8.1 Characterizing the Equilibria

1) [10 points] Find all the pure Nash equilibria of the following game:

\[
\begin{array}{ccc}
  & a & b \\
 a & 2,0 & 0,1 \\
b & 0,2 & 1,0 & 0,0 \\
c & 0,0 & 0,0 & 1,1 \\
\end{array}
\]

8.2 Price Competition in the Airline Market

Firms selling similar (substitute) products engage in price competition. Consider a scenario where the demand for American Airlines is a function of the price charged by British Airways:

\[Q_A = 100 - p_A + \frac{1}{2}p_B\]

Similarly for British Airways:

\[Q_B = 100 - p_B + \frac{1}{2}p_A\]

Each firm has a cost function \(C(q) = 20q\). The utilities are \(u_A = p_AQ_A - C(Q_A)\) and \(u_B = p_BQ_B - C(Q_B)\).

1. [10 points] What are the equilibrium prices and quantities in this market?

2. [10 points] Consider the scenario where firm A decides to purchase firm B. Now firm A can set both \(p_A\) and \(p_B\) and earns all of the revenue from sales of both products. What prices and quantities will firm A set?

3. [5 points] Explain the intuition behind the changes in price and quantity you observe for each product. Without doing any math, are consumers better or worse off post-merger?

4. [15 points] Suppose firm A can buy firm B in exchange of half of its shares. Would firm A go ahead with the purchase? The DOJ asks for our opinion as to whether the merge should be stopped under antitrust law. Based on what we have found in the previous part of this question, what would you recommend?