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## **Tron : the Board Game**

Although Tron the movie is a very complex exploration of the digital world abstracted into a real life atmosphere, it is most recognized through a mini-game the characters play. In that mini game players race "Light-Cycles" (futuristic, enclosed motorcycles) against each other across a grid. Each racer leaves a 'tail' or a solid wall behind it as it moves across the grid, thus any player who tries to cross that tail will ultimately crash. The goal of the game then is to eliminate the other players. This is the activity that our game is based upon.

This game in its most basic form is flawed. Given that the racers start side by side and move at similar rates the logical strategy would lead to each player spiraling on half the grid space until eventually they both run out of room and crash at the same time (Figure 1). The problem is that the game is both deterministic and has only a single goal that both players are trying to achieve. Our implementation addresses these issues. We dealt with the singular goal flaw by introducing a capture the flag based play mode with a scoring system. Now instead of victory being determined solely by survival it is attained by a scoring system which gives values to kills, captures, and deaths. We also introduced randomness and hidden information to deal with the deterministic nature of the game. First we introduced a random card drawing for the placement of the flags as well as the placement of the racers following a crash. We introduced new "special cards" to go along with our base "turn" and "move forward" cards. These cards are held in a players hand such that the other players know how many special cards a player has but they have no information of which exact cards the player is holding.



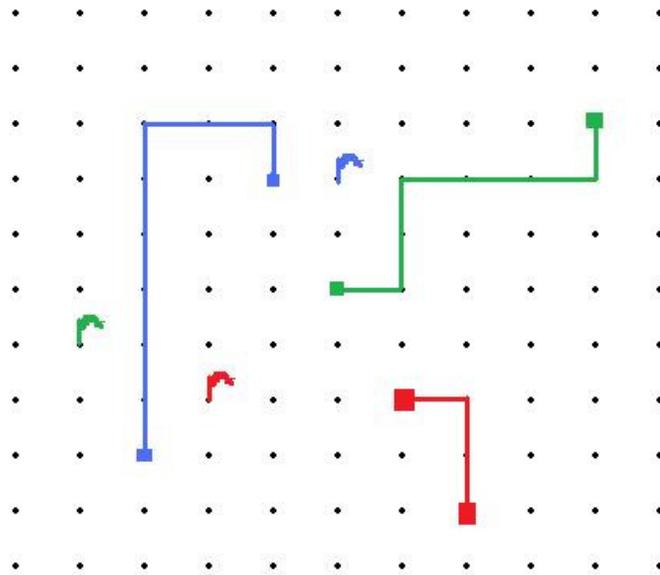


Figure 2: Example Game

While the first iteration was enjoyable to the players, there were many issues raised. Far too much of the game's objective information was perceivable to all players (Salen Zimmerman 208-210). All players knew that their opponent and they themselves would undoubtedly move one square on their next turn. Though a player had the choice of what direction to go, the dynamics of movement and interplay, as defined by Hunicke, rarely escaped the predictability realm (Hunicke 3). This is particularly true when a player is enacting a strategy. For example: if an in-game situation exists where one player is an optimal five moves away from a flag, and an opponent lies an optimal eight moves away, the closer player is committed to an optimal path, in order to capture a flag before an opponent. This player can only spare a brief divergence from an optimal path. It was a very pressing issue that the game was deterministic. Once the flags were placed, players had very few choices to make. Because information on the board is known to all players, any opponent can easily decipher this player's future moves and quite easily figure out an optimal path that will with little doubt be taken by a player and ultimately lead to a flag being captured. All opponents knew they were virtually helpless to stop this player from capturing a flag. All the interaction that came about was fairly predictable with the limited amount of moves available. In general this iteration was simply a predetermined race-game to the nearest flag with little interaction between players (Partlett 8-9). The game had already decided where flags

would be placed (Salen, Zimmerman 205). Meaningful play cannot exist when an outcome is predetermined, because predetermination is not complex (Salen Zimmerman 152-158).

