

Econ 47100: Behavioral Economics

Topic 10: Intro to Game Theory

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Strategic Decisions

- So far, we have considered individual decision making when outcomes only depend on:
 - The action chosen
 - The State of the world
- For example, how consumer's maximize utility, how firms should price in a perfectly competitive market (no individual can affect others), monopoly (not playing against anyone).
- However, many outcomes are affected not only by your decisions, but the decisions of others as well.
- We call these type of interactions, strategic interactions.
- So, let's play some games

What is Game Theory?

- Game Theory has been used to study interactions in many contexts, many of these contexts are far from the popular notion of a “game”.
- For Economists the word game implies a process of interaction with a prescribed population of participants, a game has a set of rules, and a set of payoffs associated to every possible outcome of the game.
- **Game theory** is a formal way to analyze strategic interaction among a group of rational players (or agents) who behave strategically
 - Example:
 - Sports
 - International Relations
 - Business decisions (pricing, advertising)
 - Lying vs truth telling
 - Cooperation vs defection

What's in a game?

A game is comprised of the following components:

Players: Who is involved in the game (to start with we will only look at 2 players). Does nature play a role?

Actions: What can each player actually 'do' in the game?

Strategies: Each player has a strategy that comprises a complete contingent plan of action. That is, for any given scenario or action by another player, a strategy specifies the action to be taken by the player.

Information: What each player knows before making a decision (for now we will assume perfect information).

Payoffs: A complete summary of the value to each player of each set of actions.

The Prisoner's Dilemma (The Classic Game)

- Two individuals (1 and 2) have been arrested on suspicion of jointly committing a crime.
- Placed in separate cells they are given the option of incriminating themselves and their co-accused in exchange for a lighter sentence.
- If both “defect” on their partner, providing evidence, they both receive a long sentence of 10 years.
- If both “cooperate”, not providing evidence, there is little evidence to prosecute and they both receive a sentence of 1 year.
- If one defects and one cooperates the defector goes free while the cooperator receives a stiff sentence of 12 years.

The Prisoner's Dilemma (The Classic Game)

Players: Two players (Individual 1 & Individual 2)

Actions: Cooperate or Defect

Simultaneous Game: Both make their decisions at the same time.

Payoffs: A complete summary of the value to each player of each set of actions. This can be represented in a game table (for one-shot simultaneous games).

- We call this, the Normal Form.

The Prisoner's Dilemma (The Classic Game)

		Player 2	
		Defect	Corporate
Player 1	Defect	$(-10, -10)$	$(0, -12)$
	Corporate	$(-12, 0)$	$(-1, -1)$

- What should each player do?

Strategic Decisions

- The cornerstone of game theory is the concept of a Nash equilibrium.
- **Nash equilibrium:** A Nash equilibrium is a strategy profile such that each strategy in the profile is a best response to the other strategies in the profile.
- In other words: A Nash equilibrium is a strategy profile, where no player has an incentive to **unilaterally** deviate from their strategy.
 - You can't do better, given what I do.
 - I can't do better, given what you do.
 - We are stuck there – for good or bad.

The Prisoner's Dilemma NE

		Player 2	
		Defect	Corporate
Player 1	Defect	$(-10, -10)$	$(0, -12)$
	Corporate	$(-12, 0)$	$(-1, -1)$

- Nash Equilibrium of (D,D)
 - Defect is a dominant strategy
- Pareto Improving outcome of (C,C)
 - Both players are made better off.

Strategic Decisions

- Nash Equilibrium of D,D
- In fact, Defect is a **dominant strategy** for both players:
 - A strategy is dominant if it gives a higher payoff than every other strategy, for every strategy that others' play.
 - A strategy is strictly dominant if it gives a strictly higher payoff than every other strategy, for every strategy that others' play.
 - In a dominant strategy equilibrium, all players choose a dominant strategy.
- Pareto Improving outcome of C,C
 - Both players are made better off.

Types of Games

- Many Different types of games.
- Simultaneous Games:
 - Non-Cooperative: Prisoner's Dilemmas,
 - Zero-Sum games: Sport
 - Cooperative: Players can agree on contracts. Implement joint strategies.
 - Types of Coordination games
- Sequential Games: Move order (may) matters.
 - Bargaining
 - Trust
- One-Shot vs Repeated

Pure Coordination Game

- You and your study partner are planning to meet at noon at one of two coffee shops, Lucy's Coffee and Crestwood Coffee. Unfortunately, you failed to specify which one, and you have no way of getting in touch with each other before noon. If you manage to meet, you get a utility of 1; otherwise, you get a utility of 0.
- What is the NE?

		Study Partner	
		Lucy's	Crestwood
You	Lucy's	1,1	0,0
	Crestwood	0,0	1,1

Pure Coordination Game

- What is the NE?
 - Two Pure Strategy NE: (L,L) & (C,C).
- Why a Pure Co-ordination game?
 - Players Interests and payoffs perfectly align

Study Partner

You	Study Partner	
	Lucy's	Crestwood
Lucy's	1,1	0,0
Crestwood	0,0	1,1

Impure Coordination Game

- Battle of the Sexes:
 - Bob and Alice want to go on a holiday together. They prefer to go to the same place together, but Bob has a strong preference for Florida, and Alice Ohio.
 - Where are the NE of this game?

		Bob	
		O	F
Alice	O	3, 1	0, 0
	F	0, 0	1, 3

Impure Coordination Game

- Two NE:
 - (O,O) and (F,F).
 - Because Bob prefers (F,F) and Alice (O,O) this is an impure coordination game.

		Bob	
		O	F
Alice	O	3, 1	0, 0
	F	0, 0	1, 3

The Stag Hunt

- Consider the “stag hunt game” between two players deciding what animal they will hunt. Both hunters need to cooperate to catch the stag. They can catch a hare by themselves, but it provides less meat

- What is the NE?

		Hunter 2	
		Stag	Hare
Hunter 1	Stag	3, 3	0, 1
	Hare	1, 0	1, 1

The Stag Hunt

- **Two Pure NE:**

- Payoff Dominant (Pareto)= Stag
- Risk Dominant = Rabbit

		Hunter 2	
		Stag	Hare
Hunter 1	Stag	3, 3	0, 1
	Hare	1, 0	1, 1

Matching Pennies

- The next game, called matching pennies, involves two players, Even and Odd, who each have a penny.
- Each player must select one side of the penny and simultaneously show the penny to the other player. If the pennies match, Even wins. If they don't match, Odd wins.

		Odd	
		Heads	Tails
Even	Heads	1, -1	-1, 1
	Tails	-1, 1	1, -1

Matching Pennies

- This is a zero-sum game: The total payoff in each square=0
 - One Person wins only if the other loses.
- Is there a NE?

		Odd	
		Heads	Tails
Even	Heads	1, -1	-1, 1
	Tails	-1, 1	1, -1

Mixed Strategy Nash Equilibrium

- Strategy Profiles Don't have to always be pure strategies.
- You can assign probably p to playing heads and $1-p$ to playing tails!
- Some games have no pure strategy NEs. BUT they have a mixed-strategy NE.
- **Mixed-Strategy NE:** Is a stable state in a game where players choose their actions probabilistically, rather than deterministically, and these probabilistic choices are the **best possible responses to each other**, meaning **no player can improve their expected outcome by unilaterally changing their randomized strategy**.

