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Game Design Document

Research Report

- Introduction
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  - Pillars
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  - Aesthetic
  - Target Audience
- Demography
- Interest/Activities
- Attitudes/Opinions
- Personas
  - Persona 01
  - Persona 02
  - Target platform
- Game Engine
- System Hardware Requirements
- Game Format
- Methodology
  - Quantitative Methodology
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  - Watch Dogs Legion
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  - Ties Between Narrative and Game Mechanics
  - Art Direction from INSIDE (2016)
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  - Watch Dogs Legion Applications to our Game
- Conclusion
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Introduction

Vision and Purpose

"You play as a pair of characters with experimental powers. One character manipulates and mix electricity to solve puzzles. The other carries the other character in their battery while evading and distracting security long enough to solve the puzzles and escape."

Our project aims to create an engaging experience that interests peers in the industry and allows members to develop their core skills for future careers within the 2023 academic year. This is done by exploiting opportunities for puzzle design, character mechanics, narrative wrapper, artistic designs and industry advice on our designs and processes.

Pillars

Quality over quantity **Player agency** **Play With Two Characters**

Genre

Our game aims to address the following genres:

- Puzzle

- Platform

Aesthetic

Our game will have a Decay Industrial aesthetic with subtle futuristic elements.

Target Audience

Demography

- Age: 15-30 years
- Gender: Men and women
- Income: Low, Medium.
- Marital Status: Single
- Occupation/Industry: Students/Part-time work/Junior
- Educational Level: High School/Bachelor's Degree

Interest/Activities

- They like independent games.
- They like puzzle games.
- They like to consume video games with different proposals.
- They enjoy talking to friends about their experiences with video games.
- They enjoy participating in online communities to discuss video games.

Attitudes/Opinions

- They consume unpopular things.
- They feel smart.
- Engage in communities to discuss puzzles.
- They feel good when they feel they are consuming something special/unique.

Personas

Persona 01

ame:

x

Profession:

College student

Age:

18

terests:

Videogames
Science
Sci-fi
Reddit

Behaviours:

- Play different games often
- Spend a good part of the day on computer

Powers:

- Has an online social circle
- Introduce new things on forums
- Re-forward trending indie games

alues:

Intelligence
Pioneer
Innovation

Needs:

- Unique games to talk about
- Things that make him feel smart

Aspirations:

- Find the next indie game that will become popular before everyone else
- Share amazing and unique solutions to puzz

"My name is Al3x_BackJog, I live in Lansing, and I'm just starting college. I like to spend my day on my computer playing totally underground indie games and talk to my internet friends about the games I found the coolest or the shitly. I'm always in the indie game forums and communities looking for something new that no one has heard of yet."

Persona 02

ame:

e

Profession:

Twitch Streamer

Age:

27

terests:

Videogames
Food
Boxing
Sports

Behaviours:

- Always on the lookout for new and interesting games
- Their daily routine involves playing some games after their morning workout

Powers:

- Has an influence over a large audience
- Introduce new trends
- Spreading “memes”

alues:

Energy
Engagement
Interpersonal relationships

Needs:

- Interesting games to play and entertain their audience
- Moments that will get their audience excited

Aspirations:

- Make the audience excited about the games they are playing
- Entertain the audience with wacky approach to game challenges

"My name is Mike_1, I live in LA, and I’ve been streaming on Twitch for the last 8 years. When I’m streaming, I try to create moments of excitement for the audience by trying out crazy strategies or solutior that somehow work out in the end. I like to play games that give me lots of agency to do what I want to dc and allow me to find my own solutions to challenges."

Target platform

Game Engine

The game will be assembled in **Unity 2020.3.8f1**

System Hardware Requirements

- **OS**: Windows 10 64-bit
- **Processor**: Dual Core Processor at 2.3+ GHz or better
- **Memory**: 4 GB RAM
- **Graphics**: 1024 MB Nvidia or ATI graphics card
- **DirectX**: Version 11
- **Storage**: 6 GB available space

Game Format

The game will be an application in .exe format for the **Windows** operating system, available for download at the Steam Store.

Methodology

Our team will carry out the research in our project in a mixed methods approach (Williams, 2007). Using a quantitative research methodology to collect and analyze games regarding their demographics, sales, current players, total players, reviews, and other data (Williams, 2007). Our team will also use qualitative research methodology in a content analysis approach (Williams, 2007), using theoretical aspects concerning games that may become - because they have elements of interest - to our project. Such as game mechanics, system, art, narrative, and other aspects.

The entire research must obtain and analyze data from similar games directly without applying elements or personal opinions.

Quantitative Methodology

The Quantitative Research Methodology has its application in this research to collect and analyze data from games like the concept of our project, to clarify market values, possible target audience and user interest.

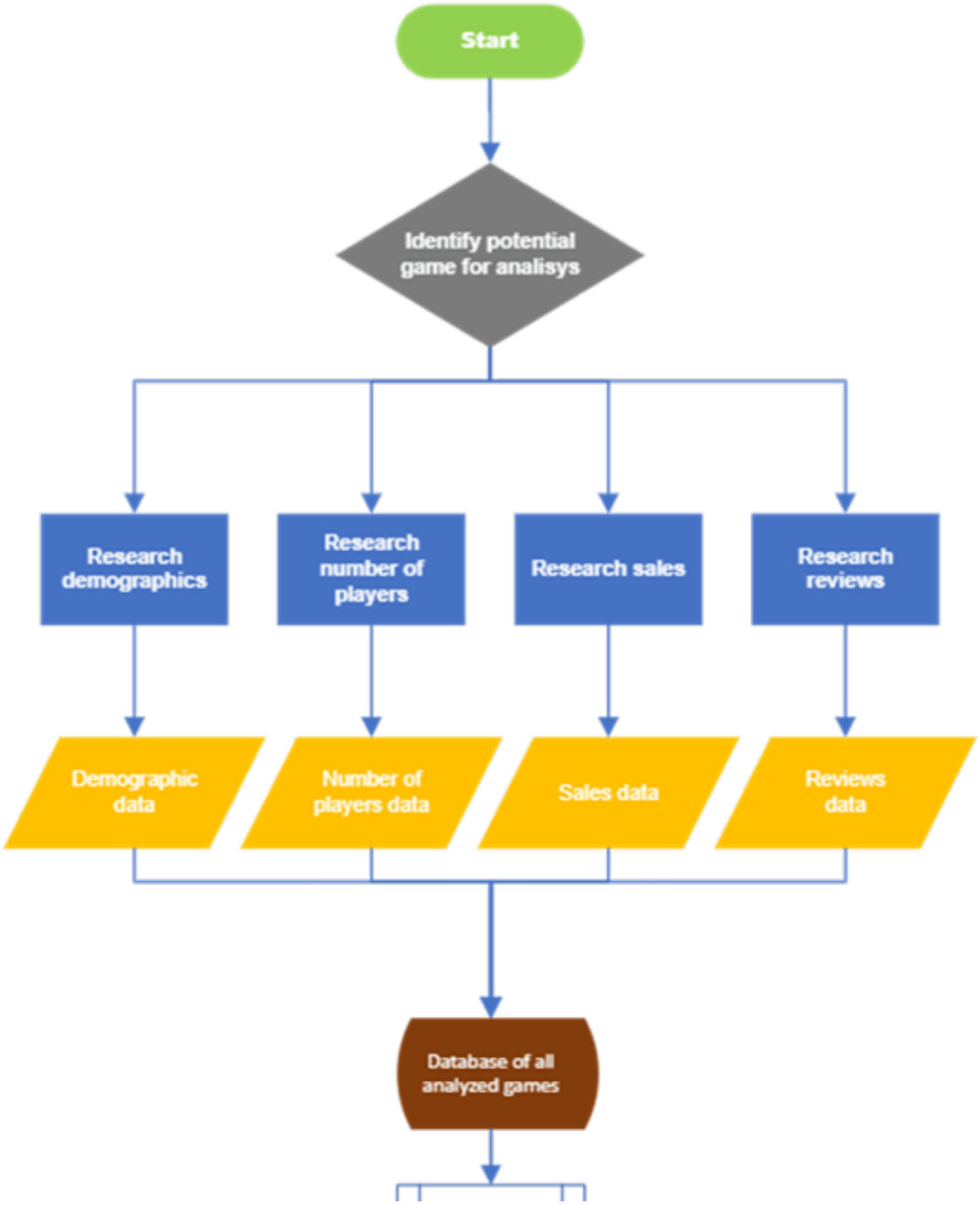
This data will be collected using tools known and credible among video game researchers, such as:

Game Official Website

- SteamDB
- PlayTracker
- VG Insights
- SteamSpy
- Statista
- GG Deals
- Metacritic

The data collected on these platforms will be aligned and compared between games to clarify the relationship of their aspects with their players, sales and ratings.

Quantitative Methodology Flow



Qualitative Methodology

The Qualitative Research Methodology has its application in this research to collect and analyze systems, rules, mechanics, and others of games similar to the concept of our project, to clarify and generate eventual incitements regarding the mechanisms and elements that intend to be applied in the development of our project.

Our design team will collect this data based on practical gameplay analysis, notes and criticism about the gameplay and experience of the games in question.

The analysis should be didactics, easy to understand by the whole team, identify strengths and weaknesses and present visual models for representation.

The data collected during this research will be presented with a list of potential uses, models or concepts that can be applied/helpful to our project.

Qualitative Methodology Flow

Target Games to Analyze

Gunpoint	The game has a puzzle system and stealth and combat elements that might be relevant to our project.
Inside	The game has a puzzle system, stealth elements and an art aesthetic that might be relevant to our project.
It Takes Two	The game has a system of cooperative mechanics and narrative that may be relevant to our project.
Papo & Yo	The game has a system of cooperative mechanics and narrative that may be relevant to our project.
Prey	The game has a weapon system that works as tools and a level design with multiple paths that might be relevant to our project.

Static Cling	The game has a puzzle system and electrical mechanics that might be relevant to our project.
The Lost Vikings	The game has a system of cooperative mechanics that may be relevant to our project.
The Talos Principle	The game has a puzzle system and a level design with multiple paths that might be relevant to our project.
Watch Dogs Legion	The game has a system of cooperative mechanics and puzzles that may be relevant to our project.
Trine 4	The game has a system of cooperative mechanics and puzzles that may be relevant to our project.

Results

Gunpoint

Inside

It Takes Two

Prey

Static Cling

The Lost Vikings

The Talos Principle

Watch Dogs Legion

Discussion

Ties Between Narrative and Game Mechanics

Every instance of new game mechanics was interesting and well developed, but what I want to focus on with this research is how they meld with the game's narrative and theme.

The entire game is founded on the principle that two characters MUST collaborate to overcome challenges and trials that prevent both from achieving a common goal. In this case, both parents must work together to find a way to overcome challenges along the way to returning to their real bodies. No one mechanic can overcome challenges on its own, just like how the two characters need each other to do the same.

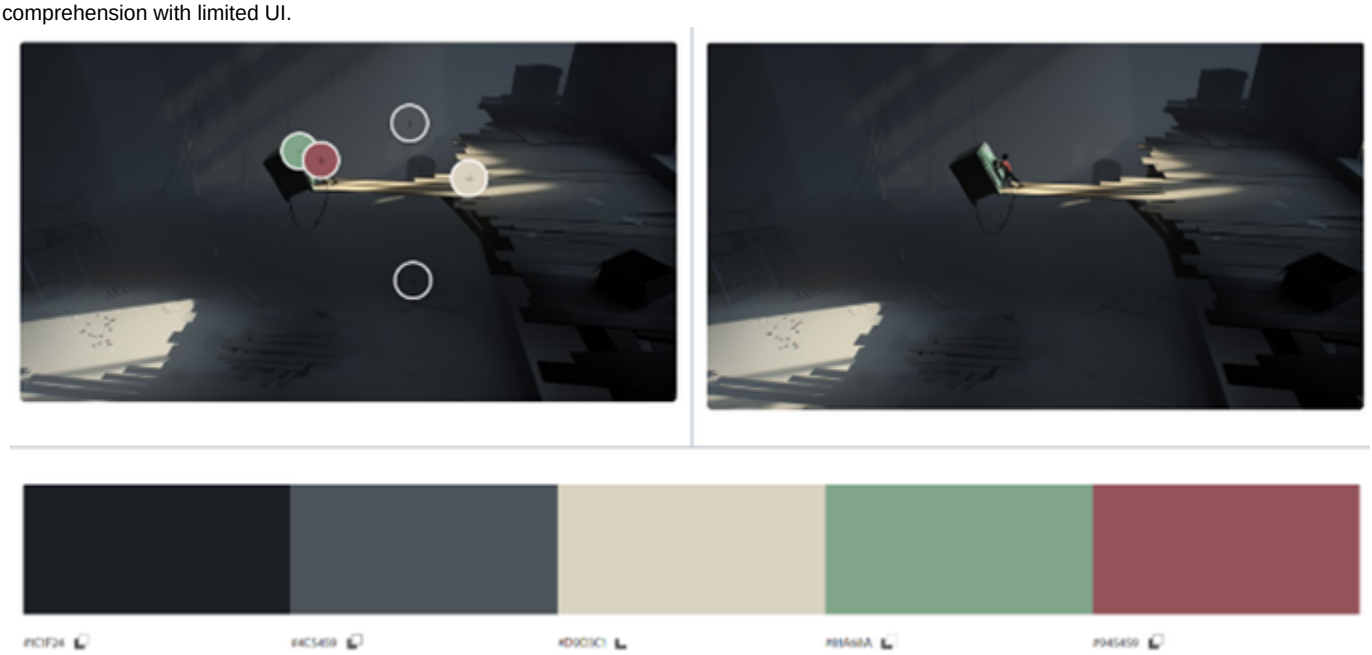
100% of the game is based on this core concept, both the narrative and the game's mechanics. There isn't a single challenge that can be solved without the help of the other player, thus a single player experience, or single character narrative, is impossible. This challenge cannot be overcome alone.

A lot of the game's mechanics spawn from creativity surrounding the current events in the narrative. The narrative drives the game's development forward, as the game changes to match the story. This proves that the same result can be made in any game, including ours. The characters and the world are the context for the mechanics. In our case, our mechanics involve the material environment and the electrical/magnetic environment. The correlation comes from the characters' relation to one another, like how both partners in a couple need to love and respect each other equally to keep their relationship alive. With the current understanding of our game's narrative, the characters have a symbiotic relationship that goes further into a sibling relationship. One primary idea is that one character cannot escape without the other, but I think we could go so far as to state that they cannot live without each other an emotional and physical level. The games mechanics could reflect this. Say: the HC requires an electric current to stay awake, but the lingering charge from the EC after they leave is enough for them to stay awake to finish a challenge. There could be a timer of some kind, or maybe the HC just turns off altogether, requiring the EC to return to them at certain points to complete a puzzle.

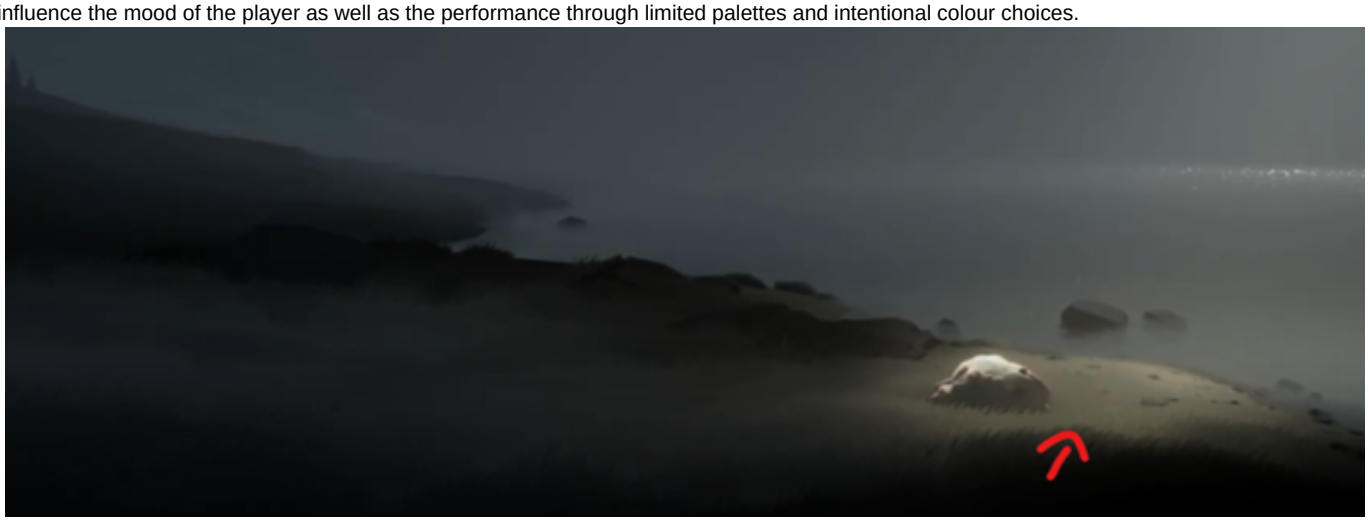
Art Direction from *INSIDE (2016)*

Based on research from INSIDE (2016), we will aim to create visual contrast through color and light constraints that will guide the player throughout gameplay, reducing confusion.

The game *INSIDE (*2016) uses color and light to great effect in its puzzle design. As can be seen on the left, they limit their color palette to desaturated ones and only key elements are saturated to a higher degree. This is one way of creating contrast within our game to ensure player comprehension with limited UI.



Color also affects how players can feel as mentioned by The Psychology of Colors (2020) red “can intensify the energy levels of the room and tends to trigger hyperactivity” (para. 3). This can be used to great affect given that our game has stealth elements to keep players anxious. Moreover, with red, Tham et al. (2020, p.1314) also mentions that context matters with what feelings that colours are associated with and affects cognitive performance. Like how red when driving promotes stopping whereas in achievement (where skill and overcoming is necessary) contexts, red promotes avoidance (risk aversion) motivation. Another point from The Psychology of Colors (2020), we can use green due to its calming nature to direct players to a sense of safety or help them calm down after an exciting section. As seen below, in *INSIDE (2016)*, after an exciting ordeal of breaking out of the facility, you land on a visually green patch of grass which exemplifies my point. We can use colour to influence the mood of the player as well as the performance through limited palettes and intentional colour choices.



Furthermore, the following image is from Tham et.al (2020) which mentions that there seem to be universal colour associations across all cultures (e.g., white – purity; blue – water/sky)(p.1311).

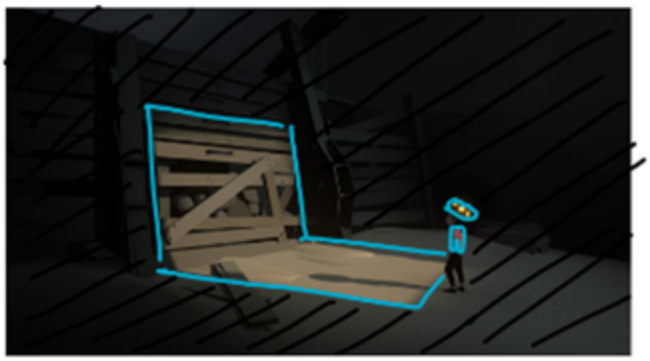
1326 THAM ET AL.

Table 1
Theme–Color Associations for Each Culture That Were Consistent Between Experiments 1 and 2 (Actual Concepts Are in Brackets)

	Color category (words) for each culture		
Theme	English	Chinese bilingual	Chinese monolingual
Universal themes			
Clean, pure	White (clean, pure, new)	White (clean, pure, holy)	White (pure (symbolic)) & blue (clean)

Negative concepts	Black (death, dark)	Black (solemn, fear)	Black (scared, dark)
Water/sky related	Blue (slippery, cold, cool, wet, swimming)	Blue (deep, broad, fly)	Blue (cool, broad, fly, swim)
Fresh, health, nature	Green (fresh, running, natural, walking)	Green (health) & blue (fresh)	Green (vitality, fresh)
"Female" traits	Pink (soft, sweet, feminine, pretty, girly)	Pink (soft, sweet)	Pink (lovely)
Heat	Orange (heat)	Red (burn, hot)	Red (fiery), orange (warm (temperature))
Bright	Yellow (light, bright)	Yellow (bright)	Yellow (bright)
Regal	Purple (regal)	Purple (noble)	Purple (elegant1, elegant2, noble)
Common themes			
Anger	Red (anger, fighting, rage)	Red (anger)	
Stop/danger	Red (stop, danger)		Red (danger)
Enthusiastic/excited		Red (enthusiastic)	Orange & red (excited)
Depressed	Black (depressing)		Blue (depressed)
Relaxed	Blue (quiet, relaxed, tranquil)		Blue (peaceful)
Mysterious		Purple (mysterious)	Purple (mysterious)
Culture-specific themes			
Attraction	Red (lust, passion)		
Bold	Orange (bold, loud)		
Summer	Yellow (summer, happy)		
Sad	Blue (sad)		
Old, boring	Grey & brown (dull, old, boring, bored)		
Plain	White (plain, simple)		
Dirty	Brown (dirty, unclean)		
Envy	Green (envy, jealousy)		
Fluffy	Pink (fluffy)		
Blend		White (blend)	
Romantic		Pink (romantic)	
Hope			Green (hope)
Thick			Brown (thick)

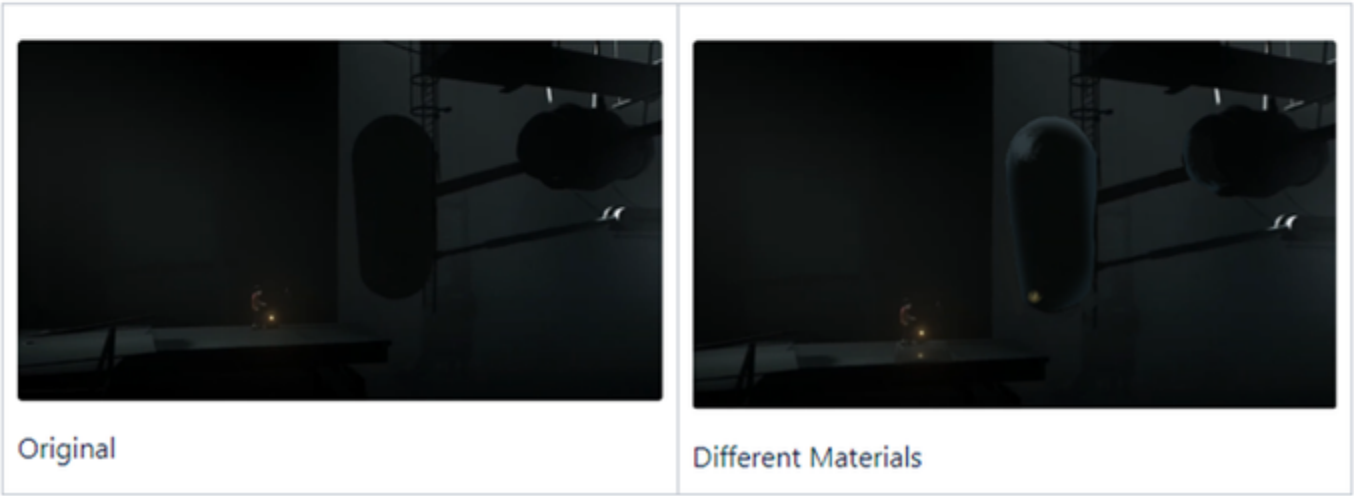
This knowledge can be used to decide which colours will resonate the most with our audience given a desired mood or feeling we wish to invoke during sections of gameplay.

Game screenshot with shape overlay	Two value composition check
	

To continue, *INSIDE (2016)* uses light and shot direction like film to great effect. This will be very useful for ensuring level and puzzle readability.

With regards to materials, as can be seen below, we will avoid material contrast as it can affect the readability within a puzzle and highlight objects that may confuse players. It will also allow us to focus on modelling and shrink our asset list for texturing and shader development.

We will need to be careful as reflections can also draw unnecessary attention.



"Based on research from *INSIDE (2016)*, we will aim to create visual contrast through color and light constraints that will guide the player throughout gameplay, reducing confusion."

Key Points From The Lost Vikings

The game's level design seems to focus more on platforming and reflex challenges rather than on puzzles, especially in the later half of the game when additional mechanics (such as the magnet or see-saw discussed previously) are introduce to support the platforming element rather than the puzzle element. Most of the puzzles are some variation of the puzzles mentioned above and the game's difficulty builds up by putting these puzzles in situations that require faster reflexes or higher skill in platforming (for example, requiring Baleog to shoot through a hole while moving up and down or requiring Olaf to glide through tight turns of electric circuits).

One of the game's strong points is that it is very good at making the player switch characters, making the core mechanic a highly integral part of the platforming experience. Most of the time, this is done by occupying one character with a specific action (e.g. using Olaf to shield) or specific location (e.g. using Erik's jump to access particular areas) so that follow-up actions must be done by one of the other two. Although The Lost Vikings uses this effect primarily to the benefit of the game's platforming aspect, we can apply the same principles to a puzzle context by occupying one character with a specific action/location while another character does something else.

Regarding pacing, the challenges are quite well-paced in terms of difficulty. The game does a good job of teaching, testing, and challenging the player's knowledge of the mechanics in each themed stage. As a result, although the challenges become more difficult later in the game, there aren't any moments where the challenges feel outright frustrating. Part of the reason for the game's effective pacing lies in how the challenges are structured such that the player is constantly switching between characters and using each character's mechanics (see the Level Design Breakdown section for an example). Because of this structure, the player is guided into constantly thinking about how to use and combine each character's abilities, minimizing chances for the player to forget about underused mechanics.

Regarding weaknesses in the level design, I think that a portion of the game's difficulty comes from not knowing the layout of the level, not knowing what challenges are coming up next (i.e. off-screen hazards), and not knowing the location of the exit. This is largely due to the limitations of the technology when the game was made, but I think a modern remake of the game would likely require reworking the level design to allow the player to better observe the challenges they are facing (either through camera controls, better guiding paths, and/or more clear

indicators/symbols) and/or the inclusion of a mini-map. As an example, there are a lot of hidden paths in the game, as well as paths that are not clearly distinguishable as paths. The hidden paths that are not required for completing a level could be argued as a feature for promoting exploration or replaying the level, but the golden paths that are hard to see can cause frustration for players who aren't able to find them.

Watch Dogs Legion Applications to our Game

- Sandbox Style Level Design – Multiple paths and solutions for every level
- Activation of Second Player (Battery)
  - Inventory Activation:
    - The player opens an inventory wheel to select the battery and switches to the battery character
    - The player opens an inventory wheel, selects the battery and throws the battery to the world to switch characters
- Placing the second character in the world and moving them according to the missions (No recallability)
  - The second character must walk to the first character to get on his back (to get to idle state). The second character must always be in the world to interact/switch.
- Recallability of the second character
  - Ability to recall the second character after being deployed in the world anytime. The second character runs to the first character's back or backpack once recalled by just one input key.

Conclusion

Aesthetics

On Art Direction

This game will have a third-person perspective with true 3D space.

We will rely on carefully manipulating lighting and colour to guide the user's eye through limitations on them to create contrast. We will avoid PBR textures and drastically different materials (especially reflective ones) as it will be time-consuming and require more attention when testing puzzles to ensure they do not derail the intended design.

Players will feel as if they are ascending Mount Everest as they progress. The level will begin lighting up as the players solve puzzles (that require powering up sections of these environments). Circuits will span the base of the cylinder to the top with symbols that differentiate each section from one another.

Failing a puzzle will shut down the lights that were lit up prior.

Each section of the game will have a different aesthetic through symbols and lighting and showing other areas through windows.

On Narrative

From our research, we can conclude that the narrative can support the gameplay by joining them through the theme of collaboration and learning. The two player characters are siblings that have been separated from each other for years, both with little knowledge of the other. As the player learns new mechanics, the characters learn more about each other. To match the theme of collaboration, neither of the two characters can complete a section of the game on their own once they are together. Thus, they rely each on each other in the game mechanically. Narratively, the characters cannot escape the facility on their own because of their innate flaws. The electric character cannot exist outside of a space designed to hold electricity, and the human/robotic character cannot live without being powered. While together, both compensate for the other persons' weakness and can overcome challenges they would normally need outside help to do.

Game Design

On Level/Puzzle Design

Design Challenge: How do we handle players being split and getting stuck mid-puzzle?

- *We can do this by only allowing traversal into a new section of the level IF both characters are together like in Portal or Talos Principle.*

Our goal is to create a nonlinear puzzle experience through multiple objects that each have an associated verb that can combine into more complex puzzles. These paths will be separated through the need for different mechanics: path A requires charging a door to open whereas path B requires physical movement.

We will focus on a cylindrical level design with a hub style layout of puzzles with sections of the level existing for metroidvania style movement. However, we will allow for shortcuts like allowing both players to travel through circuits at specific points *after* solving the puzzle to maintain engagement.
https://miro.com/app/board/uXjVPTXJ5G0=/?share_link_id=412452702289

- Both characters influence their respective worlds as they solve the puzzle.

1. Electric
2. Physical

- Using multiple types of objects in each puzzle like:

1. Pressure Plates Step on top
2. Wall switches Trigger a linked object

Our puzzles rely on logical gates through interacting with objects like buttons. **On initiation of a puzzle, the characters split, and after success, they meet up together.**

Wayfinding and landmarks: Each section of the game will have a different aesthetic through symbols and lighting and showing other areas through windows.

On Progression

Multiple objects that each have an associated verb that can combine into more complex puzzles, so they feel they are getting more powerful.

Electrical abilities will have a skill tree through exploring the entire level and finding upgrades.

EVERY new ability will be demonstrated before the player has access to it.

On Checkpoints

Have exclusion fields like in Talos Principle or Portal that separate each puzzle from each other and defines when and where a player started a puzzle.

On Enemies

We will ensure that players can only interact with them insofar as it allows them to remain hidden. No disabling of guards through weaponry but instead manipulating the environment using electricity.

They patrol the cylinder on set paths as they travel up and down it. If they spot the player (either character) the *puzzle's progress will be reset to the start*. [WC3]

The challenge will relate to the guards' interrupting puzzles by breaking the circuit or spotting the player.

On Cameras

We will avoid splitting the screen in half as we will have problems with player controls since it is a single-player game. We will keep one character static while the other character is in control.

On Two Character Dynamics

We will ensure there are things that one character cannot do**.** *A clear list of verbs and actions will be required for each character.*

Two main controls:

1. Switches between characters
2. Recalling the electrical character as puzzles get solved
    a. The electrical character is bound to the physical character

Only one character can occupy the real-world environment while the other owns the electrical circuit environment. They must rely on each other to move around by solving puzzles.

Puzzles CANNOT be solved without using both characters' strengths.

The electric character can statically charge objects to move them in the real world with the help of the physical world character.

Recommendations

Puzzle Design

Recommendations Based on Research from Static Cling

Use the computer science concept of logical gates like IF, OR, AND, NAND and so on.

Have dangerous elements for the electric character within the circuit like in Static Cling's purple power grid elements.

Using different types of conductors like water, living organisms and so on to afford players opportunities for emergent gameplay.

Perpetual generators that remain active once powered, providing the player permanent progression, and making previously travelled areas easier to access

Temporary generators that power devices for a fixed period after contact with the electric character, creating time-based puzzles or fast-paced platforming segments

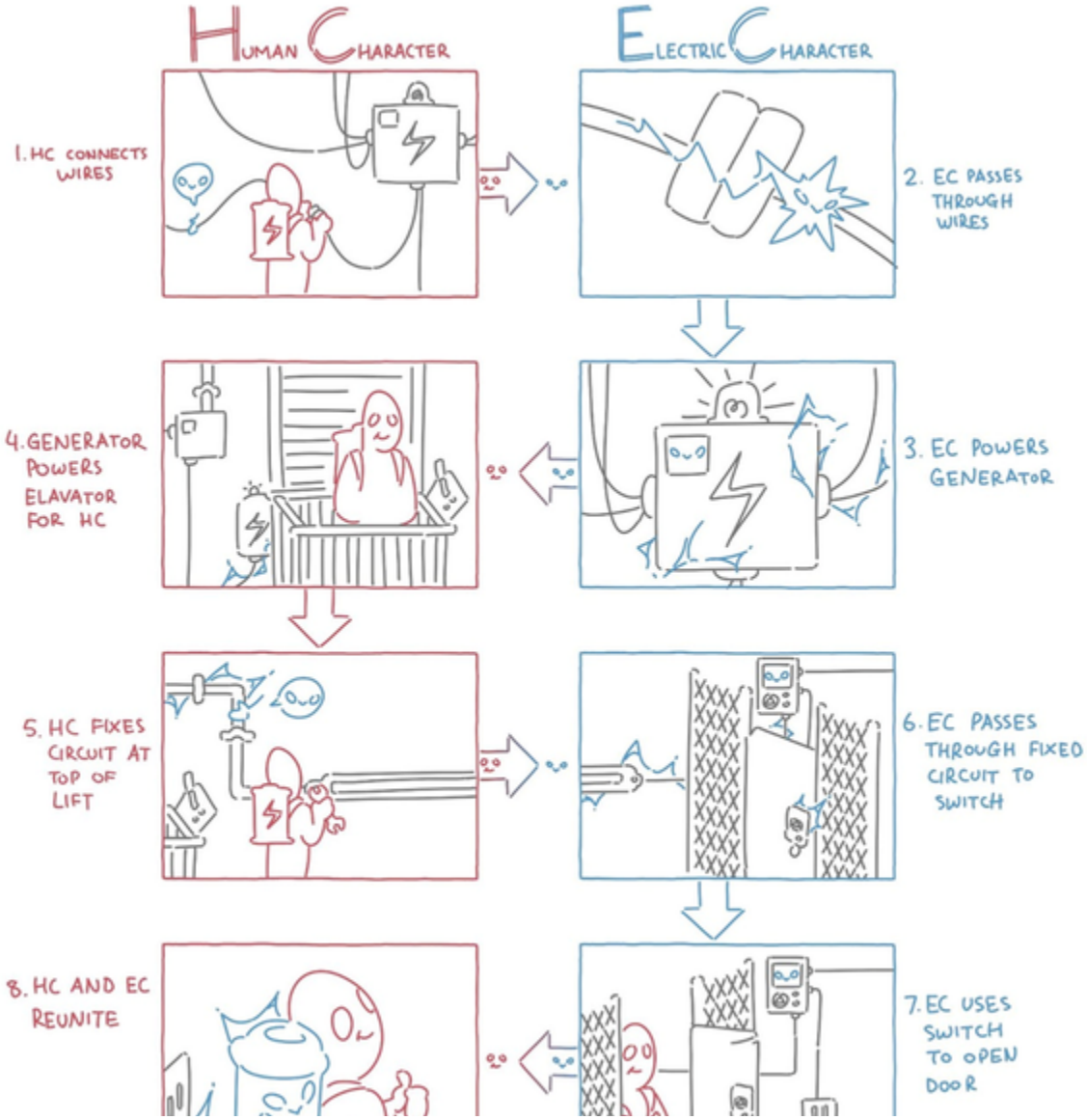
Puzzle mechanics that can be used to the player's advantage to combat enemies, such as laser turrets that can be powered on as enemies pass by

Stealth elements that provide benefits & drawbacks, such as lights that grant the player visibility when powered, but also increase enemy vision range

Alarms or elements that attract guards/defences.

Recommendations Based on Research from The Lost Vikings

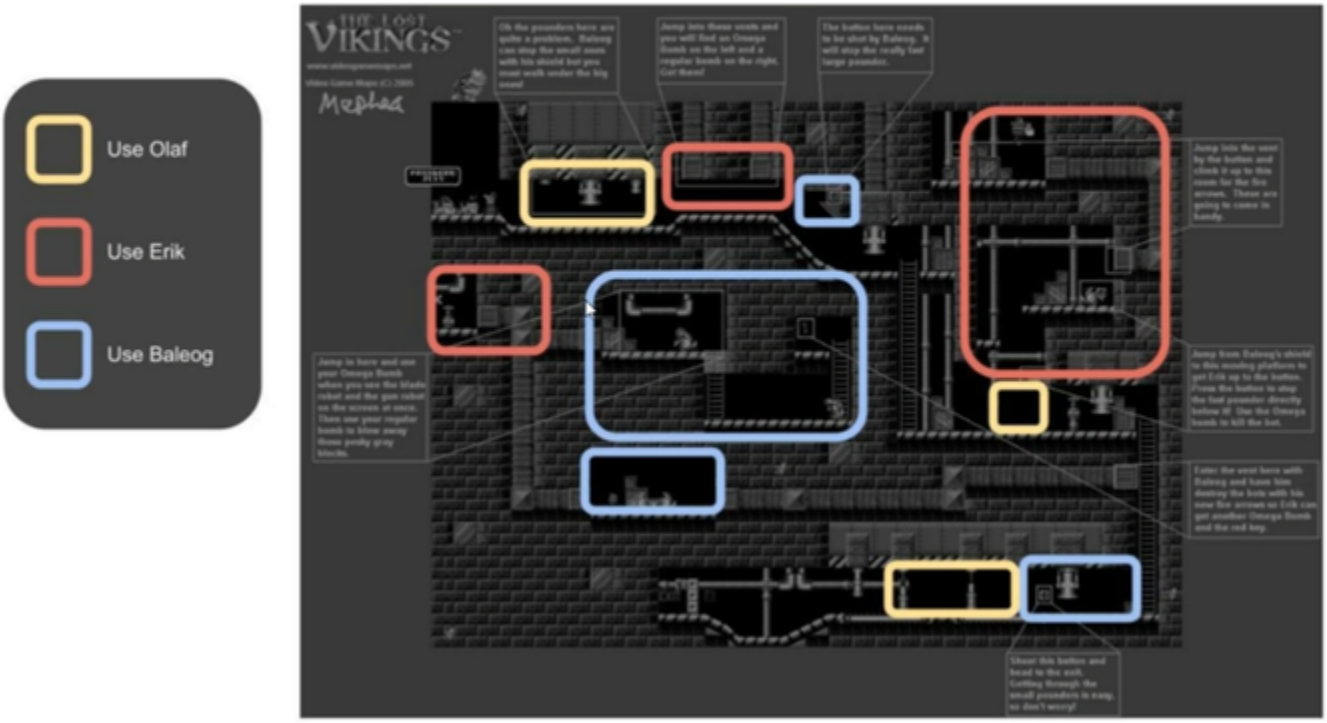
We can encourage and optimize opportunities for the player to switch between characters by using a similar level structure as The Lost Vikings (see the Level Breakdown section for an example). This can be done by having one character be occupied with an action or location and then requiring the other character to perform an action that opens new options for the first character (then repeat this cycle). For example, the human character, HC, must connect two wires for the electric character, EC, to pass through and access a generator. Then, EC must provide energy to the generator to power an elevator for the HC to ride upward. After riding the elevator, HC must repair a circuit that allows EC to travel upward as well. Once EC can get to the same spot as HC, they can activate a switch inaccessible to HC and open a door for both HC and EC to proceed. The diagram below depicts a storyboard of how this puzzle could work.



Something we can learn from The Lost Vikings is puzzle clarity. As mentioned previously, an issue with the level design in The Lost Vikings is that there are no opportunities for the player to view the level layout and observe how they can approach puzzles beforehand. This can lead to moments where the player takes damage due to an offscreen hazard, or miss a button that's far offscreen (there are quite a few instances of this in the game). As a result, we should provide many opportunities for the player to view a puzzle or level in full when playing our game. For example, have the camera zoom out and capture the whole puzzle when the player steps in a spot at the start of the puzzle.

Level Breakdown

Level 4-1 (Source: http://www.videogamemaps.net/?maps/snes/lostvikings)



Design our puzzles using diagrams like the previous one, to delineate when each character is needed to progress.

Allow players to observe the entirety of the puzzle before allowing players to interact.

Programming

AI Behaviour

- Enemies within lit regions are much more dangerous than in darker areas.
- Being able to turn the enemies off and manipulate them using electricity or player interactions.
- Character Movement Electric character travels along pre-defined rails.
- Camera Individual camera following each character
- Transition to the other camera view when the player switches character
- When two characters are in proximity, slightly zoom out the camera and adjust its centre position to keep both characters in view
- Have cinematic rails & focus points around specific areas of the level, so that the camera gives a proper view, conveys the intended feeling through perspective, or has important objects in view

ART

Framing of Puzzles and Environment

- **Colour**

Limit our colour palette to neutrals like grays and use saturation sparingly to identify the key interactable elements in puzzles and where players need to travel to progress.

- **Light & Framing**

Light is used and focuses one large light and shadow shapes to clearly communicate play spaces to reduce confusion. It will be used in tandem with colour to express our desired moods and call out points of interest without being explicit — maintaining immersion. Level design will work closely with art through diagrams of puzzle solutions where art will identify key focal points. Then, paintovers of a greybox level will be done to test our light shapes and as a result, design with readability of puzzles in mind.

