

# TECH DECK

# PARADOXICAL

## A RACE FOR PARRONDO'S PARADOX



**Ben Cheung, PhD**



**30-45 min**



**2-3**



**7+**



Game  
Theoretic



Puzzle  
Game



Tableau  
Builder

RULES VERSION 2  
Dec 26, 2023

# THE TECH DECK



Playing cards were created in China during the 9th Century. Playing cards were imported into Europe from Mamluk, Egypt, in 1370. By 1377, the French used playing cards with Hearts, Diamonds, Clubs and Spades. The Tech Deck **MODERNIZES** classic playing cards by depicting 21<sup>st</sup> century concepts on each card. It is **PORTABLE** and **VERSATILE**: play games anywhere, any time with anyone. It is a **GAME PLATFORM** you can play many games with.

# THE DOMAINS (SUITS) OF THE TECH DECK



## KNOWLEDGE (BOOK) INFORMATION TECHNOLOGIES

Knowledge is facts and information accumulated by science. It is the theoretical and practical understanding of a subject foundational to science and technology.

## SCIENCE (BEAKER) RESEARCH & DEVELOPMENT

Science is organized knowledge with testable explanations. The natural sciences (biology, chemistry, and physics) study nature. The social sciences (economics, psychology, and sociology) focuses on societies. The formal sciences (logic, mathematics, and computer science) are for abstract concepts.

## TECHNOLOGY (GEAR) INDUSTRY, MANUFACTURING

Technology is the application of scientific knowledge for practical purposes. Engineering is the creative application of science and math to the design and construction of machines, systems, and processes.

## SERVICES (GLOBE) MARKETING

Services are the integration of knowledge, science and technology to create a product to benefit consumers. Services provide a benefit or product for a customer.

# TABLEAU BUILDING GAMES GENRE



**TABLEAU BUILDING GAMES GENRE** – A *Tableau Builder* game is one where the objective is for each player to develop their own board or sandbox. The player tableau usually contains game elements that are manipulated to win the game. It provides options for the players to explore during game play. Typically, the game play of a Tableau Builder provides game elements and operations that allow a player to build or evolve their tableau. Examples of Tableau Building games are Through the Ages, Terraforming Mars, Wingspan, Castles of Burgundy, 7 Wonders, and Race for the Galaxy.

# DESCRIPTION, GAME OBJECTIVE & WINNING THE GAME



**DESCRIPTION** – Paradoxical embodies a game theory mystery called Parrondo's Paradox where two losing strategies when combined in a particular fashion can create a winning strategy. Players race to discover two Parrondo Paradoxes. Players are presented with one of two losing strategies to select from; and they must deduce a winning strategy. Tech Deck card effects can create the narrow advantage needed to reveal a Parrondo Paradox.

**OBJECTIVE OF THE GAME** – The objective of Paradoxical is discover two paradoxes. A paradox is made of set and non-set cards such that the sum value of the set cards exceeds the sum value of the non-set cards.

**GAME END** – The game ends when one player wins the game by discovering two paradoxes.

# GAME SETUP



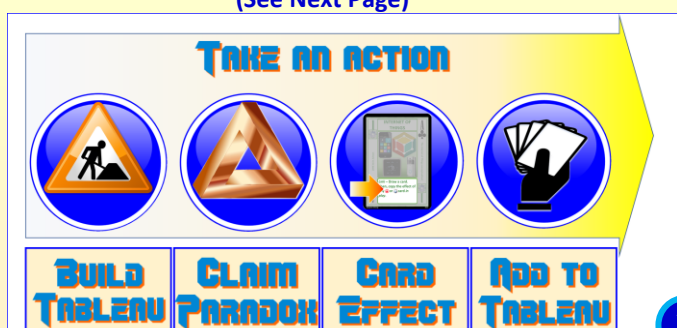
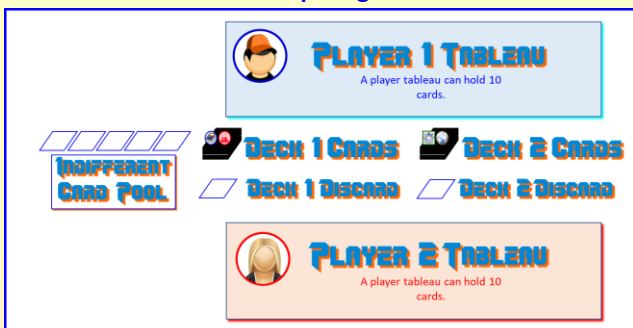
**PLAY AREA** – Each player has a 10-card tableau (that starts with no cards in it).