Matching Pennies

- Easier (and more intuitive) to find mixed-strategy NE in Zero-Sum games.
- Why? The idea is you don't want your opponent to be able to **exploit your strategy**.
 - Hence, you must make them indifferent between the pure strategies that you are mixing (in this case of Heads or Tails).
 - If a player strictly preferred one over the other, the only rational thing to do would be to play the preferred strategy with probability one.
- In other zero-sum games (think sports). Why mix your strategies?
 - In NFL, you don't want the offense to exploit your strategy by 'blitzing too much'.
 - In tennis, you don't want your opponent to exploit your strategy by always serving to the left.
 - In Rock-Paper-Scissors, what would happen if you played Rock 100% of the time?
 - What about 50% of the time?

Matching Pennies (slight reframing)

		Defense	
		Blitz	Cover
Offense	Pass	1,0	0,1
	Run	0,1	1,0

Matching Pennies

- How do we find the mixed NE?
 - Assume offense passes with probability p and runs with $1-p$ (2 actions only).
 - Assume defense blitzes with probability q and covers with $1-q$ (2 actions only).
- Offense wants to make the defense indifferent between blitzing and covering.
 - Otherwise, one will always give them a higher payoff and they will always choose that! Exploiting you.
- To do this: $EU_d(\text{blitz}) = EU_d(\text{cover})$

Matching Pennies

To do this: $EU_d(\text{blitz}) = EU_d(\text{cover})$

- Assume $U(x) = x$

$EU_d(\text{Blitz})$:

- Get $U=1$ when offense runs and $U=0$ when offense passes.

$$EU_d(\text{Blitz}) = 0p + (1-p) = 1-p$$

$EU_d(\text{Cover})$:

- Get $U=0$ when offense runs and $U=1$ when offense passes.

$$EU_d(\text{Cover}) = p$$

Matching Pennies

$$EU_d(\text{blitz}) = EU_d(\text{cover})$$

$$1 - p = p$$

$$2p = 1$$

$$p = 1/2$$

Pass with 50%, and run with 50%

- Since the game is symmetrical in payoffs, it will be the same for the defence with (blitz 50%, cover 50%).

Gauriot, Page & Wooders (2023)

“Utilizing modern ball-tracking technology, we compiled a larger dataset, encompassing nearly 500,000 serves over more than 3,100 matches. Our findings revealed that the directions in which players served were remarkably consistent with Nash equilibrium predictions. Players seem to closely equalize the winning probability in each serve direction, in each match they play.”

- Junior players deviated more than Senior players.
 - Implication: Professional players have either learned to adhere to equilibrium play or have been selected for their ability to do so.

Example 2: Some different payoffs

- No longer a zero-sum game (payoffs in each box) don't equal zero.

		Defense	
		Blitz	Cover
Offense	Pass	8,2	4,6
	Run	1,9	6,4

Mixed-NE

- How do we find the mixed NE?
 - Assume offense passes with probability p and runs with $1-p$.
 - Assume defense blitzes with probability q and covers with $1-q$.
- Offense wants to make D indifferent: $EU_d(\text{blitz}) = EU_d(\text{cover})$

Mixed-NE

$EU_d(\text{Blitz})$:

- Get $U=9$ when offense runs and $U=2$ when offense passes.

$$EU_d(\text{Blitz}) = 2p + 9(1-p) = 9 - 7p$$

$EU_d(\text{Cover})$:

- Get $U=4$ when offense runs and $U=6$ when offense passes.

$$EU_d(\text{Cover}) = 6p + 4(1-p) = 2p + 4$$

Mixed-NE

$$EU_d(\text{Blitz}) = EU_d(\text{Cover}):$$

$$9 - 7p = 2p + 4$$

$$9p = 5$$

$$p = 5/9 = 55.6\%$$

$$1 - p = 4/9$$

Pass with 55.6% probability

Run with 44.4% probability

Mixed-NE

Defense wants to make the offense indifferent between Pass and Run, so they are not exploited.

$$EU_o(\text{Pass}) = EU_o(\text{Run}):$$

$$EU_o(\text{Pass}) = 8q + 4(1-q) = 4q + 4$$

$$EU_o(\text{Run}) = q + 6(1-q) = 6 - 5q$$

$$4q + 4 = 6 - 5q$$

$$9q = 2$$

$$q = 2/9, (1-q) = 7/9$$

NE strategy profile is $(p=5/9, q=2/9)$.

A slight tangent

If I wanted to be nefarious, I could announce the following (not this is purely hypothetical).

1. If no one turns up to the next exam, everyone in the class gets 100%.
 2. However, if a person rocks up to the exam, they get their 'exam score' and everyone who doesn't turn up gets a score of 0.
- What do you think would happen?
 - What would you do?
 - Is there a Nash Equilibrium in this game?
 - Would the result differ if this class was smaller, or larger?

A slight tangent

		Everyone else	
You		Skip Exam	Go to Exam
	Skip Exam	100, 100	0, x_j
	Go to Exam	x_i , 0	x_i, x_j

The Stag Hunt

- There is also a Mixed NE in Stag Hunt!
 - In fact, almost all finite games have an odd number of NEs (Pure + Mixed).

		Hunter 2	
		Stag	Hare
Hunter 1	Stag	3, 3	0, 1
	Hare	1, 0	1, 1

The Stag Hunt

- Hunter 1 wants to make Hunter 2 indifferent between Stag and Hare.
 - Hunter 1 plays Stag with p and Hare with $1-p$

$$EU_2(\text{Hare}) = EU_2(\text{Stag})$$

$$EU_2(\text{Hare}) = p + 1 - p = 1$$

$$EU_2(\text{Stag}) = 3p$$

$$3p = 1 \dots p = 1/3; (1-p) = 2/3$$

- Symmetrical game: so it will be the same mixed strategy profile for Hunter 2 (with q).

Finately Repeated Games

- **Finately repeated games** are games in which a one-shot game is repeated a finite number of times.
- Variations of finately repeated games: games in which players
 - Do not know when the game will end.
 - Know when the game will end.
- These have different implications!

Repeated Games: Finite & Known

- If we play a PD with the same opponent for 10 rounds, what is the NE?

Answer: Defect every round. Why?

- **Rollback argument.**
 - In the 10th and final round, the game becomes 1-shot, so Defect is the dominant strategy
 - In the 9th round you know both players should defect in the 10th round, so your decision in the 9th round is your 'new final round' and thus should defect
 - ...Rolls back all the way to the 1st round

Repeated Games

- Now what if the game is infinite/the amount of rounds are unknown/or there is a stochastic end point (10% chance the game ends after each round) ?
- What is the NE?
- **Folk theorem:** Any feasible and individually rational payoff can be sustained as a subgame perfect Nash equilibrium (SPNE) if players are sufficiently patient (i.e., their discount factor is close to 1).
 - In other words, anything goes!
- Evolutionary Game Theory: <https://ncase.me/trust/>

Infinitely Repeated Games: Theory

- An *infinitely repeated game* is a game that is played over and over again forever, and players receive payoffs during each play of the game.
- Due to the time value of money, payoffs must be appropriately discounted. The value of a dollar earned during the first repetition of the game is worth more than a dollar earned in later repetitions.