References

> *Contributor, T. T. (2020, December 16). What is Logic Gate (and, or, XOR, not, Nand, nor and xnor)? A definition from http://whatis.com*
>
> *Retrieved September 27, 2022, from*
>
> *https://www.techtarget.com/whatis/definition/logic-gate-AND-OR-XOR-NOT-NAND-NOR-and-XNO*

> *Birkett, J. (2018, May 4). Using Steam reviews to estimate sales. Game Developer.*
>
> *https://www.gamedeveloper.com/business/using-steam-reviews-to-estimate-sales*

> *Fein, Z.E. (2011). The Aesthetic of Decay: Space, Time, and Perception*

> *Schell, J. (2020).* The Art of Game Design: A book of lenses*. CRC Press, Taylor & Francis Group.*

> *The Psychology of Colors In Home Interiors.[WC1] (2020, December 8). Egypt Today, NA.*
>
> *https://link.gale.com/apps/doc/A644157195/ITOF?u=ko_acd_shc&sid=summon&xid=5c009a25*

> *Tham, D. S. Y., Sowden, P. T., Grandison, A., Franklin, A., Lee, A. K. W., Ng, M., Park, J., Pang, W., & Zhao, J. (2020). A systematic investigation of conceptual color associations. Journal of Experimental Psychology: General, 149(7), 1311–1332.*
>
> *https://doi-org.library.sheridanc.on.ca/10.1037/xge0000703.supp*

> *Videogamemaps.net. (n.d.). VGM: Maps and strategies! Retrieved September 28, 2022, from*
>
> *http://www.videogamemaps.net/?maps%2Fsnes%2Flostvikings*

> *Williams, C. (1 de Mar de 2007). Research Methods.* Journal of Business & Economics Research (JBER)*.*

> *Wikimedia Foundation. (2022, September 13). Inside (video game). Wikipedia.*
>
> *Retrieved September 22, 2022, from*
>
> *https://en.wikipedia.org/wiki/Inside_(video_game)#Reception*

> *Wikimedia Foundation. (2022, September 16).* The lost vikings*. Wikipedia. Retrieved September 28, 2022, from*
>
> *https://en.wikipedia.org/wiki/The_Lost_Vikings*

Target Audience

Demography

- Age: 15-30 years
- Gender: Men and women
- Income: Low, Medium.
- Marital Status: Single
- Occupation/Industry: Students/Part-time work/Junior
- Educational Level: High School/Bachelor's Degree

Interest/Activities

- They like independent games.
- They like puzzle games.
- They like to consume video games with different proposals.
- They enjoy talking to friends about their experiences with video games.
- They enjoy participating in online communities to discuss video games.

Attitudes/Opinions

- They consume unpopular things.
- They feel smart.
- Engage in communities to discuss puzzles.
- They feel good when they feel they are consuming something special/unique.

Personas

Persona 01

Name:

Alex

Profession:

College student

Age:

18

Interests:

- Videogames
- Science
- Sci-fi
- Reddit

Behaviours:

- Play different games often
- Spend a good part of the day on computer

Powers:

- Has an online social circle
- Introduce new things on forums
- Re-forward trending indie games

Values:

- Intelligence
- Pioneer
- Innovation

Needs:

- Unique games to talk about
- Things that make him feel smart

Aspirations:

- Find the next indie game that will become popular before everyone else
- Share amazing and unique solutions to puzzles

"My name is Al3x_BackJog, I live in Lansing, and I'm just starting college. I like to spend my day on my computer playing totally underground indie games and talk to my internet friends about the games I found the coolest or the shitly. I'm always in the indie game forums and communities looking for something new that no one has heard of yet."

Persona 02

Name:

Mike

Profession:

Twitch Streamer

Age:

27

Interests:

- Videogames
- Food
- Boxing
- Sports

Behaviours:

- Always on the lookout for new and interesting games
- Their daily routine involves playing some games after their morning workout

Powers:

- Has an influence over a large audience
- Introduce new trends
- Spreading “memes”

Values:

- Energy
- Engagement
- Interpersonal relationships

Needs:

- Interesting games to play and entertain their audience
- Moments that will get their audience excited

Aspirations:

- Make the audience excited about the games they are playing
- Entertain the audience with wacky approaches to game challenges

"My name is Mike_1, I live in LA, and I’ve been streaming on Twitch for the last 8 years. When I’m streaming, I try to create moments of excitement for the audience by trying out crazy strategies or solutions that somehow work out in the end. I like to play games that give me lots of agency to do what I want to do and allow me to find my own solutions to challenges."

Similar Games

Search

Expand all Collapse all

Gunpoint

Overview

Stealth puzzle game where the player hacks & rewires electronic devices within a building

Steam Page: https://store.steampowered.com/app/206190/Gunpoint/

Gameplay video: https://www.youtube.com/watch?v=kP6Uz5wnRb4

Potentials to be researched

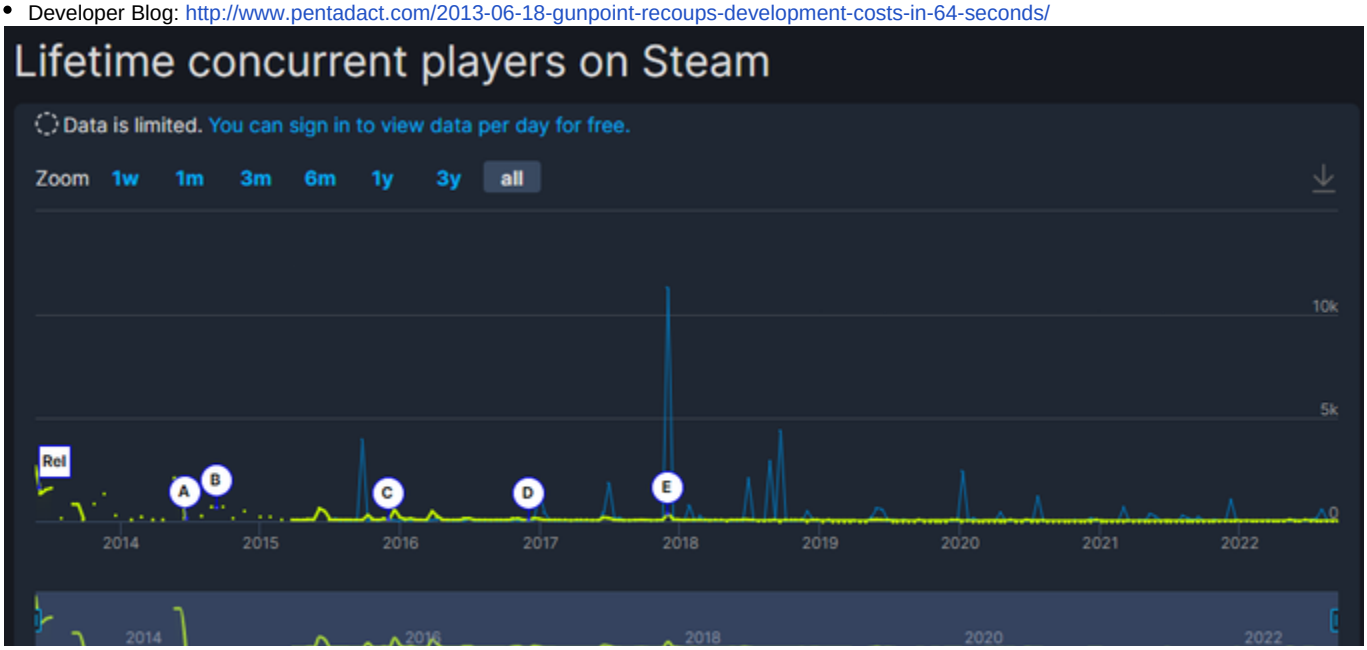
- Puzzle design outside of power grid
  - The physical world EC influences
- Inspiration for stealth elements
- Has some elements of combat

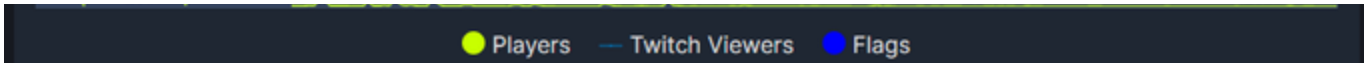
Table of Contents

- Overview
- Potentials to be researched
- Reception
- Game Analysis
  - Mechanics
    - Rules
    - Rules
    - Rules
- Conclusion
- Recommendations

Reception

- Userscore: 97%
- Metascore: 83%
- Owners: 500,000 - 1,000,000
- Developer Blog: http://www.pentadact.com/2013-06-18-gunpoint-recoups-development-costs-in-64-seconds/





Game Analysis

Mechanics

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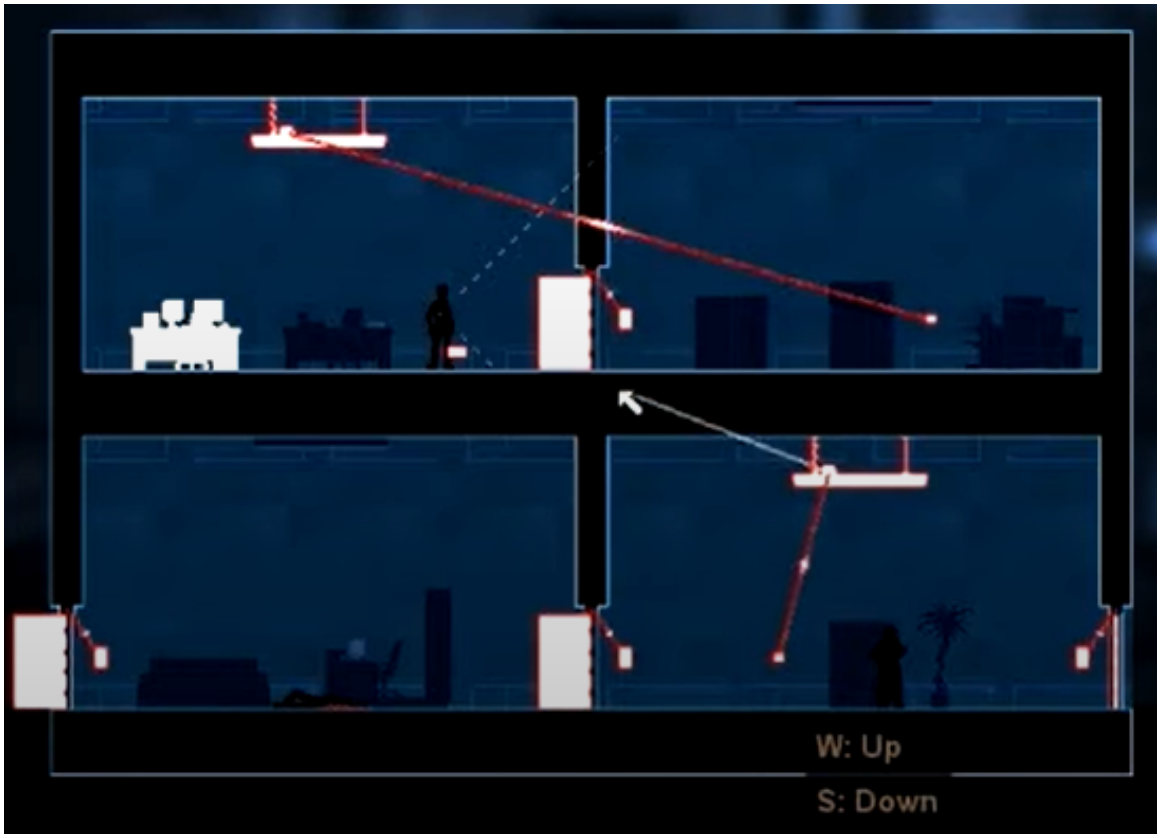
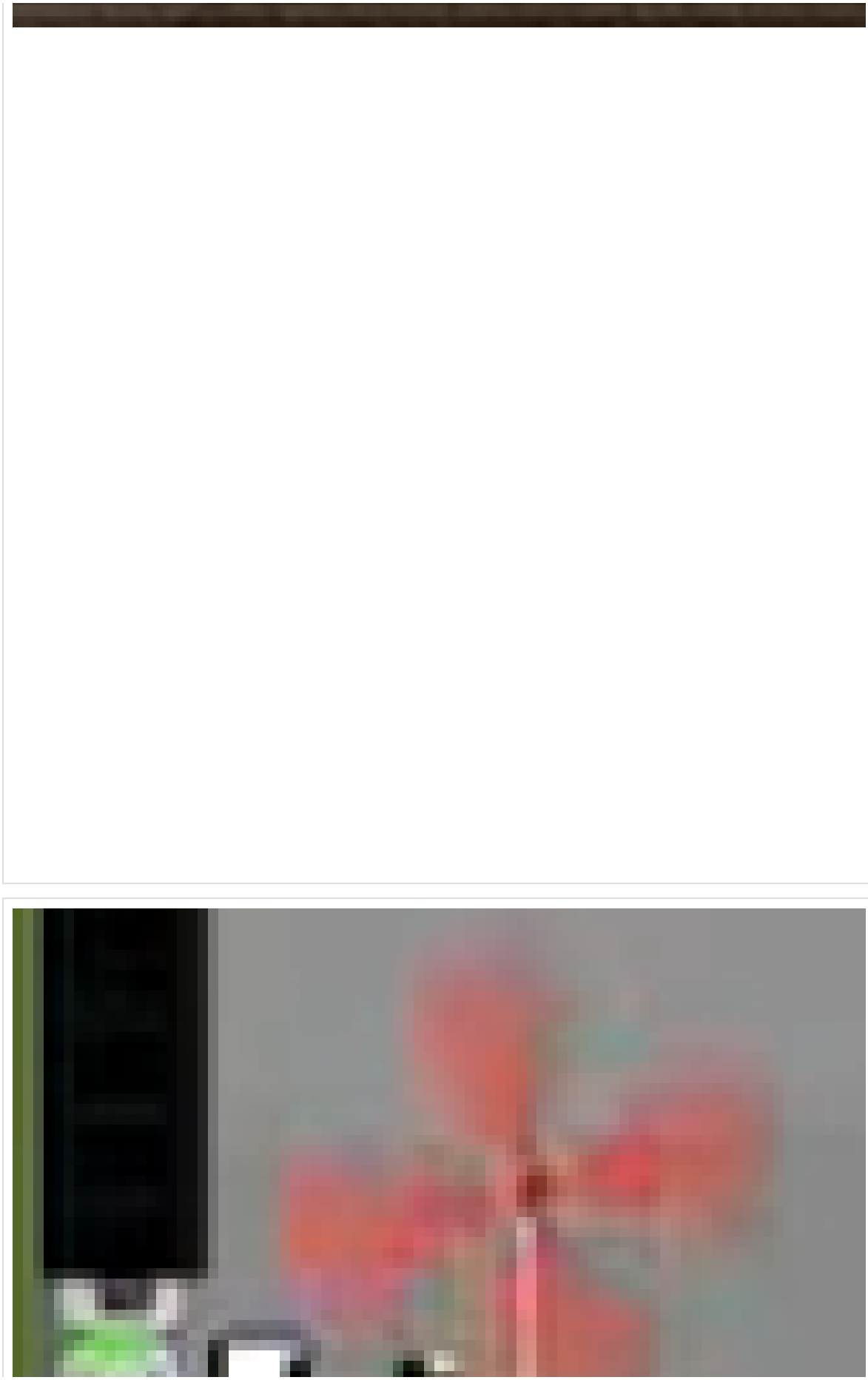
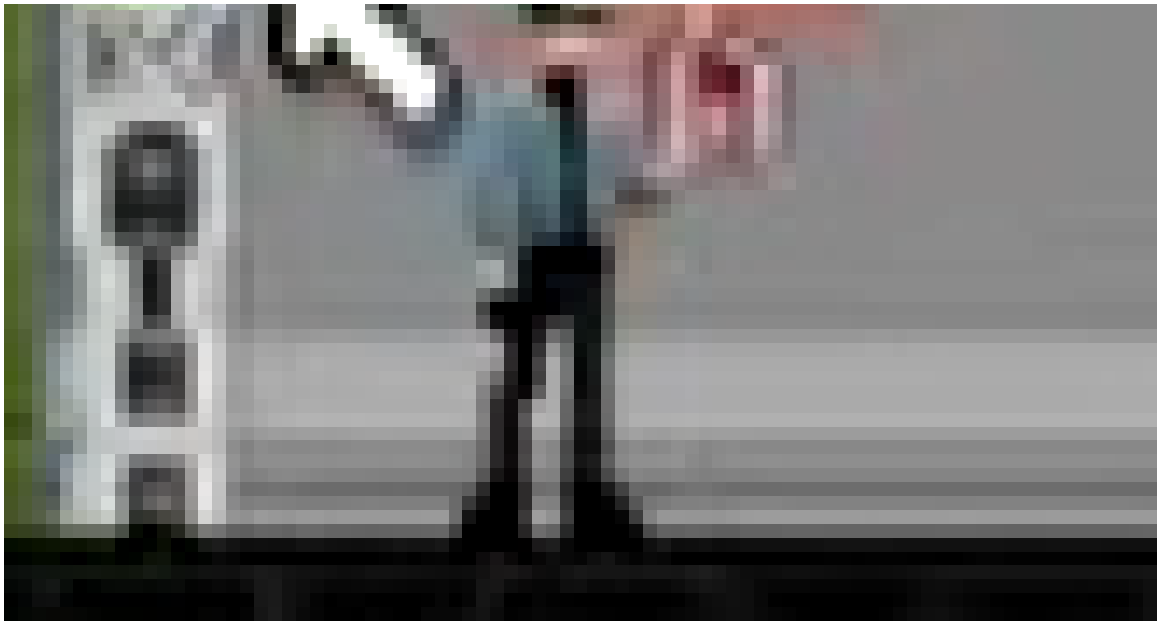
Puzzle Elements



W: Hack

W: Go up
S: Go down





Movement

Rules

- Player can move horizontally
- Player can charge an arc jump
  - Player can't move while jump
  - If it jumps on a wall/ceiling, the player can climb/move around the wall/ceiling
  - If it jumps on a fragile object, the player can break it
  - If it jumps on a guard from behind, the player can knock him out
- Player can interact with elements that will move the character one floor up or down

https://miro.com/app/board/uXjVPTXJ5Yw=/?share_link_id=799694339428

Enemies

Rules

- Players die when detected by guards
- If it jumps on a guard from behind, the player can knock him out
- When the light goes out the guard moves to the switch and tries to turn it on
- When the guard enters an alert state, it moves sideways across the map endlessly

https://miro.com/app/board/uXjVPTXasLE=/?share_link_id=820478244208

Mission

Rules

- Player chooses missions in the HUB
- Completed missions earn money and upgrades
  - Money can be used between missions to buy new equipment
  - Upgrades can be used between missions to improve the player jump
- The player needs to interact with a determined object and leave the site

https://miro.com/app/board/uXjVPTXasak=/?share_link_id=319014259337

Electrical Grid

- Switch and triggers emit an output signal that turns elements on or off
  - The player can modify the output destination, changing which element will be turned on or off
  - Triggers are triggered by the player or the enemies

https://miro.com/app/board/uXjVPTWj9c4=/?share_link_id=752948747871

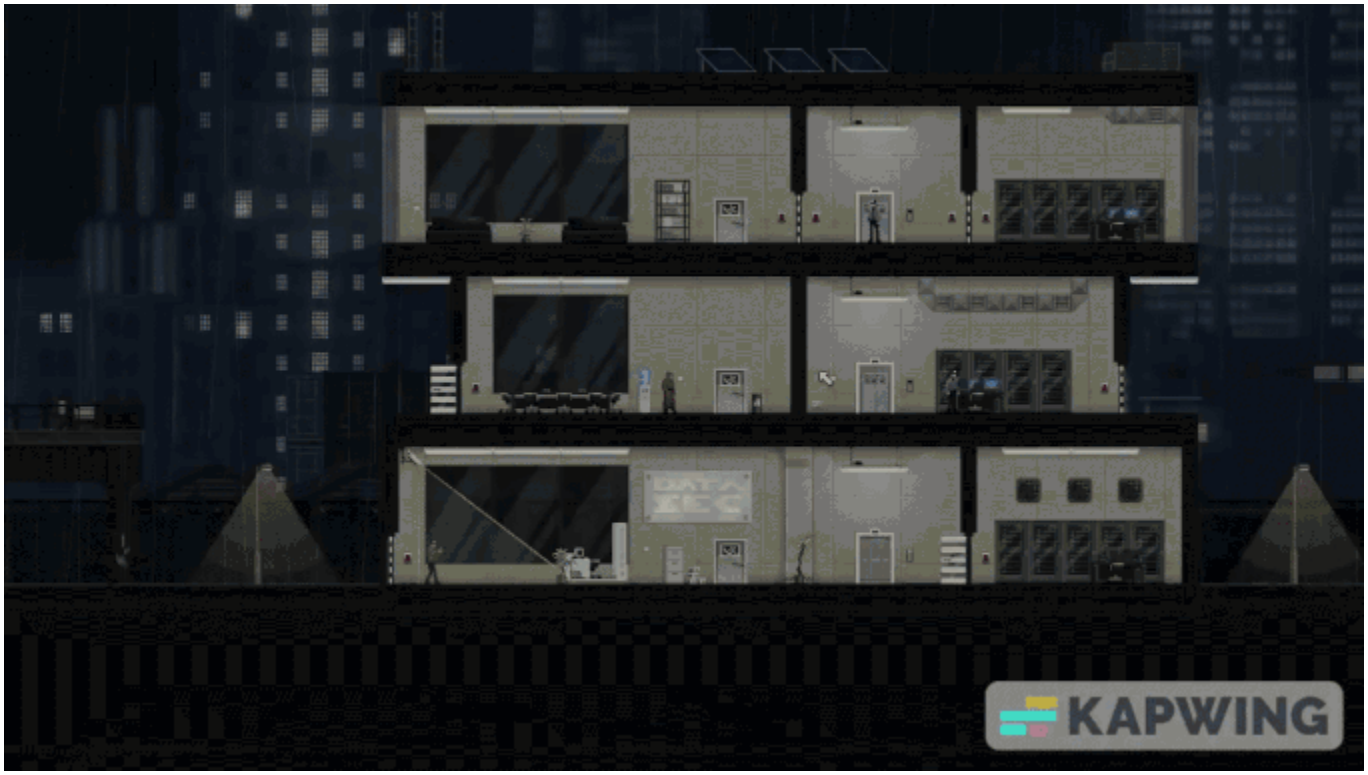
Progression

- Storytelling
- Missions' complexity increase
  - New enemies
  - New elements
- Unlock new pieces of equipment
- Upgrade abilities

https://miro.com/app/board/uXjVPTWj9Y4=/?share_link_id=681439274048

Conclusion

Gunpoint has a puzzle system aimed at manipulating electrical circuits. By manipulating the circuits, the player can vary how the scenery elements behave.



This freedom of manipulation creates many possibilities for how puzzles can be solved, giving players greater freedom in how to play the game.

Although at times the game presents multiple missions to choose from, the game has a linear progression and the interactions in a puzzle do not reflect the following.

Recommendations

Although Gunpoint uses interesting mechanics involving electrical circuits, they are not applicable in a viable way to our project.

Since the initial concept of our project was a 3D game with a level design composed of multiple paths - unlike Gunpoint which uses isolated 2D levels - using a manipulation system like Gunpoint would make things get out of control quickly (due to the number of variations this can create). Due to the short production period we have until the project deadline, it would be unfeasible to make the number of tests and adjustments necessary to ensure that this mechanic does not get out of control.

However, the way enemies are used in the game can serve as inspiration for the behaviour we are expecting from the enemies in our game.

Likewise, the progression of puzzles in Gunpoint can serve as an example of the progression of small puzzles that we can apply to our level design.

Inside

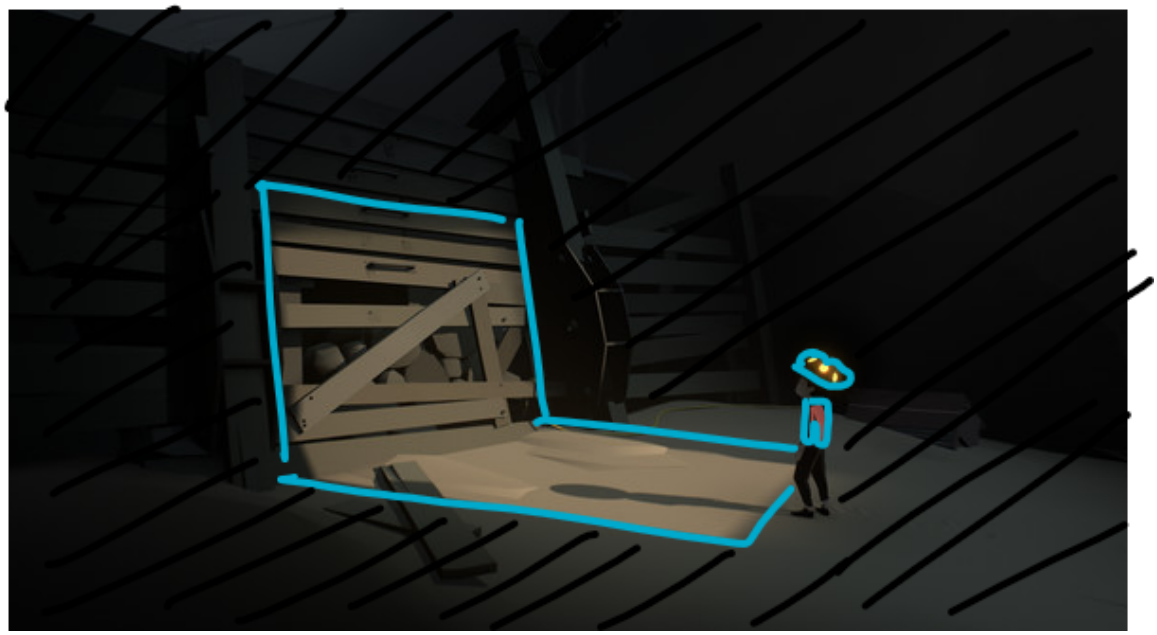
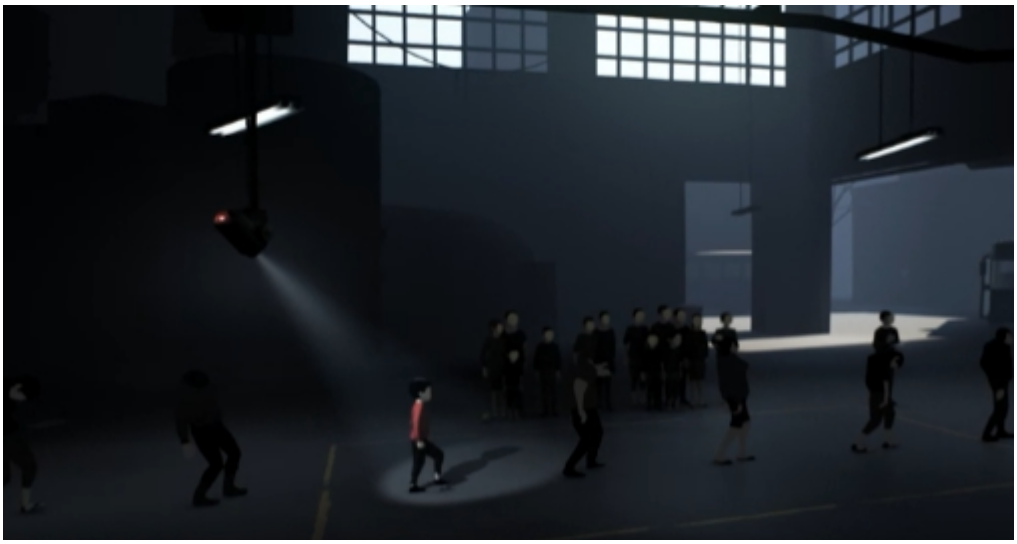
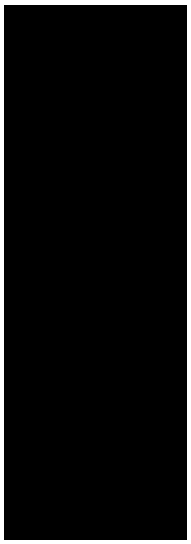
Research on *INSIDE(2016)* Art Direction

Key Qualitative Points

Environment

Layout

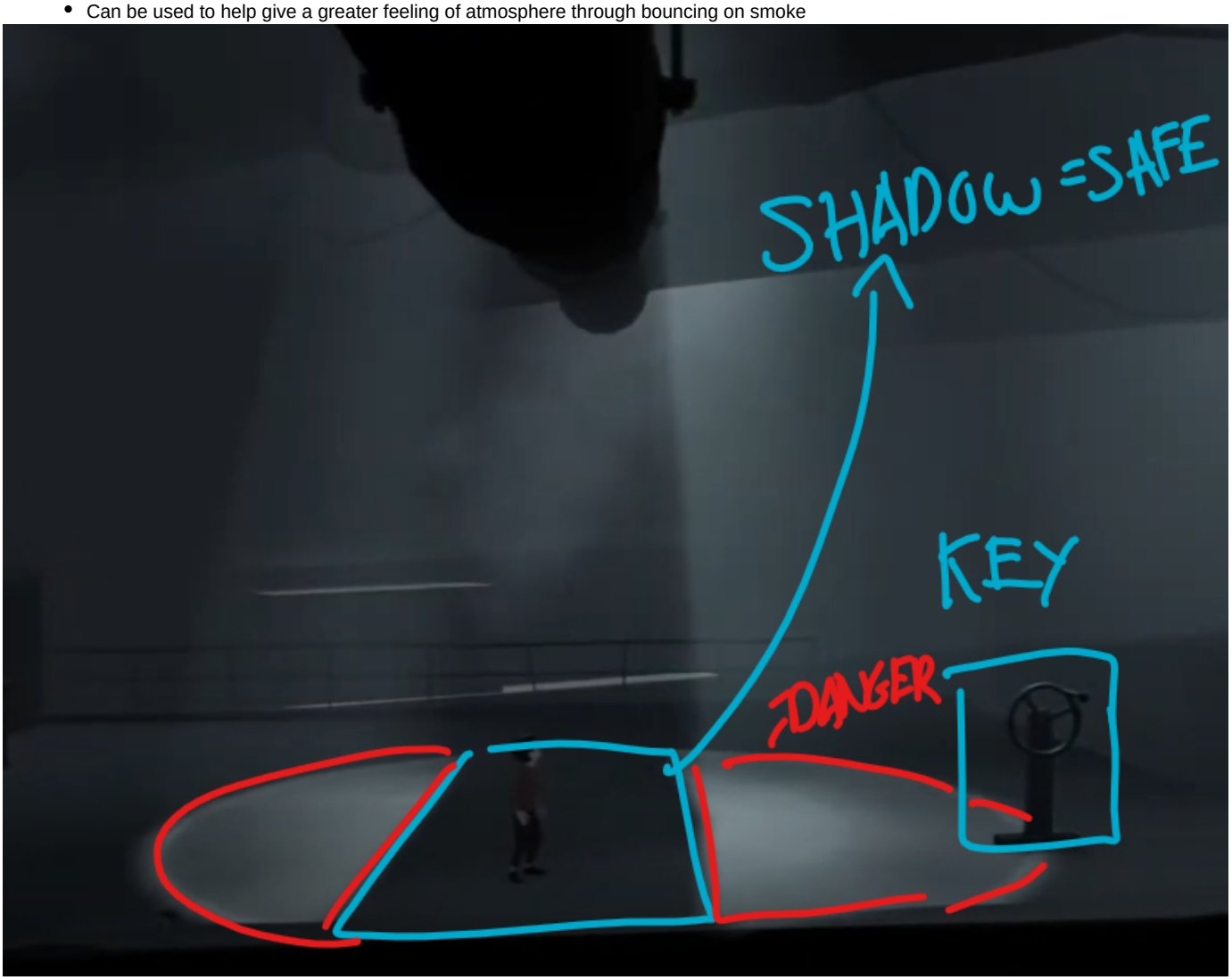
1. Use light to frame focal points like a film

Game screenshot with shape overlay	Two value composit
	
	

[redacted]

How can we incorporate this?

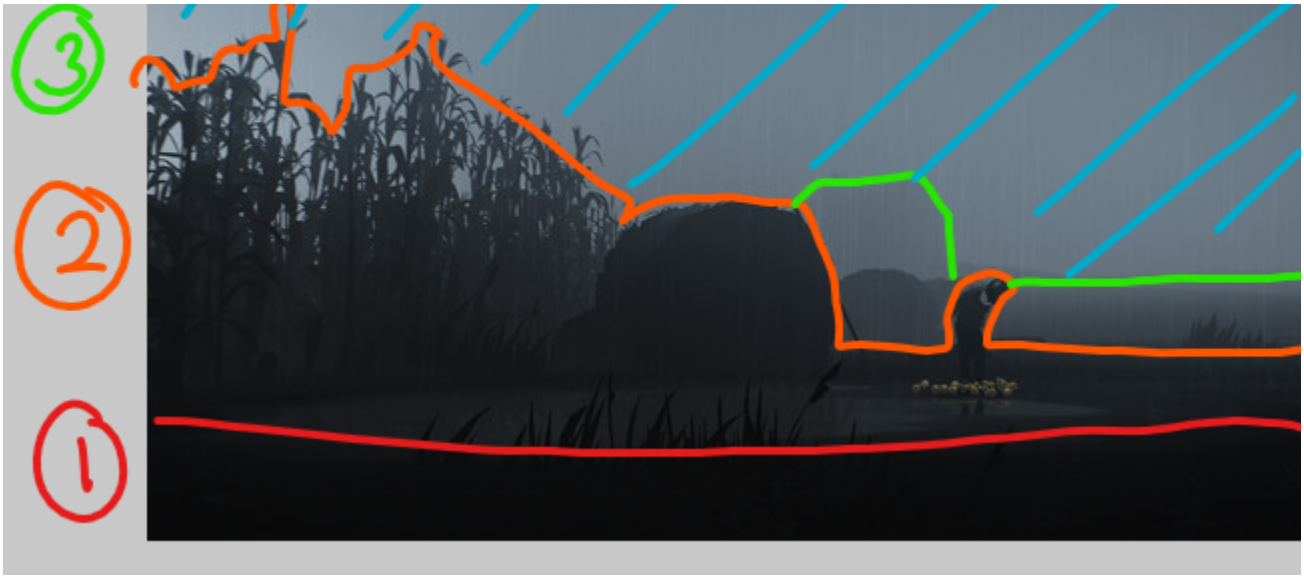
- GreyBox Paint Overs: For each puzzle, since our player's camera will be on rails, we can paint over level design grey boxes and simplify it to two values to quickly iterate on framing
- Light Types: Use a variety of lights
  - Directional
    - Used to establish large light and shadow shapes
  - Spot
    - Can be used to focus on certain focal areas like a live theater play
  - Point
    - Can be used on objects like buttons to draw attention
  - Area
    - Can be used to help give a greater feeling of atmosphere through bouncing on smoke



Inside game walkthrough no commentary | Inside full gameplay pc| How to beat Inside full game

- Using light that moves and shadows to create a safe area

2.Create depth through mist



How can we incorporate this?

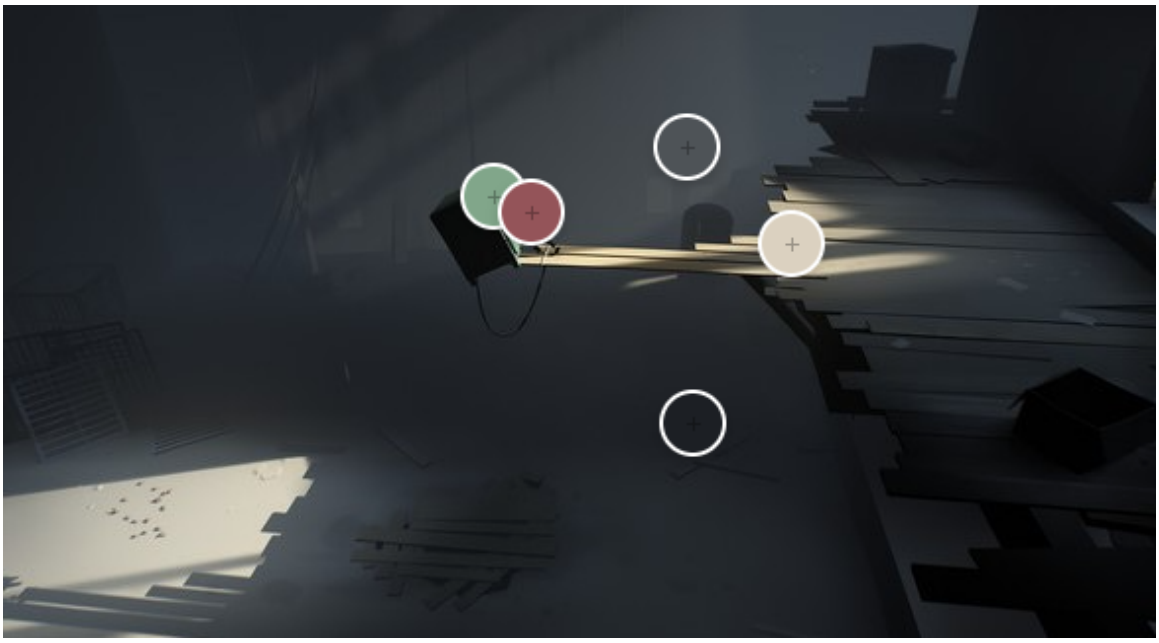
- Volumetric Mist Cube: Create a volumetric cube that has fog where we can adjust the level of depth based on the vector's magnitude from camera compared to other objects
- Particles in Air: Dust, fireflies, electricity jumping/floating in the air

Dust particles when light shines on them.

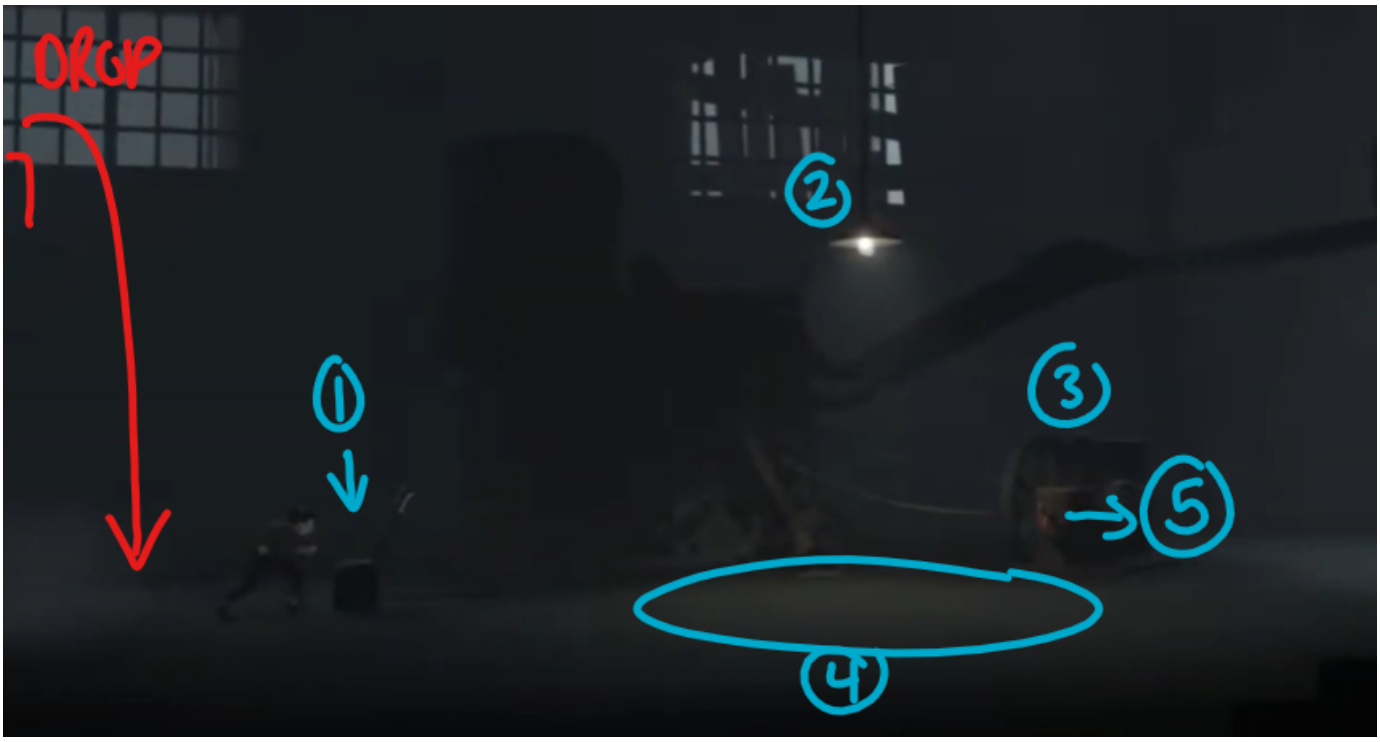
Fireflies in air - idea

- Element Silhouettes: Design visuals, prop placement and level design to create large abstract shapes that are easily identifiable (see above image). **This becomes challenging if we stick to a cylindrical level but still doable with props lying around the ground as landmarks**.
- Parallax style layering: We can add things floating from the ceiling or rotating around the central column to create shapes that give depth

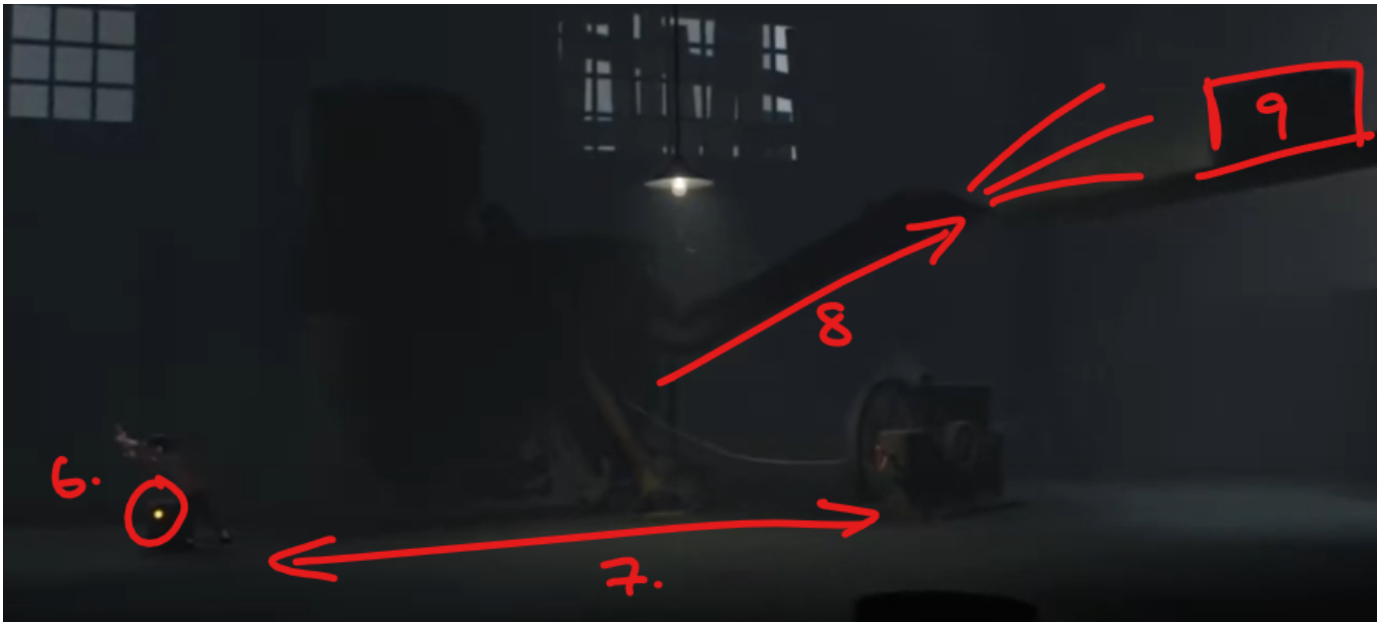
3.Create contrast through a limited color palette and using saturation sparingly for focal points like puzzle pieces



#1C1F24 #4C5459 #D9D3C1 #81A68A #945459



1. First part of puzzle is closest to player after falling
2. Spot light to show other parts of puzzle
3. Another interactable object, step 02 of puzzle
4. Area lit up by light is where you need to go
5. Slightly red light to show intractability



1. Lights up after generator is turned on - **puzzles have a context that players can understand**
2. Players discover they need to use the generator enough times to power the lever
3. A leading line created by a chute that sprays corn **(motion attracts attention too)** to lead the eye where they need to focus next
4. Light on dark object - Using light to give contrast on another focal point as players realize that box has something to do with the puzzle

How can we incorporate this?