**DRAW DECK** – Expel the Wild Cards. Cull the Knowledge and Science domain cards to form Deck 1. The remaining Technology and Service domain cards form Deck 2.

**DISCARD PILES, INDIFFERENT CARD POOL** – Each deck will have a discard pile (that starts with no cards in it). Finally, to the side of the play area is the Indifferent Card Pool (that starts with no cards in it).

Game Play Actions in a Player's Turn  
(See Next Page)

Game Setup Diagram



## PARADOXICAL GAME PLAY

On a player's turn, they take one of four actions: Build tableau, Claim paradox, Use Card Effect, or Add to Tableau:

**1. BUILD TABLEAU** – A player reveals a card from either deck and places it face up into their tableau. A player tableau supports up to 10 cards. If their tableau is full, the player must first discard a card from it into the appropriate discard pile. If any deck runs out, reshuffle its discard pile and cards with matching domains in the indifferent card pool to form a new draw deck.

**2. CLAIM PARADOX** – Identify the *valid paradox* in your tableau (see below). Afterwards, the indifferent cards of the paradox are placed to the side of the play area and become *Neutral Cards* that can be affected and used by Card Effects. The *Indifferent Card Pool* can hold up to 5 cards. If it exceeds 5 cards, the active player discard cards from the pool until there are only 5 cards left. After a player claims a 10-card paradox (full house or straight), they draw 3 cards (from either draw deck) and puts up to two cards from their hand into their Tableau. Give the player a token denoting they have claimed a paradox. If this is the second paradox they have claimed, they immediately win the game.

**3. USE CARD EFFECT** – Use a Card Effect from a card in your hand or a card in your tableau (see below).

**4. ADD TO TABLEAU** – A player reveals a card from their hand and adds it face up to their tableau. A player tableau can hold up to 10 cards. If their tableau is full, the player must first discard a card from it into the appropriate discard pile. Note: players start the game with no cards in hand, but they can get cards via Tech Deck game effects.

**PLAY PASSES** – After a player has taken an action, play passes to the next player on the left and they become the active player.

## VALID PARADOX

**VALID PARADOX** – A valid paradox has either 8 cards or 10 cards made from face up tableau cards. A paradox is composed of set cards, and an equivalent number of indifferent cards which serve as a counterweight to the set cards. The set cards are composed of either two pairs, a pair and a triple (full house), or a straight (sequence). The indifferent cards can be of any value and domain.

**Two Pair Paradox** – This 8-card paradox is comprised of a set of two pairs and four accompanying indifferent cards. Each card in each pair must be from a different deck. Thus, one card in the pair must be a (🎴, 🎴) domain card, and the other must be a (🎴, 🎴) domain card. The sum value of the set cards must be higher than the sum value of the indifferent cards. If set cards had positive value, the indifferent ones negative, their total must be positive.

**Full House Paradox** – This 10-card paradox is comprised of 5 set cards (one pair and a triple), and five accompanying indifferent cards. Each card in the pair must be from a different deck. The sum value of the set cards must exceed the sum value of the indifferent cards. Expressed in a paradoxical way, if the set cards (pair & triple) had positive values and the indifferent cards had negative values, the total sum value of all the cards in the paradox must be positive.

**Straight (Sequence) Paradox** – This 10-card paradox has 5 set cards that form a numerical sequence (e.g., 5-6-7-8-9), and five indifferent cards (of any value and domain). Cards in the sequence must be from different decks. The sum value of the set cards must exceed the sum value of the indifferent cards. Put in another way, if the set cards all had positive values and the indifferent cards all had negative values, the total sum value of all the cards must be positive.

## USING A CARD EFFECT

**USE A CARD EFFECT** – Use a Card Effect from a card in your hand or a card in your Tableau. To use a card effect from your hand, reveal the card, use its effect, then return it to your hand. The game effect of a card in your Tableau or hand can only be used once until a paradox is claimed. But that card may still be used to claim a paradox. If a game effect references a deck or discard, you can choose which deck or which discard pile to use. If a game effect refers to a neutral card, they are cards in the indifferent card pool resulting from set aside indifferent cards of a claimed paradox. The Indifferent card pool has a 5-card limit. Some card effects have draw card abilities. The maximum hand size is 5. If a player exceeds 5 cards, they must discard cards into the appropriate discard pile until they have 5 cards in hand.