Recall: Net Present Value

The **net** present value of the *income stream* generated by a project minus the current cost of the project:

$$NPV = \frac{FV_1}{(1+i)^1} + \frac{FV_2}{(1+i)^2} + \frac{FV_3}{(1+i)^3} + \text{L} + \frac{FV_n}{(1+i)^n} - C_0$$

Supporting Collusion with Trigger Strategies

Firm A	Firm B	
	Strategy	
	Low price	High price
	High price	
	Low price	0, 0
	High price	-40, 50
		50, -40
		10, 10

- The Nash equilibrium to the one-shot, simultaneous-move pricing game is Low, Low.
 - This is just a PD
- When this game is repeatedly played, it is possible for firms to collude without fear of being cheated on using ***trigger strategies***.
- ***Trigger strategy***: strategy that is contingent on the past play of a game and in which some particular past action “triggers” a different action by a player.

Supporting Collusion with Trigger Strategies

Firm A	Firm B		
	Strategy	Low price	High price
	Low price	0, 0	50, -40
	High price	-40, 50	10, 10

- Trigger strategy example: Both firms charge the high price, provided neither has ever “cheated” in the past (charge low price).
- If one firm cheats by charging the low price, the other player will punish the deviator by charging the low price **forever after**.
- When both firms adopt such a trigger strategy, there are **conditions under which neither firm has an incentive to cheat** on the collusive outcome.

Sustaining Cooperative Outcomes with Trigger Strategies

- Suppose a one-shot game is infinitely repeated, and the interest rate is i . Further, suppose the “cooperative” one-shot payoff to a player is π^{Coop} ,
- And the max one-shot payoff if the player cheats on the collusive outcome is π^{Cheat} ,

- One-shot Nash equilibrium payoff is π^N ,
$$\frac{\pi^{Cheat} - \pi^{Coop}}{\pi^{Coop} - \pi^N} \leq \frac{1}{i}.$$

- The cooperative (collusive) outcome can be sustained in the infinitely repeated game with the following trigger strategy: “Cooperate provided that no player has ever cheated in the past. If any player cheats, “punish” the player by choosing the one-shot Nash equilibrium strategy forever after.”

Supporting Collusion with Trigger Strategies in Action

Firm A	Firm B		
	Strategy	Low price	High price
	Low price	0, 0	50, -40
	High price	-40, 50	10, 10

- Suppose firm A and B repeatedly play the game above, and the interest rate is 40 percent (0.4). Firms agree to charge a high price in each period, provided neither has cheated in the past.

- **Q: What are firm A's profits if it cheats on the collusive agreement?**
- **A: If firm B lives up to the collusive agreement, but firm A cheats, firm A will earn \$50 today and zero forever after.**

Supporting Collusion with Trigger Strategies in Action

Firm A	Firm B	
	Strategy	
	Low price	High price
	High price	
	Low price	0, 0
	High price	-40, 50
		50, -40
		10, 10

- Q: What are firm A's profits if it does not cheat on the collusive agreement?

$$10 + \frac{10}{(1+.4)} + \frac{10}{(1+.4)^2} + \frac{10}{(1+.4)^3} + L = \frac{10(1+.4)}{.4} = \$35$$

Supporting Collusion with Trigger Strategies in Action

Firm A	Firm B	
	Strategy	
	Low price	High price
	High price	
	Low price	0, 0
	High price	-40, 50
		50, -40
		10, 10

- Q: Does an equilibrium result where the firms charge the high price in each period?
- A: Since $\$50 > \35 , the present value of firm A's profits is higher if A cheats on the collusive agreement. In equilibrium, both firms will charge low price and earn zero profit each period.

Supporting Collusion with Trigger Strategies in Action

- What is the interest rate is 20% (0.2)
- Then $\frac{10(1+0.2)}{0.2} = 60 > 50$ (defecting once)
- Thus, the lower interest rate is more likely to support cooperative (collusive strategies).

Games with an Uncertain Final Period

Firm A	Firm B	
	Strategy	
	Low price	High price
	Low price	0, 0
	High price	-40, 50
	Low price	50, -40
	High price	10, 10

- Suppose the probability that the game will end after a given play is θ , where $0 < \theta < 1$.
- An uncertain final period mirrors the analysis of infinitely repeated games. Use the same trigger strategy.
- No incentive to cheat on the collusive outcome associated with a finitely repeated game with an unknown end point above, provided:

$$\Pi_{Firm A}^{Cheat} = 50 \leq \frac{10}{\theta} = \Pi_{Firm A}^{Coop}$$

The Public Goods Game

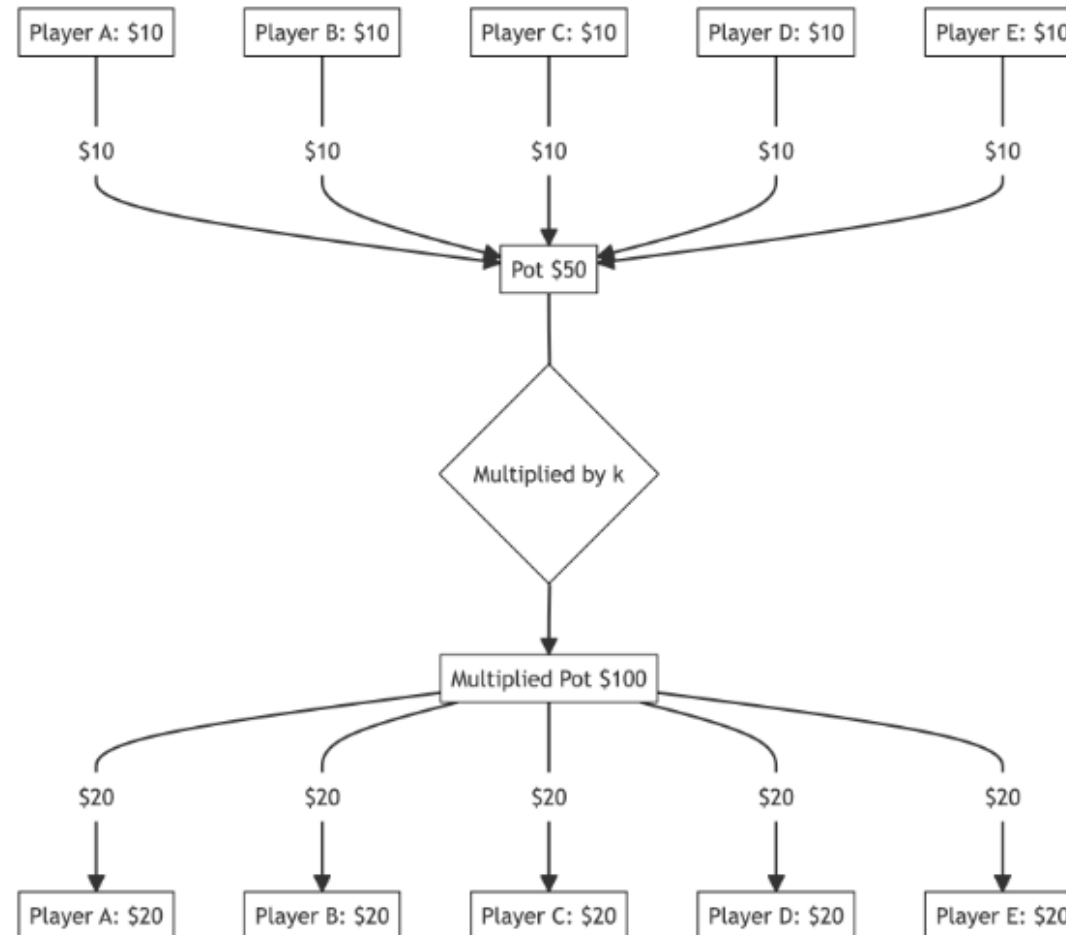
- Recall the Public Goods Problem (Free Riding).
- **The Game:**
- 5 Players
- Each person starts with \$10. Every player can choose whether to contribute some, none, or all of their dollars to the public pot.
 - Every \$1 a person keeps will be worth \$1.
 - Every \$1 contributed to the public pot, will get multiplied by 2x and then equally divided amongst all players.