- Color Guides: Create notes on allowed colors that can be used to design every visual
  - Include color codes and swatches like above images
  - Tham et.al (2020, p. 1311) mentions that there seem to be universal color associations across all cultures (e.g., white – purity; blue – water /sky

related; green – health; purple – regal; pink – "female" traits) as well as culture specific (e.g., red and orange – enthusiastic in Chinese; red – attraction in English).

1326 THAM ET AL.

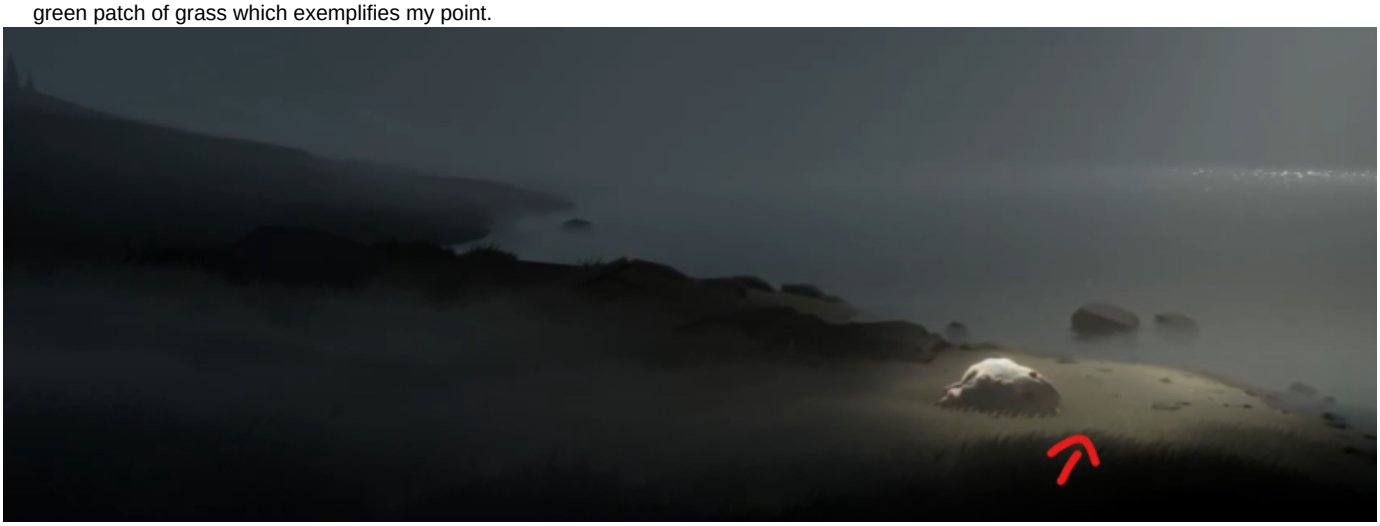
Table 1
Theme–Color Associations for Each Culture That Were Consistent Between Experiments 1 and 2 (Actual Concepts Are in Brackets)

	Color category (words) for each culture		
Theme	English	Chinese bilingual	Chinese monolingual
Universal themes			
Clean, pure	White (clean, pure, new)	White (clean, pure, holy)	White (pure (symbolic)) & blue (clean)
Negative concepts	Black (death, dark)	Black (solemn, fear)	Black (scared, dark)
Water/sky related	Blue (slippery, cold, cool, wet, swimming)	Blue (deep, broad, fly)	Blue (cool, broad, fly, swim)
Fresh, health, nature	Green (fresh, running, natural, walking)	Green (health) & blue (fresh)	Green (vitality, fresh)
"Female" traits	Pink (soft, sweet, feminine, pretty, girly)	Pink (soft, sweet)	Pink (lovely)
Heat	Orange (heat)	Red (burn, hot)	Red (fiery), orange (warm (temperature))
Bright	Yellow (light, bright)	Yellow (bright)	Yellow (bright)
Regal	Purple (regal)	Purple (noble)	Purple (elegant1, elegant2, noble)
Common themes			
Anger	Red (anger, fighting, rage)	Red (anger)	
Stop/danger	Red (stop, danger)		Red (danger)
Enthusiastic/excited		Red (enthusiastic)	Orange & red (excited)
Depressed	Black (depressing)		Blue (depressed)
Relaxed	Blue (quiet, relaxed, tranquil)		Blue (peaceful)
Mysterious		Purple (mysterious)	Purple (mysterious)
Culture-specific themes			
Attraction	Red (lust, passion)		
Bold	Orange (bold, loud)		
Summer	Yellow (summer, happy)		
Sad	Blue (sad)		
Old, boring	Grey & brown (dull, old, boring, bored)		
Plain	White (plain, simple)		
Dirty	Brown (dirty, unclean)		

Envy	Green (envy, jealousy)		
Fluffy	Pink (fluffy)		
Blend		White (blend)	
Romantic		Pink (romantic)	
Hope			Green (hope)
Thick			Brown (thick)

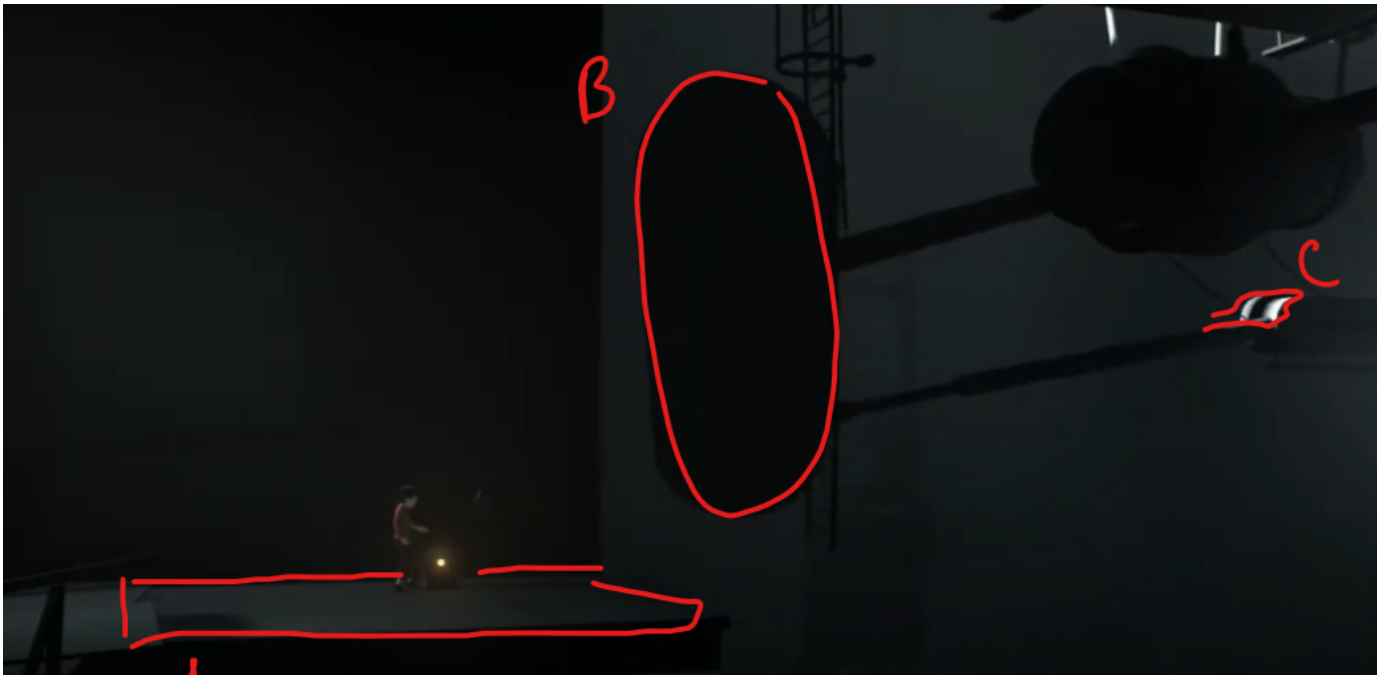
Above Image: Color associations in a table Them et.al (2020, p.1326).

- Them et.al (2020, p. 1316) also mentioned that black and gray were considered *depressing* to Chinese and English speaking participants.
- As noted in The Psychology of Colors (2020), **reds** are very intense and result in hyperactivity. We can use this to keep players anxious to emphasize the mood of the player trying to escape
  - Tham et al. (2020, p.1314) also mention that context matters with what feelings that colors are associated with and affects cognitive performance . Like how red when driving promotes stopping whereas in achievement (where skill and overcoming is necessary) contexts, red promotes avoidance **(risk aversion) motivation**.
- As noted in The Psychology of Colors (2020), we can use **green** due to its calming nature to direct players to a sense of safety or help them calm down after an exciting section. As seen below, in *INSIDE*, after an exciting ordeal of breaking out of the facility, you land on a visually green patch of grass which exemplifies my point.

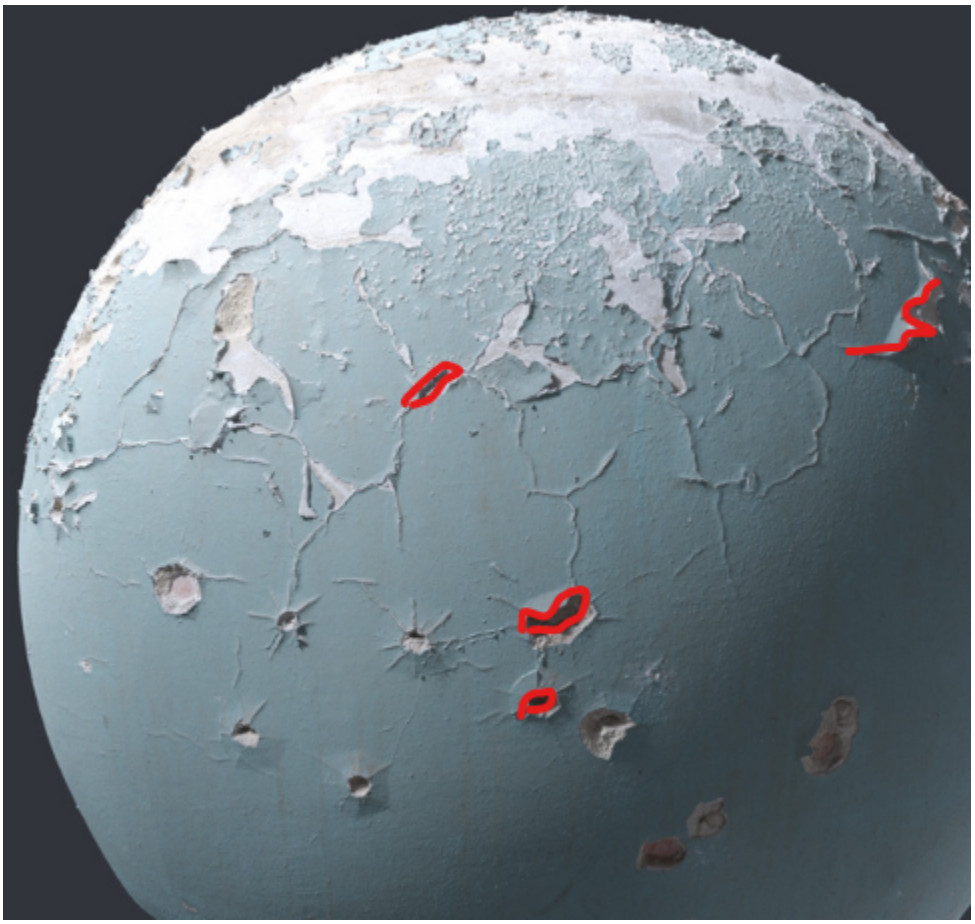


- Build Colors Up: Only start incorporating colors once depth and framing exists
  - Concept Art that is grayscale Color may help
- List out key interactable objects:
  - E.g. puzzle elements required for progression

Surfacing and Texturing

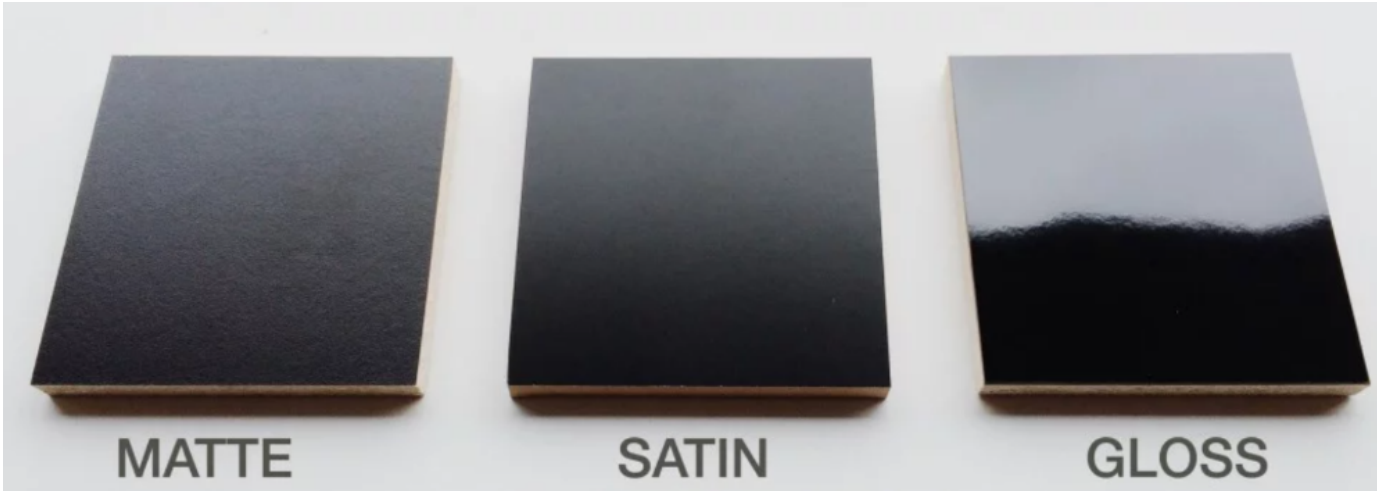


The game is very dark so texturing work is almost always invisible. They chose not to do any heavy texturing as a result. Texture is most apparent in the light and around the shadows.



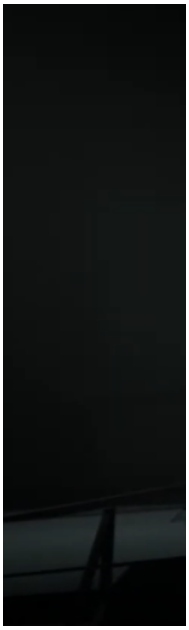
On the left, you can see that the most prominent parts of the texture detail occurs where shadows are casted as a result of contrast between light and dark. This is lost **since light is information and as shadows are the absence of light, it means less information is received to our eyes.**

However, we should still differentiate between materials as that adds a lot of variety to the eye as seen below.



We will need to be careful as reflections can also draw unnecessary attention.

Original



Different Materials

Characters

Protagonist

Humanoid character to give a sense of familiarity. Feels very alive compared to the rest of the world.

- Often times, the most saturated object
- Posed and animated like a lively person

This character is alone in the world as proximity communicates familiarity. We feel this as players.

NPCs

The image on the left shows how NPCs use contrast to differentiate from players.

- Height
- Color
- Leading lines (blue arrows) have NPCs look towards the player avatar

VFX

Diegetic Communication

Inside game walkthrough no commentary | Inside full gameplay pc| How to beat Inside full game

- VFX air bubbles increases in frequency when player is about to run out of breath
  - No need for UI
  - Uses context to convey information

Inside game walkthrough no commentary | Inside full gameplay pc| How to beat Inside full game

- Using particle explosions and “shattering” of matter to communicate damage

UI

No UI in the game, players are guided to interactable points through visuals and composition.

Death

Upon a loss condition triggering, the player and game state resets to a checkpoint within a few seconds. A fade to black is used to inform the player and that is all.

Camera

Moving between walls / barriers

Inside game walkthrough no commentary | Inside full gameplay pc| How to beat Inside full game

- The camera will swing out of the obstructed area (see above link)
- In other situations, it frames the character (see image above) so that he comprises a small part of the screen to **allow player to see what they need to do to survive**

User Experience

Immersion

Inside is a very immersive experience that easily hooks you from start to finish. And one of the main reasons for this immersion to happen is the clear invitation the game gives players to ask questions.

The game does not have speeches and texts, and all interpretations are made based on the scenes, sounds and situations that the player experiences. All subliminally and subtly.
This presentation is precisely what makes the player start asking questions like:

- Who is this boy?
- Who are these other people?
- What's going on here?

And these questions, therefore, are exactly what make the experience immersive and hold attention because they generate interest and rely on the players' own curiosity to seek answers.

Pacing

Inside has an excellent pacing system, and the game has a dark atmosphere throughout, but this atmosphere varies excellently between moments of breath and moments of shocking and impactful violence. The balance and exchange between these two points end up creating excellent moments of contrast, which ensure that the player will keep their attention and will not be over-saturated with the same sensations.

Game Feel

Inside has exquisite care in terms of polishing and sensations. The main character has a fluid movement with an impressive variation of animations - dynamics - that help to create an emotional bond between him and the player. Those animations also help to give feedback to players on their actions.
Likewise, the scenario has a wide range of sounds for different mechanisms, solos, interactions, etc. Helping to establish veracity to the fictional universe.

Recommendations

The way Inside works his narrative is quite interesting and can serve as an example of less cost for our project, as it removes the need for narration and other aspects. However, a subliminal narrative like this takes a lot of effort to ensure that it is effective and interesting in the end result.

Game Design

System Puzzle

Inside's puzzle system has a linear progression, where the player must solve a puzzle to start the next one, following this way until the end of the game.
The puzzles fall into three categories:

Environment puzzle

It consists of puzzles where the player must interact with elements of the scenario, such as boxes, structures, stairs, etc., positioning them in such a way as to be able to take the character from point A to point B, ending the puzzle.

Action/time puzzles

They are the tensest moment puzzles in the game, where the player must perform a sequence of actions in the right moment - or order - to avoid the death of the main character.
These puzzles have a strong connection with the game's sonic environment, which helps the player to have a sense of rhythm about when to perform his actions.

Recommendations

The variation between puzzle styles in Inside can be a good example of how to create tension and draw attention without necessarily having to completely change the game. This can be useful in our project as an example of good pacing

Quantitative

Reception

The game released in 2016 on Steam and to now in 2022 has accrued 34,827 reviews on Steam with a 96% positivity rate. It was also released on Xbox, Playstation 4, iOS and Nintendo Switch.

As per Metacritic, it has scored over 87/100 on all the aforementioned released platforms (except iOS as it isn't present).

Awards

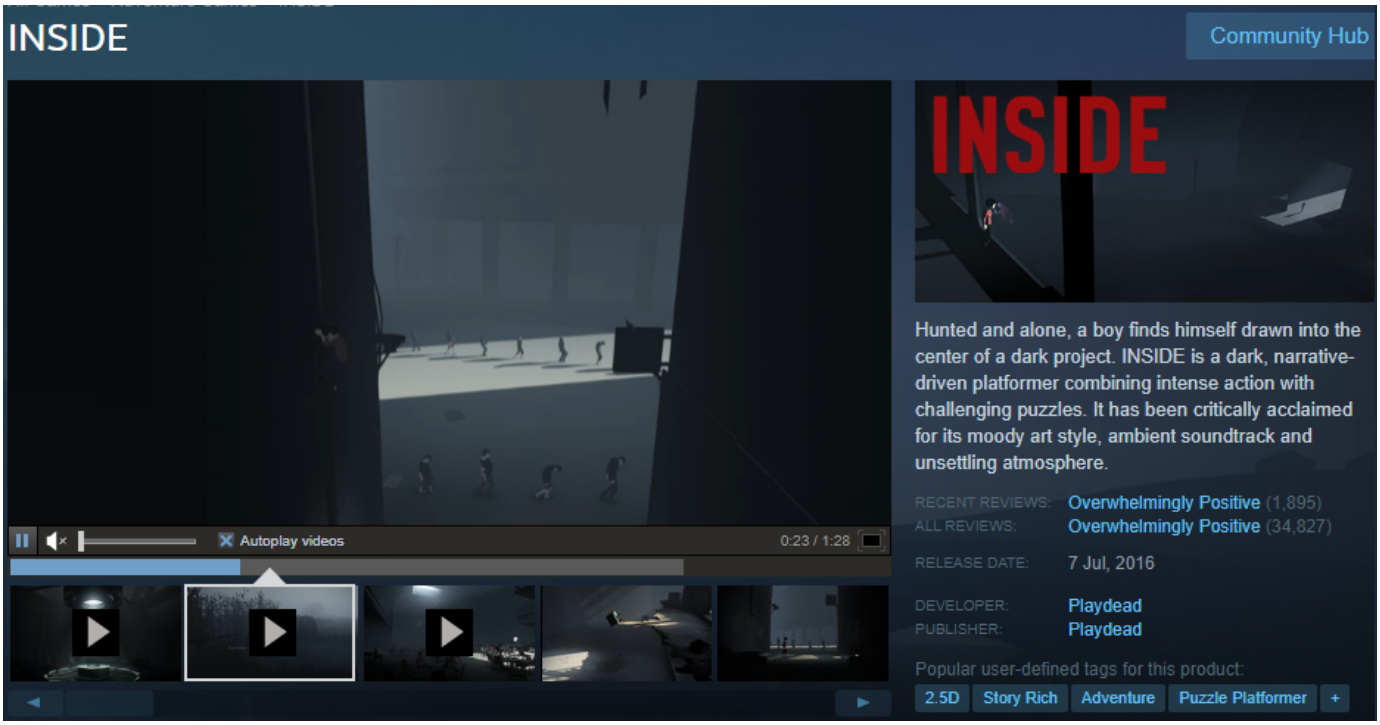
Year	Award	Category	Result	Ref

2016	Game Critics Awards 2016	Best Independent Game	Won	[73]
2016	The Game Awards 2016	Best Art Direction	Won	[76][77]
2016	The Game Awards 2016	Best Independent Game	Won	[76][77]
2017	20th Annual D.I.C.E. Awards	D.I.C.E. Sprite Award	Won	[78]
2017	20th Annual D.I.C.E. Awards	Outstanding Achievement in Art Direction	Won	[78]
2017	20th Annual D.I.C.E. Awards	Outstanding Achievement in Game Direction	Won	[78]
2017	National Academy of Video Game Trade Reviewers	Camera Direction in a Game Engine	Won	[79]
2017	Game Developers Choice Awards 2016	Best Audio	Won	[82][81]
2017	Game Developers Choice Awards 2016	Best Visual Art	Won	[82][81]
2017	13th British Academy Games Awards	Artistic Achievement	Won	[85][86]
2017	13th British Academy Games Awards	Game Design	Won	[85][86]
2017	13th British Academy Games Awards	Narrative	Won	[85][86]
2017	13th British Academy Games Awards	Original Property	Won	[85][86]
2018	2018 Webby Awards	Action	Won	[87]
2018	2018 Webby Awards	Best User Experience (People's Voice)	Won	[87]
2018	2018 Webby Awards	Best Visual Design	Won	[87]

Wikimedia (2022)

It won awards mostly in the aesthetic categories like sound, narrative and art direction.

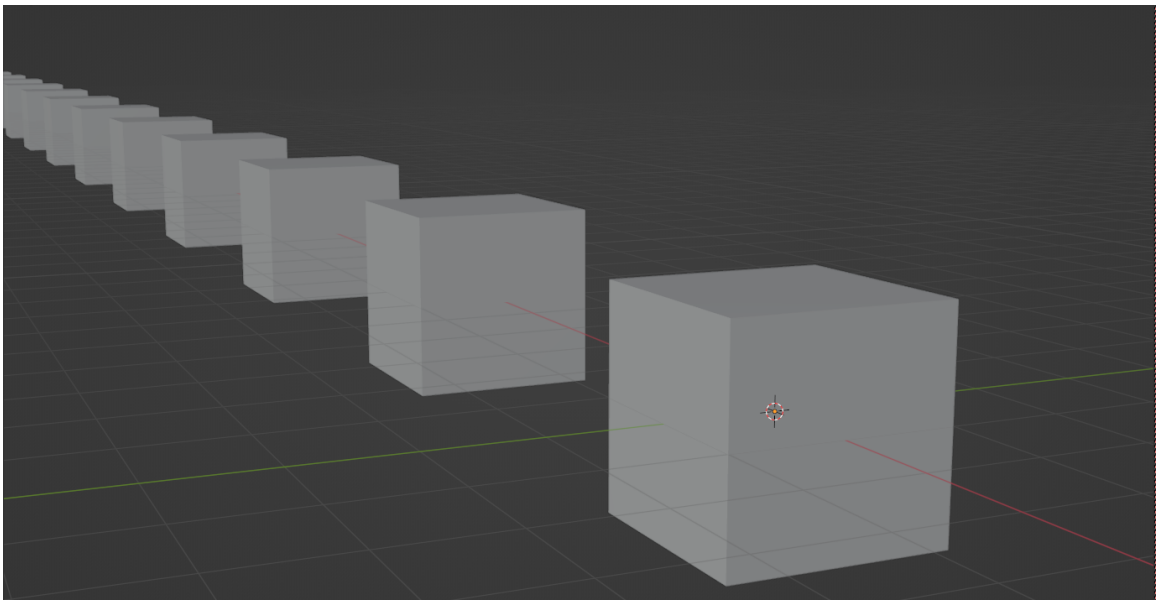
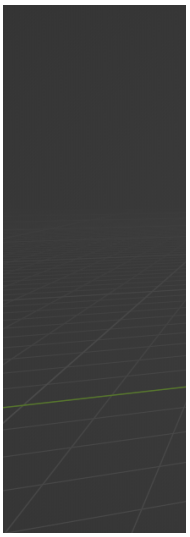
Sales



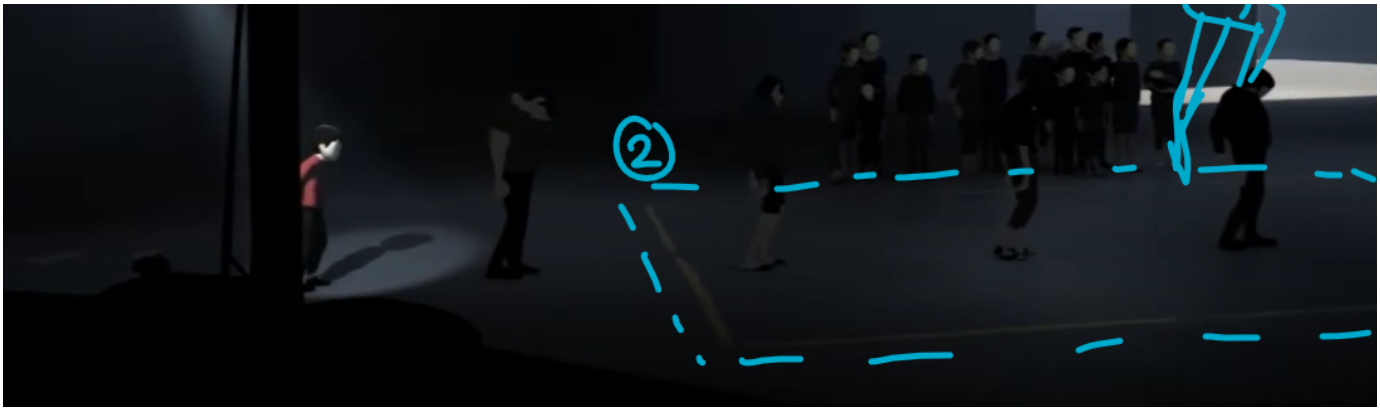
No official sales data is present but as Birkett(2018) mentions, we can use the “Boxleiter” number to estimate the revenue from this title based on the price of $23.99 CAD. As a result, we get an estimated revenue of **$32 million CAD on Steam alone**.

Discussion Points

1. Camera Focal Length: Adjusting the player camera’s focal length between the larger character and the electric character to create contrast and have players feel as if they are electricity.
    a. If it is too disorientating we can change focal length on switch and then slowly bring it back to baseline

50 mm lense	20 mm lense
	

1. Post Processing:
    a. Bloom
    b. Focal Depth - edges further away get more blurred from the focal point to. Changes based on what needs to be in focus
2. Environment Manipulation
    a. **https://youtu.be/I5NVketf2-M?t=1426 -Link to gameplay part**
    b. Wires from an interactable point that lead the player to another interactable point
    c. Rotation of objects is possible as the player pushes the object on the crane and it gets stuck between the two pillars framing the crane’s chain
3. Using Contrasting Boundaries top show, teach then test
    a. Inside game walkthrough no commentary | Inside full gameplay pc| How to beat Inside full game
    b. 1. An eye that looks for suspicious activity from the humans
        i. Communicated through animation as the player avatar enters a new state to resemble the line of other people
    c. 2. A yellow outline that delineates a boundary for a different action. **We are shown, and given time, to learn what we need to do once we get there, which** is jumping as seen in 3.
4. **Challenge**
    a. How to control our light when we have one main column? How will puzzle rooms/areas use it as well?
5. Lightning and Sound - Gameplay addition?
    a. Inside game walkthrough no commentary | Inside full gameplay pc| How to beat Inside full game
    b. Watch video above for a few seconds
    c. Light faster than sound so you as a player see the electricity/lightning flash before the sound hits you
    d. It also distorts the camera and objects
6. **Bodies as conductors**
    a. In INSIDE, players can control human “drones”
7. **Create memorability through subverting expectations:**
    a. I entered with the impression it was a cute story about escape until the end you become an amalgamation of flesh
    b. How will we do that?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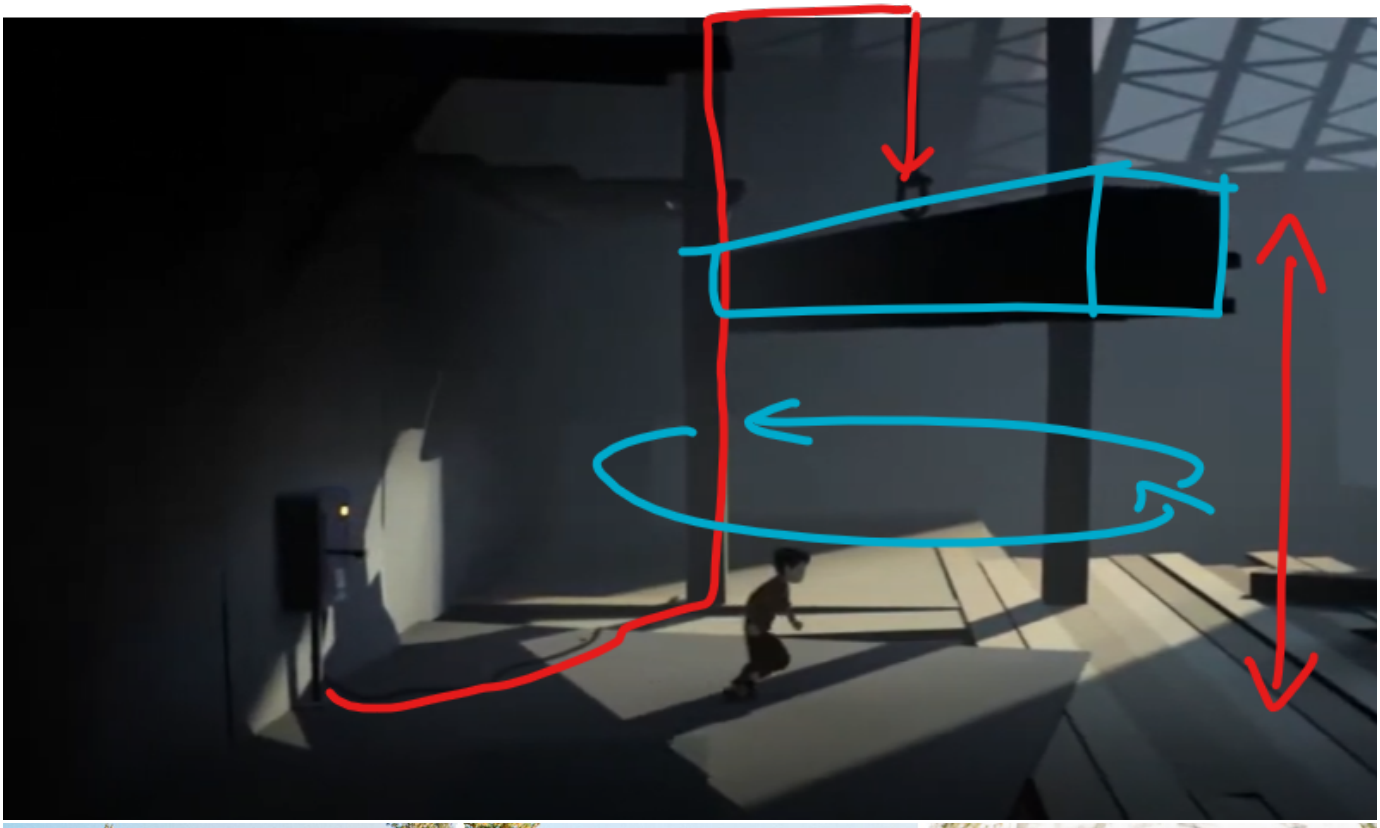

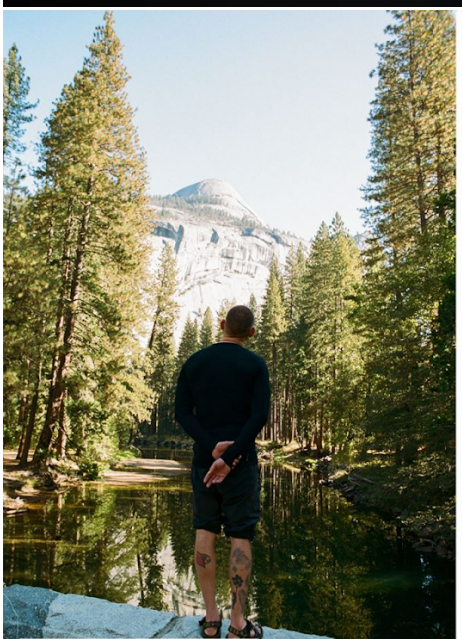

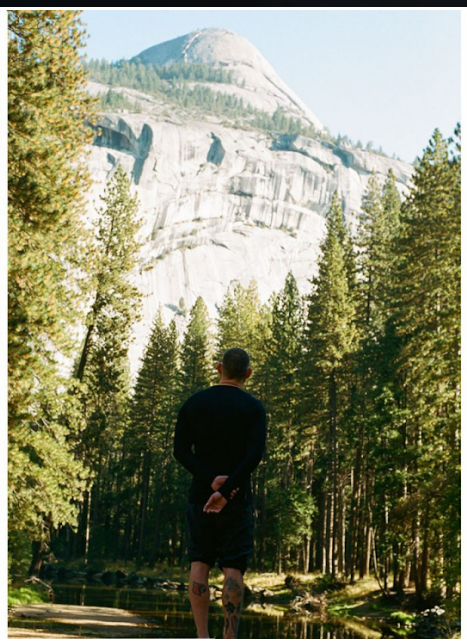

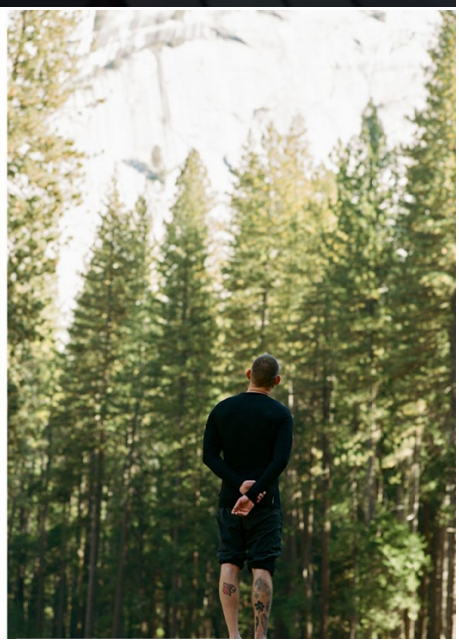

Conclusion Points

Color Is Pivotal To Aesthetics and Feelings

As seen in work by Tham et al. (2020), color has universal associations with concepts (e.g. black = death, white = purity) and must be used carefully when designing visuals. We can also use green to promote safety and yellow colors to attract the attention of our players as that is seen as a bright color.

Every Puzzle is a Film Grab

Each moment of the game should be readable, especially puzzles. Use light to express focal points and manipulate the camera using post processing effects to emphasize the details.

Materials and Texturing:

Depending on how dark we want our game in terms of lighting, we can avoid texturing heavily. But we should still differentiate between materials but do so carefully to guide the player's eyes.

Contrast between characters and everything else:

We can enhance readability of characters by creating contrast between them and the surroundings, including intractable objects and enemies. Contrast through:

- Shape language
- Color
- Animation
- VFX
- Size
- Materials

References

Birkett, J. (2018, May 4). *Using Steam reviews to estimate sales*. Game Developer.

https://www.gamedeveloper.com/business/using-steam-reviews-to-estimate-sales

The Psychology of Colors In Home Interiors. (2020, December 8). Egypt Today, NA.

https://link.gale.com/apps/doc/A644157195/ITOF?u=ko_acd_shc&sid=summon&xid=5c009a25

Tham, D. S. Y., Sowden, P. T., Grandison, A., Franklin, A., Lee, A. K. W., Ng, M., Park, J.,

Pang, W., & Zhao, J. (2020). A systematic investigation of conceptual color

associations. Journal of Experimental Psychology: General, 149(7), 1311–1332.

https://doi-org.library.sheridanc.on.ca/10.1037/xge0000703.supp

Wikimedia Foundation. (2022, September 13). Inside (video game). Wikipedia. Retrieved

September 22, 2022, from

https://en.wikipedia.org/wiki/Inside_(video_game)#Reception

It Takes Two

Overview

It Takes Two on Steam (steampowered.com)

It Takes Two is a genre-bending platform adventure made for a purely co-op experience. To enforce this pure co-op gameplay experience, you can get your friend to download the free friends pass version of the game to play with you if you've purchased the game. The game's entire narrative is completely based around the two players and player characters cooperating with each other to overcome outlandish puzzles and events in a bizarre shrunken world. The game's content is unique and inspiring for what can be done in the modern era of games.

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    - Cosmic Inflation and Gravity Boots
- Ties Between Narrative and Game Mechanics

The Games Camera and Controls

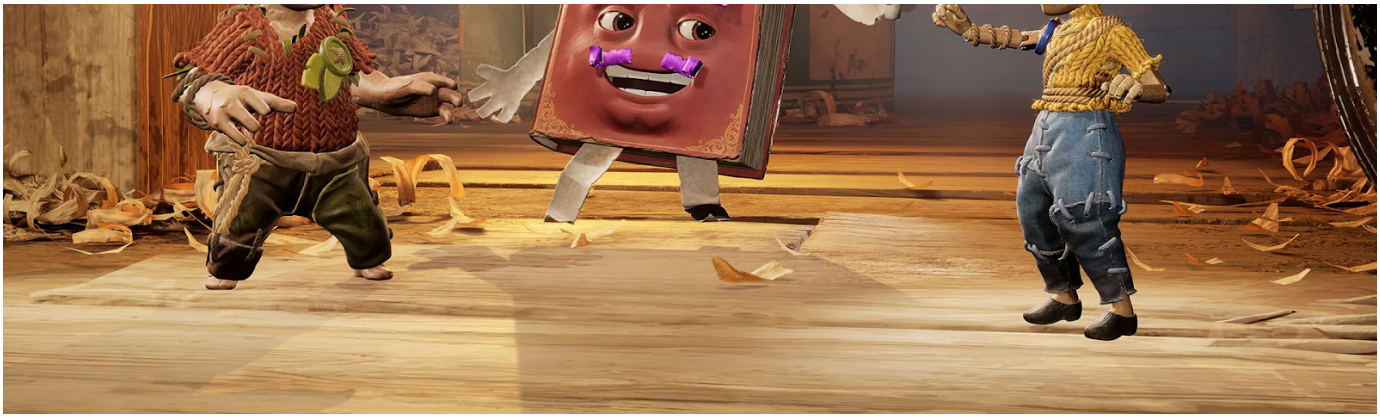
The game uses the classic split screen co-op view despite both players commonly playing on two different machines. There was always something about this method of displaying the game to the players that helped the two players bond over the player experience.

