Game Theory - Assignment 3

Due date: **September 16, 2025**.

1. In the game in Table 1, $a, b, c, d \in (-\frac{1}{4}, \frac{1}{4})$. Show that there is a **unique** correlated equilibrium of this game. Find this correlated equilibrium. What is the limit of this correlated equilibrium as a, b, c, d approach 0?

	X	Y
A	$(1, 0)$	$(c, 1+d)$
B	$(0, 1)$	$(1+a, b)$

Table 1: Correlated equilibria

2. Consider the strategic form game Γ shown in Table 4.

	a	b	c	d
A	$(2, 0)$	$(2, 1)$	$(0, 3)$	$(0, 1)$
B	$(1, 2)$	$(3, 3)$	$(2, 2)$	$(0, 1)$
C	$(0, 2)$	$(-1, 4)$	$(3, 0)$	$(0, 1)$
D	$(0, 0)$	$(0, -2)$	$(0, 0)$	$(1000, -1)$

Table 2: A two player strategic form game

   (a) What is the largest profile of rationalizable strategies in Γ?

   (b) Compute all (pure and mixed) Nash equilibria of $\Delta\Gamma$.

   (c) Provide an upper bound on payoff of each player if they play their max-min (mixed) strategies in $\Delta\Gamma$.

3. Table 3 shows the payoff of player 1 in a two-player game Γ: payoff of player 2 is not shown. Two experts (who know the payoffs of both the players) make the following claims.

   (a) Expert 1 claims that strategy C of player 1 is a never best response in Γ. Is Expert 1 correct? Explain your answer.

   (b) Expert 2 claims that strategy C of player 1 does not survive iterated elimination of never best response pure strategies in $\Delta\Gamma$. Can Expert 2 be correct? Explain your answer.

	a	b	c
A	$(1, \cdot)$	$(3, \cdot)$	$(2, \cdot)$
B	$(2, \cdot)$	$(1, \cdot)$	$(3, \cdot)$
C	$(3, \cdot)$	$(2, \cdot)$	$(1, \cdot)$

Table 3: A two player strategic form game

4. Consider the game in Table 4.

	a	b	c	d
A	$(7, 0)$	$(2, 5)$	$(0, 7)$	$(0, 1)$
B	$(5, 2)$	$(3, 3)$	$(5, 2)$	$(0, 1)$
C	$(0, 7)$	$(2, 5)$	$(7, 0)$	$(0, 1)$
D	$(0, 0)$	$(0, -2)$	$(0, 0)$	$(9, -1)$

Table 4: A two player strategic form game

Answer the following questions for the game in Table 4.

(a) What is the profile of largest set of rationalizable strategies?

(b) Consider the following correlated strategy p:

$$p(A, a) = p(A, c) = p(C, a) = p(C, c) = \frac{1}{4}$$

Is p a correlated equilibrium? Justify your answer. **(2 marks)**