Public Goods Game

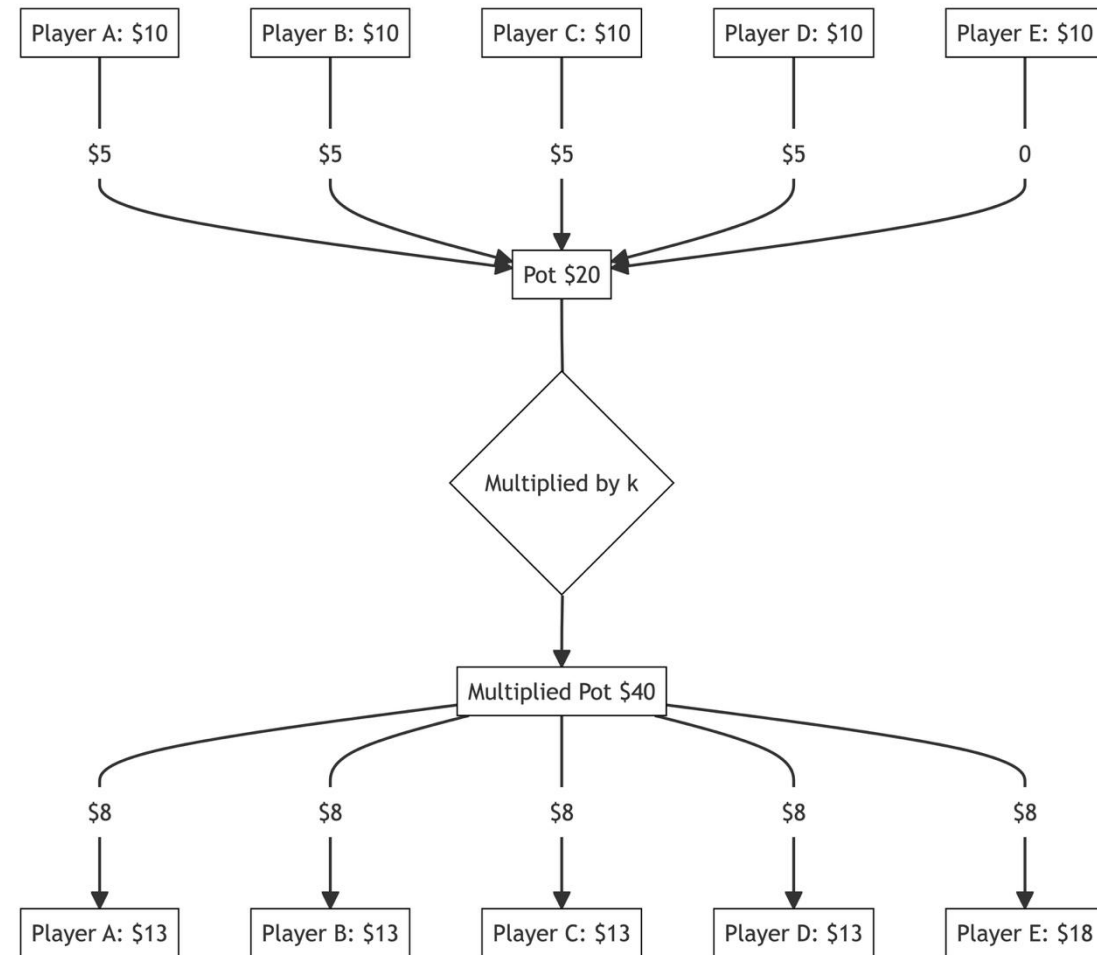
Players: $n > 2$ players

- A Public Goods game is essentially a multi-player Prisoner's Dilemma.
 - In Nash equilibrium in the public goods game, nobody transfers anything to the pot. Any contributions are split between all players, so if there are more players than the multiple, which is normally the case by design, contributions result in a loss to that individual player.
 - Pareto Optimal result is for all players to contribute their full endowment. However, this is not stable (incentive to deviate).
- What is the NE in a 3-round game?
- What is the NE in an infinite game or a game with an unknown end point?

Public Goods Game (Cooperation)



Public Goods Game (Defection)

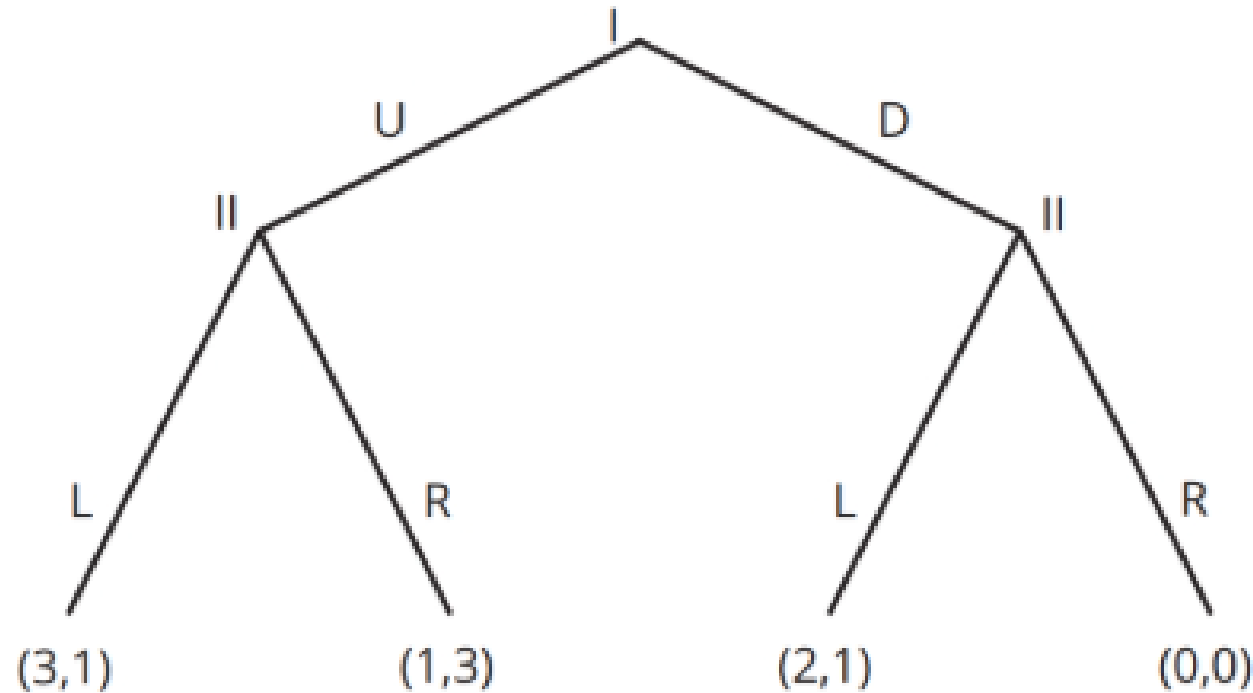


Sequential Games

- Sequential games involve players making decisions in order, with knowledge of previous actions. These games are typically represented in “extensive form” using a game tree.
- We can analyze (and find the Nash Equilibrium) using backwards induction.

