

CIS 716 Homework 2

1. Consider the following game.

Player A chooses a number, and records whether the number is odd or even. A does not show the number to B. B then decides whether to place a coin with heads or tails facing up. If the number is odd and B chooses heads, then A pays B \$2. If the number is odd and B chooses tails, then B pays A \$3. If the number is even and B chooses heads, no money changes hands, but if the number is even and B chooses tails, then C, who is watching the game, pays both A and B \$1.

- (a) Draw out the extensive form for this game.
(10 points)
- (b) Draw out the strategic form for this game.
(10 points)
- (c) Is this a zero sum game? Why?
(10 points)

2. Consider the following game in normal form:

$$A = \begin{bmatrix} -1 & 3 & 7 \\ 2 & 4 & 0 \\ 0 & -2 & 1 \end{bmatrix}$$

- (a) Compute the loss floor and the gain ceiling of this game.
(10 points)
- (b) Does this game have a saddle point?
(10 points)

3. Consider the following game in normal form:

$$A = \begin{bmatrix} 2 & -1 \\ -3 & 4 \end{bmatrix}$$

where P1 is the row player and P2 is the column player.

Calculate the mixed strategy for both players.

(20 points)

4. Here is a general sum game:

$$(A, B) = \begin{bmatrix} (3, 3) & (0, 5) \\ (5, 0) & (1, 1) \end{bmatrix}$$

(a) What is the Nash equilibrium for this game? Why?

(15 points)

(b) What is the Pareto efficient solution for this game? Why?

(15 points)