45,000</td>
</tr>
<tr>
<td>NAC 1</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>NAC 2</td>
<td>10,000</td>
<td>8,000</td>
</tr>
<tr>
<td>NAC 3</td>
<td>15,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Total</td>
<td>30,000</td>
<td>25,000</td>
</tr>
<tr>
<td><strong>Maui:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital D</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Hospital E</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Total</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>NAC 4</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>NAC 5</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Total</td>
<td>7,000</td>
<td>7,000</td>
</tr>
</tbody>
</table>

Suppose a health economist estimates the demand for acute care and finds (i) the price elasticity of demand for acute care equals -0.05, while the cross-price elasticity of demand for acute care (with respect to the price of non-acute care) = 0.01. For those who have completed a statistics course, suppose these estimates are insignificantly different from zero.

A. Recall that markets are defined in terms of their “product space” and “geographic space”. Based on the above information, argue that hospitals (i.e., acute care providers) operate in a different product market from non-acute care providers. Further, using the concepts of LIFO and LOFI, argue from a geographic perspective whether or not Oahu and Maui hospitals operate in the same or two different markets. In your analysis, use the rule that if LIFO and LOFI exceeds 0.90 on Oahu, then hospitals on Oahu reside in a different market from hospitals on Maui; if not, then hospitals on Oahu and Maui compete in the same market.

B. Using local supply as a measure of each firm’s production, if Hospitals B and C proposed to merge, (based solely on the 1982 merger guidelines) would the FTC likely challenge the merger or not? In your analysis, assume the quantity produced by the newly combined firm is simply the sum of their pre-merger quantities.