Sequential Games: Extensive Form

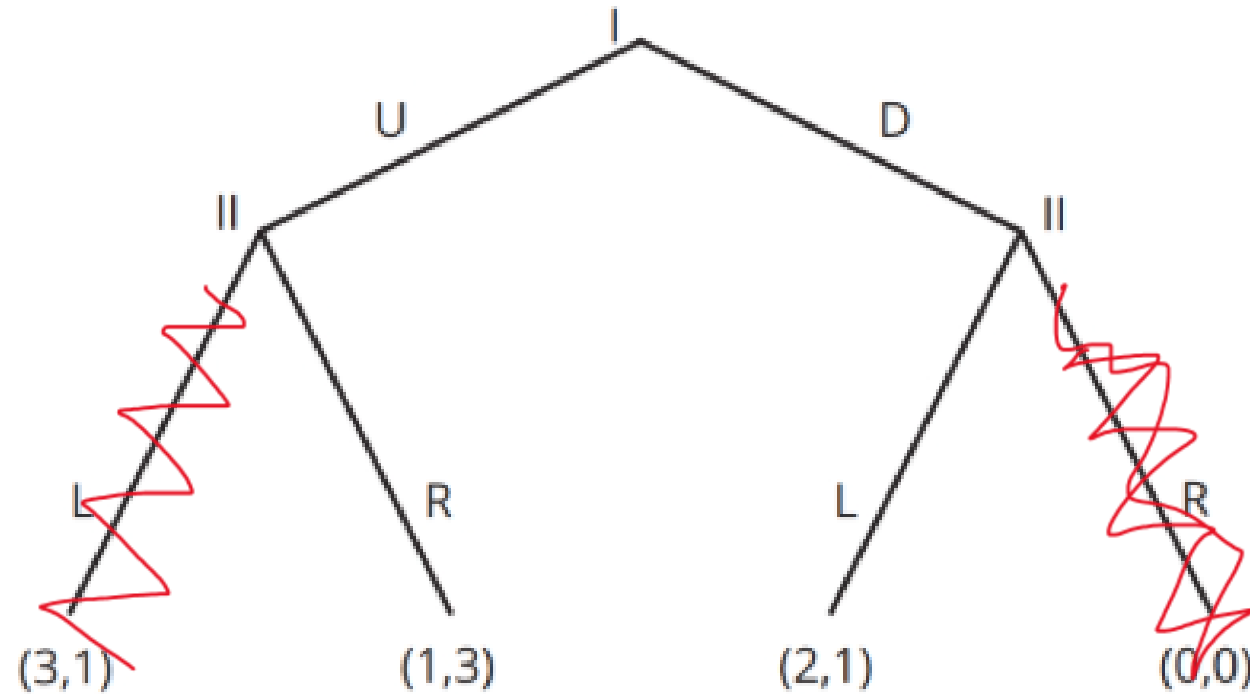
- A representation of a game that summarizes the players, the information available to them at each stage, the strategies available to them, the sequence of moves, and the payoffs resulting from alternative strategies.



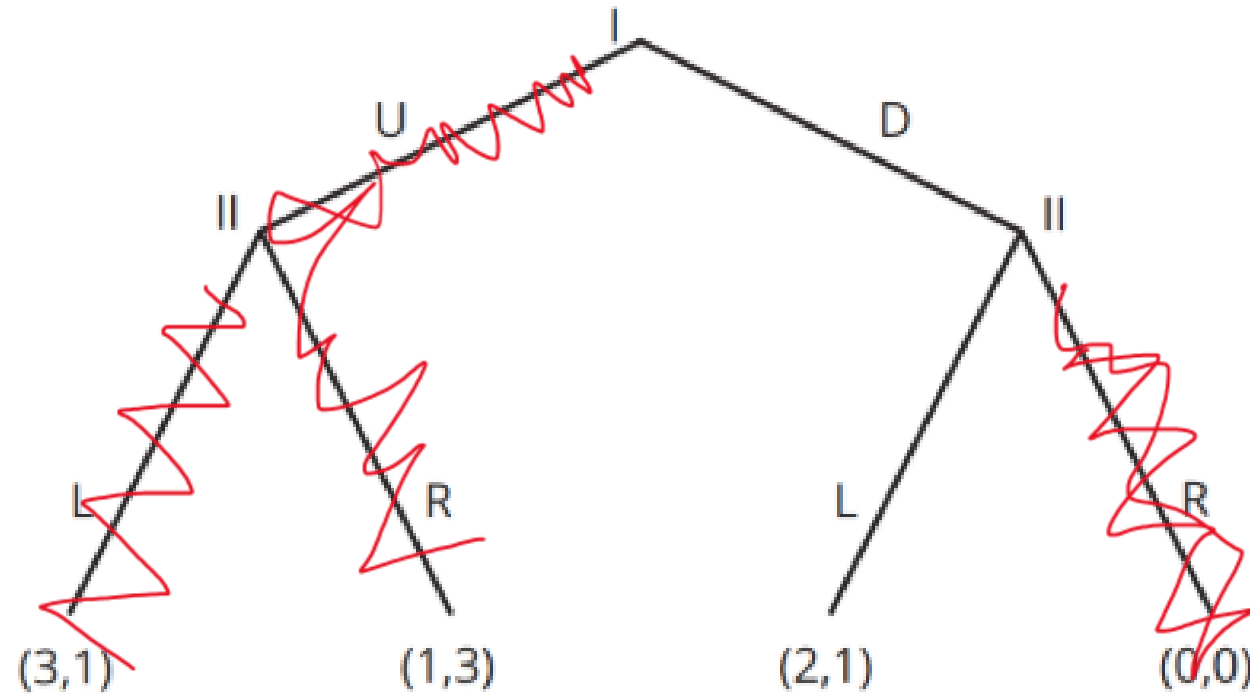
Sequential Games: Solving Sequential Games

- **Backward induction** is a solution technique for solving *dynamic games of complete and perfect information*.
 - Information is **complete** when players' payoff functions are common knowledge.
 - Information is **perfect** when each player knows the full history of the game at the time she moves.
- The process proceeds by first looking at the last possible action, determine what the last player will do in each situation (i.e. information set). Using this information, one can then determine what the second to last player will do. This process continues until one determines all possible actions.