The camera is placed in a third-person perspective over the shoulder of player characters. This remains consistent throughout the entire game, despite the various mechanics that could change this. Other than that, the game uses classic PC and console controls for everything in the game. WASD to move, click to shoot, E to interact, etc.

Narrative Analysis

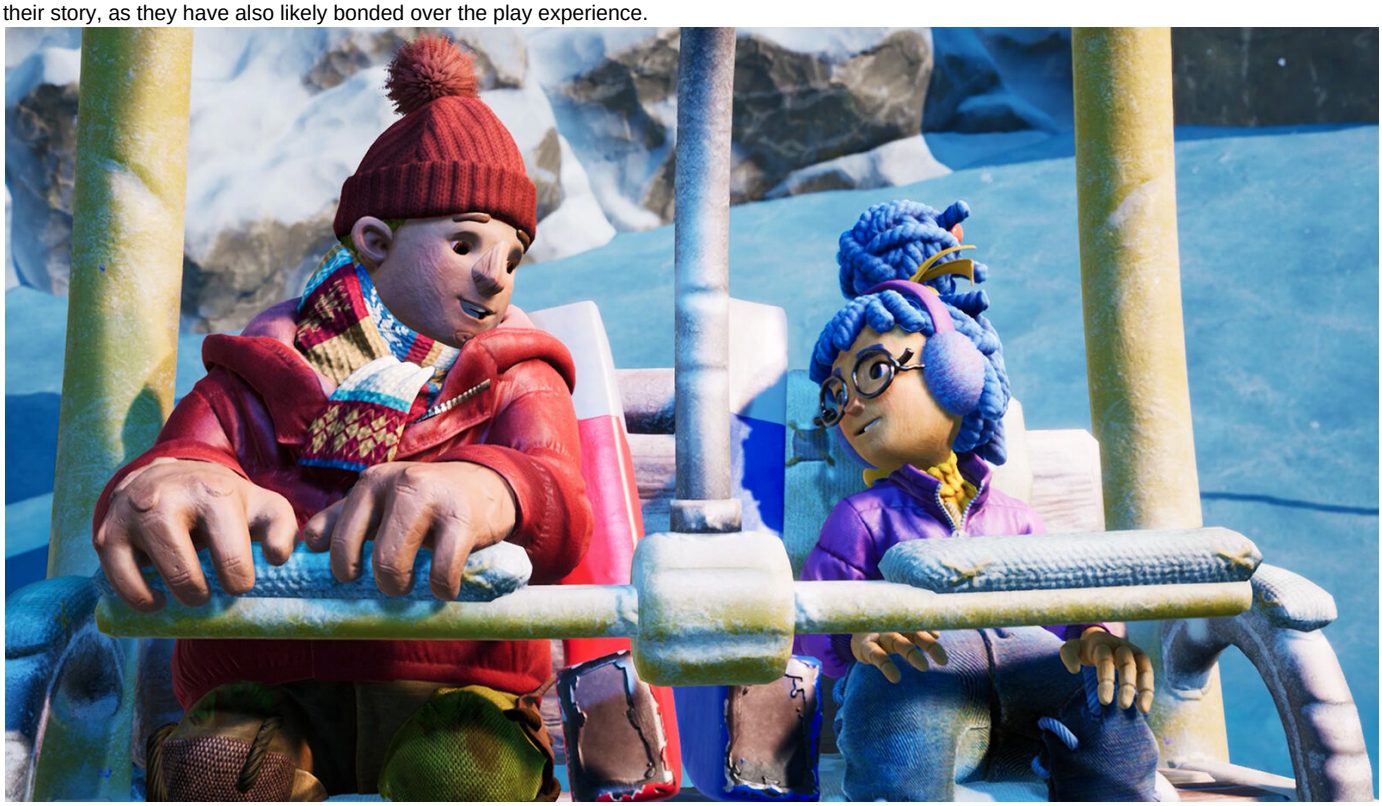
The Narrative

In It Takes Two, the players play as a husband and wife duo that start the game off seeking a divorce. Their daughter is torn by this decision, and wishes with a book on relationship development that she found in the trash at school in hopes that they would get back together again. The wishful actions pay off, and both parents are transformed into toy doll versions of themselves that their daughter had made.



The book introduces itself by name of its author, Doctor Hakim, and takes the couple on a wonderland-like journey through their property, starting off in their back shed. The book complicates the couple's progress to force them to collaborate to overcome challenges, giving them a physical and growing understanding of what they can do together.

After escaping a vengeful vacuum, fighting a wasp legion with a sap thrower and matchstick gun, street fighting squirrels, overthrowing an innocent elephant princess, and a long list of other things; the couple finds themselves going through old times when they were happy together. They grow throughout the game, as shown through in-game dialogue, mini games and cutscenes. This really helps the player grow attached to their story, as they have also likely bonded over the play experience.



With every new mechanic and narrative introduced, the players and player characters explore more about sharing, caring for another's passions and quirks. You learn more about what it means to work together with someone in harmony through game mechanics that work hand in hand.

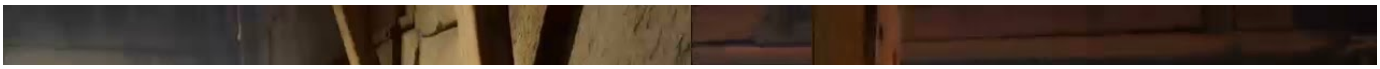
After the couple's long journey to reunite their love for each other, they are returned to their normal bodies by Dr Hakim, and embrace their daughter together as a family once broken, now mended.

Game Design Analysis

The Mechanics

During the game, the players go through a massive list of mechanics that are only relevant and available in certain sections, or levels.

The Hammer and Nail



In the first section of the game where core mechanics like these are introduced, the wife May is given the head of a hammer, and Cody the husband is given three nails. May is able to break obstacles, hammer platforms, and swing on nails. Cody is able to throw and retrieve his nails like Thor's hammer, nailing them to marked surfaces, nailing platforms in place or to hit targets. In this section of the game, both players are required to keep moving forward. Cody sticks nails into places to allow May to swing and travel further. May hammers down platforms to allow Cody to catch back up.

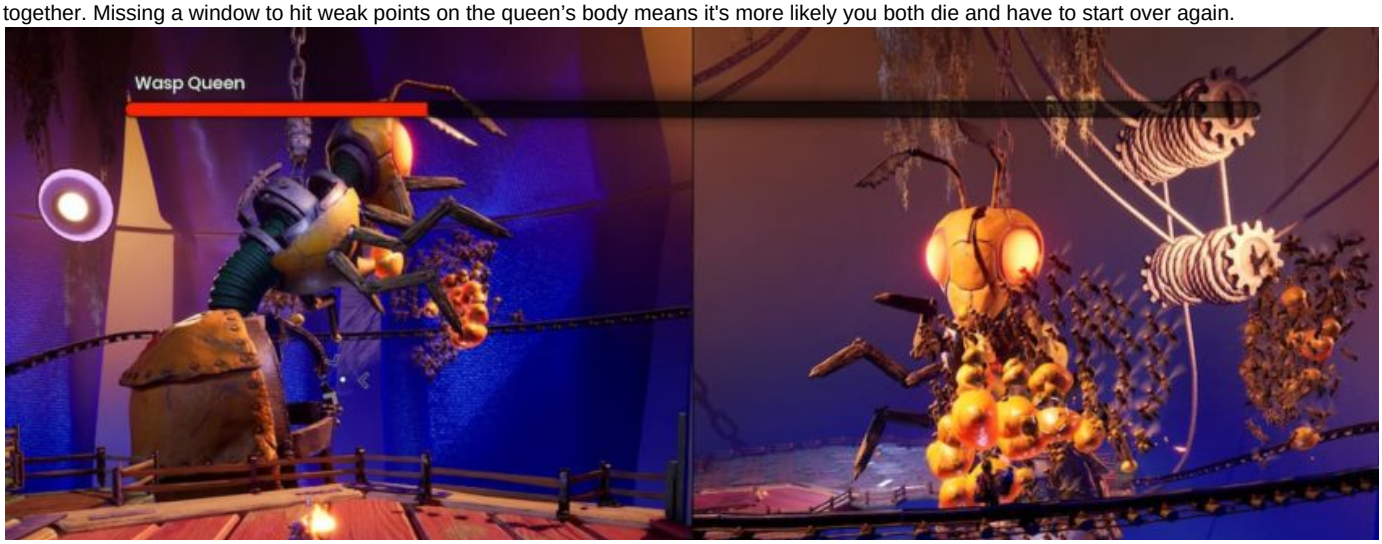
The collaborative elements of this level come together in a big boss fight where the players battle against a sentient toolbox corrupted by rust. The players must work together to expose the bosses weak points and defeat it. For example, when the boss swings his arm to hit the players, he slams it into a wall where Cody can nail it down. He then throws two more nails along his arm to allow May to reach the toolbox and break one of two locks keeping this arm in place.

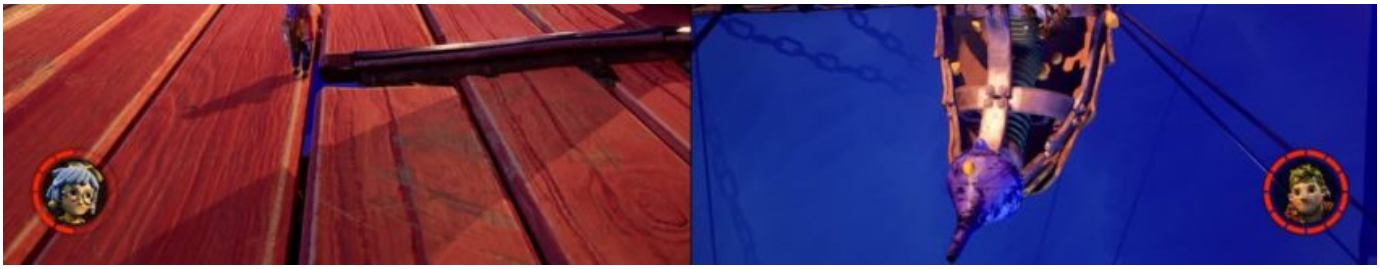
After this section, May must help Cody by using the boss's other arm to launch him high enough to throw nails at an explosive canister that falls into a compartment on top. Every level has a climactic boss at the end where the mechanics are utilized together to defeat it. This is just the first.

The Sap Thrower and the Matchstick Gun

In the next level, the couple climb into the tree in their backyard and are abducted by squirrels who are fighting against a wasp nest in the same tree. They are recruited to help the squirrels and given two weapons. Cody is given a sap gun that can weigh down objects, or fill compartments. May is given a matchstick gun that can be fired into panels to activate mechanisms or detonate Cody's sap. This combination of mechanics is used to overcome puzzles, but also defeat swarms of wasps in multiple instances.

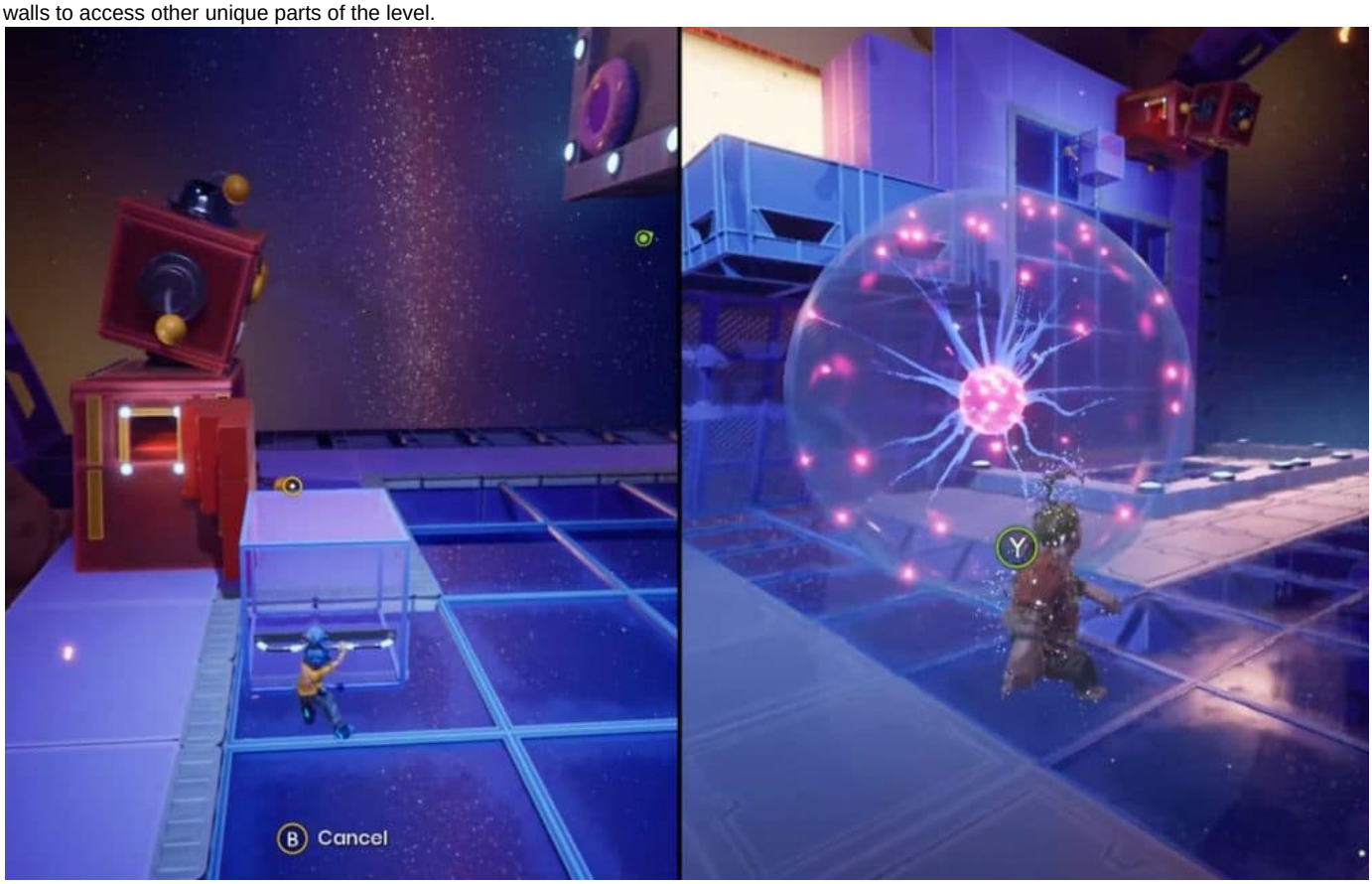
In the final climax of this level, the couple faces off against a robotic wasp queen, and must use both of their guns to blow apart the metal body of the false queen. The fight is intense, and made even more reliant on teamwork in the case that the players don't coordinate their part of the fight together. Missing a window to hit weak points on the queen's body means it's more likely you both die and have to start over again.





Cosmic Inflation and Gravity Boots

This one was weird with its name, but that's because the mechanics are based on scientific principles. Cody is given a belt that can turn him super big or super small, which allows him to traverse the level in various different ways. May is given gravity boots that let her walk up marked walls to access other unique parts of the level.



The boss fight for this one relies less on the mechanics and more on the players cooperation. The fight has three sections. In the first, one player is targeted by a laser from a spaceship. The other player must go to a spot in the arena and stand on it to raise a column that can protect the targeted player. Once the column is struck by the laser three times, the fight moves to the second phase.

In the second phase the players each need to drive rockets fired by the spaceship into it to do damage. This phase is pretty simple and quick. After this though, the game uses the mechanics as May must dodge the spaceship's full arsenal as Cody shrinks and traverses the inside of the ship to eject its pilot.

There are many more mechanics and levels in the game that I haven't covered, but that's because I haven't gotten through the rest of the game yet. It's a little hard to research first hand without a partner readily available at all times.

Ties Between Narrative and Game Mechanics

Every instance of new game mechanics was interesting and well developed, but what I want to focus on with this research is how they meld with the games narrative and theme.

The entire game is founded on the principle that two characters MUST collaborate to overcome challenges and trials that prevent both of them from achieving a common goal. In this case, both parents must work together to find a way to overcome challenges along the way to returning to their real bodies. No one mechanic is able to overcome challenges on its own, just like how the two characters need each other to do the same.

100% of the game is based on this core concept, both the narrative and the game's mechanics. There isn't a single challenge that can be solved without the help of the other player, thus a single player experience, or single character narrative, is impossible. This challenge cannot be overcome alone.

A lot of the game's mechanics spawn from creativity surrounding the current events in the narrative. The narrative drives the game's development forward, as the game changes to match the story. This proves that the same result can be made in any game, including ours. The characters and the world are the context for the mechanics. In our case, our mechanics involve the material environment and the electrical/magnetic environment. The correlation comes from the characters' relation to one another, like how both partners in a couple need to love and respect each other equally to keep their relationship alive. With the current understanding of our game's narrative, the characters have a symbiotic relationship that goes further into a sibling relationship. One primary idea is that one character cannot escape without the other, but I think we could go so far as to state that they cannot live without each other an emotional and physical level. The games mechanics could reflect this. Say: the HC requires an electric current to stay awake, but the lingering charge from the EC after they leave is enough for them to stay awake to finish a challenge. There could be a timer of some kind, or maybe the HC just turns off altogether, requiring the EC to return to them at certain points to complete a puzzle.

Prey

Game Overview

by VG Insights

Developers: Arkane Studios

Publishers: Bethesda Softworks

Release Date: May 4, 2017

Current price: $29.99

Avg price during last 6 months: $26.58 (11% discount)

Genres: Adventure, Action

Languages: Russian, English, French, Italian, German, Spanish, Polish, Brazilian, Traditional Chinese, Japanese, Simplified Chinese

Description: In Prey, you awaken aboard Talos I, a space station orbiting the moon in the year 2032. You are the key subject of an experiment meant to alter humanity forever – but things have gone terribly wrong. The space station has been overrun by hostile aliens and you are now being hunted.

Steam link: store.steampowered.com/app/480490

Potentials to be researched

- The game has several abilities and powers that can be used to interact with the environment in diverse ways
  - These tools and skills can serve as examples/inspirations for the eventual powers of the electric character
  - The way in which the tools and skills can be used to manipulate the scenario can serve as inspiration for the puzzles of our project

- The game has a multi-choice level design that can be applied to our concept
  - Areas have multiple paths that can be used to play the game in multiple ways
    - These multiple paths can serve as an example of how each of the characters should interact with the environment in our project
- The level design features several areas connected to a central hub, like our project
- The system of progression and unlocking of new areas and tools/skills may be relevant to our project

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    - Statistics over time
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    - Level Design
- Conclusion
- Recommendations

Analysis

Quantitative Analysis

Concurrent players

by SteamDB

- **458** players right now
- **477** 24-hour peak
- **24,594** all-time peak 6 years ago

Store data

by SteamDB

- **163,041** followers
- **#1941** in top sellers
- **36,783** positive reviews
- **3,875** negative reviews
- **90.47%** positive reviews

YouTube stats

by SteamSpy

- **1,559,016** views
- **6,146** comments

for top 50 videos uploaded last week

- **over 50** new videos uploaded yesterday

Twitch stats

by SteamDB

- **594** viewers right now
- **594** 24-hour peak
- **163,630** all-time peak 3 years ago

Owner estimations

- **1.22 M .. 3.05 M** on reviews *(30-75)* *by SteamDB*
- **~4.02 M** *by PlayTracker*
- **~1.51 M** *by VG Insights*
- **~1.96 M** *by SteamSpy*

Playtime

by PlayTracker

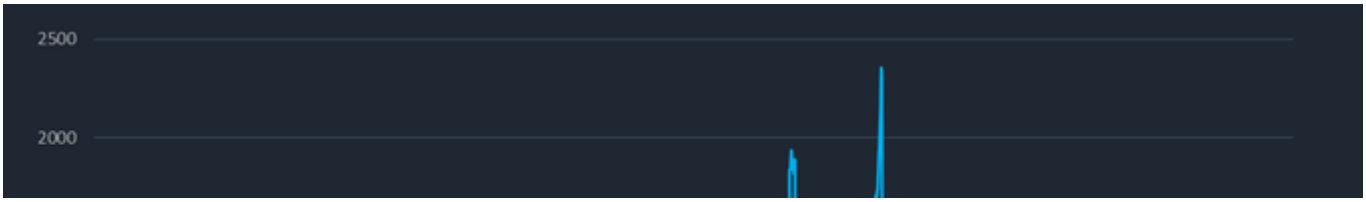
- **15.4h** average total playtime
- **1.5h** average recent playtime

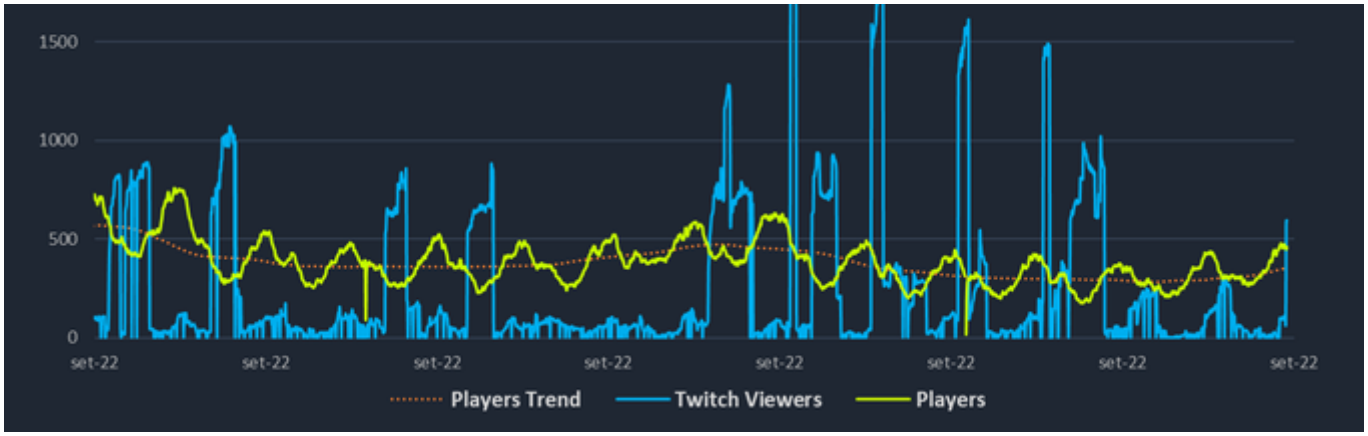
Rating

by Metacritic

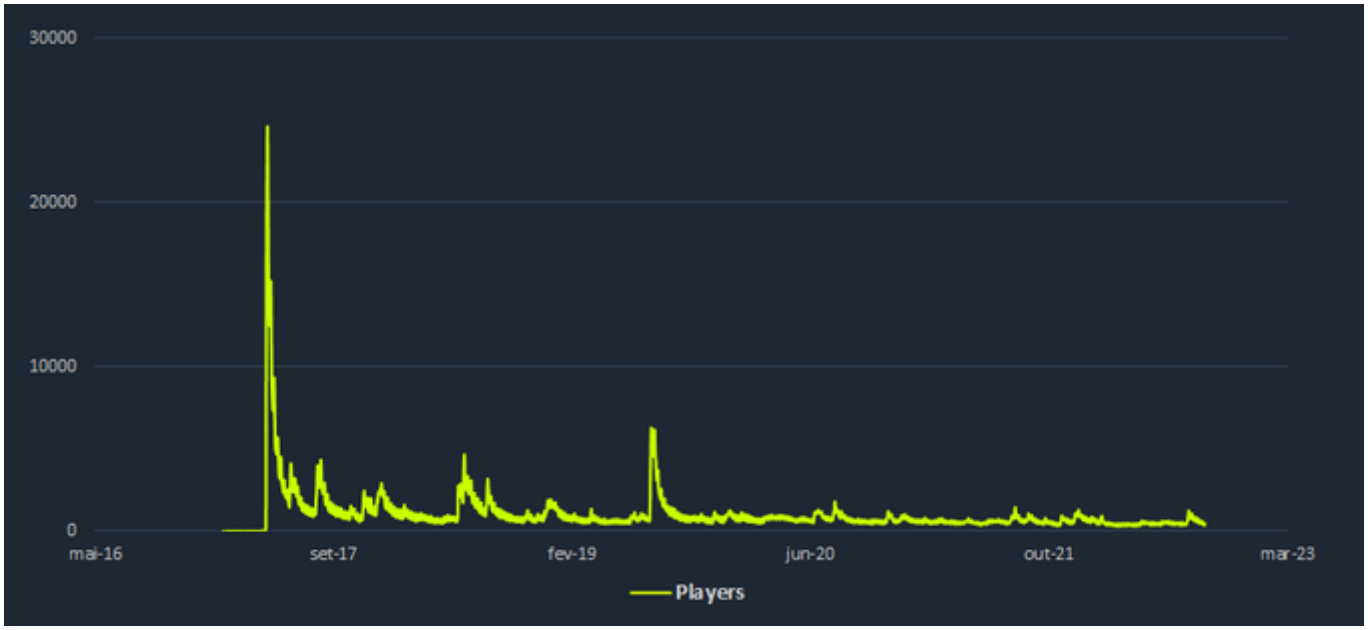
- **79/100** Metascore *68 Critic Reviews*
- **81/100** User Score *1205 Ratings*

Statistics over time





Lifetime concurrent players on Steam



Game Design Qualitative Analysis

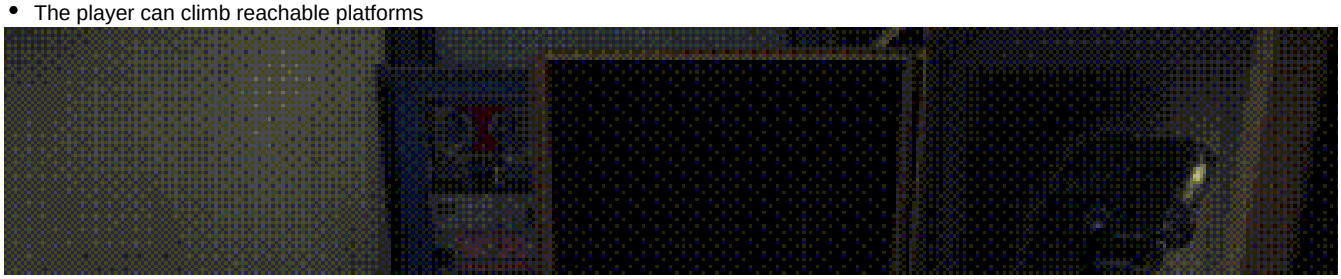
https://miro.com/app/board/uXjVPTQQXu0=/?share_link_id=992134813724

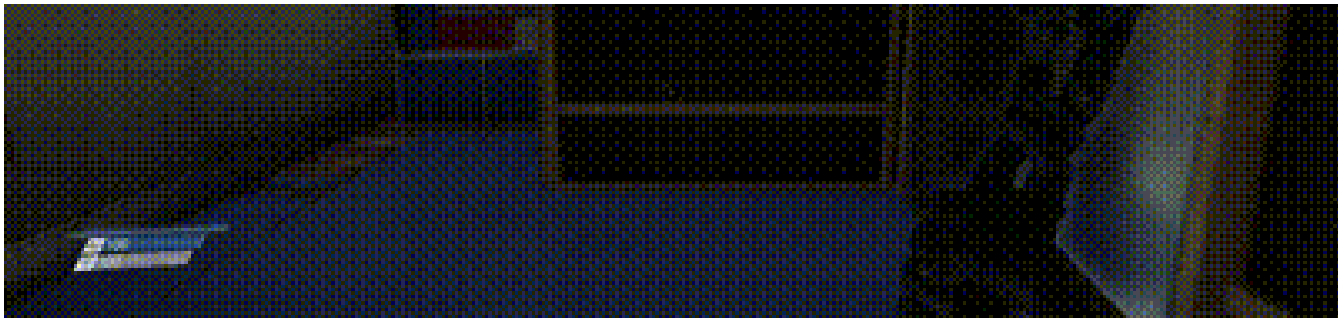
Game Elements

Movement

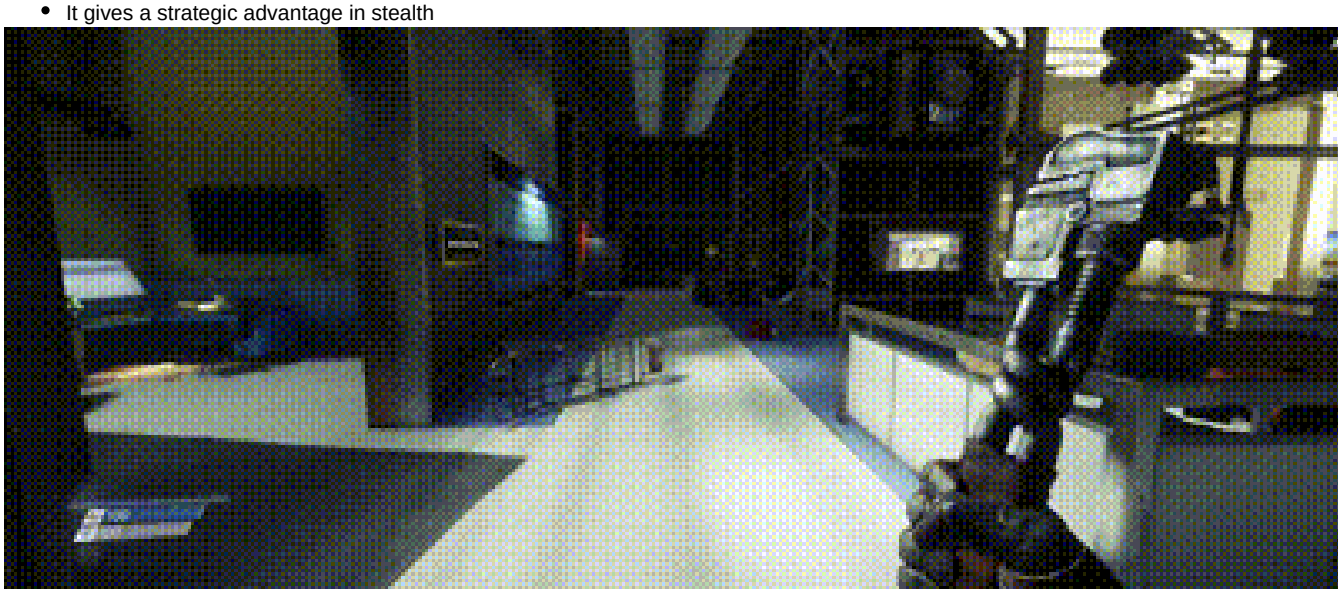
Rules

- The player can walk/run on the horizontal line
  - Running consumes the character's stamina
  - Stamina gradually recovers when the player character is not running or fighting
- The camera rotates three-dimensionally
  - It is possible to zoom the camera
- The player can make a single jump
- The player can climb reachable platforms





- The player can bend sideways to change the viewing angle
  - It gives a strategic advantage in stealth

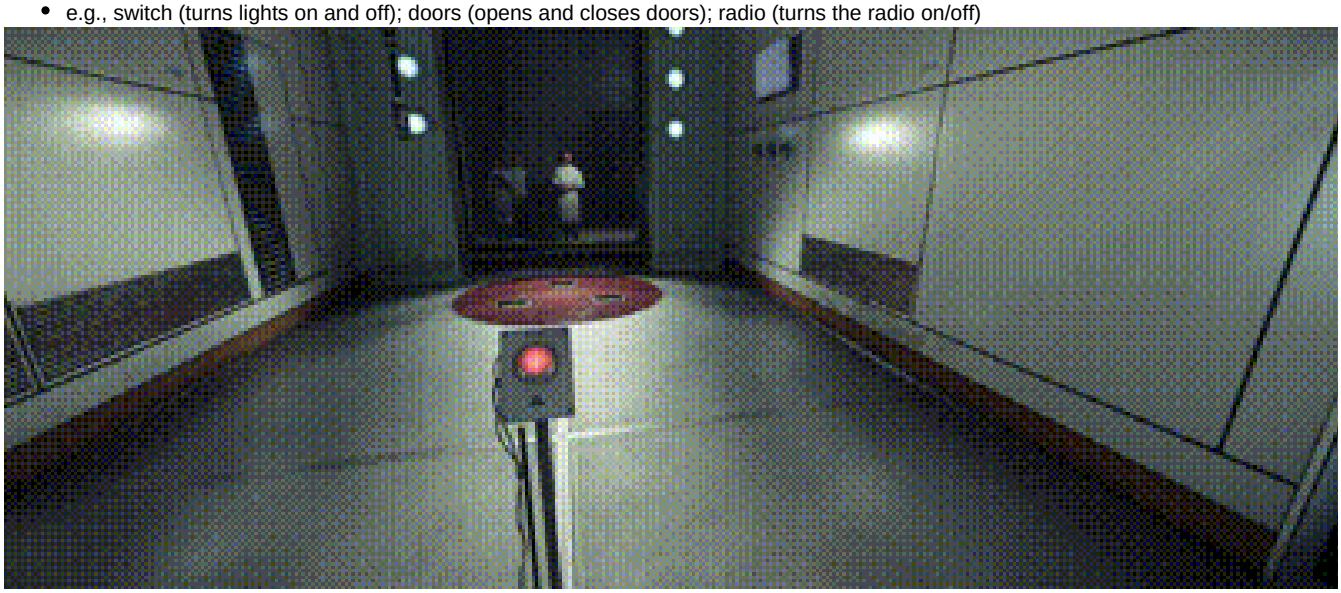


- The player can duck

Interactions

Rules

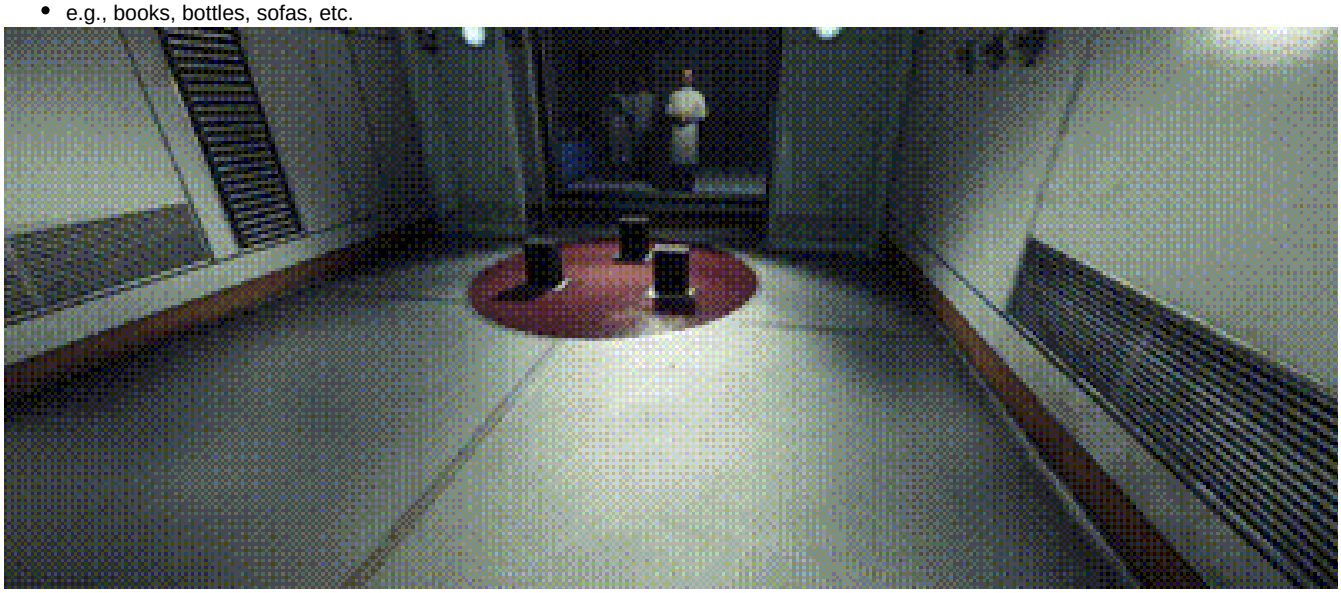
- The player can interact with interactive elements that result in a reaction
  - e.g., switch (turns lights on and off); doors (opens and closes doors); radio (turns the radio on/off)



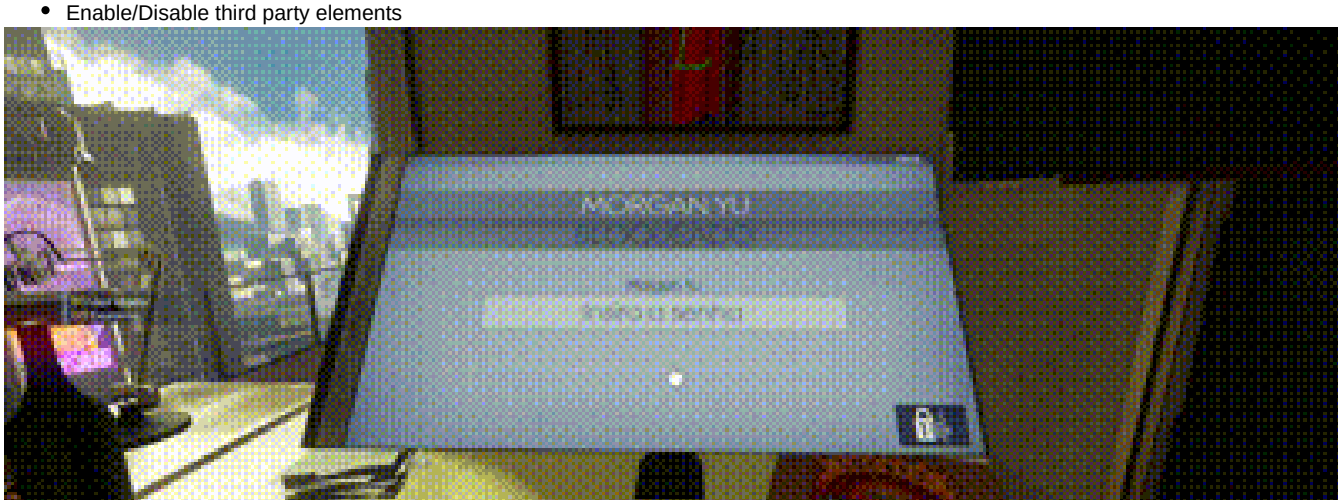
- The player can collect elements that go into his inventory

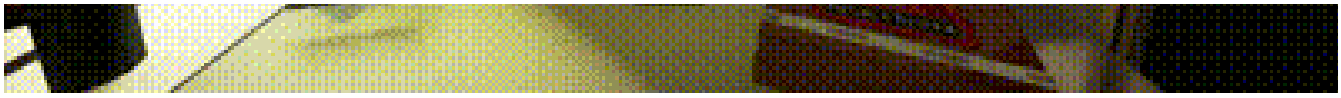
- e.g., weapons, ammunition, consumables, crafting resources, etc.
- They have a distinct glow to stand out at the level

- The player can carry some elements by changing their position or throwing them
  - e.g., books, bottles, sofas, etc.

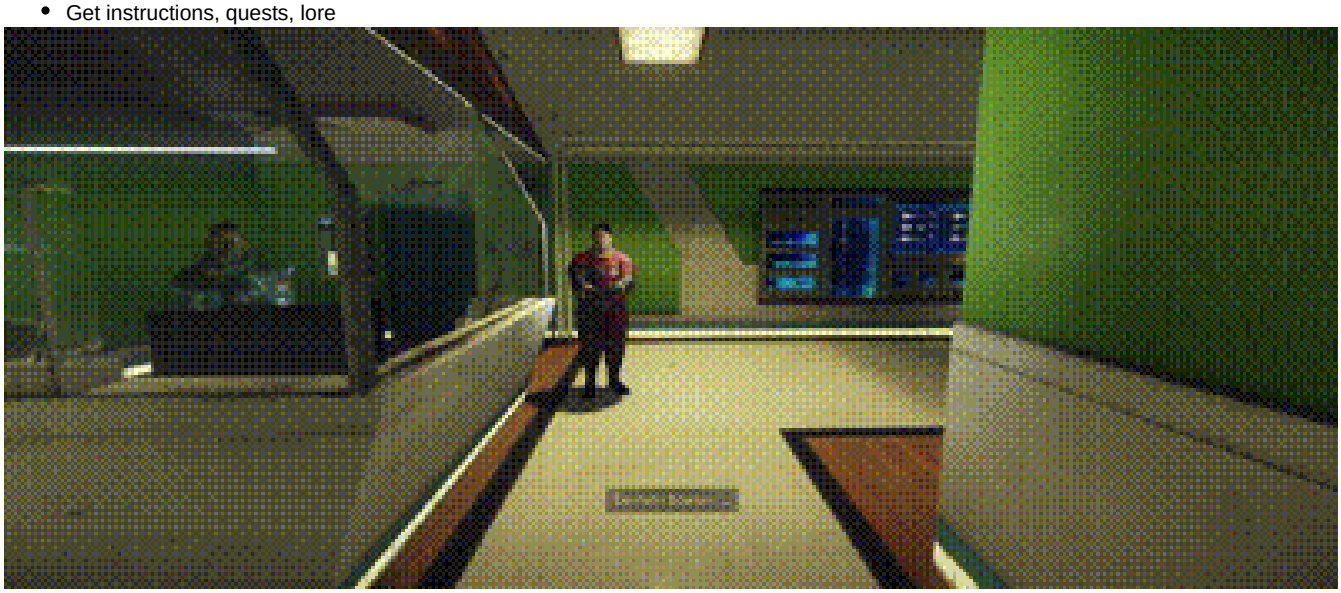


- The player can interact with panels (e.g., computers, hubs, etc)
  - Get instructions, quests, lore
  - Enable/Disable third party elements





- The player can interact with NPCs
  - Get instructions, quests, lore



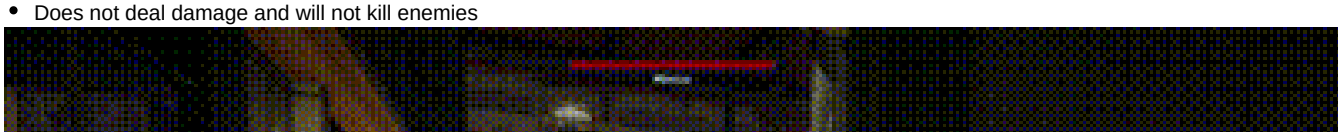
- The player can interact with readable elements (e.g. files, magazines, docs, etc.)
  - Get instructions, quests, lore
  - They have a distinct glow to stand out at the level.