Furthermore, the player who is farther away from the flag may only reach the flag if the closer player miscalculates and diverges too far from the optimal path. In other words, the closer player messes up. The strategy of hoping another player makes a mistake hardly stirs up dramatic tension when skilled players rarely make a mistake (Hunicke 3). Additionally, the severe unlikeliness of such an outcome occurring among skilled players prevents the strategy from being viable. In truth, this method of winning can be interpreted as chance that another player makes a mistake, and no meaningful play can occur amongst skilled players when progression is purely chance based instead of skill based. Chance is not complex (Salen Zimmerman 152-158).

Random flag placement was intended to minimize path predictability. If it were known beforehand where a flag would reappear on the game board, players would invariably drive their tokens to advantageous positions. Again, the same situation would occur as mentioned above where a player could unquestionably obtain a flag by sticking to an optimal path. With all future moves known or easily calculable, the entire Tron game would be far too predictable to be meaningful (Salen Zimmerman 152-158). With random flag placement, the game existed as a series of deterministic paths. Although in the long run this iteration seemed deterministic, the random placing of flags made it impossible for players to know or determine who would win. That information, in Celia Pearce's terms, was only known to the game (Salen, Zimmerman 205-208). Some drama was stirred up as players hoped that the benevolence of the game's decision would reveal advantageous cards. This is akin to many games of chance, where players hope that fate or the game will smile upon them. This is Roger Caillois' Alea in its purest form (Caillois 133-135). However, to avoid situations of extreme benevolence and what could be interpreted as extreme bias on the part of the game, the rule was instituted that a player may not get the same flag twice in a row unless that flag had since been captured by another player. This prohibited a player from benefiting disproportionately from chance. Yet, this iteration was a far cry away from the highly dynamic and complex light-cycle scene in the film *Tron*, where a riders decision and skill, not the game's benevolence, determined success.

Other major issues discussed included references to the fact that there was little to no malicious behavior towards other players and that the board was too large for three players. The overall goal of our design was to have a game where obstructing and ultimately destroying your opponents would be a large part of the game play. As part of our next iteration we made the board smaller as a 10X10 grid (later it was expanded back to 12x12) and let each player have an arbitrarily long tail. We also introduced special cards in an attempt to throw other players off of each other's strategies by expanding the space of possible moves and increasing game complexity. To our delight, shrinking the board did lead to increased interactions and exciting dynamics were fostered by the implementation of special cards. Before they are played, special cards exist as information known to only one player. They remain information known to only one player until they are played (Salen, Zimmerman 205-208). Previously, what direction card a player would use in a round of play was intended to be information known only to one player, but the predictable nature of the game compromised the secrecy of cards not yet played. After the introduction of special cards, a player might know what situations would be advantageous for an opponent to play a special card, but it was difficult to predict whether an opponent was capable of executing a special move. Players were encouraged to calculate how likely it was for a certain special card to be in the hands of an opponent. Utilization of a special card was and is completely at the discretion of the player who possesses the card. That is, a player may choose when to use a special card and who to use a special card on. Skillful utilization of a card rewards a player through advancement, escape, or the hindrance of an opponent. Optimal usage saves a player's life, results in a captured flag, results in an opponent not getting a flag, or results in an opponent's death. The prospects of creating, avoiding, or escaping situations created dramatic tension in our game (Hunicke 3).