Sequential Games

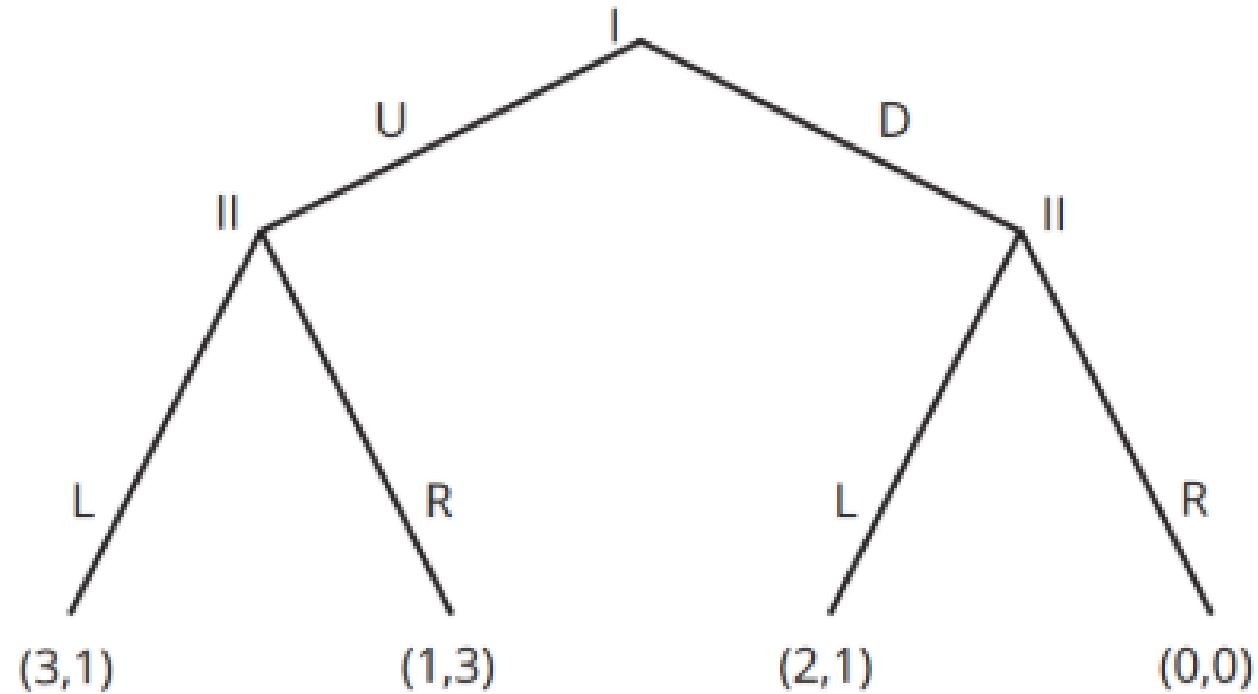


Sequential Games



Subgame

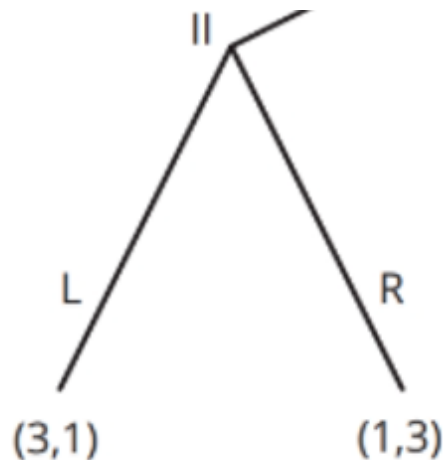
A subgame is a part of a game that can be played as a game itself. It begins at a single node and contains every successor node.



Sequential Games

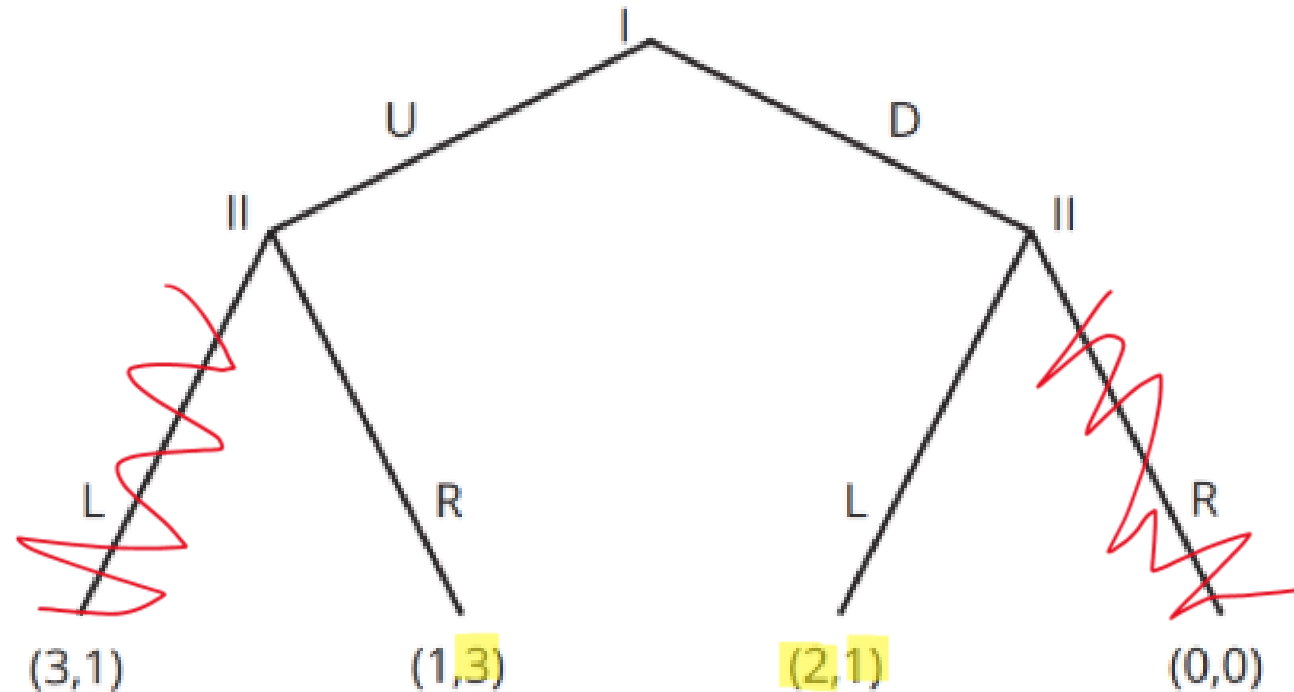
For example, this final stage of the game (if Player 1 chooses U) is a subgame.

- A Nash Equilibrium is subgame perfect if every player plays the Nash Equilibrium in every subgame
 - All subgame-perfect equilibria are Nash equilibria, but not all Nash equilibria are subgame perfect.
- In this case, The NE of this subgame is R, as that is what Player 2 will play to maximize their payoff.



Sequential Games:

- 3 Subgames
- The unique subgame-perfect Nash equilibria is Player 1: D, Player 2: (D,L; U,R)

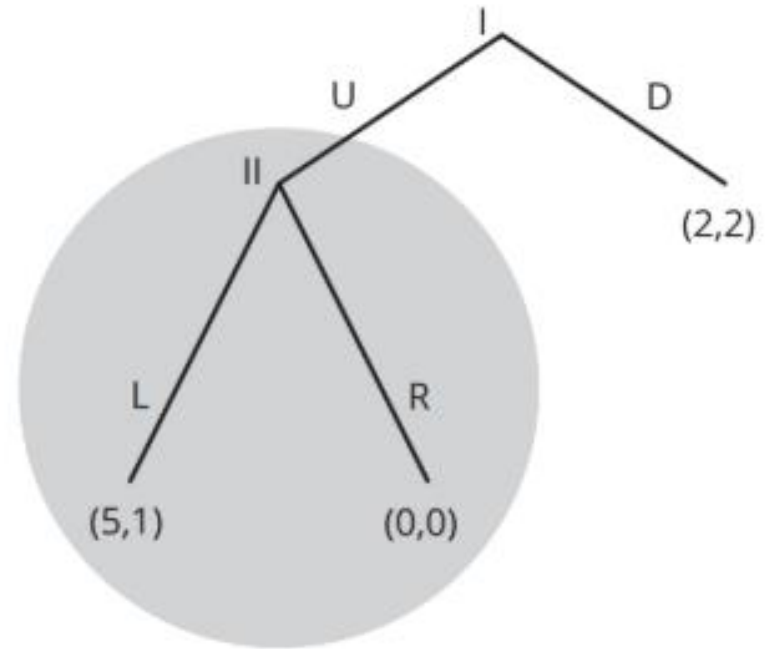


Mutually Assured Destruction

- Question: Since WW2, The USA and Russia (and now other geopolitical powers) have nuclear weapons. Why haven't we seen a nuclear attack?
- **Mutually assured destruction (MAD)**: is a military doctrine according to which two superpowers (such as the US and the USSR) can maintain peace by threatening to annihilate the human race in the event of an enemy attack.
- Is this threat credible?

