Activity: Strategic Games and Dominance

Econ 305

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1 Strategic Games

For each of the games described below, determine the normal form of the game: number of players n, strategy space for each player S_i, and payoffs (as a matrix or function).

a. Matching Pennies (a zero-sum game). Two players simultaneously place a penny on a table. If the pennies match (e.g., both placed heads up), player 2 pays player 1 a dollar. If the pennies do not match, player 1 pays player 2 a dollar.

Players: $N = \{1,2\}$

Strategy Space: $S_i = \{H, T\}$

Payoff Functions: $u_1 = \begin{cases} 1, & s_1 = s_2 \\ -1, & s_1 \neq s_2 \end{cases}$

$u_2 = \begin{cases} 1, & s_1 \neq s_2 \\ -1, & s_1 = s_2 \end{cases}$

		Player 2	
		H	T
Player 1	H	1,-1	-1,1
	T	-1,1	1,-1

b. Bach or Stravinsky / Battle of the Sexes (a coordination game with some conflict). A couple wants to be together on their date night rather than alone, but they have different preferences over which type of concert they attend. They simultaneously — and without communication — choose to go to either the Bach or Stravinsky concert. Conditional on being together, player 1 prefers Bach and player 2 prefers Stravinsky.

Players: $N = \{1,2\}$

Strategy Sets: $S_i = \{B, S\}$

Payoffs:

		Player 2	
		B	S
Player 1	B	5,3	2,2
	S	0,0	3,5

c. Hawk vs. Dove / Chicken (an anti-coordination game). Two teenagers ride their bikes at high speed towards each other along a narrow ride. Neither of them wants to “chicken out” and lose their pride, but even worse is getting hurt by crashing into the oncoming biker.

Players: $n=2$

Strategy Space: $\{D, H\}$

Payoffs:

		Player 2	
		D	H
Player 1	D	1,1	1,2
	H	2,1	0,0

d. Cournot Competition (an industrial organization game). Two firms compete by simultaneously choosing how much to produce of a homogenous good (e.g., oil, soybeans) for a market.

Players: $n=2$

Strategy Space: $S_i = [0, \infty)$ $\qquad P = d^{-1}(q_1+q_2)$

Payoff: $\pi_i = d^{-1}(q_1+q_2)\,q_i - c_i(q_i)$

2 Strict Dominance

Are the following games dominance solvable? Justify your answers.

a. A 4×4 game:

Yes, (B, X) is the result from IESDS on this game

	~~*W*~~	*X*	~~*Y*~~	~~*Z*~~
~~*A*~~	5,2	2,6	1,4	0,4
B	0,0	3,2	2,1	1,1
C	7,0	2,2	1,5	5,1
~~*D*~~	9,5	1,3	0,2	4,8

b. The beauty contest game, i.e., to win, come closest to guessing two-thirds the average of numbers between 0 and 100 selected by players.

Yes, every strategy is strictly dominated by 0 the game is dominance solvable