The dynamics arising from the use of special cards required a modest number of rules to resolve problems. Play-testing revealed that the order in which special cards are enacted could result in drastically different outcomes. In a single situation, two players were set up to grab the same flag. One player used a normal card to land in a nexus occupied by a flag, while another player used the special card "uber-dash" to go through the position occupied by the flag. Questions arose regarding who reached the flag first, who should receive points, and who should

die. Does uber-dash mean one player reaches the flag because that player is quicker, or should the person who used the normal card reach the flag first because that player was closer? Should points be shared or canceled out? To resolve this, moves were prioritized by type from first enacted to last enacted, and the ordering became an explicit part of the rules. According to this ordering, the player who used the normal card reached the flag first, a clear benefit to using normal cards. However, to not belittle the superiority of special cards and in the interest of carnage, it was decided that a player must live through a round of play in order to capture a flag. From this rule, both players had aesthetically obliterated each other in a dramatic fight for a flag (Hunicke 3). There was no score change, reflecting a cancellation of effects. Each player's efforts were meaningful enough to combine in both gain and loss zero-sums for both (Salen, Zimmerman 255).

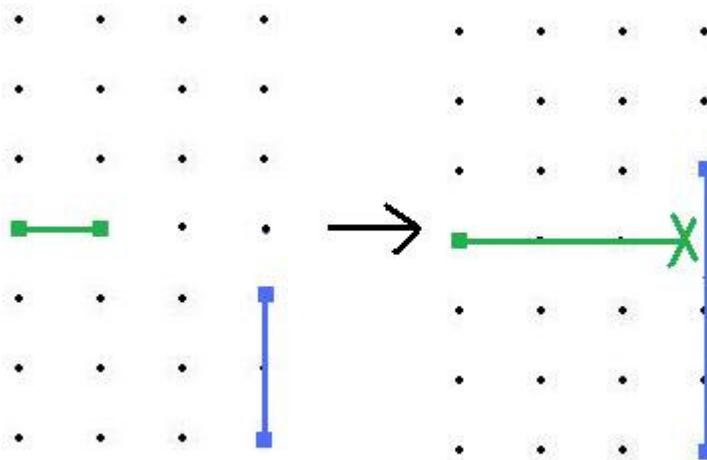


Figure 3: both players dash, player closest wins

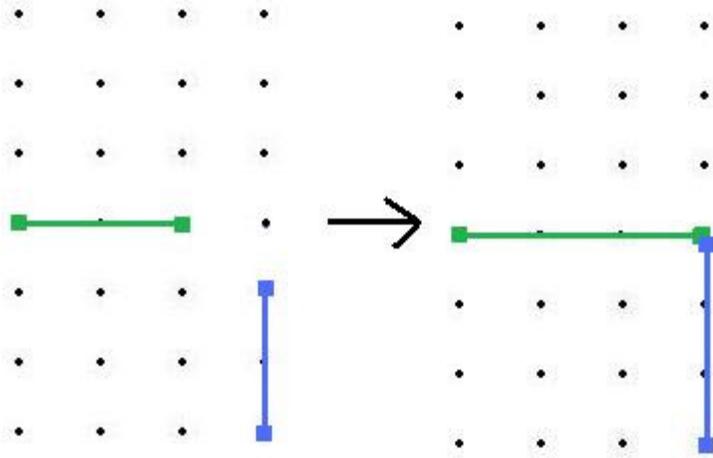


Figure 4: Mutual Death

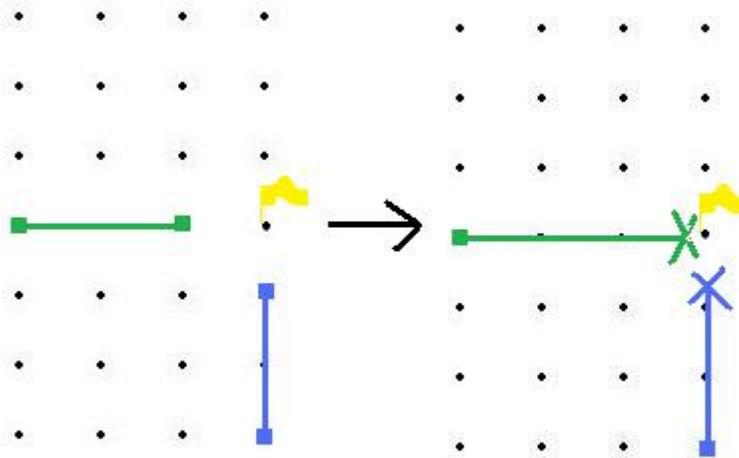


Figure 5: both players die, flag remains

Despite the addition of the Special cards, the game remained both somewhat dry and dependent upon the luck of the draw. The latter problem had been alleviated just a bit through skillful use of the Special cards, but the best times to use these cards quickly became obvious after playing a few games, so it was quite easy to master. Consequently, the random placement of flags was still the largest factor in determining the winner, so we had to take control of the dynamics of our game and find a way of slowing down any player that just kept getting lucky. Rather than create a new mechanic, we decided to introduce Negative Feedback using what we already had, hopefully giving the players who were losing more opportunities to catch up (Hunicke 3). Since Special cards are the only real advantages we have, we decided to give all

players a Special card whenever one of their opponents captured a flag (that is, everyone but the guy who scored gets a card). In this new version, players could save up Special cards, and use multiple ones to trap their opponents or quickly pick up several flags at once. With several cards at their disposal, the losing players also began to gang up on the leader, sometimes forgoing their own objectives for the communal good and creating a new form of cooperative game-play (Player Cooperation instead of just Systemic Cooperation, as defined by Salen and Zimmerman, pg. 256).

