

## Prisoners Dilemma:

Best Responses Interest

	$P_2$	C	D
$P_1$			
Confess C		-3, -3	0, -4
Deny D		-4, 0	-1, -1

Annotations: An orange box highlights the (C, C) cell. A green circle highlights the (C, C) cell. A green circle highlights the (D, C) cell. A green circle highlights the (C, D) cell. A green circle highlights the (D, D) cell. A green circle highlights the (D, C) cell.

## 'Best Response' (BR)

$BR_i(a_{-i})$

of player  $i$

given fixed action of all other players.

$$BR_1(C) = C$$
$$BR_1(D) = C$$

$$BR_2(C) = C$$
$$BR_2(D) = C$$

Best Response Dynamic

Player 2

Player 1 Denies

'Nash Equilibrium'  
(NE)  
Intersection of best  
Responses.

NE — each player  
is playing his best response  
to the actions of all the  
other players.

NE has interesting implications:

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NE is a 'SELF ENFORCING' Agreement

$P_1 \backslash P_2$	C	D
C	-3, -3	0, -4
D	-4, 0	-1, -1

Nash equilibrium is  
also a 'self enforcing'  
agreement.

$P_1 \backslash P_2$	C	D
C	-3, -3	0, -4
D	-4, 0	-1, -1

Nash equilibrium -  
Outcome from which  
no player has an  
incentive to deviate unilaterally.

Nash Equilibrium  
is a 'No-Regret'  
outcome

No-Regret'

$P_1 \backslash P_2$	C	D
C	-3, -3	0, -4
D	-4, 0	-1, -1

Handwritten annotations: A red circle around the cell (C, C) with a red arrow pointing to it from the text 'No-Regret'. A green arrow points from the cell (C, D) to the cell (C, C). A red arrow points from the cell (D, D) to the cell (D, C).

## Nash Equilibrium:

$a_1^*, a_2^*, \dots, a_N^*$  — NE  
 if for each player  $i$   
 $u_i(a_i^*, a_{-i}^*) \geq u_i(a_i, a_{-i}^*)$

- has to hold for  
each player  $i$
- each action  $i$