- The player can interact with stock elements
  - e.g. lockers, dead bodies, etc.
  - These elements have collectible elements stored inside
  - Stored collectible elements are presented in a list

Weapons/Tools

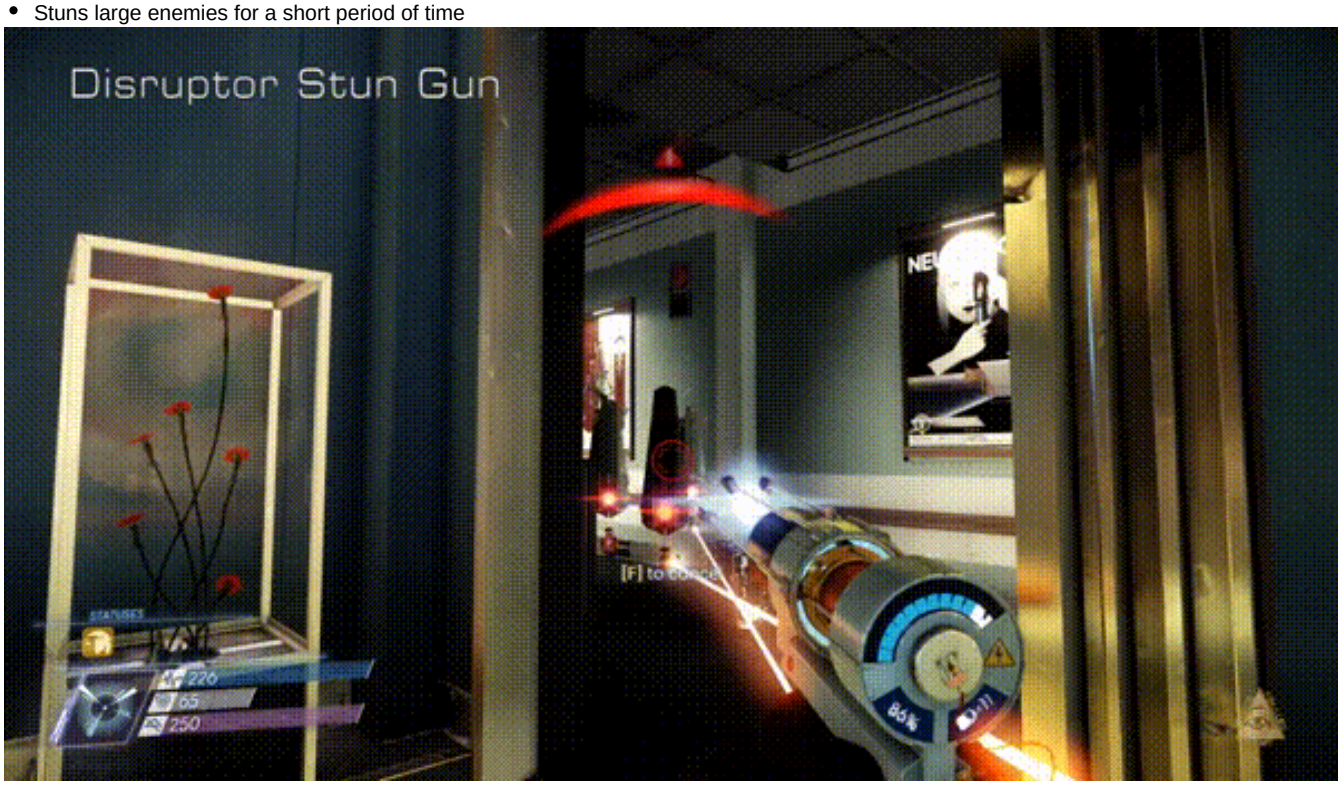
GLOO Cannon

- Can be used to trap foes where they stand, cover exposed flaming pipes and surging electrical boxes, or provide an interesting new path
- Does not deal damage and will not kill enemies



Stun Gun

- Immobilizes small enemies with a short-range electric current.
- Stuns large enemies for a short period of time



Huntress Boltcaster

- Deal no damage to enemies or objects
- Can be used to attract the attention of enemies
- Remotely opening/closing doors or interacting with workstations

EMP Charge

- Can be thrown as grenades or positioned as a mine

- Emits an electromagnetic pulse that temporarily disrupts any nearby electronics, including the user's
- Can also be used to disable broken power junctions and other electric-based obstacles

Typhon Lure

- Can be thrown as grenades
- Emits a signal that draws nearby enemies to it
  - Can keep their attention trained on it either for as long as it lasts or until they are attacked
- The device can be used to distract the enemy in order to make a sneak attack or to past it unnoticed

Abilities

Rules

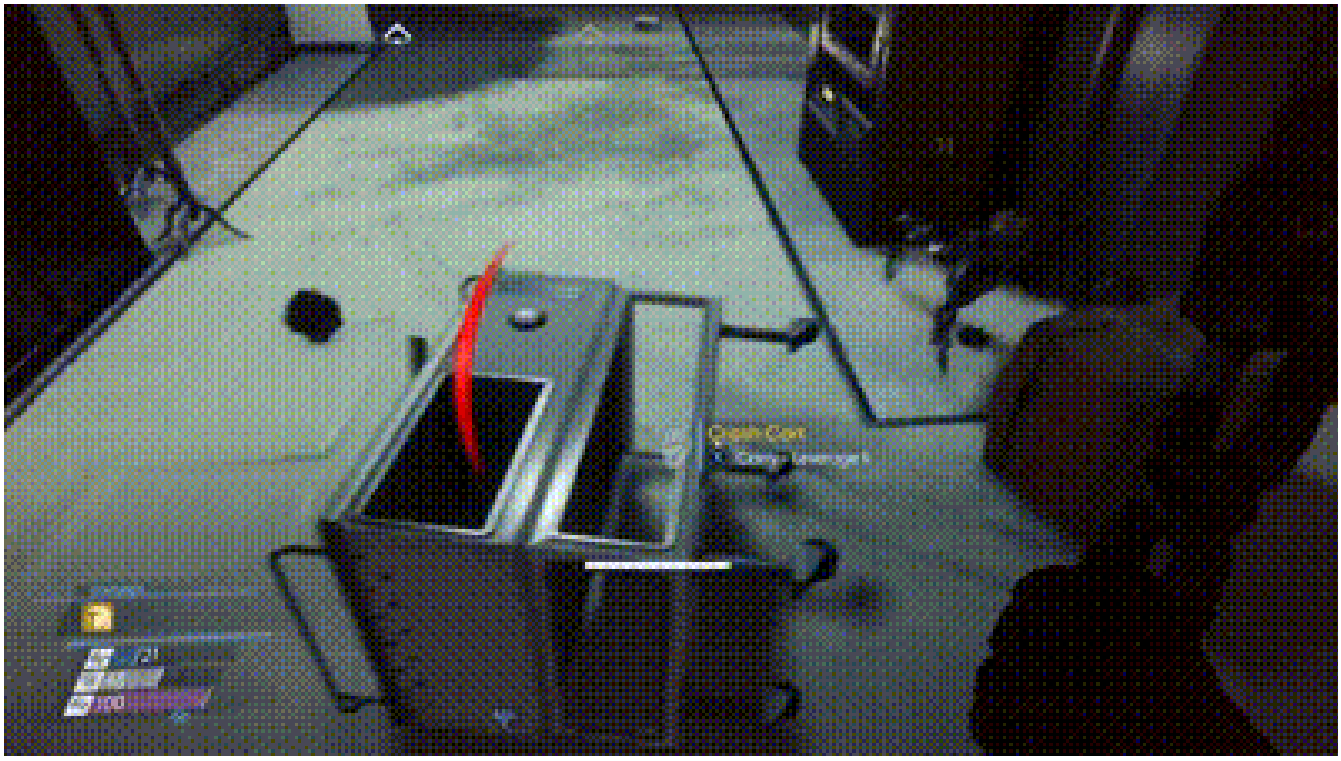
- The player unlocks skills by spending upgrade points on a skill tree
- Upgrade points are acquired by exploring the map or progressing through the game
- The game has two different skill trees
  - The amount of upgrades in each of these trees modifies how the environment reacts to the player.

Hacking

- The player can open locked elements without needing to unlock them first *(e.g. no need of password or access key)*
- To unlock the element, you must win a mini game
- Elements have different levels of blocking that require more or less levels of this ability.

Leverage

- Lift heavy objects with ease
- Throw objects further
- Thrown objects damage enemies
- Dropped explosive crates also detonate on impact
- Move large objects to clear a path or create platforms



Repair

- Fixes non-functional elements in the game making them operable again
- Used to break new ground
- Used to create traps for enemies

Focus

- For 10 seconds time slows around you and actions cost 50% stamina
- Can be used to defeat enemies more easily
- Can be used to get through obstacles that require a time delay

Lift Field

- Creates a column of ascending force for a brief period of time
- It can help the player to reach higher places
- Can move heavy objects to clear a path
- Levitate enemies in the center of the column which keeping them inactive

Mimic Matter

- The player can transform himself into any other game element
- The player can move even transformed into any element
- Can be used to camouflage from enemies
- The player can transform into small elements to pass through small openings

Phantom Shift

- Rapidly change position (as a teleport)
- Leave behind a double that fools' enemies

Phantom Genesis

- Create a Phantom that will fight for you

Remote Manipulation

- Brings distant elements to the player
  - Brought elements can be thrown to deal damage
- Allows the player to interact with out-of-range elements

Machine Mind

- Force robotic enemies to end hostilities and fight for the player

Progression

Rules

- Game progress is based on exploration and quest completion
- New lore is presented periodically as quest completion or through exploration
- New weapons/tools are unlocked as mission completion or through exploration
- Upgrade points are obtained by completing quests or through exploration.
  - With upgrade points the player can unlock new abilities
- New areas are unlocked as mission completion or through exploration
  - Obtaining keys
  - Modifications performed by the player that now allow entry into different areas
  - New weapons/tools or new abilities allow access to new areas
- More difficult areas are introduced as you progress
- More challenging enemies are presented as you progress
- When returning to an area already visited, it is possible to observe changes
  - Variations of elements
  - Returning to an area after eliminating all enemies keeps the status clean
  - New weapons/tools or new abilities allow access to points previously not possible in old areas

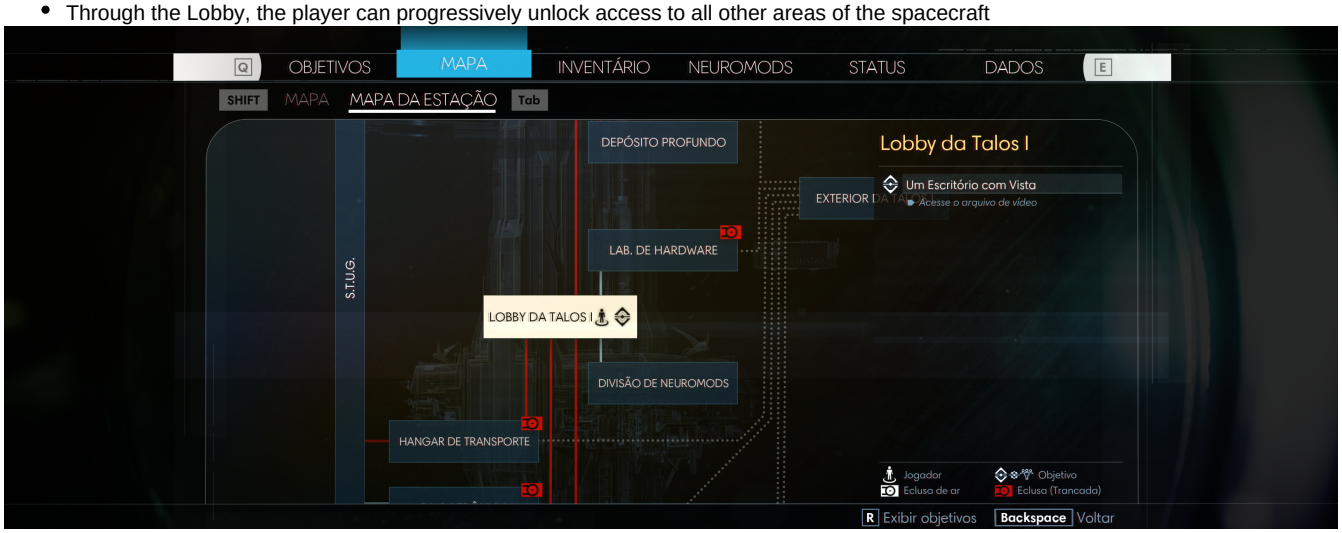
https://miro.com/app/board/uXjVPTXyp2Q=/?share_link_id=314272085249

Level Design

https://miro.com/app/board/uXjVPTXEIOk=/?share_link_id=516659118978

Environment

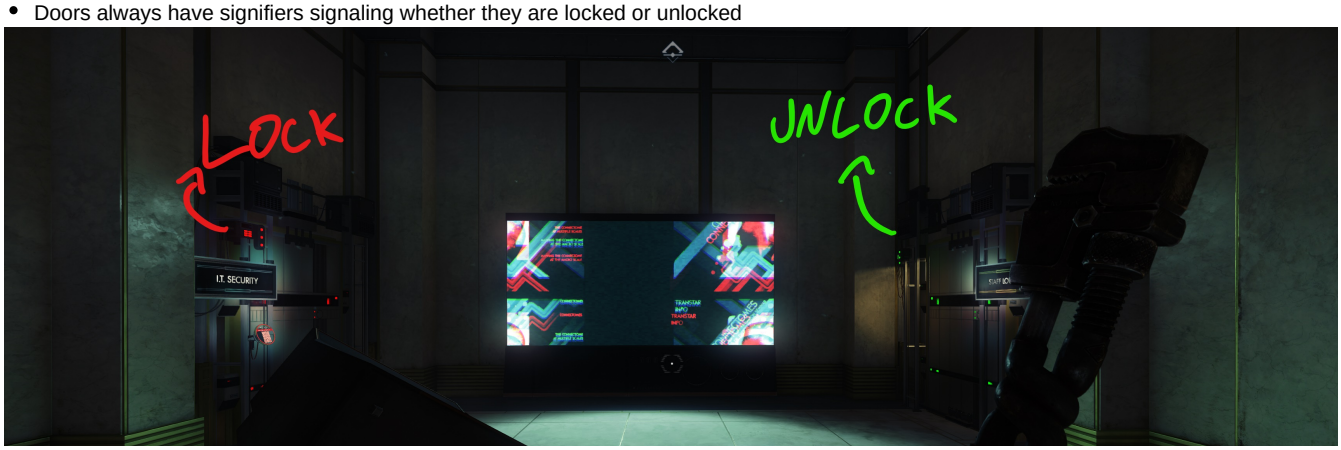
- The spaceship has its Lobby as its central point
  - The Lobby is the first area to be presented to the player
  - Through the Lobby, the player can progressively unlock access to all other areas of the spacecraft



- The game environment has an aesthetic variety in each new area
  - e.g. space gardens, high-tech labs, socialization rooms
  - this variation helps to emphasize the sense of progress and the sense of location
- The player can easily spot the location or the path to other areas

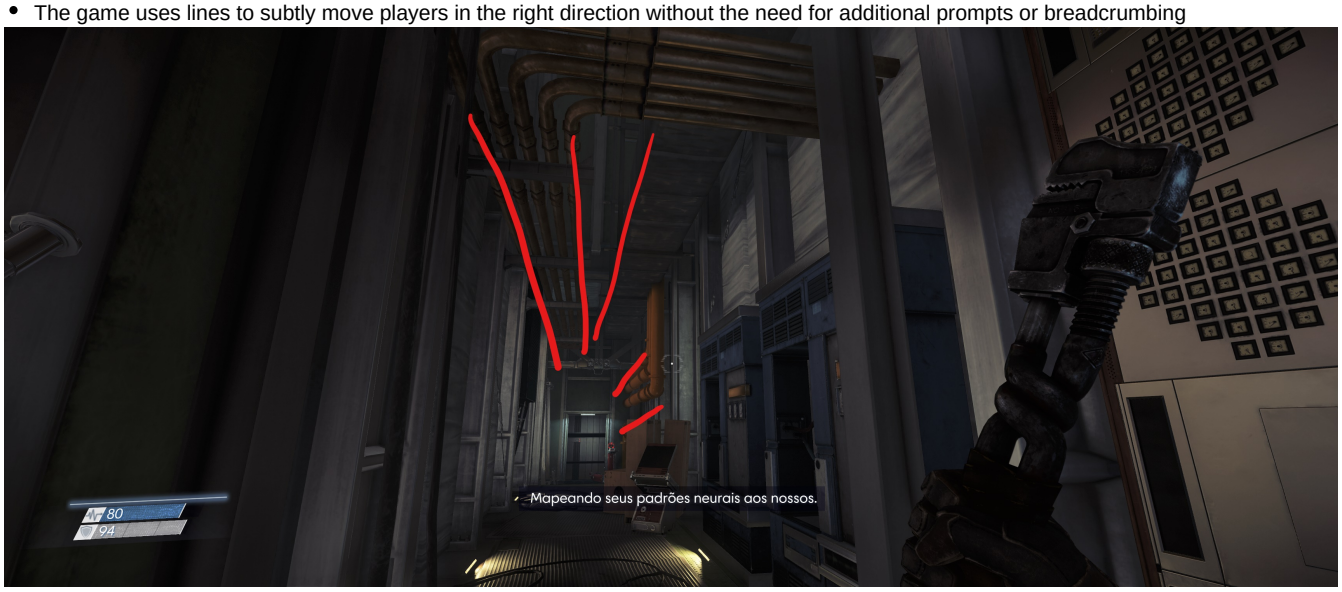
Affordances

- Important doors always have the same format
- Doors always have signifiers signaling whether they are locked or unlocked

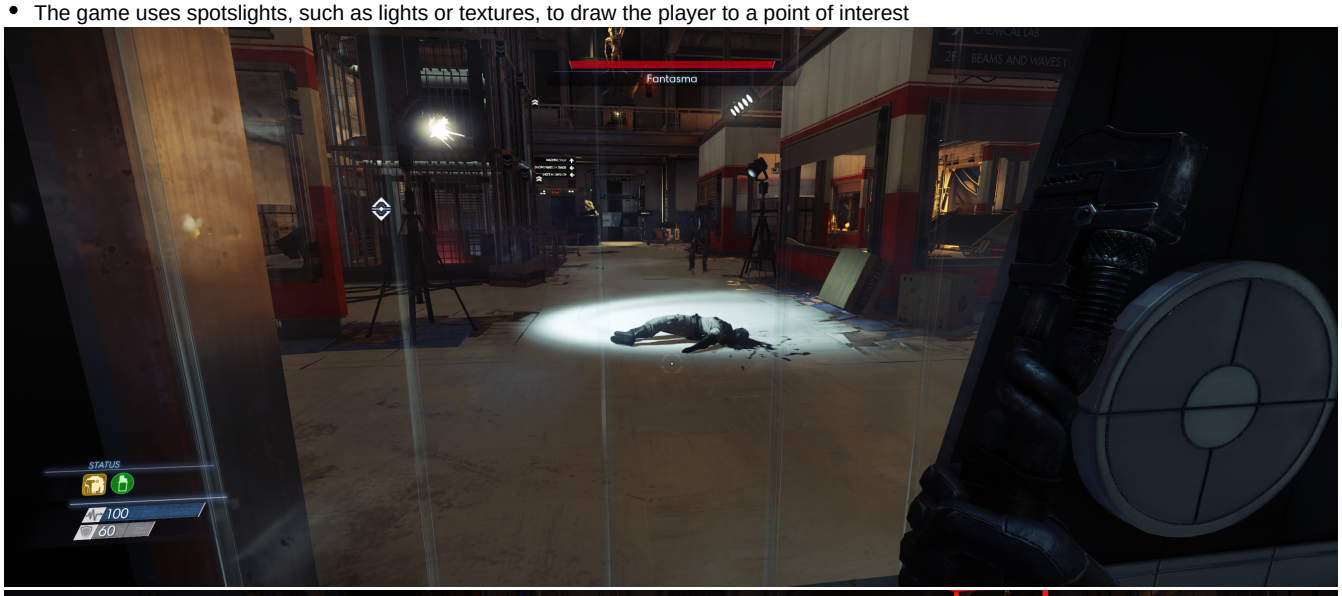


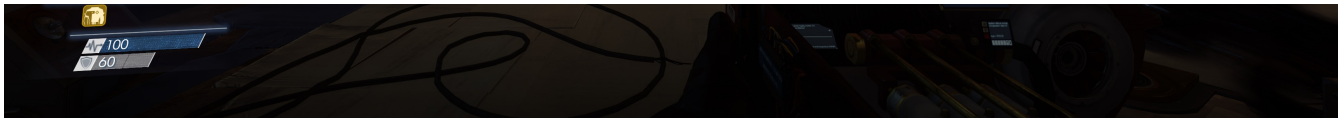
Leading Lines & Spotslights

- The game uses lines to subtly move players in the right direction without the need for additional prompts or breadcrumbing



- The game uses spotslights, such as lights or textures, to draw the player to a point of interest





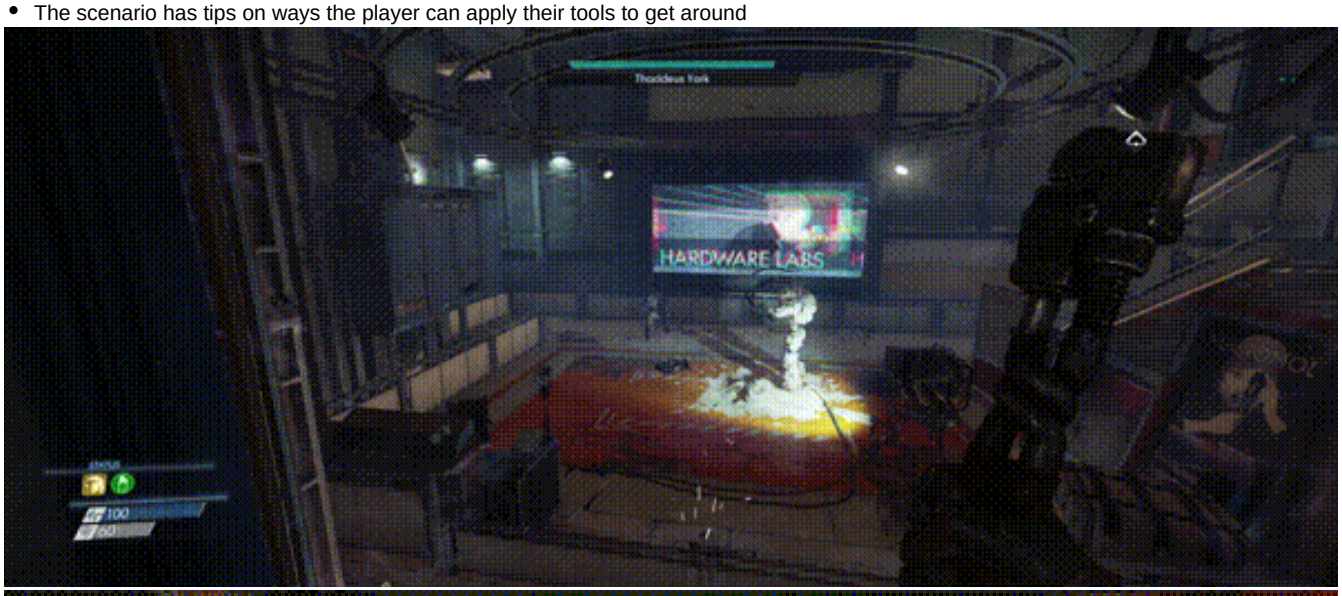
Dynamic

- Multiple paths

- Variations of elements
- Old areas change according to progression
- New weapons/tools or new abilities allow access to points previously not possible in old areas

Teach Mechanics

- The scenario has tips on ways the player can apply their tools to get around



Conclusion

Prey features several mechanics for interacting with the environment as well as a dynamic and multi-path level designer.

The game mechanics provide an open experience where the player can use different tools to reach a destination, either opening pre-defined paths or creating their own path.

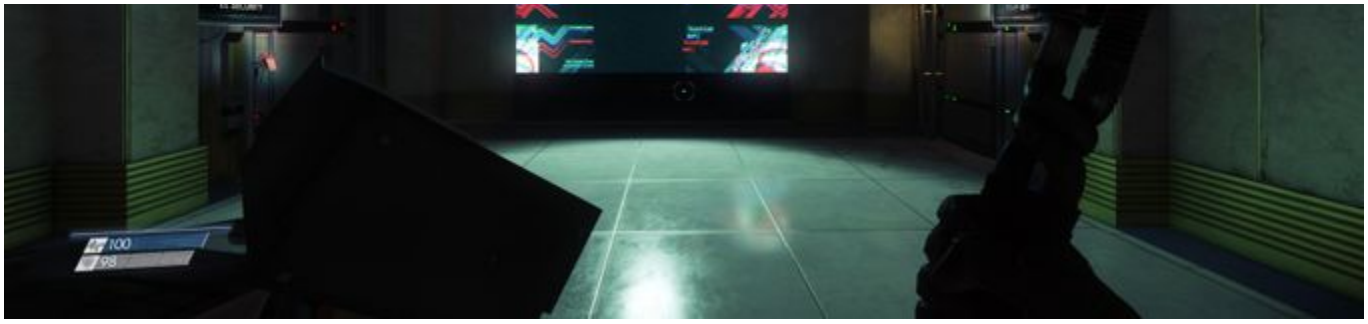
The way the game handles the progression experience is quite interesting, either using limiting to certain locations or providing missions that manipulate the player into going to a specific destination. These applications help keep the player on track with the game experience, preventing the player from getting lost and not knowing what to do.

Recommendations

Prey's character's powers can be used as a source of inspiration for the Electric character's powers. Been a good example of ways to manipulate the environment to solve puzzles.

The way the level design provides the feeling of freedom even in restricted environments should serve as an example for the level design development.

As with Prey, it is important that we always provide more than one choice, even if it is something simple, because even a simple choice can give a sense of freedom, because it is still a choice.



Likewise, it's essential to present these choices to the player in an understandable way, ensuring they know what they can do, what they can't and what they will be able to do later.

Prey does that in an inspiring way, introducing new tools in environments that inherently teach their usability (without tutorials) and presenting all the problems from the beginning, encouraging the player to look for a solution and return when they find one.

Static Cling

Abbreviations used in this document:

- EC: The *electrical character* in our game
  - Not to be confused with “Electric spark”, which refers to the character inside the *Static Cling* game
- HC: The *human character*

Static Cling

A jam game created for the *GMTK Game Jam 2021*. The player plays as an electric spark that traverses through wires, powers up machines, and possesses moveable robots in order to escape into an outlet.

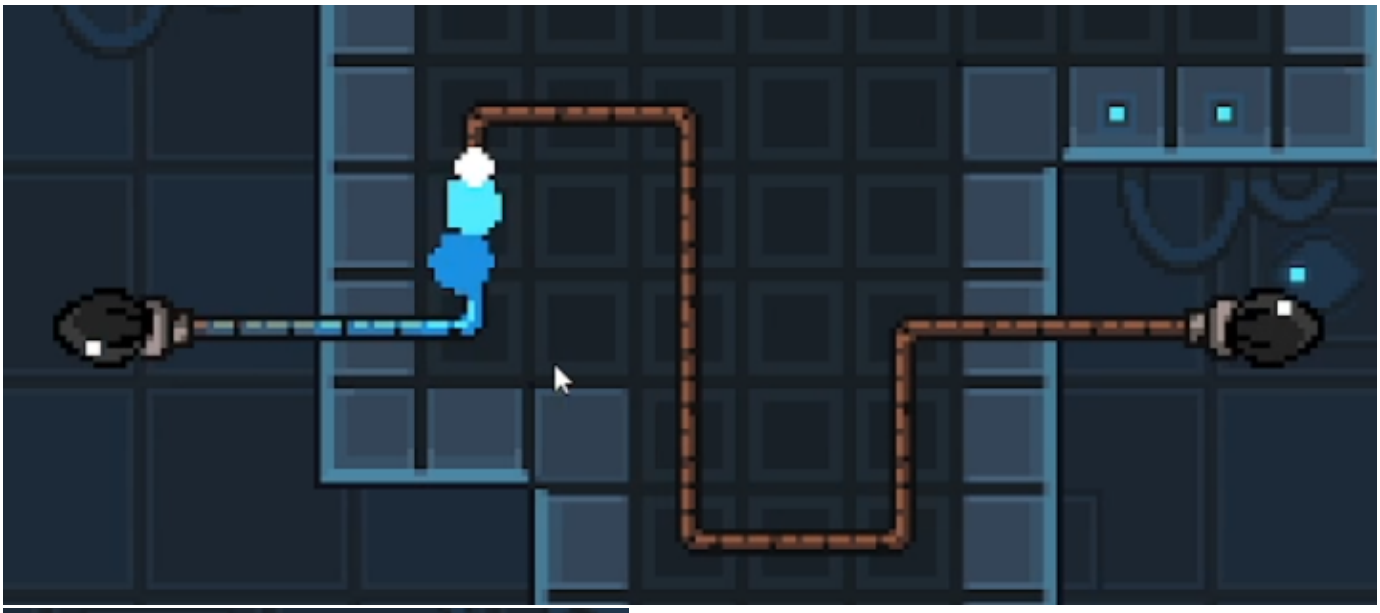
Itch.io: https://team-bugulon.itch.io/static-cling

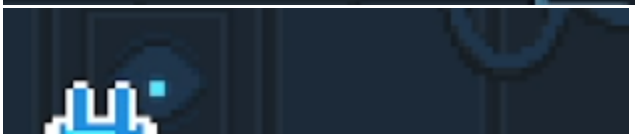
Gameplay video: https://www.youtube.com/watch?v=XwzbF3wG0-w

Applications to our game:

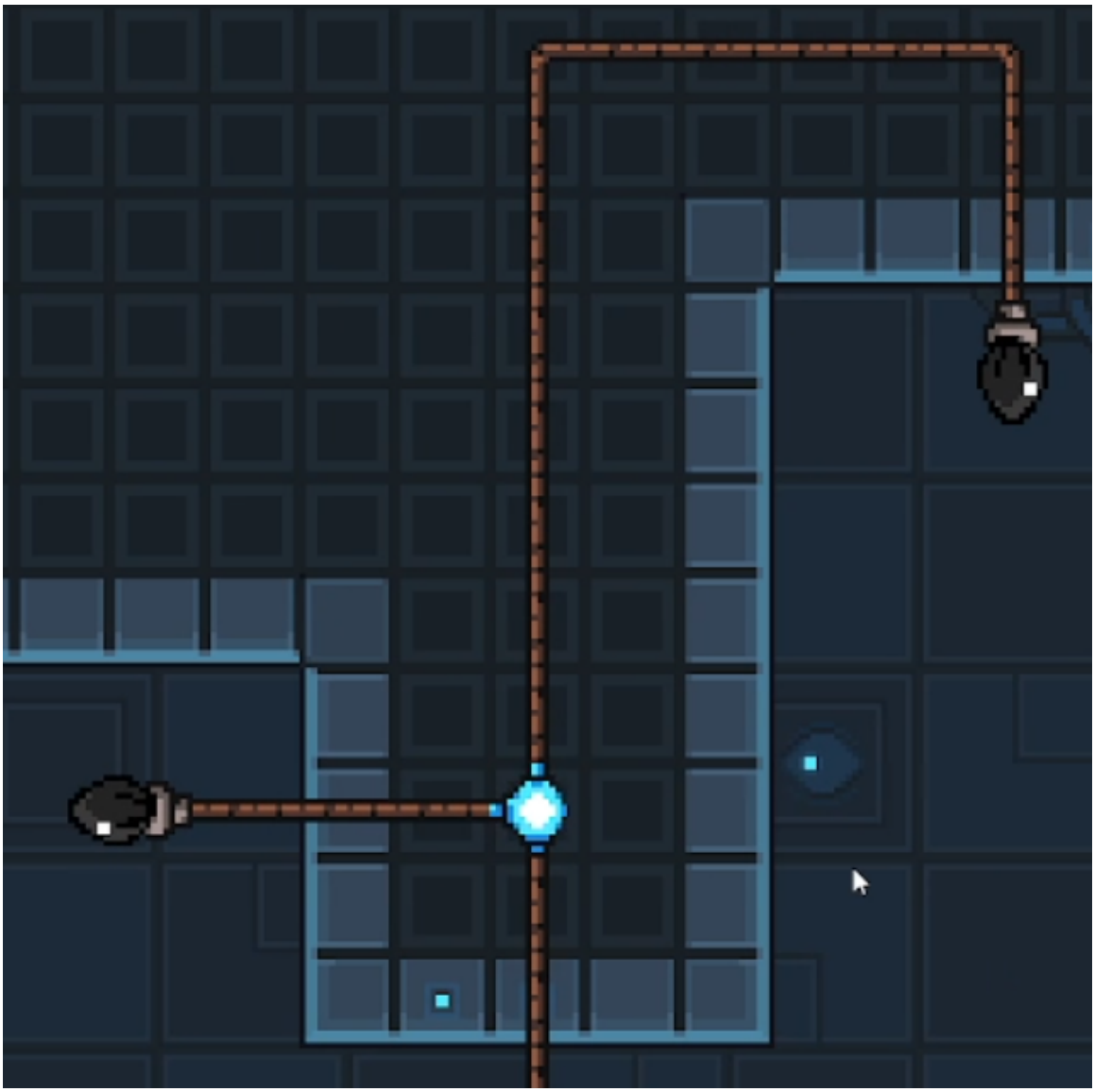
- Electric character movement
- Power Grid escape puzzle design
- Puzzle mechanic inspirations
- Camera setup

Electric Character Movement

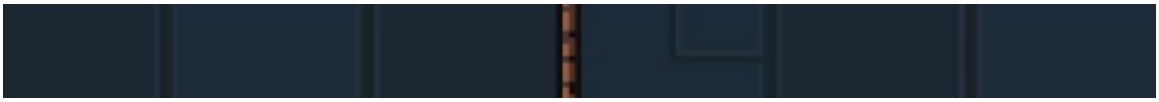




- (left) Electric spark is **plugged into** a nearby power reception by dragging
  - In our game, we could simply *dedicate a key* for transferring EC into / out of his *battery*
  - A key input icon could show up above the *target power outlet* when HC stands near one
- (right) Electric spark **rapidly moves across** an entire wire segment once given a *single directional input*
  - Electric spark's shape narrows to *emphasize fast motion* accompanied by a *continuous sound effect*, leaving behind a glowing *trail*
  - No additional inputs are required to traverse through twists & turns within the same wire segment
    - Gives a good sense of speed & diversity in motion
    - Allows for condensing the size of level without complicating controls
    - Simplistic navigation
  - Camera lags *slightly* behind electric spark while moving, then smooth damps to electric spark's position



- **Stop nodes** exist between wire segments, creating *branching paths*
- This is where **directional inputs** come in: When stopped at a node, the player decides which way to zip through next



Puzzle Mechanics

Broken Outlet

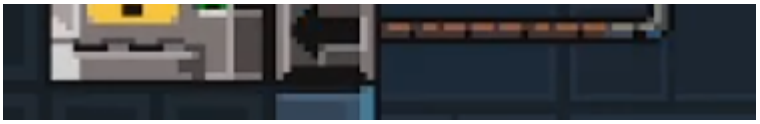
- **One-way exit**
- Allows the player to exit out of wire,
- Disallows the player from entering back in

Possessable Robot

- A **physical entity** that allows the player to move outside of power grids
- Electric spark enters a robot by navigating to an exit outlet near the bot
- Robot could also *hold down buttons*
- Unlike the electric spark, robot is *vulnerable to laser fire* - Spark dies out if the bot it's possessing is killed
- In our game:
  - HC basically takes the role of the robot
  - HC stays near outlets to receive EC & carries EC through physical spaces

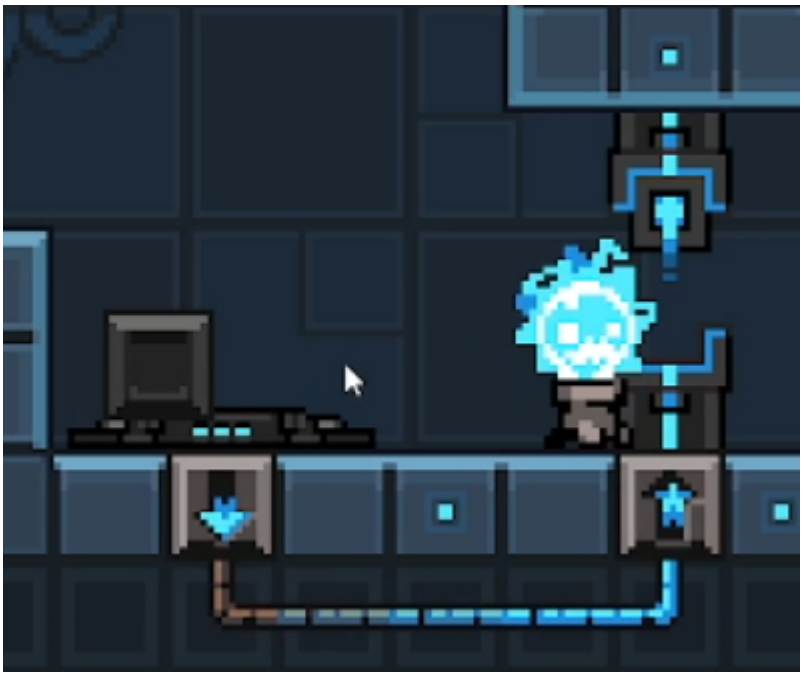
Perpetual Generator

- Once touched by the electric spark, this generator **activ ates & stays on**, continuously powering parts of the power grid
- In this case, the generator keeps a *door open* without electric spark needing to stay in the wire segment
- Generators are *activated* when spark *bounces off* of its **i nput**
- Generators send *electric surges* into the **output** wire - same effect as if spark travelled through that wire
- In our game:
  - Narratively fits the facility being gradually lightened up as EC travels through more parts



Temporary Generator

- *Activates* when spark bounces off of **input**
- Has a **bar metre** indicating how long this generator will stay on for
- Temporarily powers up output wires
  - time based puzzles
  - Faster-pace action segments

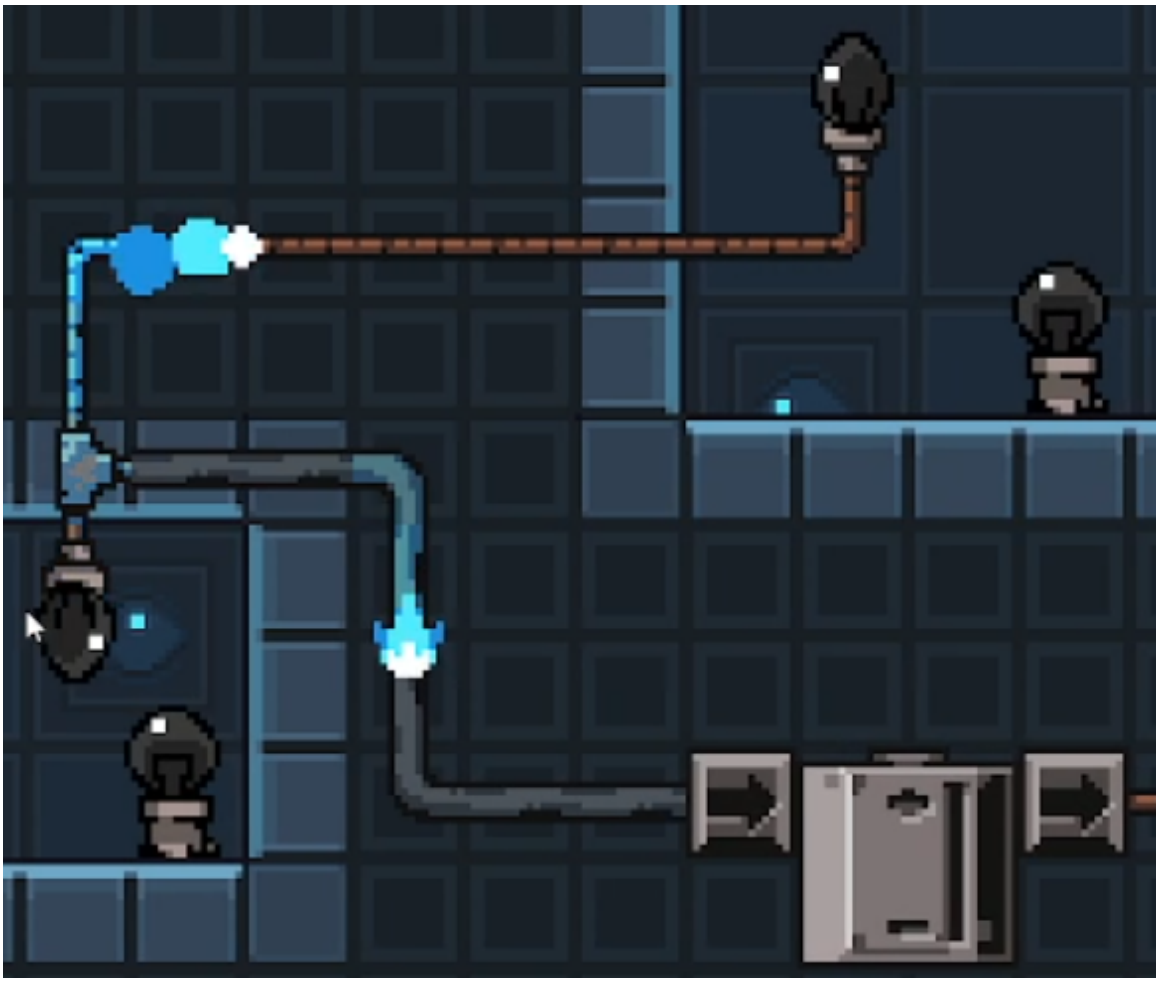


Button Switch

- **Held down** by weighted objects / physical robots
- While pushed down, provides power through output wires
- Powered equipments do not immediately turn off when button is lifted - Depends on output wire length
- In our game:
  - Could have HC hold down a button to bridge wires, while EC travels across
  - Different from *hand-held switches* that cannot be held down by objects, and do not switch back when HC leaves - effectively a permanent toggle