At this point we had a game that was definitely not deterministic, created palpable tension, afforded multiple ways to win, and had enough variety in strategies that it did not become predictable. Still, the game suffered from boring stretches when the intentions of the players were obvious and not in direct conflict, and yet everyone still had to methodically move their pieces one space at a time to progress. Inspired by the idea of "rule-breaking as game design" (Salen, Zimmerman 281), we decided to break our most important, and yet tyrannical, rule: the one-space-at-a-time method of movement. Early on we had considered the different possibilities for ways to move, and we had selected one-space-at-a-time over arbitrary-number-of-spaces-at-a-time because it was simpler. But after playing a few rounds with unlimited straight-line movement on each turn, we realized how much potential had been lost for trapping and killing each other, which we found to be more exciting than capturing flags. Rather than discard the one-space method that we had worked hard to balance, we compromised and combined the two games, adding the new method of movement as the "Over-Drive Mode". The result is a game that drastically changes periodically, making strategies harder to maintain and outcomes harder to predict.

In the end, our game plays much differently from the one seen in Tron, but it is still recognizable as a similar game. The core elements of the Grid, the Light-Cycle Tails, and the "Crushers" (which are actually called Recognizers in the film - hardcore Tron fans can use this terminology if they wish) are so distinct that they can get the player to enter Tron's realm of fantasy, just as Battleship (which is an incredibly abstract game, really) can create a fantasy based on naval warfare. Yet, playing the game is a completely different experience from riding a motorcycle or playing a videogame. It is a game of strategy and luck (like most board games)

rather than concentration and reflexes. I think we can conclude from this exercise that if you take the theme from one type of game and mix it with the mechanics of a different type, the experience will be affected more by the mechanics than the thematic elements.

#### Works Cited:

Caillois, Robert. "The Definition of Play and The Classification of Games" Game Design Reader: A Rules of Play Anthology. Ed. Salen, Katie, Eric Zimmerman. Cambridge: The MIT Press, 2006. 122-147.

Hunicke, Robin, Marc LeBlanc, Robert Zubek. "MDA: A Formal Approach to Game Design and Game Research" 2004. <http://www.cs.northwestern.edu/~hunicke/MDA.pdf>

Partlett, David. The Oxford History of Board Games. Oxford: Oxford University Press, 1999.

Salen, Katie, Eric Zimmerman. Rules of Play: Game Design Fundamentals. Cambridge: The MIT Press, 2004.

