

Prisoner's Dilemma

		Player 2 (partner)	
		NC	NC
Player 1 (you)	NC	(-1, -1)	(-9, 0)
	NC	(0, -9)	(-5, -5)

" your payoff: higher
is better

⇒ examples

Definition of game:

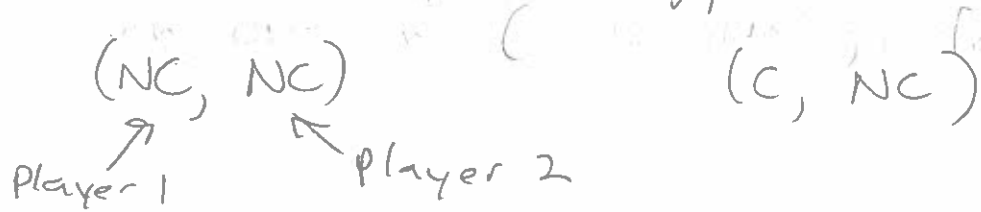
- Set of players $\{1, 2\}$
- Set of strategies for each player

We will focus on 2-player games

Player 1: $\{NC, C\}$

Player 2: $\{NC, C\}$

- Outcome = choice of strategy for each player



②

Definition (cont.)

- Payoff matrix: specify payoff to each player for each outcome

$$P_i(S, T)$$

↑ ↑ ↖
player player 1 player 2 strategy
strategy

$$P_1(NC, C) = ?$$

$$P_2(NC, C) = ?$$

$$P_1(C, C) = ?$$

Goal: use games to predict behavior (outcomes)

Assumptions: (discuss)

- ① Each player wants to maximize payoff (no other considerations)
- ② Rationality
- ③ Full knowledge of game (know strategies/payoffs for all players)
- ④ No communication

Predictions: what happens if one or both players do not have DS?

Ex 2:

		Player 2	
		A ₂	B ₂
Player 1	A ₁	2, 1	2, 0
	B ₁	0, 0	1, 1

Player 1: A₁ is BR to A₂ } A₁ is DS
 A₁ is BR to B₂ }

Player 2: A₂ is BR to A₁ } no DS
 B₂ is BR to B₁ }

What will happen?

P1 will play A₁

P2 will play A₂

3/10/11

What if neither player has DS?

(Central notion of prediction of game outcome)

Def: a Nash Equilibrium is a pair of strategies that are best responses to each other

Ex: (C,C) is Nash eq. in Prisoner's Dilemma
(A₁, A₂) is Nash eq. in Ex. 2

Ex 3: coordination game

		P ₂		
		PPT	Keynote	
P ₁	PPT	1, 1	0, 0	text/email
	Keynote	0, 0	1, 1	

- no DS
- (PPT, PPT) is Nash eq.
- (Keynote, Keynote) is Nash eq.

Battle of Sexes

P1

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

(coordination w/ diff. prefs.)

What does this model?
What are NE?

Hawk-Dove

	D	H
D	3, 3	1, 5
H	5, 1	0, 0

(compete for resource)

What does this model?
What are NE?