## GAME END

**GAME END** – The game ends when a player has discovered two Paradoxes. A Paradox is when you have 4 or 5 set cards with an equal number of indifferent cards, so the sum of the set cards exceeds the sum of the indifferent cards.

## FOUR PLAYER PARADOXICAL VARIANT

**FOUR PLAYER VARIANT** – Paradoxical can be played with 4 players using two Tech Decks. Follow the rest of the rules normally for game setup and game play.

## PARADOXICAL PARADOXES RELATIONSHIP TO PARRONDO'S PARADOX

**PARADOXES** – Drawing only from either deck never results in a set (losing strategies). The average value of any card is 7. Thus, 5 set cards will sum to 35, and 5 indifferent cards will sum to 35 for a total of 0. So, on average, a player should not be able to find a group of set cards with an equal number of indifferent cards that sum to greater than 0.

# PARADOXICAL GAME PLAY AFTER CLAIMING A PARADOX

## EXAMPLE PARADOX

**EXAMPLE PARADOX:** The tableau of Player #1 has a 2,6,7 of Knowledge, 3, 10, 12 of Science, and 2, 12 of Technology and 7,12 of Service. The cards on the left were drawn from Deck 1 and the cards on the right were drawn from Deck 2. The Set cards are a full house (a pair of 2s and a triple of 12s). There are also 5 indifferent cards that accompany the Full House to form a Paradox. For this to be a valid Paradox, the set cards (Full House) value (40) must have a sum which is greater than the indifferent card sum (33). In this case,  $40 > 33$ , so this is a valid Paradox.

## EXAMPLE PARADOX

### FULL HOUSE

The Set cards are a full house made of a pair of 2s and a triple of 12s with a sum value of +40 ( $3 \times 12 + 2 \times 2$ ).

### INDIFFERENT

Five indifferent cards accompany the set cards with a sum value of -33. After claiming, these become neutral cards.

## Deck 1 CARDS



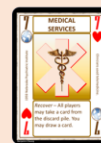
Pair

## Deck 2 CARDS



Triple

Sum +40



Sum -33

## AFTER CLAIMING A PARADOX

**AFTER CLAIMING A PARADOX:** After claiming a valid Paradox, the set cards of the Paradox are discarded into their respective discard piles. The five indifferent cards of the Paradox are set to the side of the play area and are now considered Neutral Cards for Game Effect purposes. The indifferent card pool can hold 5 cards. If there are more than 5 cards in the Indifferent Card Pool, the active player chooses which cards to discard into their respective discard piles until there are only 5 cards left in the Indifferent Card Pool.

## AFTER CLAIMING A PARADOX

### FULL HOUSE

After claiming the Paradox, the set cards of the Paradox are discarded into their respective discard piles.

### INDIFFERENT

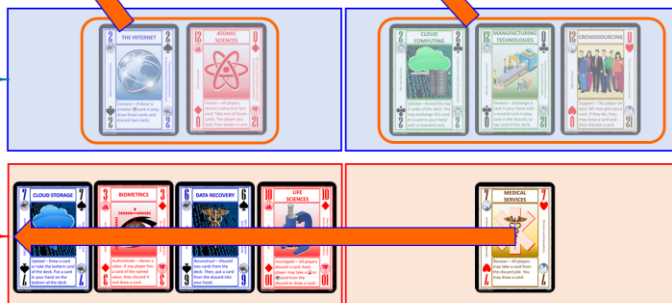
The five indifferent cards of the Paradox are set to the side of the play area and are now considered Neutral Cards for Game Effect purposes. The neutral card pool can hold 5 cards

## Deck 1 CARDS

## Deck 1 DISCARD

## Deck 2 CARDS

## Deck 2 DISCARD



## TECH DECK RESOURCES: RULES, VIDEOS

Rules and videos for Tech Grid Poker, Tech City, Tech Exchange, Tech Chess, Gears of Industry, Chronological, Elevator Pitch, Peer-to-Peer, Cardoku, Newsworthy, Card Barrage, Prisoner's Trilemma, Tricks of the Trade, Host a Heist Dinner Party and Paradoxical are at my homepage [cheung.interzone.com](http://cheung.interzone.com), Boardgamegeek (BGG) and my Youtube channel.



## CREDITS

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