“Both And” Gate

- Requires **multiple input surges** in order to output power

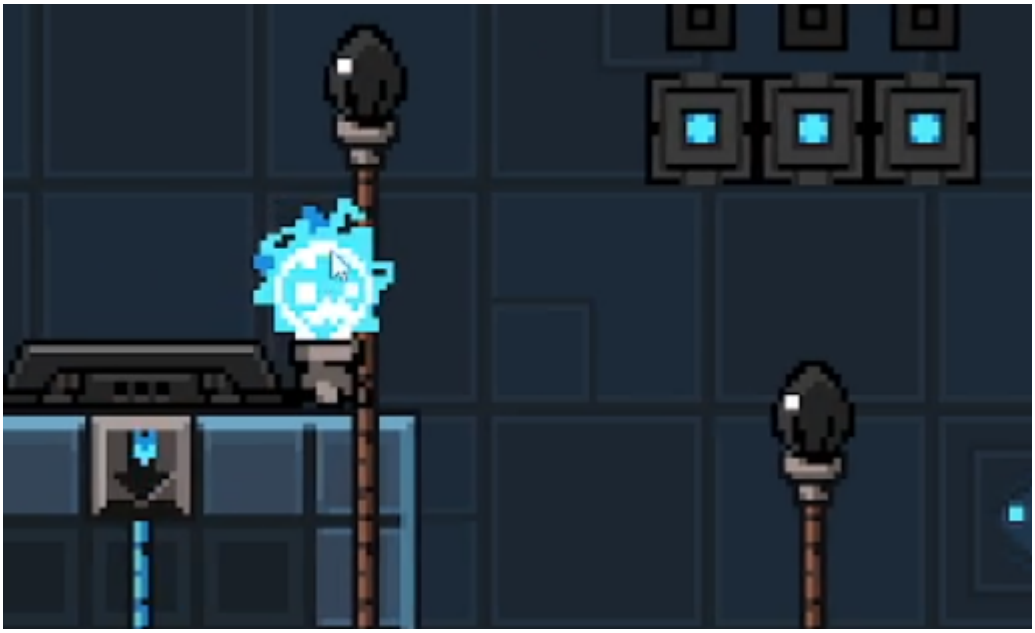


Split Wire

- Differentiated from normal wires via **gra y color**
- When player passes through a normal wire it’s connected to, *some energy split off* into the gray wire
- Allows player to power multiple appliances at the same time
- Good for *ten se, time-based* segments

Wall Platforms

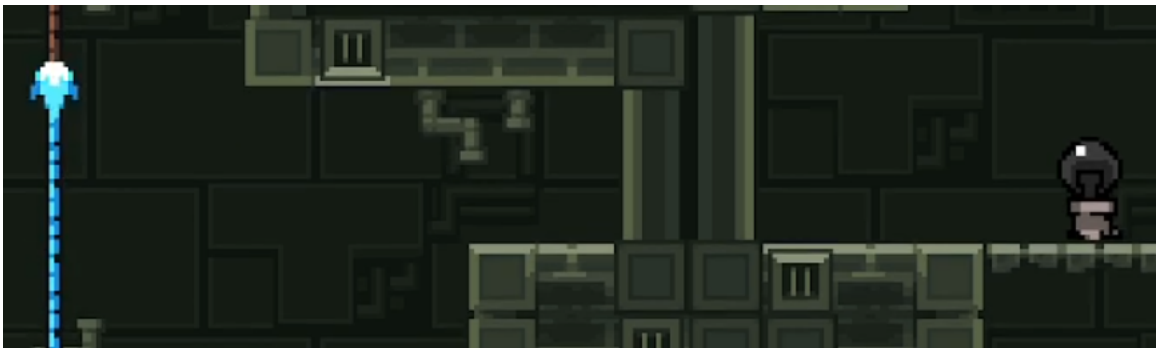
- Only exist when powered



- Good for *platforming* segm ents

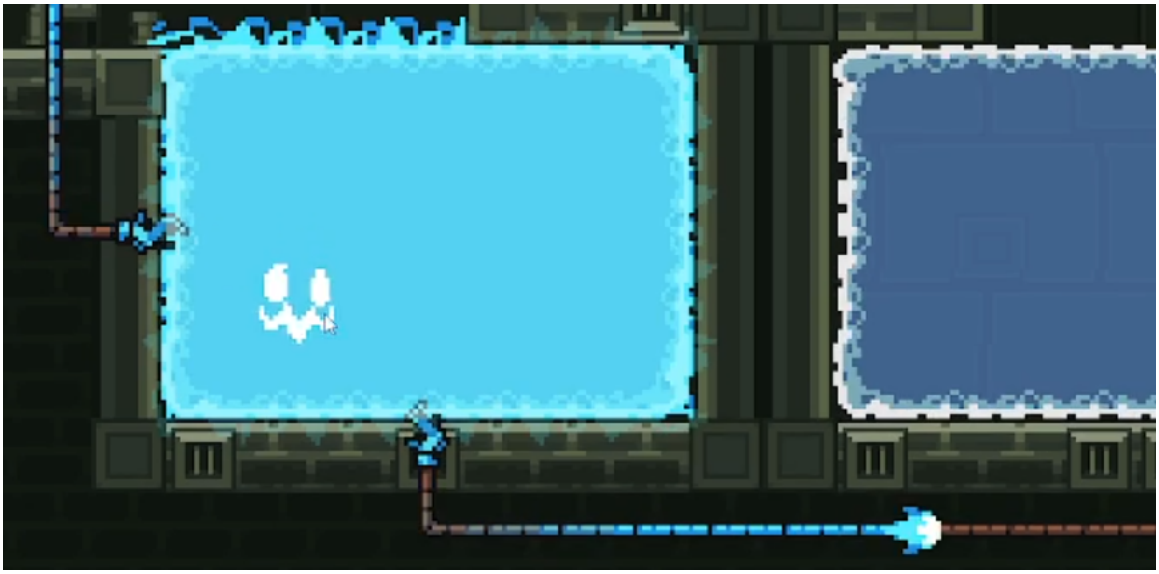
Electric Magnet

- When powered, lets player transport unreachable objects
- In our game:
  - A way to let EC influence the physical world
  - Could be a way of combat (HC tricks robot guards to a magnet's range, while EC activates magnet to trap the guards)



Water

- A conductor
- Powers wires dipped in water & all appliances in water while spark is inside
- In our game:
  - Fluid & portable



- A way for HC to plan out EC's travel paths
- Combat implications

Sentry Turret

- When powered, becomes a threat to physical entities
- In our game:
  - Could be blocked with large blocks
  - Could be an obstacle EC must deactivates
  - Could also be used to kill robot guards

Action Segments inside Power Grid

- Zip zag to avoid purple stuffs
- Very fast-paced
- We could have things that drain electricity (maybe some in-universe creatures) which EC must avoid

Reception

Jam Statistics: https://itch.io/jam/gmtk-2021/rate/1083948

GMTK review: https://youtu.be/9U4Zoagd_40?t=583

- Overall second place in Game Jam
- 96 ratings

The Lost Vikings

The Lost Vikings | Play game online! (playclassic.games)

Link to research (recommended to view through this link since it maintains the formatting)

Research - The Lost Vikings

Introduction

The Lost Vikings is a 2D platforming puzzle game released for the SNES in 1993. In this game, the player controls three separate characters with different abilities. This game is a good reference to research because our team also intends to create a puzzle game where the player can control separate characters with different abilities. Thus, we are studying this game in hopes of better understanding the design of the puzzles in The Lost Vikings and analyzing how the developers made use to different character abilities to construct puzzles.

Demographic

Source: https://en.wikipedia.org/wiki/The_Lost_Vikings

The Lost Vikings is targeted towards children who enjoy action platforming games. Every aspect of the game, from the colourful characters to the silly dialgoue, supports this demographic.

Sales

Source: http://www.fact-index.com/i/in/interplay_entertainment.html

The Lost Vikings is estimated to have sold around

250,000 copies.

Reviews

Source: https://en.wikipedia.org/wiki/The_Lost_Vikings

The game received positive reviews for its unique puzzles and well-designed pacing. It received a score of 92% from *Super Gamer* maga zine and made the rankings of many “best SNES games” lists including that of *Nintendo Power* in 1993 and *Total!* In 1995.

Reception

Review scores	
Publication	Score
AllGame	★★★★☆ (SNES)[9] ★★★☆☆ (SMD)[10]
Aktueller Software Markt	11/12[15][16] 10/12 (CD32)[17]
Amiga Computing	84%[11]
Amiga Format	79%[12] 72% (CD32)[13]
Amiga Power	87%[14]
CVG	88/100 (SMD)[18] 90/100 (SNES)[19]
EGM	34/50 (SMD)[20] 30/40 (SNES)[21]
GamePro	17/20[22]
GamesMaster	90%[23]
GameSpot	7.1/10[24]
GameZone	7.9/10[26]

IGN	8.5/10[27][28]
Jeuxvideo.com	16/20[a]
Mean Machines Sega	84/100[36]
Mega Fun	83/100[34][35]
Nintendo Power	14.2/20[37]
Total!	87%[38]
Video Games (DE)	80% (SMD)[39] 78% (SNES)[40]
VideoGames & Computer Entertainment	9/10 (SNES)[41]
The One	90%[42]

Mechanics

The player can switch between three characters that each have different abilities.

Erik can run quickly, jump, and bash through some walls.

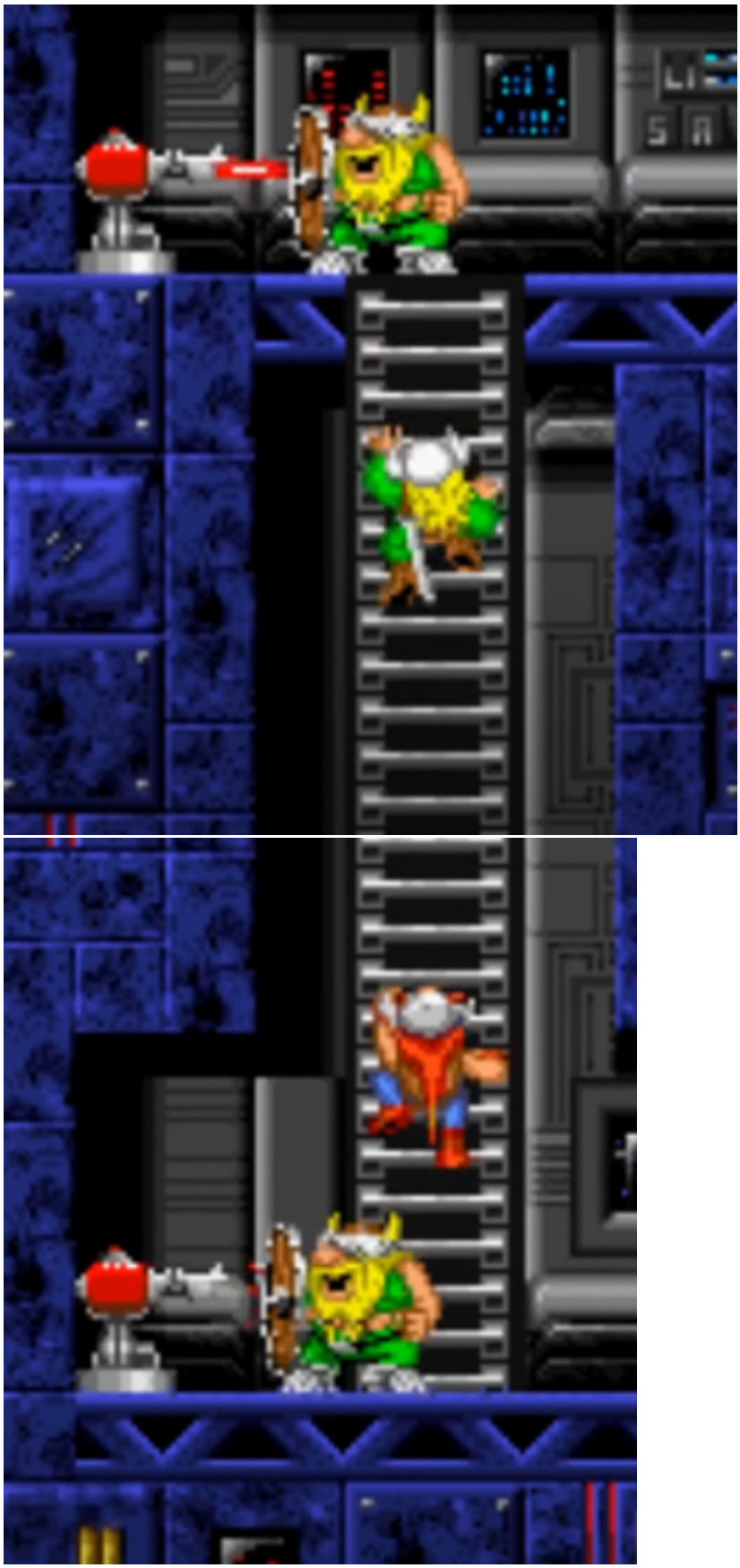
Olaf can block enemies with his shield and use his shield as a hang glider or platform.

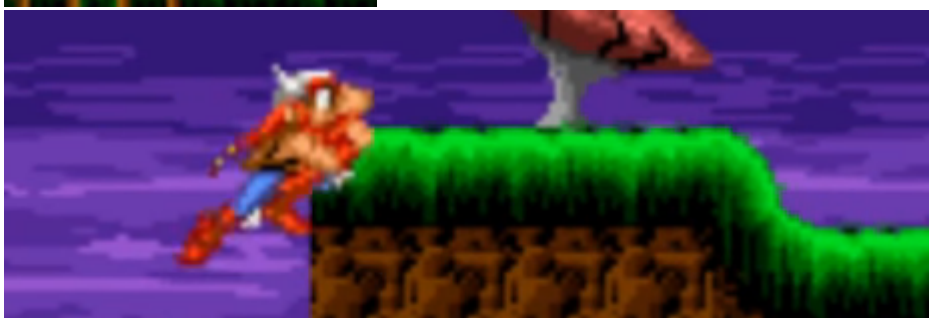
Baleog can attack enemies with his sword and his bow.

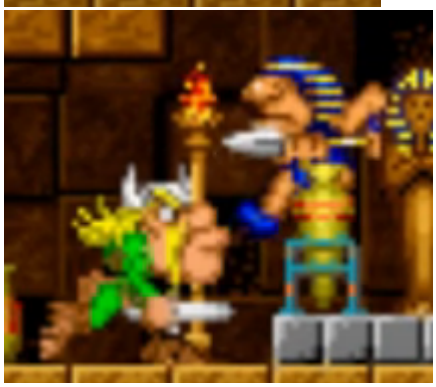
Puzzles

One of the earliest puzzles involves using Olaf's shield to block turrets at the top and bottom of a ladder while the other two climb down.

This introduces the player to the idea of an order of operations in solving the puzzles (move Olaf first, then move the other two onto the ladder, then move Olaf again).



Another puzzle involves placing Olaf in front of a wall before Erik bashes it down. Because there is an enemy on the other side, bashing it down without Olaf in front will cause Erik to take damage. This tests the player's knowledge of the core mechanics and forces the player to plan ahead.	
In another puzzle, the player must use Erik's jump to obtain a key in the air then combine Erik's jump with Olaf's shield platform to unlock a door from the other side. This tests the player's knowledge and ability to combine mechanics.	 

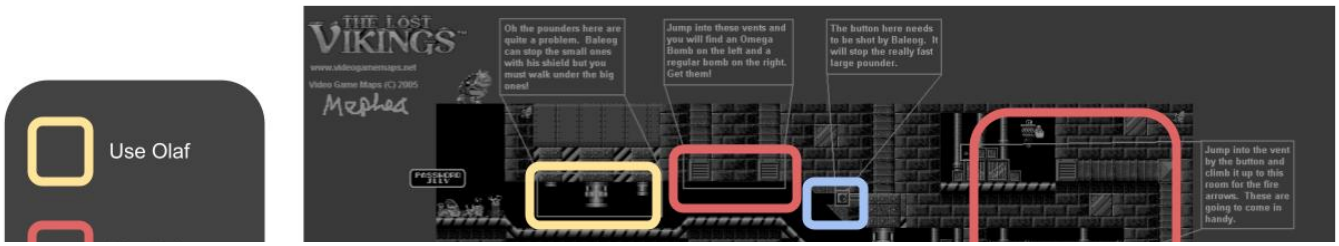
Another puzzle involves using Baleog's bow to shoot down coconuts from a tree in the distance to create a bridge. This tests the player's knowledge and encourages the player to explore new ways to use Baleog's bow.	
Another puzzles involves using Olaf's shield to block a turret's bullets while enemies attack from the other side. This challenges the player's skill at using the mechanics since most other puzzles prior to this point involved using Olaf to defend against enemies while Baleog attacks. This time, Olaf is occupied with the turret and the player must use Baleog to defeat the incoming	 

enemies before they reach Olaf.	
In another puzzle, the player must hit a distant button with Baleog's bow then quickly switch to Erik who jumps across and pulls a lever that creates a path for the other two. This is a modified version of the key and door puzzle from earlier, with greater emphasis on testing the player's reaction and control.	
Another puzzle involves using Erik's jump to access a location with switches that the other two cannot get to. The switches provide pathways for the other two to cross over a bed of spikes. This is a good reference for our game's puzzles, as we could also have a puzzle where one character uses a switch inaccessible to the other to create a new path for the other character.	

In another puzzle, the player uses a jumpad to put Baleog, who can't jump otherwise, on top of Olaf's shield. Then, the player must inch forward with the two characters by switching back and forth, moving Olaf forward and having Baleog follow without falling off. This allows the player to get Baleog onto a tall ledge while Erik is occupied elsewhere. This is an interesting puzzle that challenges the player to think outside the box, as Erik is normally the one jumping on Olaf's shield.	

Level Breakdown

Level 4-1 (Source: http://www.videogamemaps.net/?maps/snes/lostvikings)



The image above shows a breakdown of level 4-1 in The Lost Vikings. The different colours show the areas where each character should be used (yellow for Olaf, red for Erik, and blue for Baleog). Each character has 3-4 opportunities to be used, and they are positioned one after the other (Olaf, then Erik, then Baleog, then back to Olaf, etc.). This maximizes the number of opportunities for the player to switch characters, which is the game's main mechanic. When designing levels for our game, we should keep this structure in consideration and aim to maximize opportunities for the player to switch characters. Link to original image here.

Interesting Ways the Mechanics Are Used

Later in the game, the player is able to use a magnet to lift up Olad and his shield. This allows the player to get over top of obstacles and avoid obstacles on the ground. This is an interesting way to use Olaf's shield that keeps the gameplay interesting.	
Later in the game, the player is able to use a see-saw machine with Erik's jump. This allows the player to bounce Olaf and Baleog into the air.	

This is an interesting way to allow Olaf and Baleog to “jump” and highly supports the game’s theme of teamwork.	

Points to Note

The game’s level design seems to focus more on platforming and reflex challenges rather than on puzzles, especially in the later half of the game when additional mechanics (such as the magnet or see-saw discussed previously) are introduce to support the platforming element rather than the puzzle element. Most of the puzzles are some variation of the puzzles mentioned above and the game’s difficulty builds up by putting these puzzles in situations that require faster reflexes or higher skill in platforming (for example, requiring Baleog to shoot through a hole while moving up and down or requiring Olaf to glide through tight turns of electric circuits).

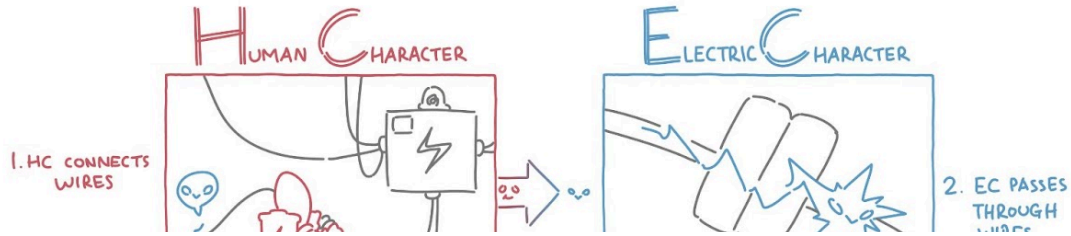
One of the game’s strong points is that it is very good at making the player switch characters, making the core mechanic a highly integral part of the platforming experience. Most of the time, this is done by occupying one character with a specific action (e.g. using Olaf to shield) or specific location (e.g. using Erik’s jump to access particular areas) so that follow-up actions must be done by one of the other two. Although The Lost Vikings uses this effect primarily to the benefit of the game’s platforming aspect, we can apply the same principles to a puzzle context by occupying one character with a specific action/location while another character does something else.

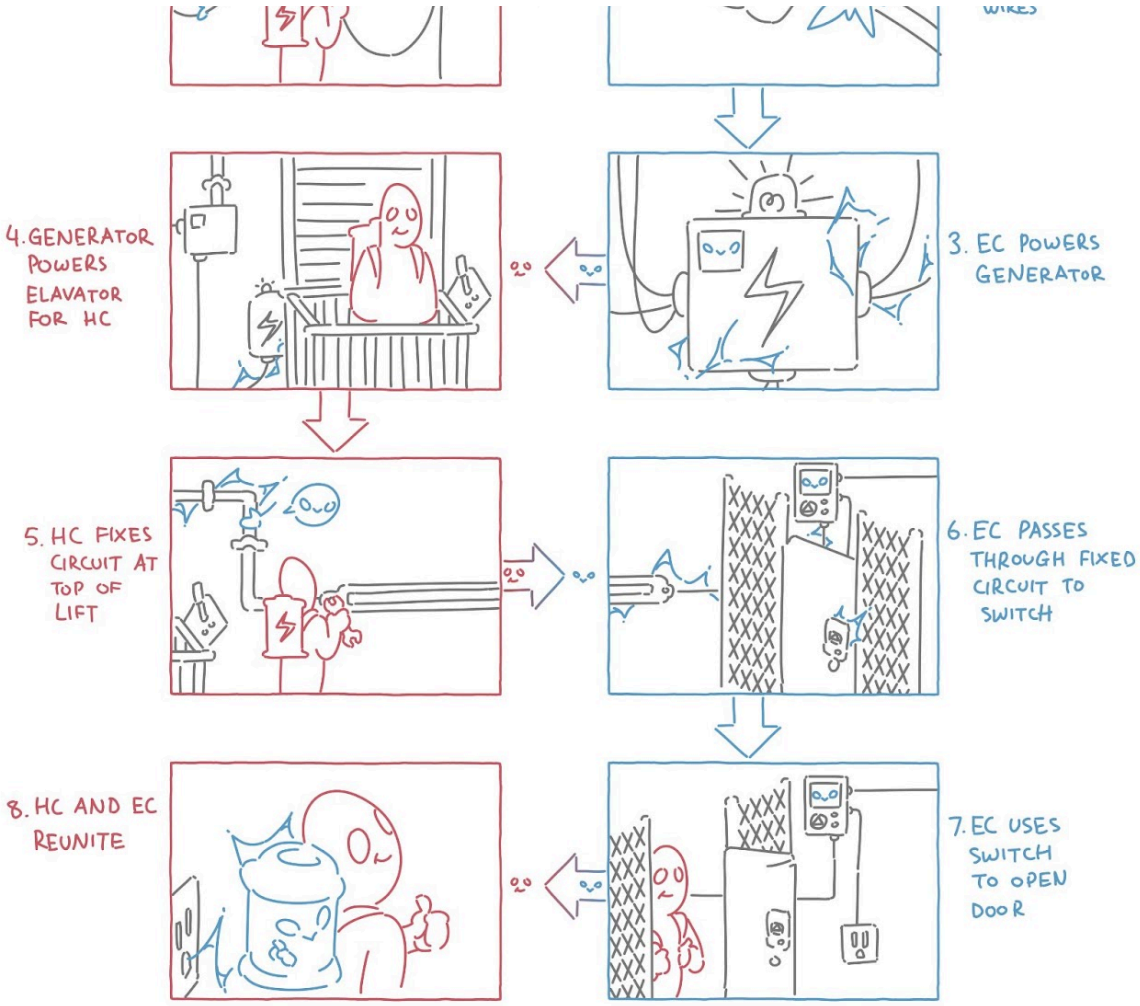
Regarding pacing, the challenges are quite well-paced in terms of difficulty. The game does a good job of teaching, testing, and challenging the player’s knowledge of the mechanics in each themed stage. As a result, although the challenges become more difficult later in the game, there aren’t any moments where the challenges feel outright frustrating. Part of the reason for the game’s effective pacing lies in how the challenges are structured such that the player is constantly switching between characters and using each character’s mechanics (see the Level Design Breakdown section for an example). Because of this structure, the player is guided into constantly thinking about how to use and combine each character’s abilities, minimizing chances for the player to forget about underused mechanics.

Regarding weaknesses in the level design, I think that a portion of the game’s difficulty comes from not knowing the layout of the level, not knowing what challenges are coming up next (i.e. off-screen hazards), and not knowing the location of the exit. This is largely due to the limitations of the technology when the game was made, but I think a modern remake of the game would likely require reworking the level design to allow the player to better observe the challenges they are facing (either through camera controls, better guiding paths, and/or more clear indicators/symbols) and/or the inclusion of a mini-map. As an example, there are a lot of hidden paths in the game, as well as paths that are not clearly distinguishable as paths. The hidden paths that are not required for completing a level could be argued as a feature for promoting exploration or replaying the level, but the golden paths that are hard to see can cause frustration for players who aren’t able to find them.

Recommendations for Our Game

We can encourage and optimize opportunities for the player to switch between characters by using a similar level structure as The Lost Vikings (see the Level Breakdown section for an example). This can be done by having one character be occupied with an action or location and then requiring the other character to perform an action that opens up new options for the first character (then repeat this cycle). For example, the human character, HC, must connect two wires for the electric character, EC, to pass through and access a generator. Then, EC must provide energy to the generator to power an elevator for the HC to ride upward. After riding the elevator, HC must repair a circuit that allows EC to travel upward as well. Once EC is able to get to the same spot as HC, they can activate a switch inaccessible to HC and open a door for both HC and EC to proceed. The diagram below depicts a storyboard of how this puzzle could work.





Something we can learn from The Lost Vikings is puzzle clarity. As mentioned previously, an issue with the level design in The Lost Vikings is that there are no opportunities for the player to view the level layout and observe how they can approach puzzles beforehand. This can lead to moments where the player takes damage due to an offscreen hazard, or miss a button that's far offscreen (there are quite a few instances of this in the game). As a result, we should provide many opportunities for the player to view a puzzle or level in full when playing our game. For example, have the camera zoom out and capture the whole puzzle when the player steps in a spot at the start of the puzzle.

The Talos Principle

Game Overview

by VG Insights

Developers: Croteam

Publishers: Devolver Digital, Croteam

Release Date: Dec 10, 2014

Current price:$29.99

Avg price during last 6 months:$31.43

Genres: Action, Adventure, Indie

Languages: English, Traditional Chinese, Simplified Chinese, Brazilian, Korean, Polish, Czech, Japanese, Russian, Spanish, German, Italian, French

Description: The Talos Principle is a first-person puzzle game in the tradition of philosophical science fiction. Made by Croteam and written by Tom Jubert (FTL, The Swapper) and Jonas Kyratzes (The Sea Will Claim Everything).

Steam link: store.steampowered.com/app/257510

Potentials to be researched

- The game has several tools and interactions that can be used to solve puzzles
  - These tools and interactions can serve as examples/inspirations for the interactions we want in our project's puzzles
  - The game uses simple tools and environment elements that can be combined to create complex puzzles.
- The puzzle system and flow can serve as examples/inspirations for the puzzles we want in our project
- The game has a multiple choice puzzle/level design that can be applied to our concept
  - Areas have various puzzles that can be chosen by the player
  - Players are free to choose each puzzle they want to do and, in each order
    - This freedom can serve as an example of how the puzzles will be distributed in our project
- The level design features several areas connected to a central hub, like our project
- The progression system and unlocking of new areas and tools/skills may be relevant to our project

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Analysis

Quantitative Analysis

Concurrent players

by SteamDB

- **144** players right now
- **164** 24-hour peak
- **4,007** all-time peak 7 years ago

Store data

by SteamDB

- **178,798** followers
- **#3452** in top sellers
- **24,689** positive reviews
- **1,127** negative reviews
- **95.63%** positive reviews

YouTube stats

by SteamSpy

- **1,914** views
- **64** comments

for top 50 videos uploaded last week

- **11** new videos uploaded yesterday

Twitch stats

by SteamDB

- **0** viewers right now
- **6** 24-hour peak
- **139,966** all-time peak 5 years ago

Owner estimations

- *903.6 k .. 2.32 M on reviews (35-90) by SteamDB*
- *~3.44 M by PlayTracker*
- *~1.26 M by VG Insights*
- *~1.29 M by SteamSpy*

Playtime

by PlayTracker

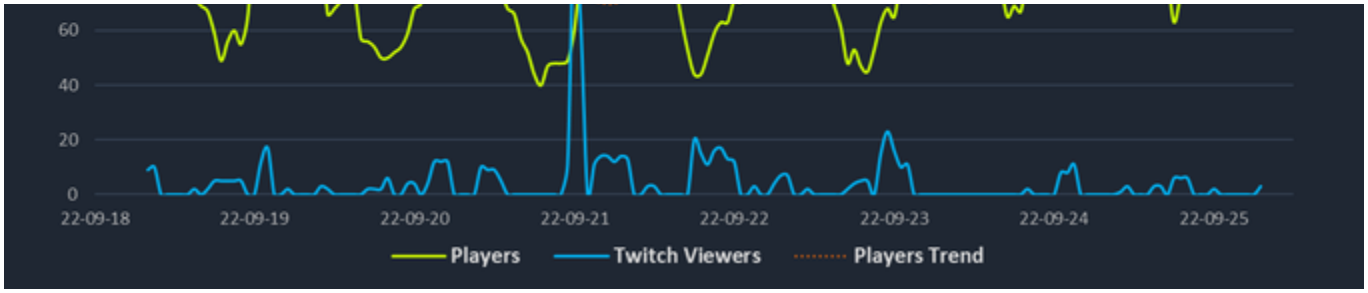
- **10.8h** average total playtime
- **0.5h** average recent playtime

Rating

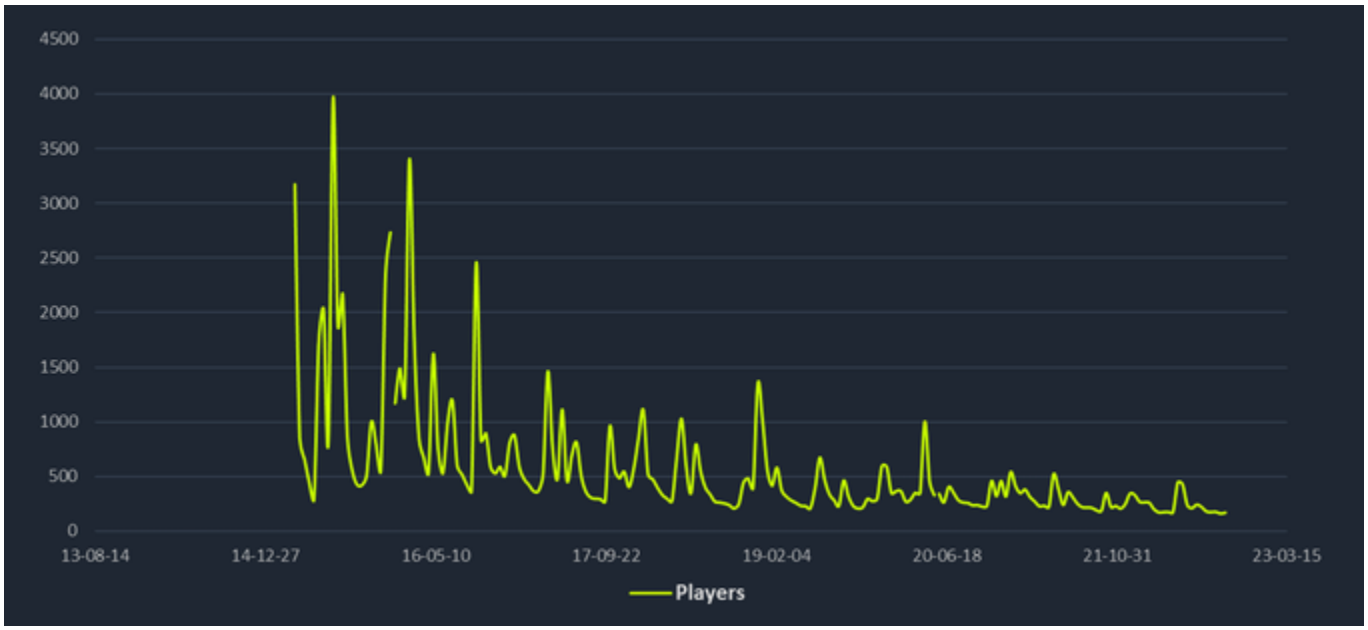
by Metacritic

- **85/100 Metascore** *based on 57 Critic Reviews*
- **86/700 User Score** *based on 702 Ratings*

Statistics over time



Lifetime concurrent players on Steam



Qualitative Game Design Analysis

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Mechanics

Interaction

Rules

- The player can walk/run on the horizontal line
- The camera rotates three-dimensionally
  - It is possible to change the TPS to three different positions
  - It is possible to use the camera in the first person
- The player can make a single jump

Key pieces

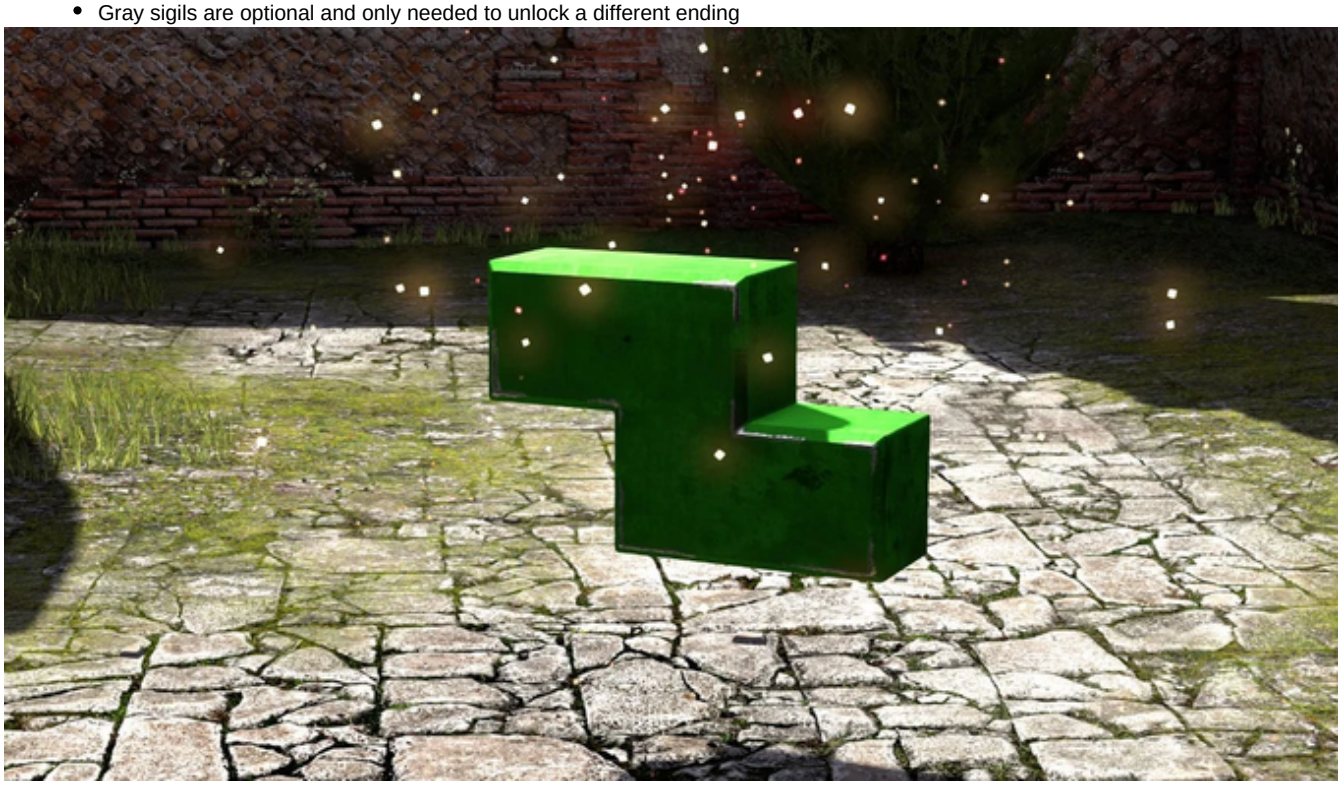
Rules

- If the player manages to complete a puzzle, he is rewarded with a key piece.
- Key pieces are divided into two categories, Sigils and Star
- Sigils can be used on Sigil locks to unlock new tools or new areas to explore

Sigils

- Sigils are rewards for completing a puzzle
  - Sigils can be green, yellow, red, or gray
    - Green sigils allow you to progress to new lands and areas
    - Yellow sigils unlock tools
    - Red Sigils are used to unlock new floors at the Tower

- Gray sigils are optional and only needed to unlock a different ending



Stars

- Stars are an optional reward that the player can find in some areas
  - When they are inside an area, the players can tell how many stars are present by the signal at the beginning of the area or before they teleporter
  - Stars can be found in a test or outside of them
  - They require extra effort compared to Sigils, a challenge offered to players who are willing and interested in solving more complicated puzzles

Elements

Tools

Rules

- These are the main elements that players must use/manipulate to solve puzzles
- Only the humble jammer may be used at the start
  - The other tools need to be unlocked using yellow sigils

Jammers

- Can be used to prevent the operation of another element
  - Deactivate energy wall, turret, fan base, bomb, or buzzer
- They can operate from any distance
- Need line of sight to the target object or will stop operating
  - However if they regain line of sight and the object remains in the same position, they will operate again
- More than one Jammer can be pointed to the same object creating redundancy
  - e.g. Two Jammers can be used to break through any wall of energy. Aim one at the gate on one side, move the other one into the gate and block the open energy gate from the inside, then take the outer blocker and move forward.
- Can operate through Exclusion fields
- Can be used to maintain Pressure plates pressured

Connectors

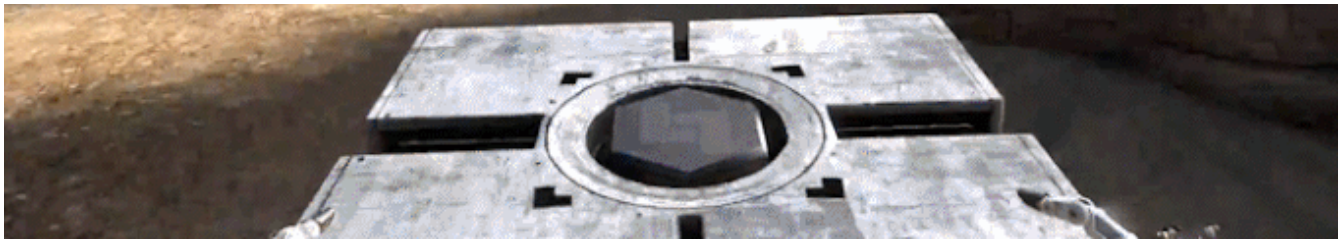
- Used to solve puzzles that require a beam of light from coloured light generators to reach coloured light receivers
  - Generators are sources of red or blue light that you can connect to a connector and connect that to a receiver to manipulate the puzzle
  - Receivers take light from a generator that has been bounced off a connector
    - When they have power, they perform different actions
      - e.g. turn off energy walls, activate fan bases
    - They need to be matched to the correct colour to operate
- Connectors can be attached to any number of other connectors, coloured light generators, and coloured light receivers
- When you then place them on the ground or on a hexahedron, the connector will send beams towards all these objects (and generators send beams of light towards the connector) until it's picked up again
- If the beam of a connector strikes another connector's beam, the two will cancel out
  - This can be used to create a cycle of connectors causing walls to open and close in sequence
- If any object passes in front of the light beam, it will be interrupted.
  - Except for the player character
- Can operate through Exclusion fields
- Can be used to maintain Pressure plates pressured