## Rules for Tron

### **Equipment:**

- 1 Game Board (for 3 players this should be a 12x12 Grid; 4 players = 14x14; 5 players = 16x16, etc)
- 1 Light-Cycle for each player (Lightcycles consist of a two tacks that can be stuck into the board, and a piece of string between them)
- 1 Flag per player
- 1 "Forward" card, 1 "Left" card, and 1 "Right" card for each player
- 1 Row card for each Row on the Grid
- 1 Column card for each Column on the Grid
- A deck of Special Cards, including:
  - 3 Dash cards
  - 3 Uber-Dash cards
  - 3 Crusher cards
  - 1 Cut Tail card
  - 1 Retract Tail card
  - 1 Over-Drive card

### **How to Win the Game:**

The first player to 15 points wins the game. If two players reach 15 on the same turn, then whoever reaches 16 points first wins, and so on.

### **Points:**

- Capturing a flag: 3
- Killing another player: 2
- Getting killed: -1 (including by Crusher and suicide)
- Mutual kill: 0
- Player getting killed by a Crusher you place: 0

### **Setup:**

- 1) Players draw Row cards to determine order of placement. Higher cards go first.
- 2) Players place the head of their token anywhere on the board.
- 3) Players place the tail of their token on the board, establishing initial direction and tail length of one.
- 4) Row and column cards shuffled, and then the top cards are drawn to determine placement of flags.
- 5) Each player receives a turn left, turn right, go straight, and one random Special card.

### **Gameplay:**

- 1) To start a round of play, each player chooses one card to use from their hand. This may be a regular movement card, or any of the Special cards. All players flip over their cards simultaneously. No player may "pass."

- 2) Players enact the cards that they played in the following order: Regular Movement, Cut Tail, Retract Tail, Dash, Uber-Dash, Crusher, and Over-Drive.
- 3) Any Special cards that were used are placed back into the pile, and the pile is shuffled.
- 4) Any Players who died remove their pieces from the board, and points for kills and deaths are awarded.
- 5) Any Players who captured flags may remove those flags and award themselves points for the capture. When a player captures any flag, all the other players get to draw an additional Special card. If not enough special cards exist in the special card deck, distribute remaining cards as fairly as possible, possibly distributing none at all.
- 6) A Row and Column is selected for each Player who died and must be reincarnated (see Placement).
- 7) A Row and Column is selected for each flag that was captured and must be replaced (see Placement).

## **Placement:**

### **Players**

To replace their Lightcycle after destruction, a Player must draw the top cards from the Row and Column piles. If this space is unoccupied (there is no Lightcycle, Flag, or Tail on that space) the Player puts their Lightcycle there. Otherwise, they must continue drawing Row-Column pairs until they get an unoccupied space.

### **Flags**

To replace a flag after a capture, a Player must draw the top cards from the Row and Column piles. If this space is unoccupied (there is no Lightcycle, Flag, or Tail on that space) the Player puts the flag there. Otherwise, they must continue drawing Row-Column pairs until they get an unoccupied space. A player must live through the current round of play for a flag to be considered captured. A Player may not capture the last flag that they have placed, but each time a flag is captured and moved it is considered a new flag. Imagine the following scenario:

Player 1 captures a flag at (1,1) and places a new one at (2,2)

Player 1 may not capture the flag at (2,2)

Player 1 captures a flag at (3,3) and places one at (4,4)

Player 1 may not capture the flag at (4,4), but CAN capture the one at (2,2)

Player 2 captures the flag at (4,4) and places a new one at (5,5)

Player 1 may capture ANY flag, but Player 2 may not capture the flag at (5,5)

### **Crashes**

-If a player crashes into the tail of another player, that player is destroyed.

-A tail cannot be destroyed by crashing into it.

-A killed player's tail does not disappear from the board until after the end of the current round of play.

-If a player tries to drive off the grid, that player is destroyed.

-If a player crashes into a Crusher, that player is destroyed. The Crusher is not harmed.

-When a player crashes into the head of another player, both players are destroyed. Neither receives or loses any points.

## Cards

Each player has a hand consisting of three regular movement cards and potentially any number of Special Cards.