Mutually Assured Destruction

- MAD: Player 2 says they will retaliate if Player 1 Plays U, by choosing R. If this is the case, then (D,R) is a Nash Equilibrium
- HOWEVER, Player 2's threat of playing R if U, is not credible!
 - If Player 1 chooses U, we know that in the subgame at this node, Player 2 is better off choosing L.

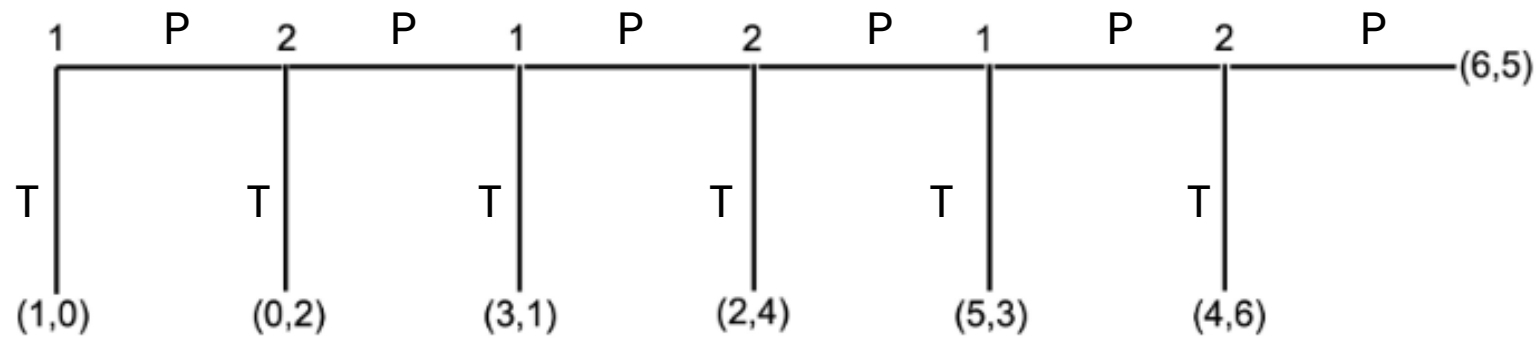


Credible Threats

- Strategic moves are actions that change the game being played, typically from a single-stage to a two-stage game. They come in two forms: unconditional (commitments) and conditional (threats and promises).
- For commitments to be effective, they must be observable and irreversible.
- Unconditional Strategic Move (Commitments). These need to be observable and irreversible. Essentially remove an option from the game tree.
 - If a country creates a technology that ‘automatically’ fires back
- Conditional: A threat involves specifying negative consequences to the other player if they do not play as you wish. “If you don’t clean your room, you won’t get dessert.”
 - Threats and promises only achieve their objective if they are credible. That is, they only work if the other player believes they will be carried out as stated (otherwise, cheap talk).
 - Make the other player believe you are ‘crazy’

The Centipede Game

- How many subgames?
 - 7
- What will Player 2 do at the final node?
- Use backwards induction



The Centipede Game

- There is a unique subgame perfect equilibrium for the centipede game: $S_1 = (take, take, take)$ and $S_2 = (take, take, take)$, where S_1 and S_2 are the set of strategies for player 1 and player 2 respectively.
- In the subgame perfect Nash equilibrium of the centipede game, player 1 takes at the first node

The Centipede Game

Checkmate: Exploring Backward Induction among Chess Players

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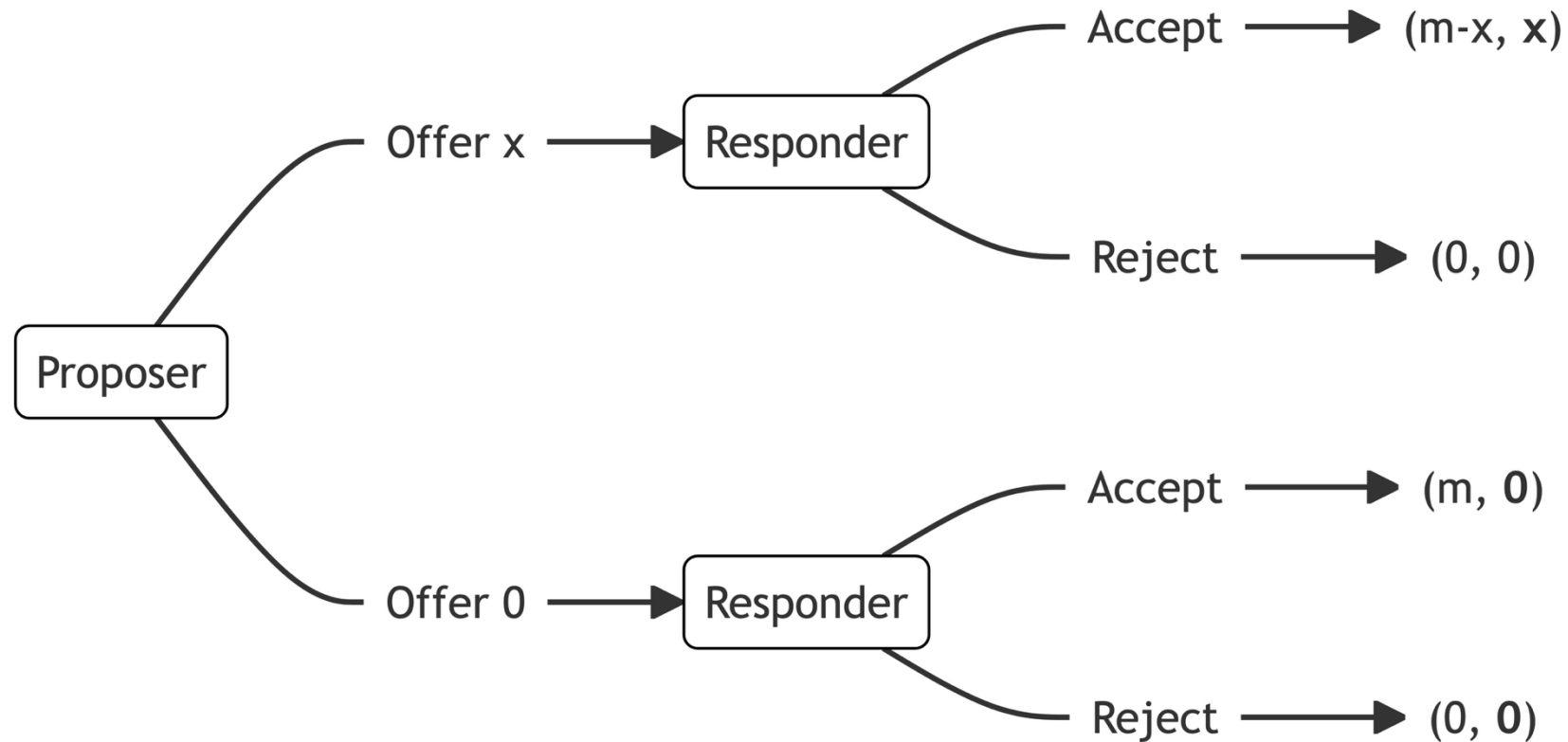
Abstract