Hexahedrons

- Hexahedrons may be jumped upon and stacked
- Players can jump onto one hexahedron
  - jumping onto a stack of two requires more elevation
  - e.g. a third hexahedron to get a step up first
- Can be used to maintain Pressure plates pressed

Fans

- Fans will propel the player in the direction of the air stream
  - Fans do not work without their bases
  - Their bases must be powered
    - e.g. by a receiver or wall switch
- Some fans cannot be removed from their bases
- The amount that fans push depends upon their base; some will push just a bit, some will push far
- If a fan pushes upwards, the player can ride on top of it
- Hexahedrons may also ride a fan, and multiple hexahedrons may be stacked
- Other tools will fall off the air stream
- To mount a connector or jammer on a fan, the player needs to place them on a hexahedron first



Playback

- The playback tool allows the players to record up to five minutes of movement (but not through an exclusion field) when used
- When they use it again, a simulation of them will do what they did while recording
  - The simulation ends when the recording ends
  - The simulation ends when players die
  - The simulation ends when the simulation dies
  - The simulation ends when the players walk through an Exclusion field
- During playback, all tools have doubles
  - This allows the players to double the number of tools they have available
  - Players cannot ride a playback hexahedron

Platforms

- Platforms are used with the playback tool during recording to provide for the player's future self a place to stand on
- During playback players need to be high enough to be able to jump on the platform or put tools on top of it

Keys

- Keys can be found in some tests
- They may be able to open one or more than one locked gate
- They will be dropped if the player passes through an Exclusion field, returning to where they picked them up

Environment Tools

Rules

- Elements in the environment that the player needs to interact with to solve the puzzles

Pressure plates

- Pressure plates that can be activated to cause something to change state in the environment
  - e.g. hold down to turn off a power wall
- They need to be pressed constantly. Otherwise, they - and the third element - revert to their previous state.
  - The player can use the character to press them
  - Connectors, hexahedrons, jammers, fans or platforms can also be used to press it

Wall switches

- Wall switches are used to change the state of an element for an indefinite period (until the switch is used again)
  - e.g. turn on/off power walls, disable/on turrets

Enemies

Bombs

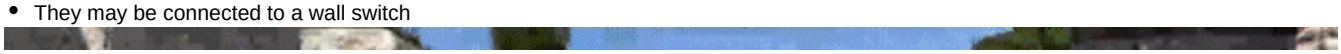
- Move around in a set pattern
- Have a detection circle around
  - If they get close enough to the players, they will suddenly fly towards them and explode, killing them
    - Upon being killed, players return to the last Exclusion field
    - All changes made to the puzzle are undone
  - Bombs will target active turrets if they get too close
    - Kill both of them in the explosion
- Bombs can be temporarily disabled with a jammer
- Players can put hexahedrons on top of bombs and then jump on them for a ride or use the surface in other ways
- Bombs will bounce off almost any object, including connectors, jammers, and of course hexahedrons

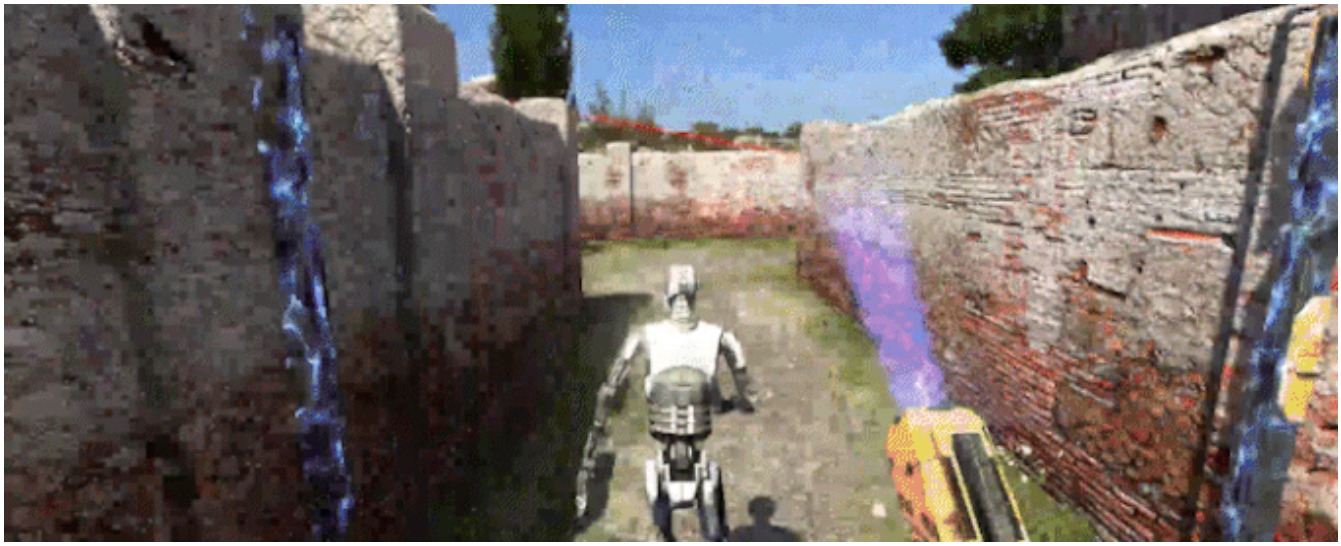
Buzzers

- Do not attack the player
- Maintain a Patrol Pattern
- Interrupt beams of light

Turrets

- Turrets are weapons that, if active, will scan a conic region in front of them
- If they spot the players, they will start beeping
  - If the players are close enough, they will fire to kill them
  - When Turrets start firing, players have a small window of time to retreat before being killed.
- There is a blind area beneath them, and the angle for the cone of their view is not very wide, meaning they can only see mostly what's in front of them
- Turrets can be temporarily disabled with a jammer
- They may be connected to a wall switch





Obstructions

Energy walls

- Blue barriers that block all movement and connector beams.
  - Block the player's passage
  - Block the passage of Bombs
- They may be disabled with a jammer, or by activating a colored light receiver that can disable them

Exclusion fields

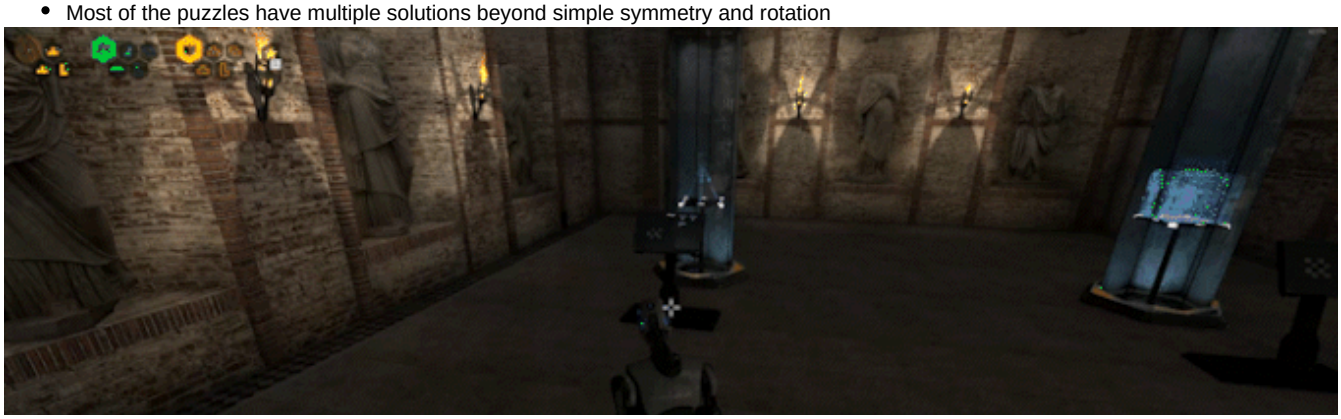
- Purple walls that works as a limiter to the players
- When crossed, tools that were in hand are released
- They are the boundary into all puzzle
  - Sometimes used within puzzles as well
- They work as a checkpoint at the beginning of the puzzle
- When crossed, stops recording or playback
- Colored light beams can pass through them
- Jammers can affect elements through them

Locked gates

- Barriers that impede the passage of the player or any element
- Are opened when using keys

Sigil locks

- Sigil locks are obstructions that require the correct number of sigils of the correct colour to be unlock
- To unlock, the players need to solve a mini puzzle
  - They must be organized on the grid so that none overlap and all spaces are filled
  - Most of the puzzles have multiple solutions beyond simple symmetry and rotation



Puzzle Design

- Progression

  Rules

  - Puzzles designed for players to learn from mistakes
  - No errors are penalized
  - The players are quickly respawned if they die
    - The game has no game over state
  - About players correcting mistakes
    - Players can easily see the result of their actions
  - Completed puzzles provide pieces that give access to more difficult puzzles

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- Logic Gates

  Rules

  - The puzzle system works with the logic of Logic Gates system
  - The player needs to use tools or elements in the scenario to change the state of the puzzle elements.
  - It is necessary to make a combination of Logic Gates that unlock the path to the end of the puzzle as the player moves
  - Puzzle actions can be redone, there is no no-return state

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- rewards

  Rules

  - Players receive pieces that can be used to unlock new tools or new puzzles at the end of each puzzle
    - Puzzles give pieces according to their difficulty
      - e.g. pieces to unlock advanced areas are obtained in more difficult puzzles
  - Puzzles have optional pieces (Stars), which serve as a secondary challenge for players looking for something more difficult
    - Collecting all the stars unlocks a unique ending

Level Design

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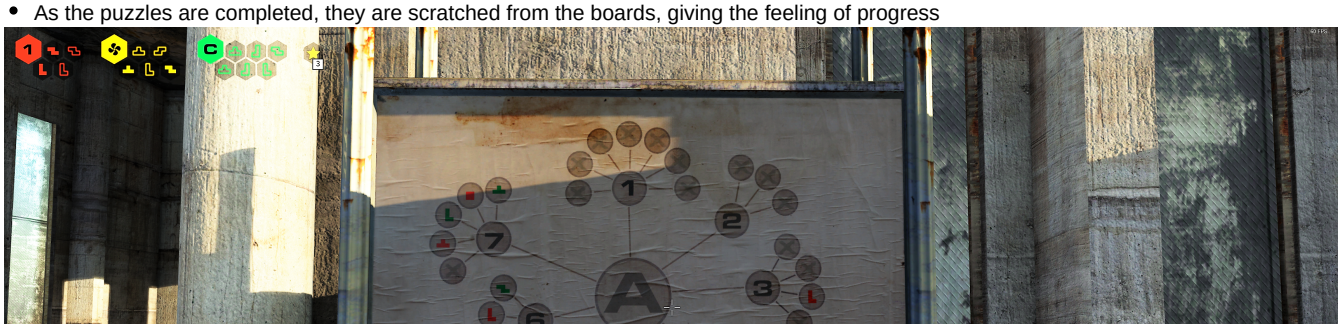
- Enverinment
  - The game has several environments and worlds to be unlocked
  - Each world has an aesthetic variation
    - e.g. Greek, Egyptian, Gothic, decay, etc.
  - The game has the Nexus as a central lobby from where the player can access other worlds
  - Each world is made up of different levels

- Each level consists of several puzzles

- The game has signs indicating the content and the path of each puzzle

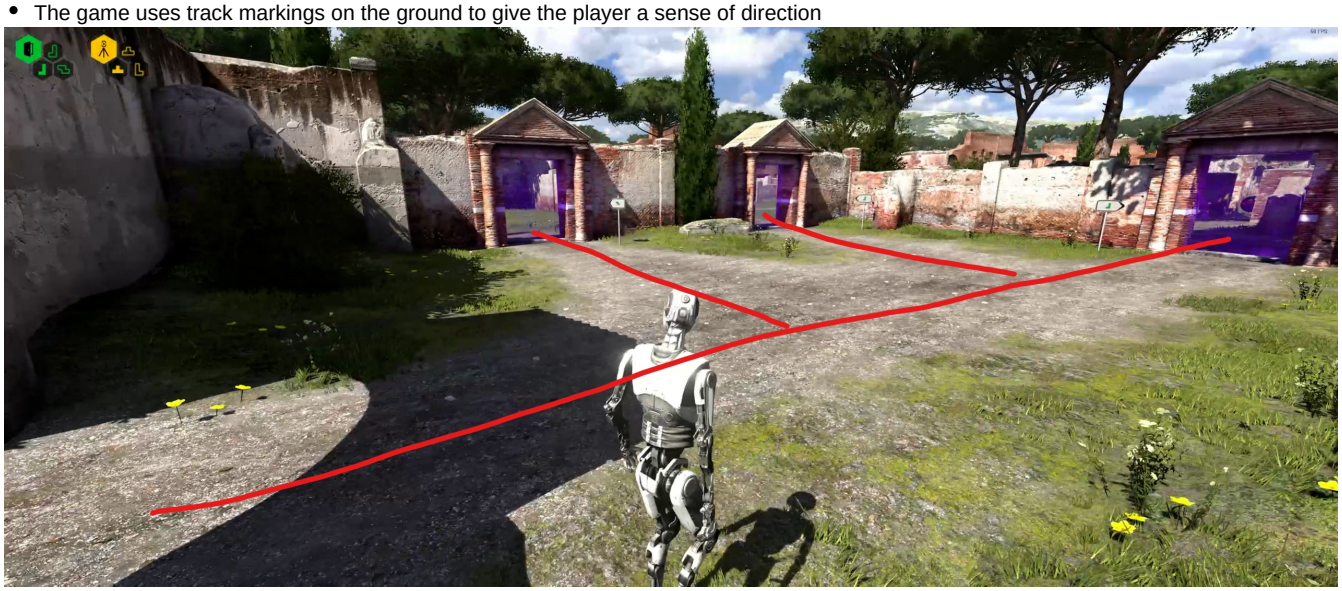
Multiple choices

- The game's map allows for a non-linear progression, where the player can do the unlocked puzzles in the order they prefer.
- The sense of progression comes with increasing the difficulty of the puzzles, unlocking new tools and unexplored areas
- As the puzzles are completed, they are scratched from the boards, giving the feeling of progress



- Affordance
  - All puzzles have the same entry portals, facilitating recognition
  - The interaction elements have a futuristic aesthetic, contrasting with the environment and facilitating recognition
- Leading Lines & Spotlights
  - The game uses spotlights to give a sense of direction and show the player the path to unlock

  - The game uses track markings on the ground to give the player a sense of direction



Conclusions

The Talos Principle features a very refined non-linear puzzle system. Where the game gives the player freedom, but not enough to make the player go off the rails. Making the player advance to progressively more difficult levels without losing the feeling of freedom.
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The player has the freedom to select some puzzles to solve, but to unlock more advanced puzzles, he needs to solve other puzzles first, ensuring that the player only advances to more advanced sessions when he is ready.

The way the puzzles are put together is also quite interesting. Although the game has simple elements, each of them has a very different function. By mixing them, it is possible to create very complex and interesting puzzles.

The game's enemies have simple but clear functionality. Serving more as an extra piece in the puzzle than as enemies per se.

Recommendations

The freedom of choice of puzzles as presented in The Talos Principle can be a splendid example for our project.

Although the game gives a sense of freedom of choice, the player is limited to how far he can advance without having completed certain levels beforehand.

This can be applied in the same way in our project, where the player is presented with multiple puzzles, which perform different functions, but the player will only be able to progress to the next area when he has completed certain puzzles in the current area.

Our project can also use the gameplay mechanics and puzzle construction in The Talos Principle as an example/inspiration. The puzzles have simple elements that can be added and mixed to create more complex puzzles. This can be applied to our project in order to facilitate development due to the short production time.

The game's enemies serving more as an extra piece in the puzzle than as enemies is also something that we can apply to the mechanics of our puzzles

Gameplay Record

Talos - 64bit 2022-09-25 17-21-42.mp4

Watch Dogs Legion

Watch Dogs: Legion on PS4, Xbox One, PC, Stadia | Ubisoft (CA)

Research Report – Watch Dog’s Legion and Discussion Section

- Kevin Jacob Stanly

Watch Dog’s Legion Research

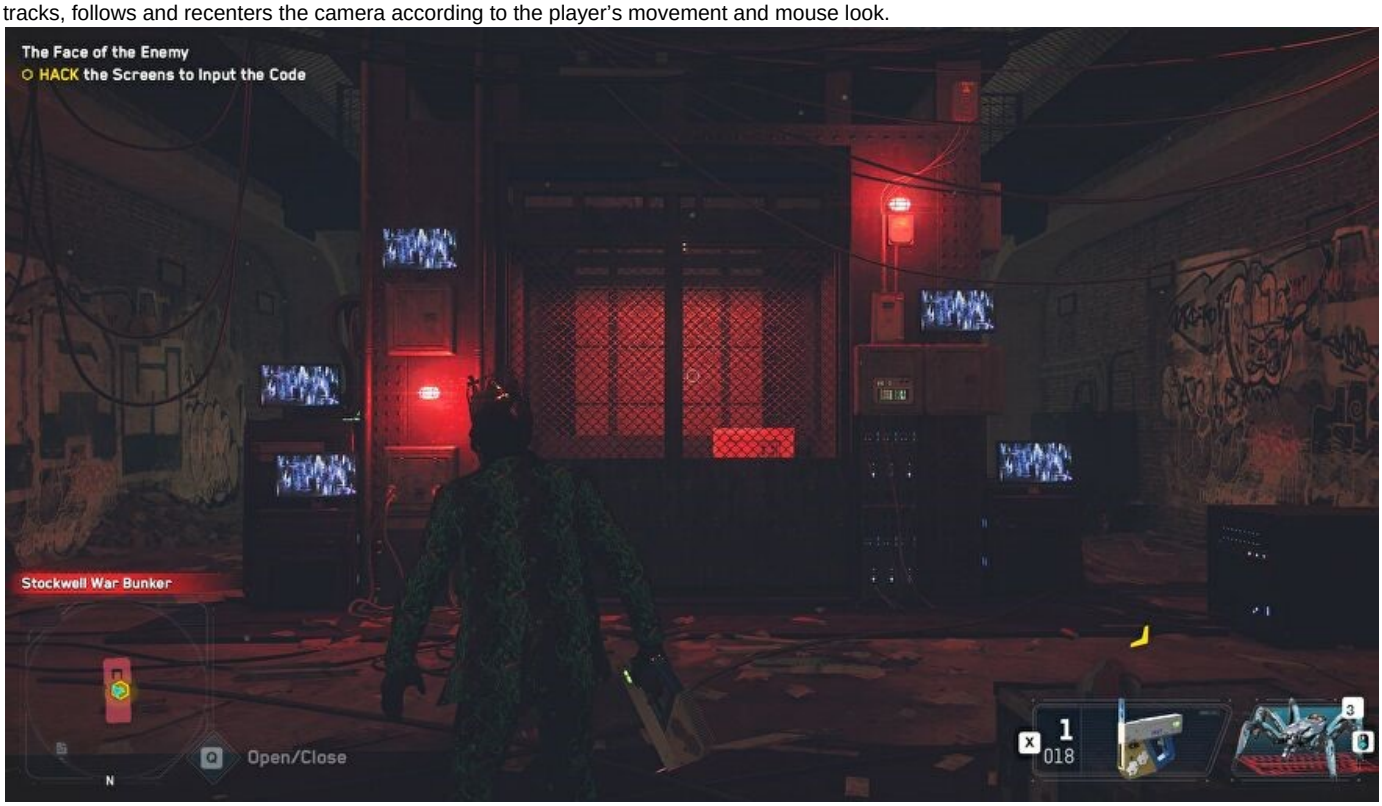
Watch Dogs: Legion is an action-adventure game developed and published by Ubisoft. The core gameplay in this sequel includes shooting, driving, hacking systems and stealth. The new gameplay added is the recruitment system where players can recruit any virtual NPC to their crew. Additionally, there are multiple ways to complete a mission (non-linear puzzle) and is **dependent** on what player character is currently selected. The game follows the classic **3C approach** to the game design just like other open-world games (Camera, Character and Control).

3D Camera

Figure 1 Free Move Camera

Watch Dogs Legion uses a traditional character controller that can be seen in most open-world games.

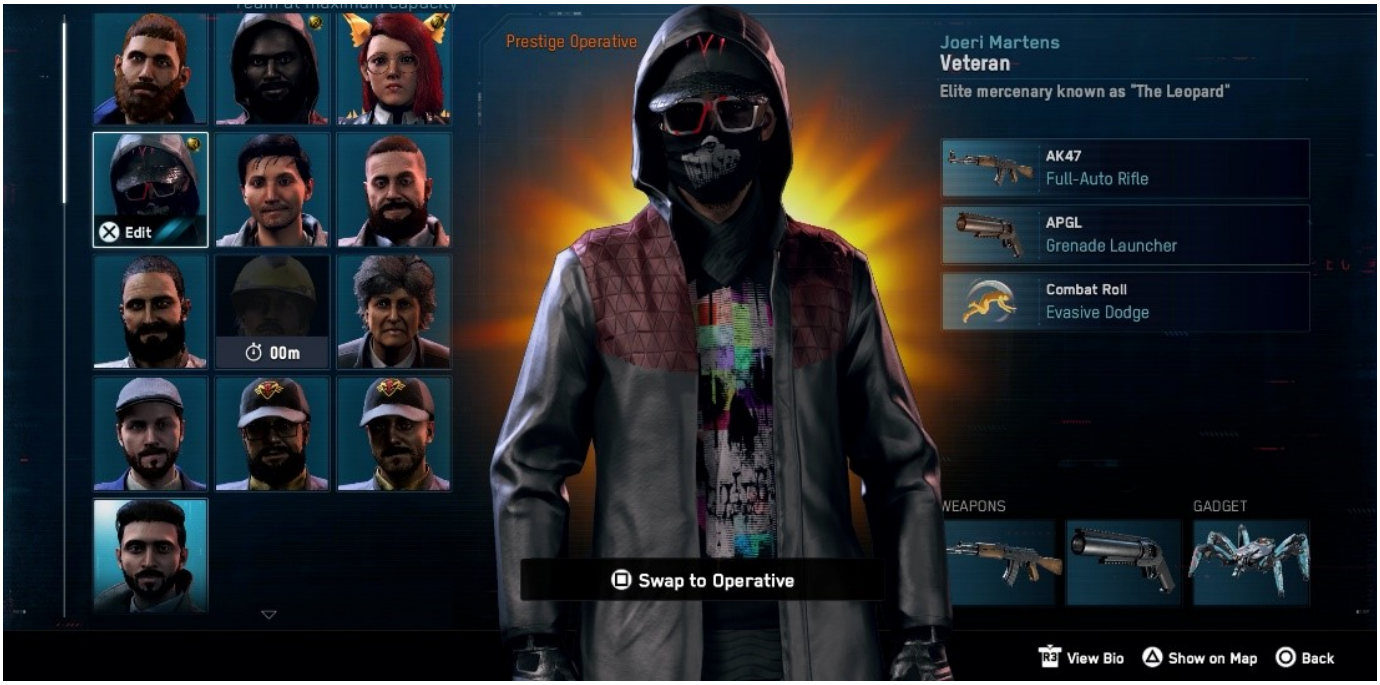
This type of camera is used so the player can catch and spot important signifiers in the environment easily. It makes the puzzle/level design more visible to the player. The game uses a **free-move camera.** The camera is behind and above the main character, centred for the most part. It tracks, follows and recenters the camera according to the player's movement and mouse look.



Toggling Characters and Spider Bot

Changing Operatives/Characters

Players need to access the main menu and select the team's tab to switch operatives. The player can then choose from the list of playable characters in the current team. Once a character is selected, the other character has a **small interaction** with the first character indicating to the player that the switch was successful.



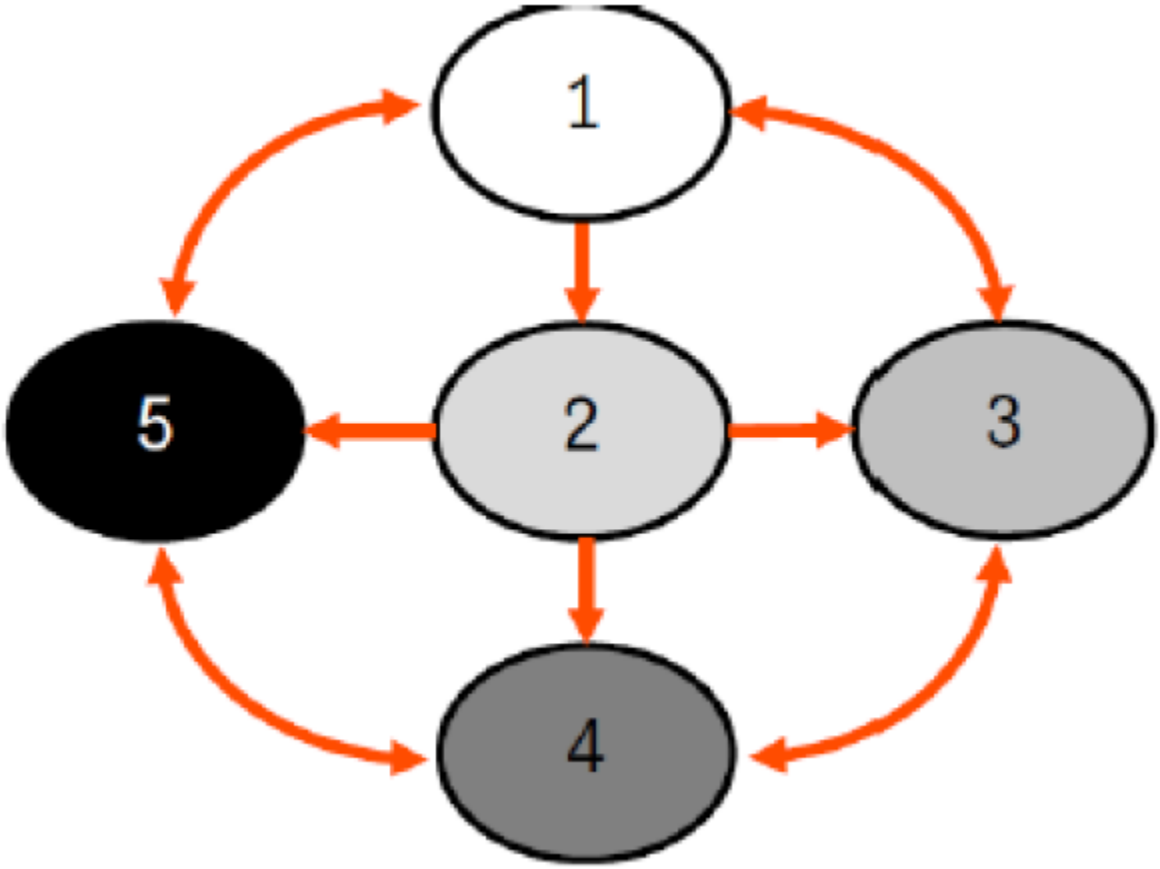
Spider Bot

A spider bot is a gadget that the player unlocks in the early game to hack facilities, and distract guards and can be combined with stealth for various approaches. There are two ways of calling these spider bots. One of the ways is by using the **spider bot stations (refer to the screenshot below)** in each facility the player is in. The second way is to **throw the spider bot from the inventory** to the ground. The player must then hijack the bot (*E on keyboard*) to switch to the spider bot.

The spider bot has its own uses in the game. It can be used to finish missions faster and easier by hacking systems without the main character present in the mission building. The player can get out of the drone by recalling it. If the drone is left at a specific place, the player must be in the drone's radius to control it again.

Non-Linear Puzzle Design

Most of the game's puzzle is non-linear for the initial first bit of getting into the building and such. There are some scenarios where players are required to follow an order of hacking sequence to get a certain code. In the example above, from the level design aspect, the designers have used **Form, Space and Order** to teach the player the correct sequence of hacking execution. The **lighting** and **contrast** of the materials help with the visual aspect of conveying this to the player.



Watch Logs: Legion follows a **sandbox** style to each level/puzzle. There is not only one way to solve puzzles. Given the various characters and gadgets, it is possible to finish high combat missions with stealth or spider bots and vice versa. This is one of the biggest **pillar** of this game.

Player Experience

- **Exploration**
  - The player gets to explore the open world setting by driving, walking and sprinting around the environment
- **Non-Linear Puzzle**
  - There are numerous ways to solve the level/puzzle
  - By making use of the environment, character abilities and gadgets, there are many solutions to each mission
- **Non-Linear Mission Structure**
  - The player can complete the missions in any order to reach the endgame
  - The missions are branched and met at one point. It does not matter what order the player completes them.

Possible Applications to our Game

- Sandbox Style Level Design – Multiple paths and solutions for every level
- Activation of Second Player (Battery)
  - Inventory Activation:
    - The player opens an inventory wheel to select the battery and switches to the battery character
    - The player opens an inventory wheel, selects the battery, throws the battery to the world to switch characters
- Placing the second character in the world and moving them according to the missions (No recallability)

- The second character must walk to the first character to get on his back (to get to idle state). The second character must always be in the world to interact/switch.
- Recallability of second character
  - Ability to recall the second character after deployed in the world anytime. The second character runs to the first character's back or backpack once recalled by just one input key.

References

1. Schell, J. (2020).

The Art of Game Design: A book of lenses. CRC Press, Taylor & Francis Group.

Quantitative Analysis

Excel - Quantitative Analysis Data

User Documentation

How to Play

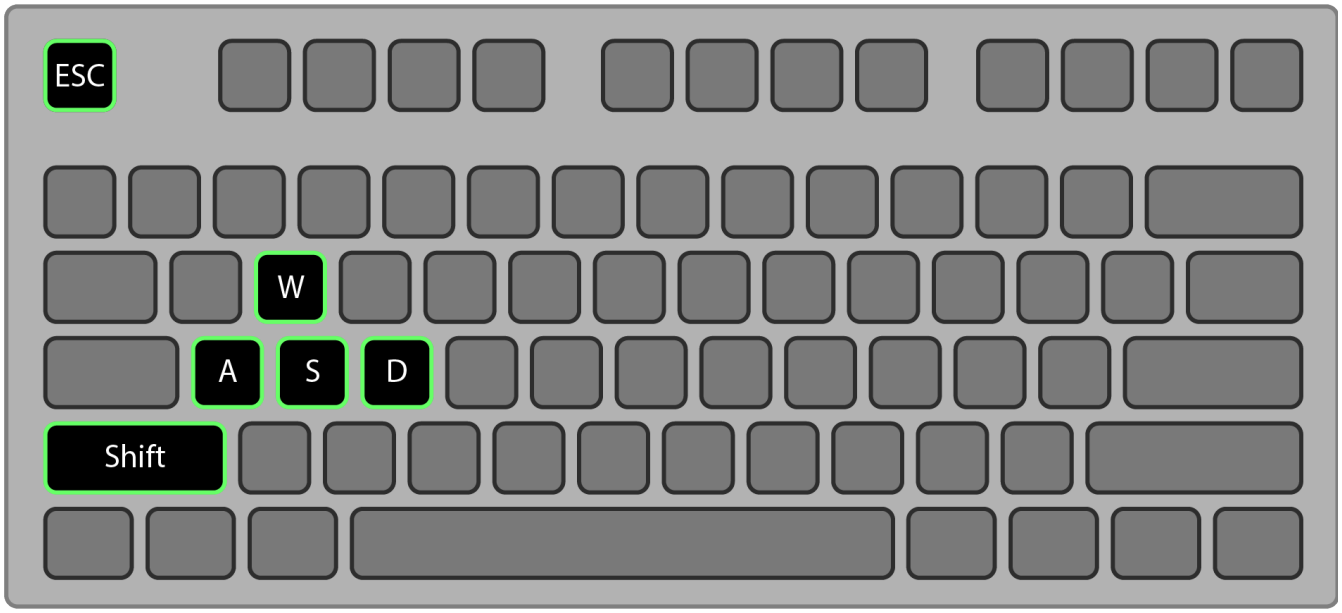
Players need to solve puzzles to unlock new abilities and new and harder puzzles

Keyboard/Mouse Guide

Keyboard/Mouse Guide

Comum Actions

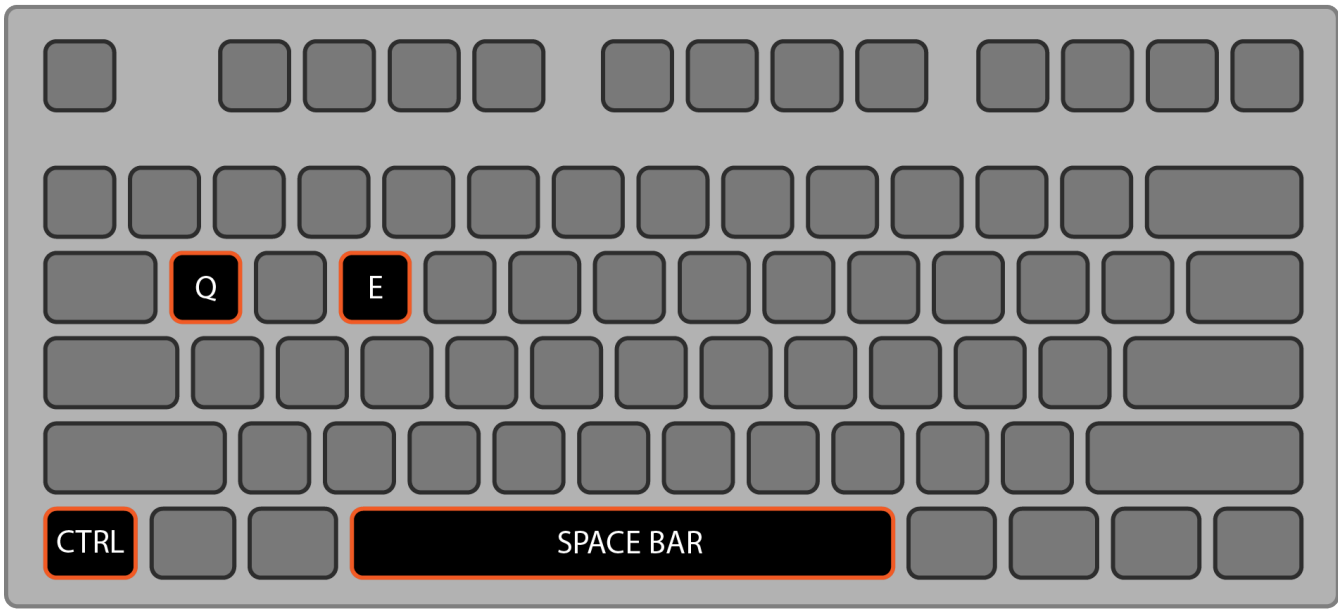
Move Characters	**W - A - S - D**
Switch Characters	**SHIFT**
Pause Menu	**ESC**



Data's Actions

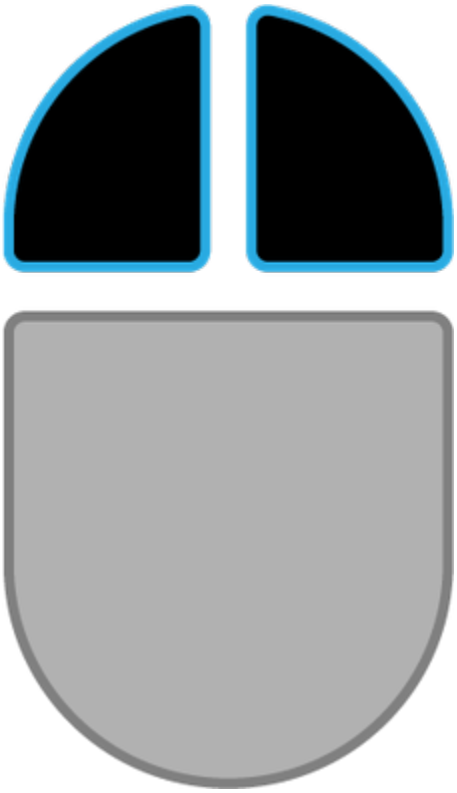
Launch Left Arm	**Q**
Launch Right Arm	**E**
Interact Left Arm	**CTRL**

Interact Right Arm	**SPACE BAR**



Surge's Actions

Magnetic Field	**Mouse Left Button**
Electric Arc	**Mouse Right Button**



Controller Guide

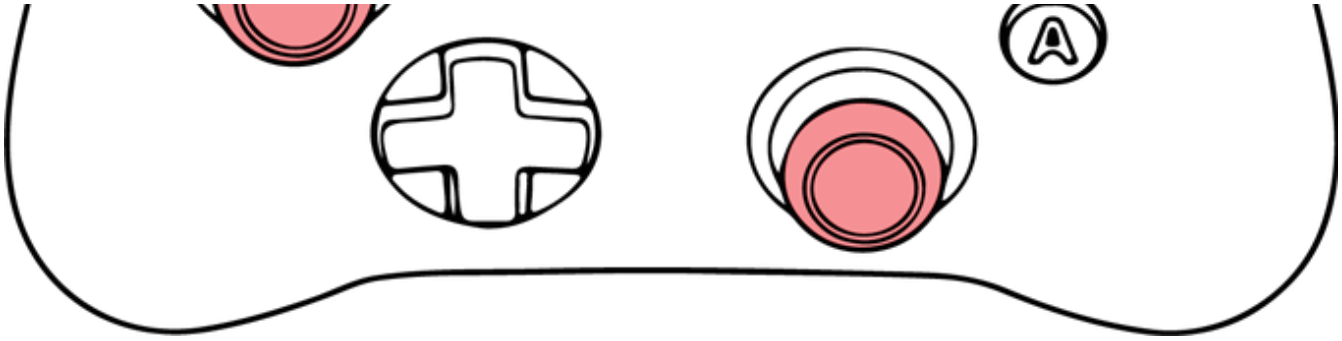
Controller Guide

Comum Actions

Move Characters	**LEFT STICK**
Move Camera	**RIGHT STICK**
Switch Characters	**A - B**
Pause Menu	**MENU BUTTON**

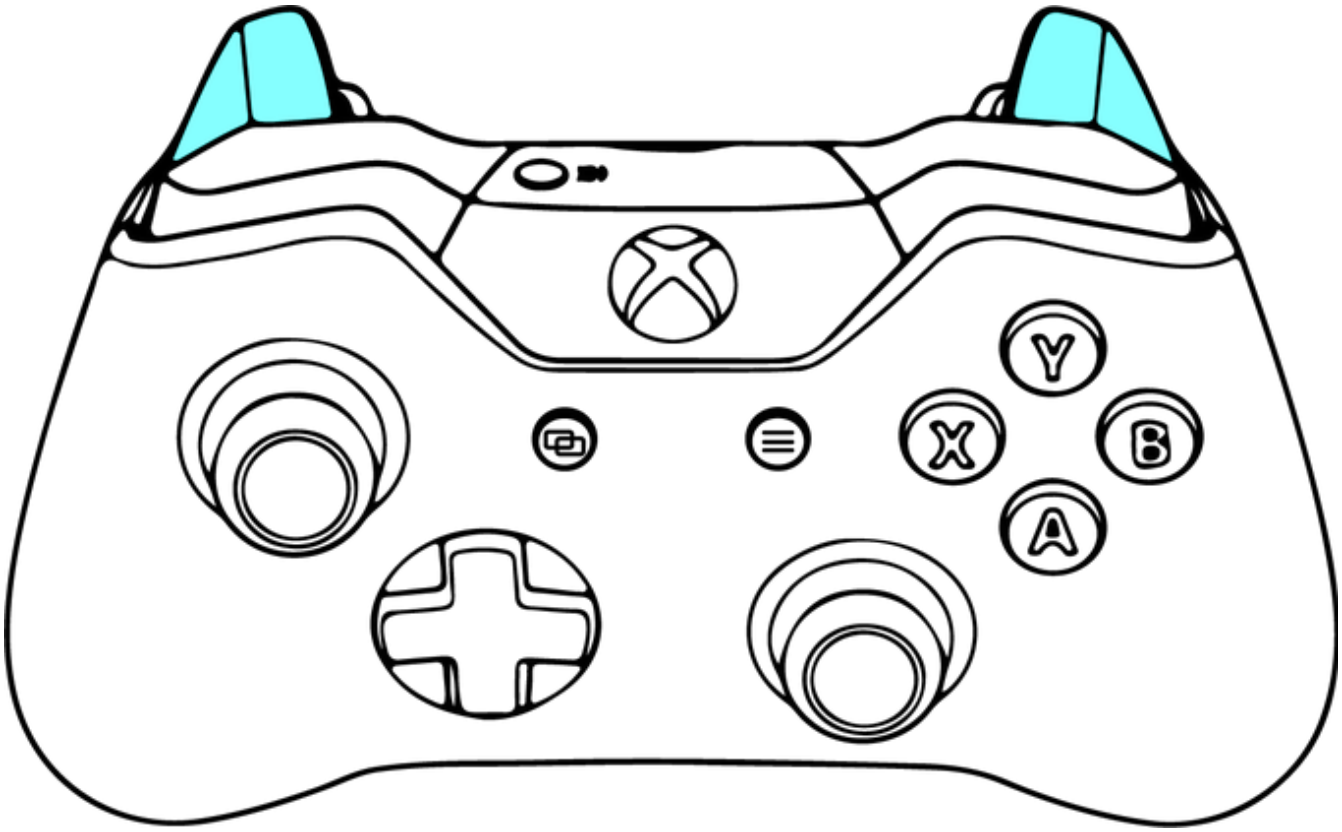
Data's Actions

Launch Left Arm	**PRESS LEFT STICK**
Launch Right Arm	**PRESS RIGHT STICK**
Interact Left Arm	**LB (LEFT BUMPER)**
Interact Right Arm	**RB (RIGHT BUMPER)**



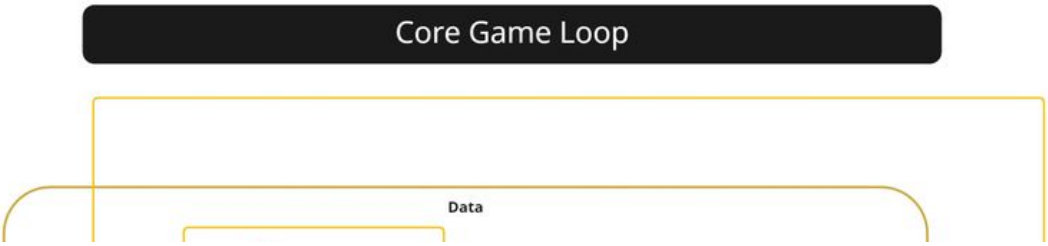
Surge's Actions

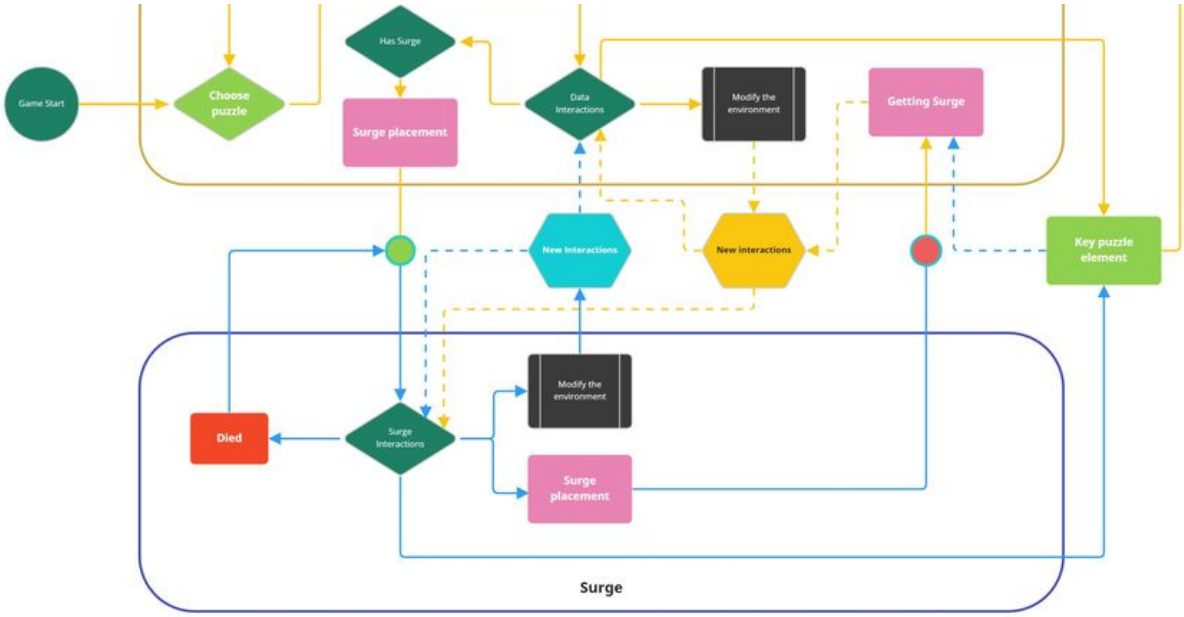
Magnetic Field	**LT (LEFT TRIGGER)**
Electric Arc	**RT (RIGHT TRIGGER)**

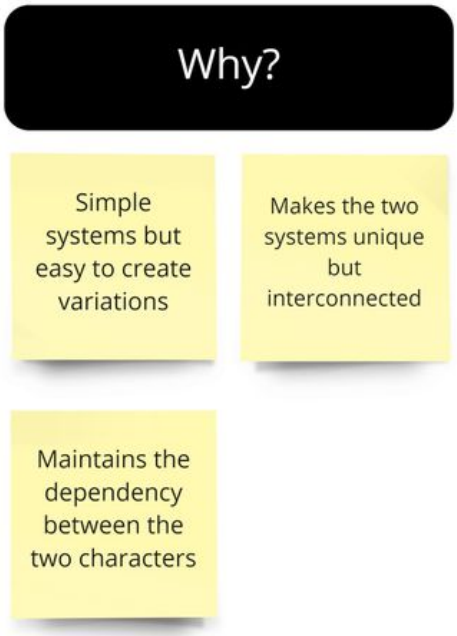


Gameplay

Gameplay System







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Gameplay Mechanics & Rules

Mechanics

- Mechanics
  - Puzzles
    - Verbs:
    - Signifiers:
    - Rules:
- Characters
  - Surge

        - Verbs:
        - Signifiers:
        - Rules:
        - Electric Slide
            - Verbs:
            - Signifiers:
            - Rules:
        - Electric Arc
            - Verbs:
            - Signifiers:
            - Rules:
        - Magnetic Field
            - Verbs:
            - Signifiers:
            - Rules:
        - Energy Beam
            - Verbs:
            - Signifiers:
            - Rules:
        - Quantum Entanglement
            - Verbs:
            - Signifiers:
            - Rules:
    - Data
        - Verbs:
            - Signifiers:
        - Rules:
        - Carry and place Surge
            - Verbs:
            - Signifiers:
            - Rules:
        - Interacting With Mechanisms
            - Verbs:
            - Signifiers:
            - Rules:
        - Machine Possession
            - Verbs:
            - Rules:
- Game Core loop

Puzzles

Solving puzzles is the main mechanic of the game. Players must use the abilities of the two characters together to reach the end of each puzzle.