### Regular Movement Cards

Each player has three cards in their hand at all time: "Forward", "Left", and "Right". Normally, when a player plays one of these cards, it means that they are moving one space in that direction, relative to the way they are already facing. This is not true when the game is in "Over-Drive".

### Special Cards

A special card is discarded into a deck of all special cards after it has been used.

### Cut Tail

When a Player plays this card, they gain the ability to move into a space occupied by a tail for one turn. They choose the direction they wish to move in, and if a tail is in their way, it is cut off at that space. The portion of the tail that is not attached to a lightcycle disappears from the board. A player must be next to the tail intended to be cut in order to use this card.

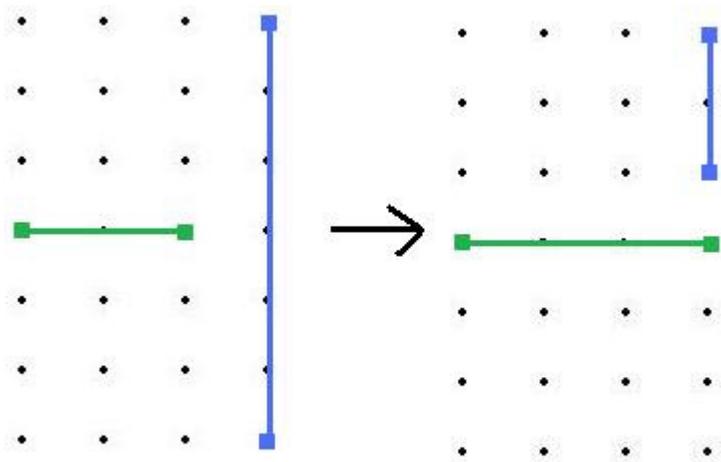


Figure 6: Cut Tail

### Retract Tail

When a Player plays this card, they use their turn to make their tail as small as they want. The remains of the tail must still lie along the path that the tail previously occupied, and the player may not leave their tail at a length less than one.

### Dash and Uber-Dash

While in normal mode, these cards let a Player move 2 or 3 spaces on their turn instead of one. The Player gets to choose which direction to move, but they can only move after all the Regular Movement has been done.

### Crusher

When a Player uses this card, they take a Crusher and place it on a line between any two spaces

(NOT on a space). If there is a Crusher that is not yet on the board, the Player must use that one. Otherwise, the Player may pick any Crusher and move it to the desired location. A Crusher may not be placed in an already occupied position, including where a tail exists.

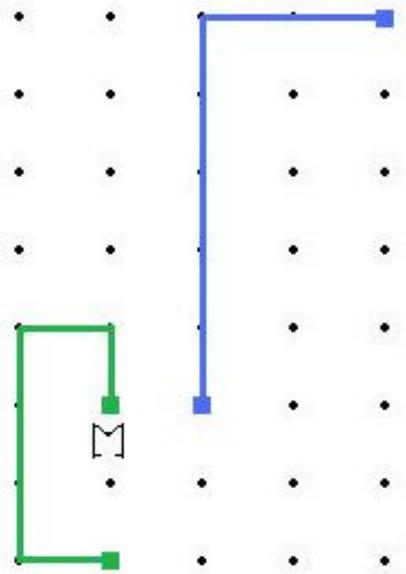


Figure 7: Crusher use

### Over-Drive

- The game enters "Over-Drive" mode when the Over-Drive card is played, and it returns to normal game play when the Over-Drive card is played again.
- When in Over-Drive mode, instead of moving one space when they use a Regular Movement card, players may move as many spaces as they like in that direction.
- If there is a conflict, and two players cross paths, the player who is closer to the junction wins the space, and the other player may either stop short or die.
- Dash and Uber-Dash cards no longer have an effect while in this mode. Player's who use one of these cards still have to wait for other players to move before they can move their piece, but in exchange, they can choose which direction they want to go (this is the same way Dash cards work normally)