Although backward induction is a cornerstone of game theory, most laboratory experiments have found that agents are not able to successfully backward induct. We analyze the play of world-class chess players in the centipede game, which is ill-suited for testing backward induction, and in pure backward induction games—Race to 100 games. We find that chess players almost never play the backward induction equilibrium in the centipede game, but many properly backward induct in the Race to 100 games. We find no systematic within-subject relationship between choices in the centipede game and performance in pure backward induction games. (JEL C73)

The Ultimatum Game

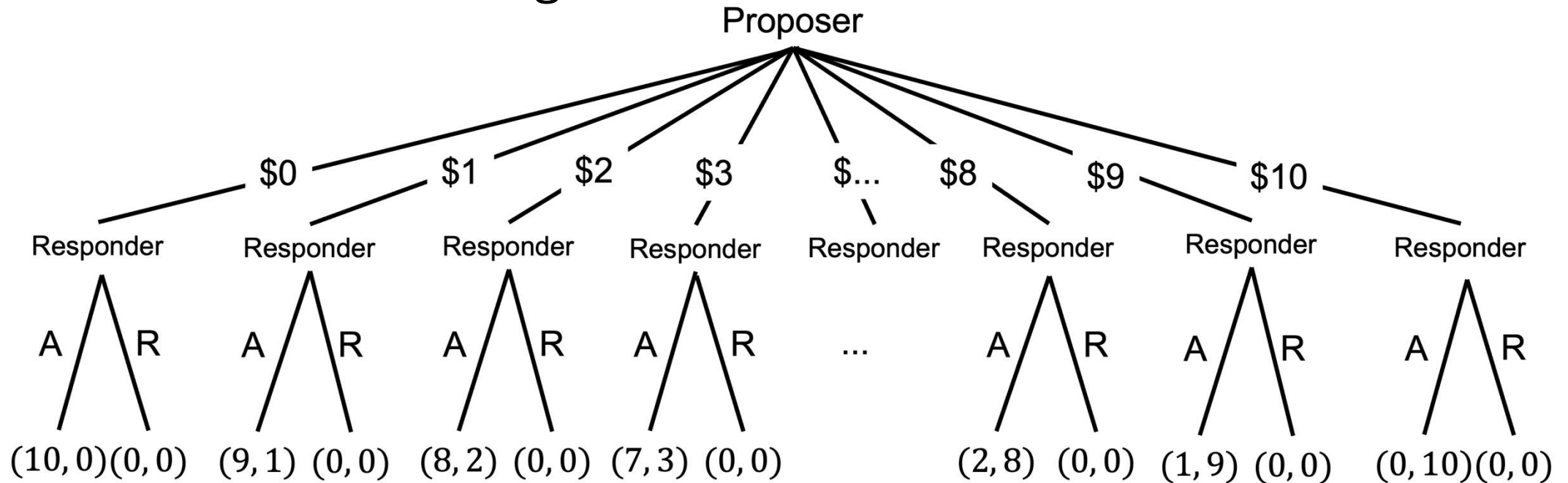
- The Proposer is given a fixed amount of money m . They can then offer some portion x of the sum of m to the Responder
- The Responder can either accept or reject the offer. They make this decision knowing the fixed amount m held by the proposer and the offer x .
- If the Responder accepts, the Responder receives the offer x and the Proposer gets the remainder $m - x$. If the responder rejects, both players receive nothing.

The Ultimatum Game

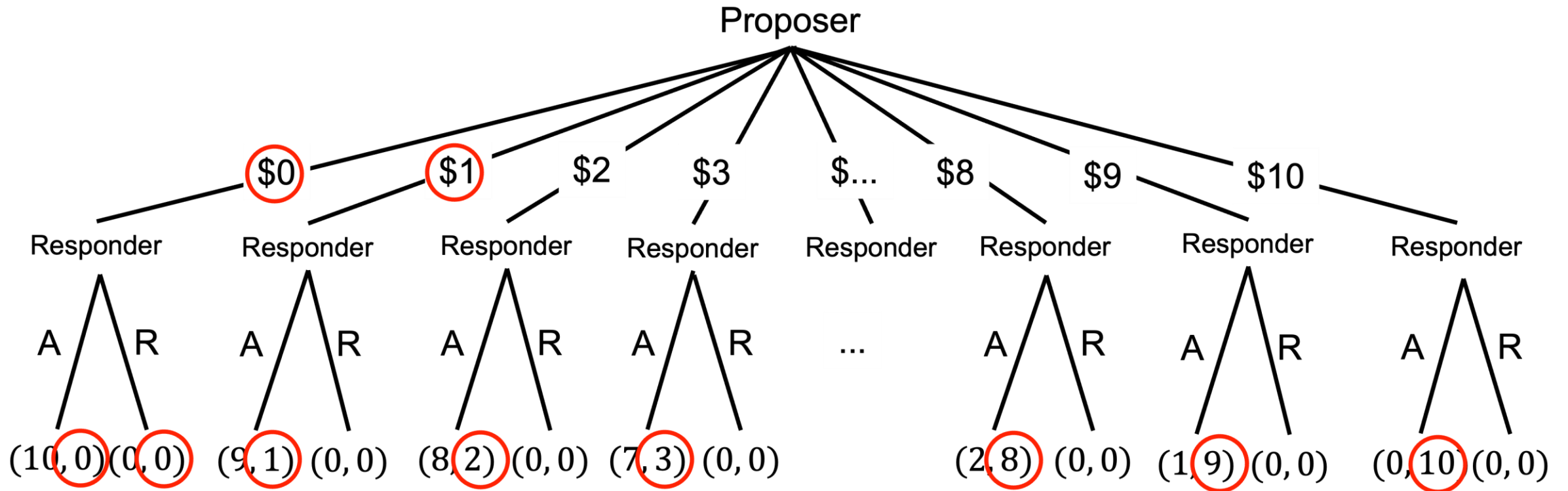


The Ultimatum Game: Extensive Form

- Assume $m = \$10$, and offers 'x' must be in dollar amounts.
- What is the NE of this game?



The Ultimatum Game: Extensive Form



The Ultimatum Game

- We can say that there are two subgame perfect Nash equilibria. The first is for the proposer to offer \$1 and the responder to accept if offered \$1 and reject if offered \$0. The other (weak) subgame perfect Nash equilibrium is an offer of \$0 and acceptance
- More generally, game theory makes a clear prediction on the outcome of the ultimatum game. If the players have monotonic preferences - that is, more is better - the responder accepts any $x > 0$ (and possibly even if $x = 0$) and the the proposer offers the smallest amount the proposer can offer.

The Trust Game

- The trust game involves two players: a sender and a receiver
- Both the sender and receiver are given an initial sum m .
- The sender sends a share of their m 'x' to the receiver. This amount is often called the investment.
- Before the investment is acquired by the receiver, it is multiplied by some factor 'k'.
 - Therefore the receiver get $k \cdot x$.
- The receiver then returns to the sender some share y of their total allocation $m + kx$
- The final outcome is the sender has $m - x + y$ and the receiver has $m + kx - y$. We can represent these payoffs as: $(m - x + y, m + kx - y)$