NORMAL FORM (SIMULTANEOUS MOVE) GAMES

Partial Notes

		Left	Center	Right
	Up	1, 1	0, 1	2, 4
Row	Middle	2, 2	1, 3	4, 1
	Down	3, 3	2, 1	1, 2

		Left	Center	Right
	Up	1, 1	0, 1	2, 4
Row	Middle	2 , 2	1, 3	4, 1
	Down	3, 3	2, 1	1, 2

Middle dominates up, because **2>1**, **1>0**, and **4>2**. So we can eliminate up.

		Left	Center	Right
	Up	1, 1	0, 1	2, 4
Row	Middle	2, 2	1, 3	4, 1
	Down	3, 3	2, 1	1, 2

Now try to eliminate columns.

		Left	Center	Right
	Up	1, 1	0, 1	2, 4
Row	Middle	2, 2	1, 3	4, 1
	Down	3, 3	2, 1	1, 2

Now try to eliminate columns.



Now try to eliminate columns.

Left dominates right because 2>1 and 3>2.



Now try to eliminate columns.

Left dominates right because 2>1 and 3>2.

Example: Iterated dominance

Column



Now try to eliminate rows again.



Now try to eliminate rows again.

Down dominates middle because 3>2 and 2>1.



Now try to eliminate columns again.

Left dominates center because 3>1.



SDSE = {Down, Left}

...because a single outcome remains, we call the game "dominance solvable."

Practice: Iterated elimination of dominated strategies _{Column}

 x
 y
 z

 A
 2,3
 -16,2
 5,0

 B
 5,6
 4,6
 6,4

 C
 8,0
 3,10
 1,8

Row

12

Column

		С	D
Dow	С	3, 3	0, 2
RUW	D	2, 0	1, 1

How do I find Nash equilibria?

<u>Determine the best responses</u>, that is the best strategy for a player given the strategies played by opponents. The best responses for each player intersect at the Nash equilibrium.



Given column plays C, what is best response for Row?



Given column plays C, what is best response for Row?

C because 3 > 2.



Given column plays C, what is best response for Row?

C because 3 > 2.

Let's circle 3 because it indicates one of the best responses.



Given column plays D, what is best response for Row?



Given column plays D, what is best response for Row?

D because 1 > 0.



Given column plays D, what is best response for Row?

D because 1 > 0.

Let's circle 1 because it indicates one of the best responses.

Column



Given "Row" plays C, what is best response for Column?

Column



Given "Row" plays C, what is best response for Column?

C because 3 > 2.

Column



Given "Row" plays C, what is best response for Column?

C because 3 > 2.

Let's circle 3 because it indicates one of the best responses.

Column



Given "Row" plays D, what is best response for Column?

Column



Given "Row" plays D, what is best response for Column?

D because 1 > 0.

Column



Given "Row" plays D, what is best response for Column?

D because 1 > 0.

Let's circle 1 because it indicates one of the best responses.

Column



Where the best responses intersect {C;C} and {D;D} are Nash Equilbria.

N.E. = $\{C;C\}$ and $\{D;D\}$

Note: equilibria are always stated in terms of strategies, never in terms of payoffs in the outcomes.

Compare NE and SDSE

Column



What's the SDSE?

 $SDSE = \{C;C\}, \{C;D\}, \{D;C\}, \{D;D\}$

Note: NE are a subset of SDSE.