Verbs:

- Connect
- Turn on
- Scape

Signifiers:

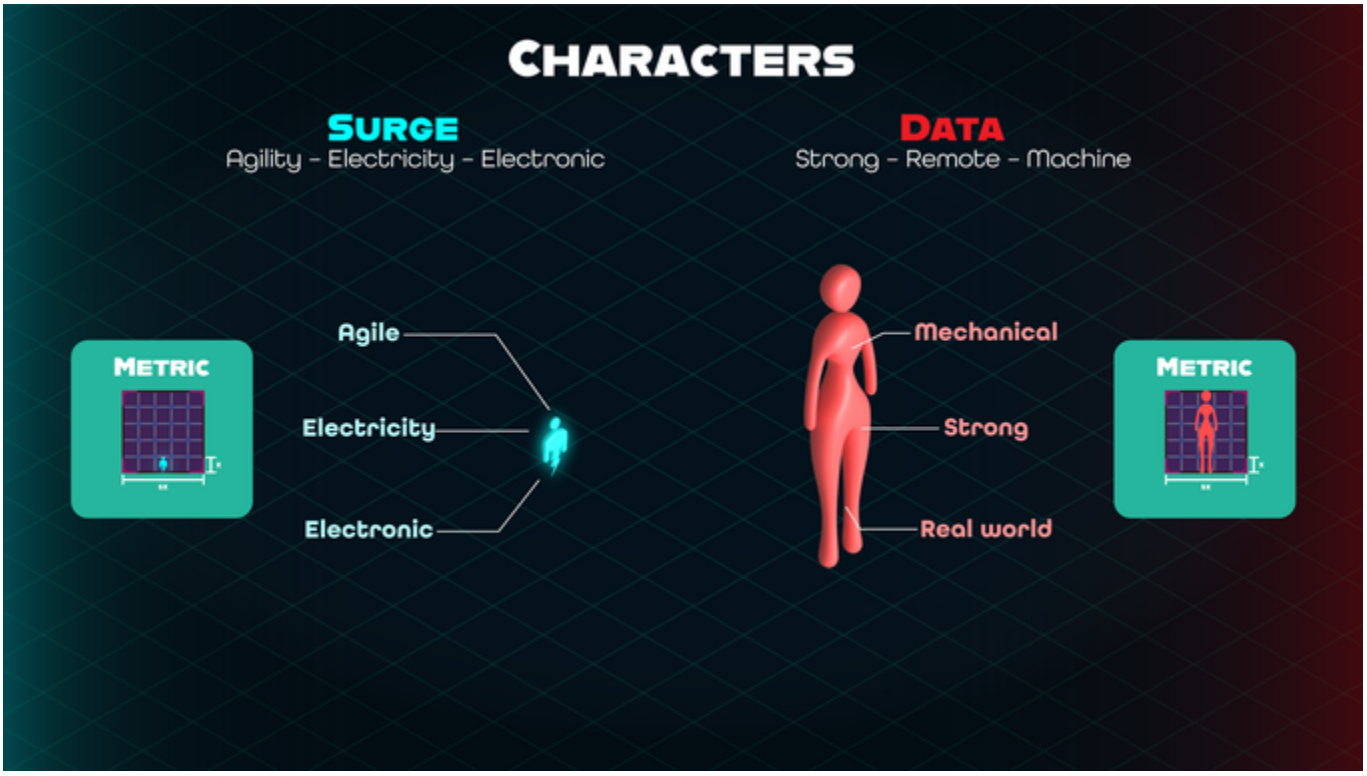
- Endpoint
- Available Elements
- Input Feedback

Rules:

- Solving all puzzles unlocks the exit door and ends the game.
- Players can change between both characters all the time if they are separated.
- Each character's abilities have different button keys that can be activated regardless of the character the players are controlling.
- Players have more than one puzzle to choose from.
    - Players can explore the environment.
- Solving puzzles unlock new puzzles or a new ability.
    - New abilities can be used to unlock puzzles.
    - Players can only access puzzles if they have the necessary abilities.

- Puzzles have their areas separated by Charging/Discharging Fields.
- Puzzles are completed after both characters interact with the key element at the end of the puzzle.
- Doesn't fall off the level.

Characters



Surge

Surge is an electrical character that can move across electrified surfaces and interact with electrical objects to turn them on or off.

Verbs:

- Agility
- Electricity
- Electronic

Signifiers:

- Small Character
- Lives on Electronic World
- Non-biologic being/Made of Energy
- Abilities available
- Abilities equipped

Rules:

- Can use 2 powers at the same time
- Has two key buttons to activate the powers at all times
- Can only move at electrified components
  - Grids need to be electrified to be able to walk
  - If a grid is de-electrified with him on top, he dies
  - Wires need to be electrified to be able to move throw
- When spotted by a sentinel, he dies
- When he gets close to an electric spider, he dies
- Cannot move out of electrified grid panels or wires
- When he dies, he returns to the last used Electric Pole

Electric Slide

Surge can utilize the Electric Rails to move around the level.

Verbs:

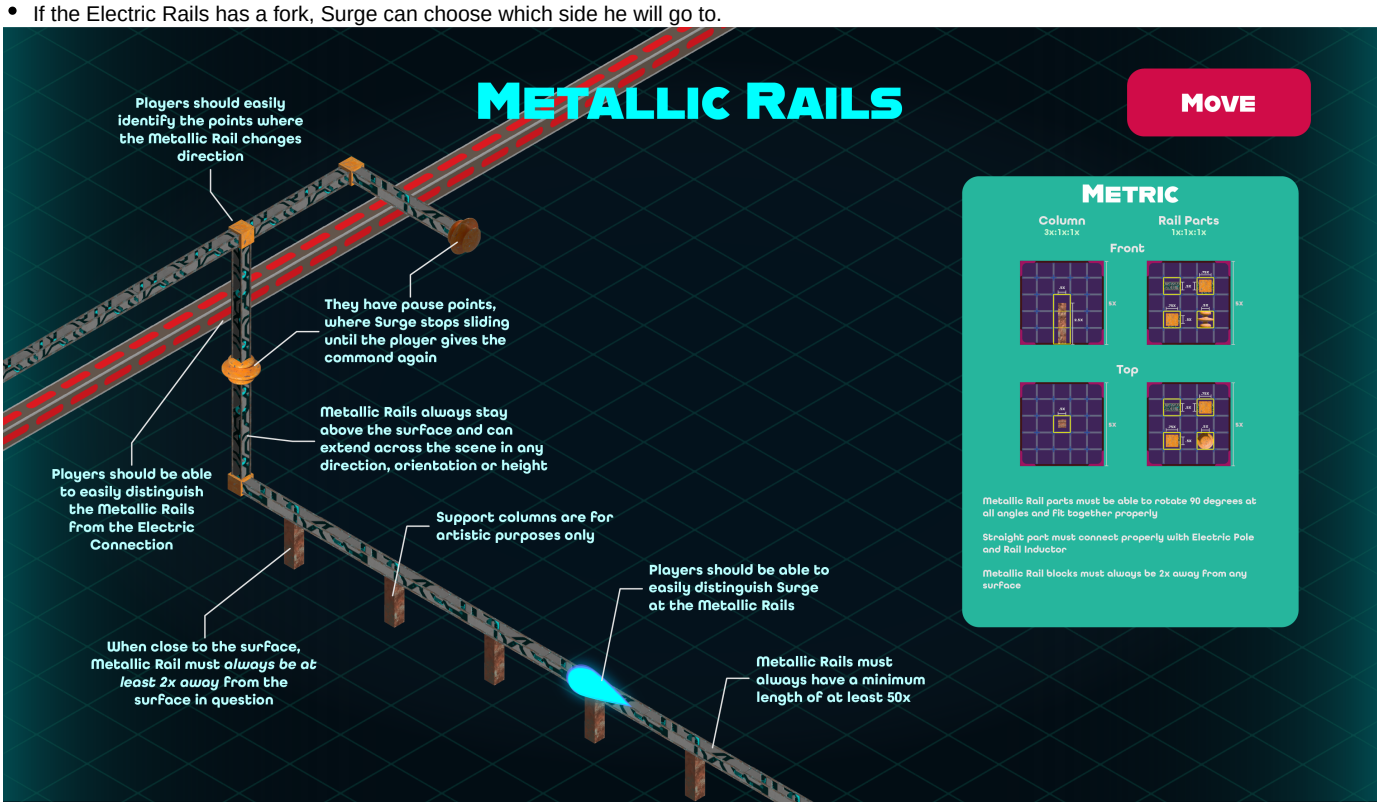
- Movement
- Fast

Signifiers:

- Available Paths
- Direction of Movement
- Waiting for input
- Unavailable input
- Movement Direction Available
- Movement Direction Made/Making

Rules:

- When Surge is inside a Power Rail, he can move along it.
- Surge moves automatically, following the flow of the Electric Rail until it reaches its end or a fork.
  - When arriving at a fork, Surge stops moving and waits for the player to define which direction to continue.
  - If Surge reaches an energized Rail Inductor, he is moved off the Electric Rail automatically.
  - If Surge reaches an unpowered Rail Inductor or an Electric Pole, his movement stops until the player commands him to return or catches him with Data.
  - When Surge is placed on an Electric Rail by the Electric Pole, his movement does not start automatically.
- Surge can use the Electric Slide only on the Electric Rails.
- If the Electric Rails has a fork, Surge can choose which side he will go to.



Electric Arc

An electrical discharge that projects electrical arcs to charge objects.

Verbs:

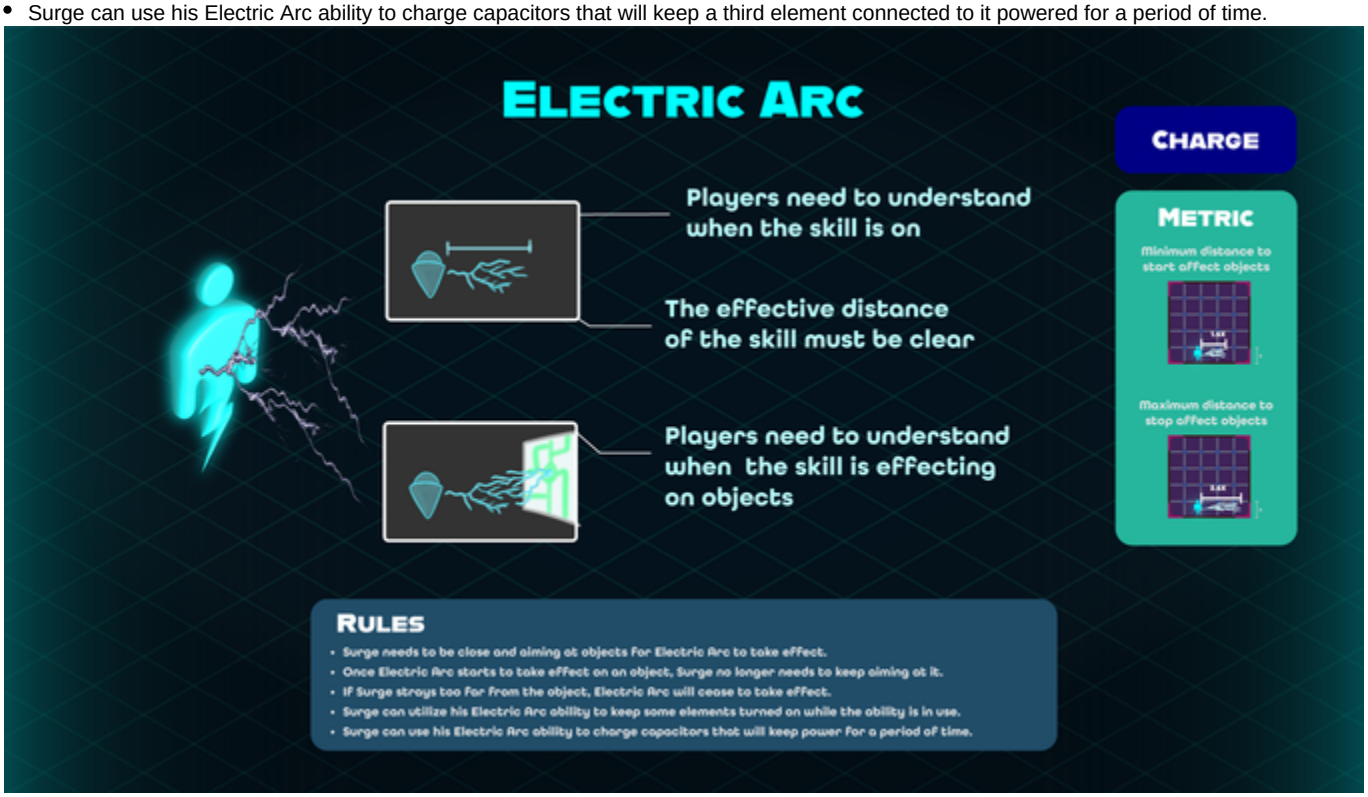
- Charge
- Close

Signifiers:

- Power is on
- Object is under power effect
- Object is not more under power effect
- Power is off

Rules:

- Surge needs to be close and aiming at objects for Electric Arc to take effect.
- Once Electric Arc starts to take effect on an object, Surge no longer needs to keep aiming at it.
- If Surge strays too far from the object, Electric Arc will cease to take effect.
- Surge can utilize his Electric Arc ability to keep some elements turned on while the ability is in use.
- Surge can use his Electric Arc ability to charge capacitors that will keep a third element connected to it powered for a period of time.



Magnetic Field

A magnetic field that projects magnetic waves and grabs objects

Verbs:

- Move

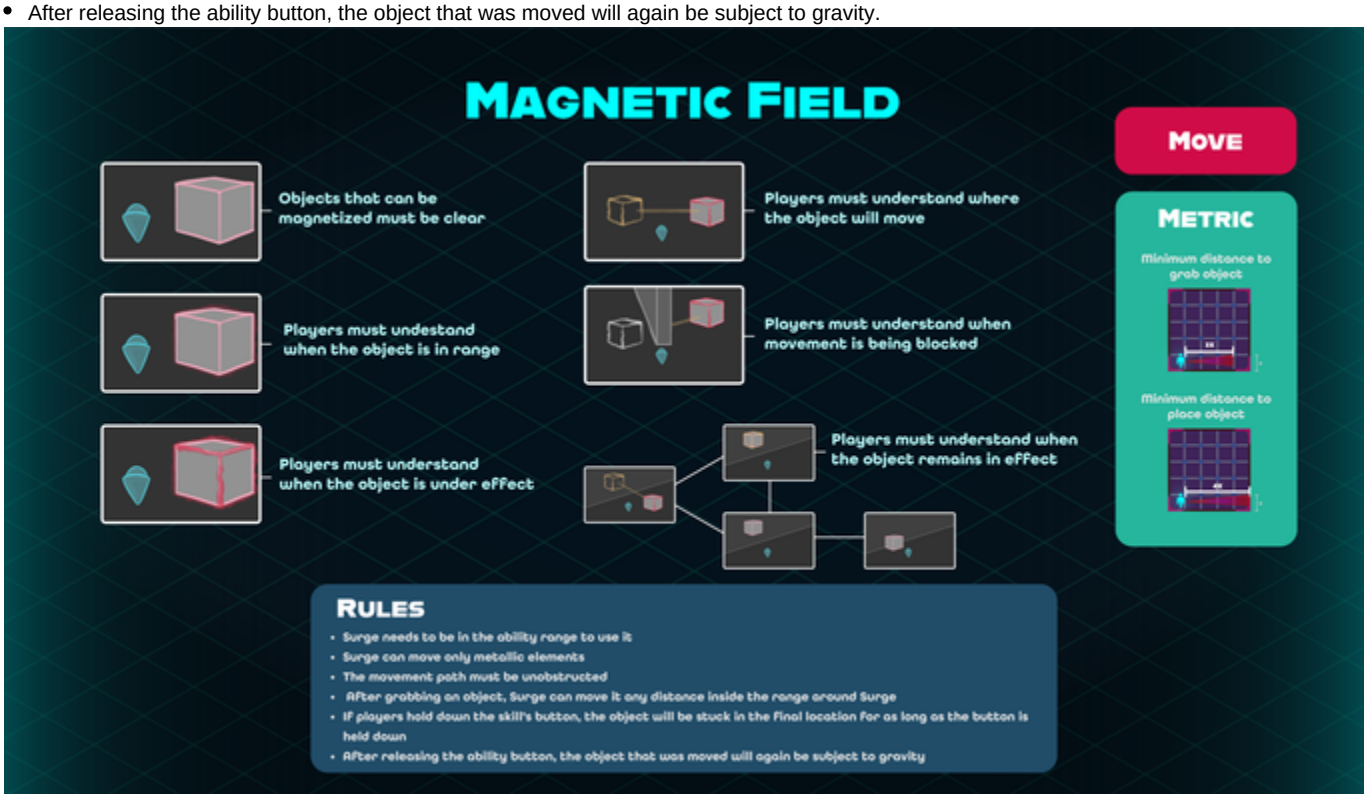
Signifiers:

- Power is on
- Object is under power effect
- Object is not more under power effect
- Object is on range
- Power is off

Rules:

- Surge needs to be in the ability range to use it
- Surge can move only metallic elements
- The movement path must be unobstructed
- After grabbing an object, Surge can move it any distance inside the range around Surge
- If players hold down the skill's button, the object will be stuck in the final location for as long as the button is held down

- After releasing the ability button, the object that was moved will again be subject to gravity.



Energy Beam

A concentrated beam of electrical energy that can be directed at distant objects.

Verbs:

- Charge
- Distant

Signifiers:

- Power is on
- Power is hitting right spot
- Power is hitting wrong spot
- Power is off

Rules:

- Surge can activate distant objects with the Energy Beam.
- Surge can use its Energy Beam ability on Energy Receptors to power up a third element connected to it.
- The Energy Beam needs to make a clear, linear path to the receiver to work.
  - Energy Beam can be reflected on reflective panels.

Quantum Entanglement

Allows Surge to charge the magnetic field of ferromagnetic objects.

Verbs:

- Charge
- Move
- Control

Signifiers:

- Power is on
- Object is under power effect
- Object is not more under power effect
- Power is off

Rules:

- Surge can use his Electric Attraction ability to influence magnetic objects.
- Magnetic objects under the influence of Electric Attraction will mirror Surge's movement.
- If a magnetic object under the influence of Electric Attraction touches another magnetic object, that third object is also under the influence of Surge's ability.
- If the magnetic object is blocked by an obstacle (such as walls or the end of the grid), it will not follow Surge's movements.

Data

Data is a cyborg that can hack and remotely control machines that are turned on. She can carry Surge with her and take him from circuit to circuit.

Verbs:

- Strong
- Direct
- Machine

Signifiers:

- Mechanical and strong character
- Leaves in the “real” world

Rules:

- Can place Surge on activated Electric Poles.
- It can interact with switches, circuit breakers and machines with power.
- Can pass through Discharging Fields.
- Has four button keys to set her interactions direction.
- When spotted by a sentinel, the sentinel generates an output signal.
- Doesn't fall off the level.
- Doesn't die.

Carry and place Surge

Data can carry Surge on her battery and place him in Electric Poles locations.

Verbs:

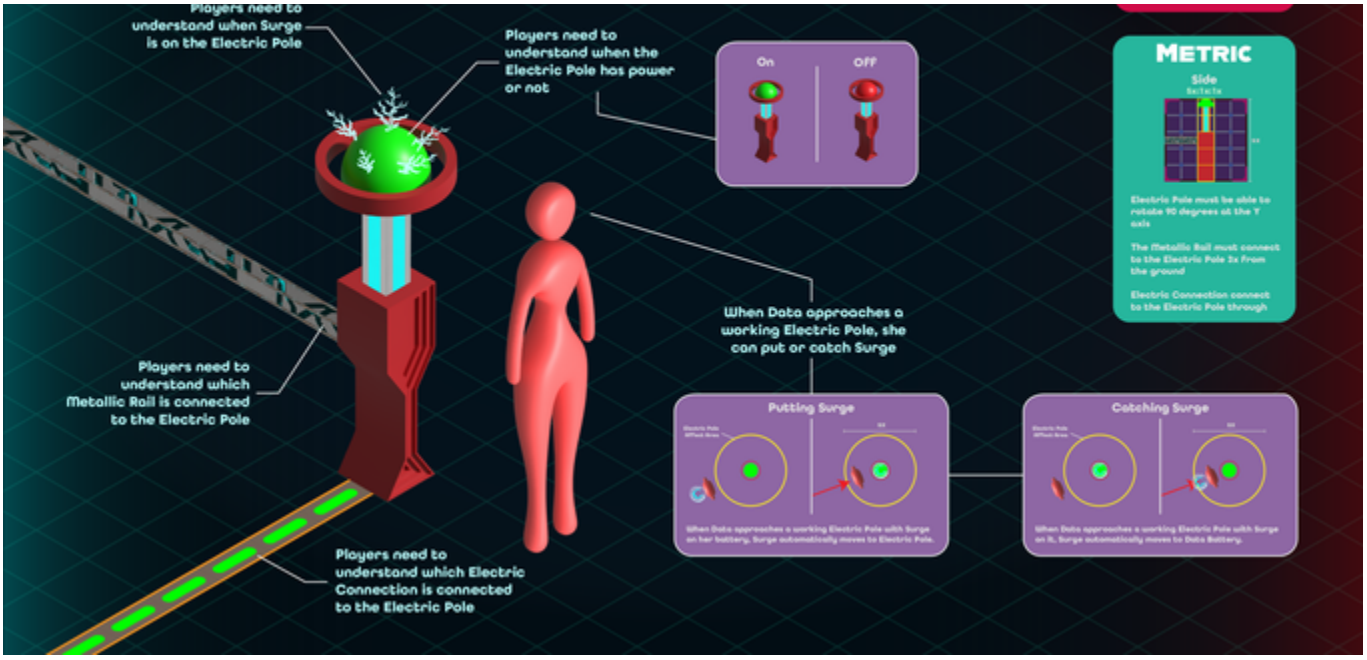
- Move
- Place

Signifiers:

- Surge is with Data
- Surge can be placed
- Surge is placed
- Surge can be grabbed
- Surge isn’t with Data
- Surge is grabbed

Rules:

- Data can place Surge on Electric Poles that are unlocked.
- Data can get Surge from Electric Poles when he is inside them.
- If Data passes through a Discharging Field carrying Surge, he will be stuck in the Discharging Field until she passes through it again.
- If Surge is in a Charging Field, Data will collect him in her battery when passing through the Charging Field.



Interacting With Mechanisms

Data can interact with mechanisms to modify the level by moving them to different positions.

Verbs:

- Direct
- Control
- Brute Force

Signifiers:

- Power turns on
- Can’t be moved
- Can be moved
- Available directions
- Current power direction
- Power turns off

Rules:

- If the player is controlling Surge, but Data is within range of a mechanism, they can use Data's interaction keys to move the mechanism to the desired position.

Machine Possession

Data can use this ability to connect to machines remotely

Verbs:

- Remote
- Control
- Move

Rules:

- Data needs to have a direct and clean view of the machines to be able to own them.
- The machines are moved with the Data interaction buttons.
- Data can only possess machines that are powered up.
- Data can control powered machines and move them according to the limitations of each machine.
- If Data is connected to a machine, players can use Data's interaction keys to move the machines even when controlling Surge.

Game Core loop

The game's core loop is owned by the player, who is responsible for running the process.

1. The player must select one among the puzzles he has available
2. Use both characters to interact with elements of the puzzle to solve it
   and after solving
3. Select another puzzle to continue the loop

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Gameplay Elements

- Environment Elements
  - Electric Pole
  - Electric Panel
  - Charging Field
  - Discharging Field
  - Electric Connections
  - Electric Gates
- Data's Elements
  - Reflector
  - Mechanical Piston
  - Blocking Field
  - Generator
  - Mechanical Bridge
  - Switch
  - Circuit Breaker
  - Servo Tractor
  - Mechanical Arm
  - Hanging Bar
  - Power Socket
- Surge's Elements
  - Electric Grid
  - Arc Ladder
  - Capacitor
  - Metallic Rail
  - Rail Inductor
  - Ferromagnetic Object
  - Metallic Object
  - Energy Receptor
- Enemies
  - Electric Spider
  - Sentinel

Environment Elements

Electric Pole

Electric Poles are the elements that allow the Surge connection between Data's battery and the electrical circuits.

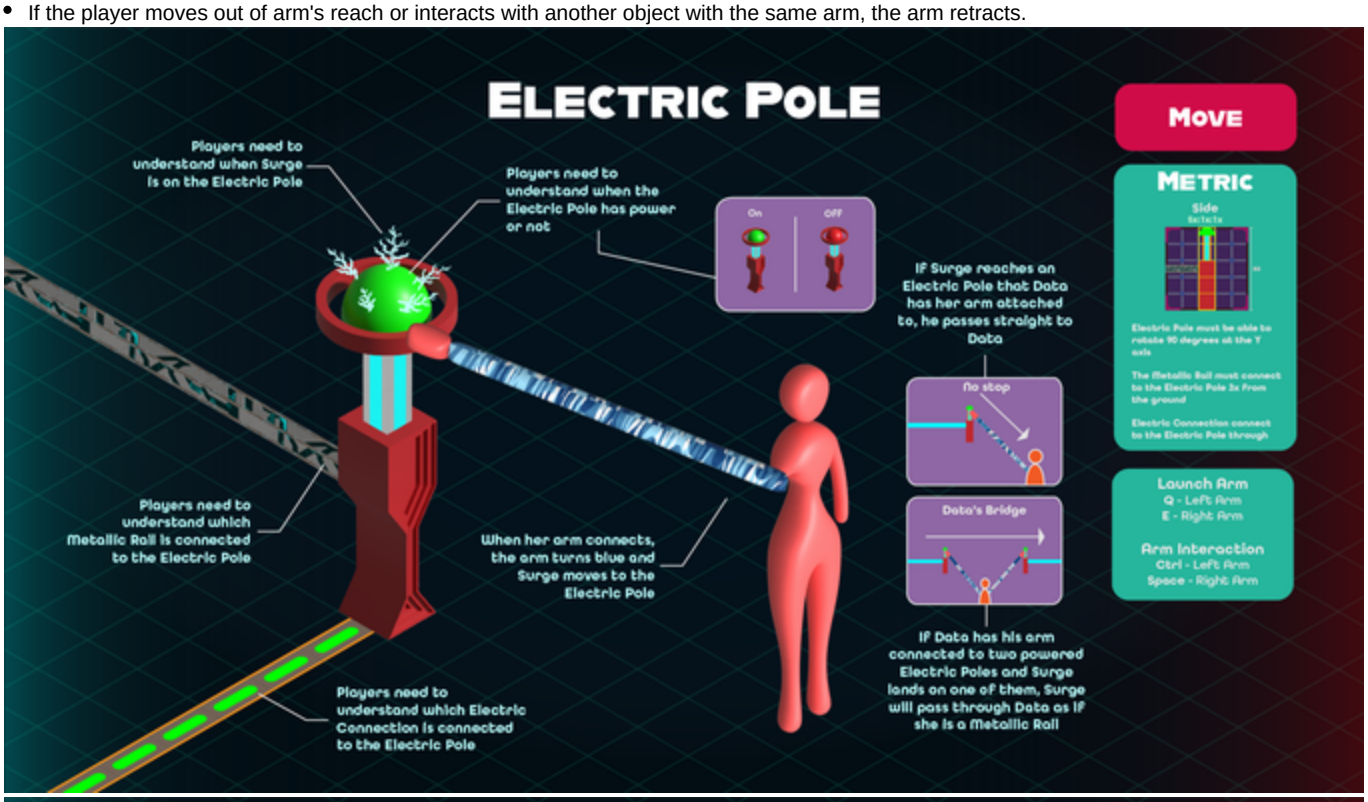
Verbs:

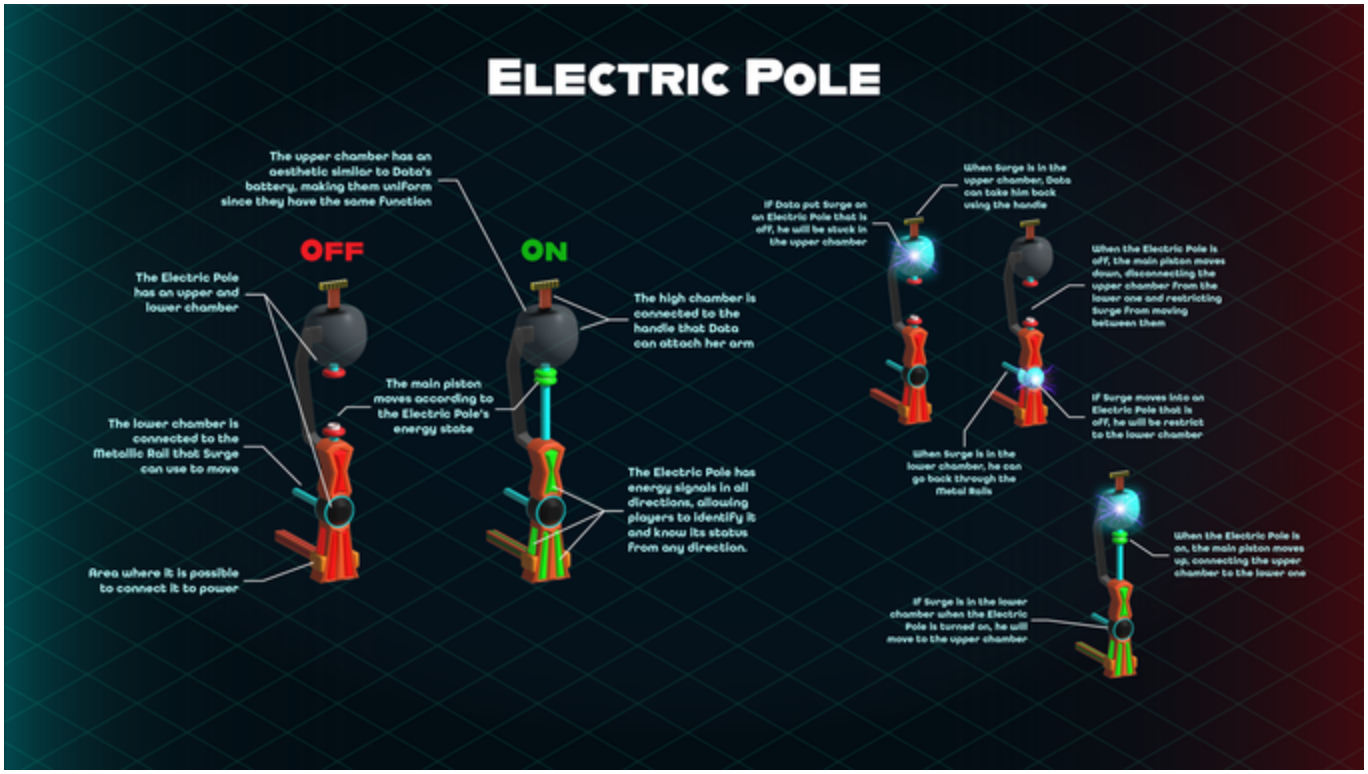
- **Reunite** the characters
- **Separate** the characters
- **Release** Surge
- **Grab** Surge

Rules:

- The Electric Pole have two chambers, an upper and a lower.
  - The Electric Pole must be on for Surge to be able to move between the two chambers.
- Data can place and collect Surge from the Electric Pole's upper chamber whether it is turned on or not.
- Surge can travel to the lower chamber of an Electric Pole, whether powered up or not.
- The player needs to look to throw the arm (by pressing the key)
  - The arm depends on the pressed key.
- When her arm connects, the arm turns blue, and Surge moves to the Electric Pole.

- If Surge hits an Electric Pole that Data has his arm attached to, he passes straight to Data.
- If Data has his arm connected to two Electric Poles and Surge lands on one of them, Surge will pass through Data as if she were a metal rail.
- With the arm attached, the player can look around and walk - within arm's reach - without releasing the Electric Pole.
- When players press the button on the connected arm, the arm retracts back towards Data.
- If the player moves out of arm's reach or interacts with another object with the same arm, the arm retracts.





Electric Panel

These are the endpoints for the levels.
What they are is not so important from a mechanical point of view, as they simply form the landmark in the puzzle to indicate where the player needs to go to finish the puzzle.
It is important that they are distinct from the rest of the scene and are easily visible when starting the puzzle.

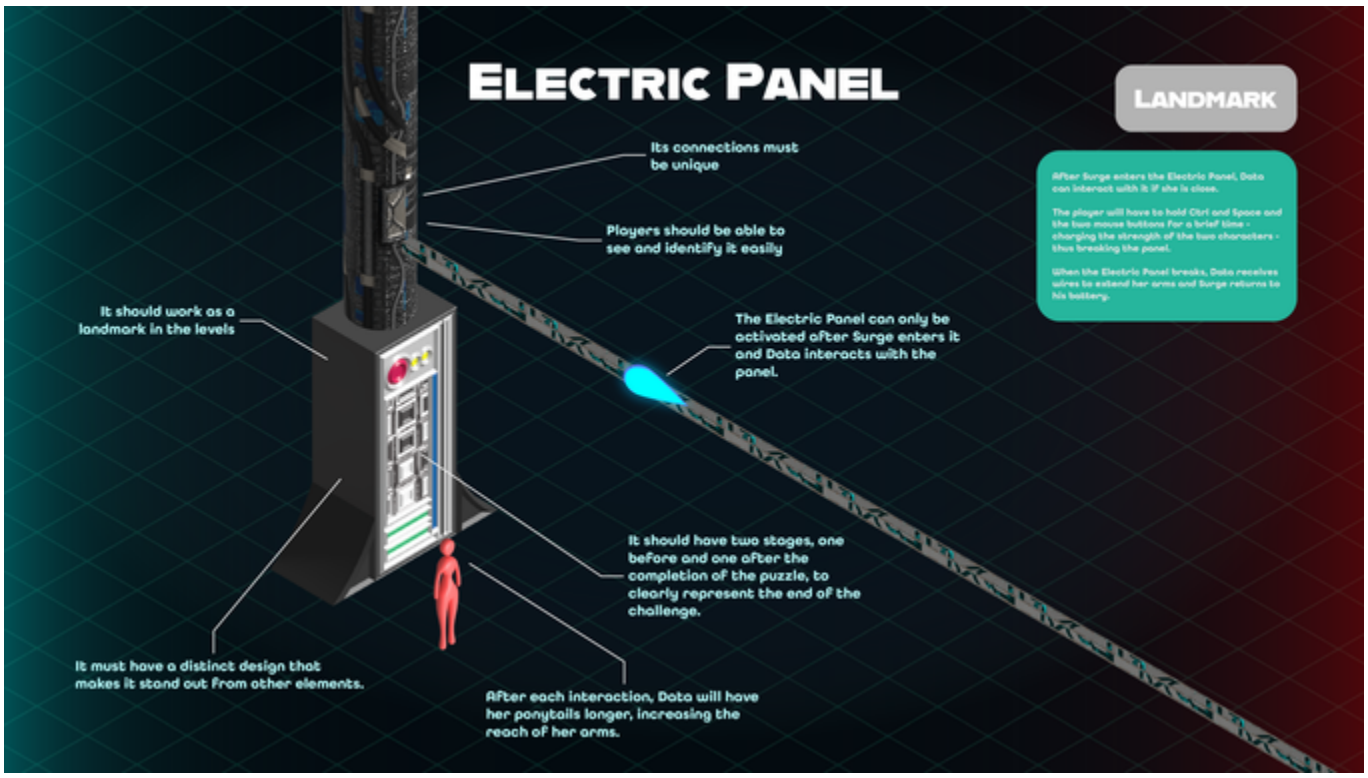
Verbs:

- **Finish** the puzzle
- **Define** a landmark
- **Indicates** the end of the puzzle

Rules:

- Players need to have Surge and Data together to activate the Terminal.
- They must be easily identified at the beginning of the puzzle.
- Terminals are automatically activated when the two characters approach

> **Opportunity for a new mechanic:**
>
> - *To turn a Computer Terminal on, Data and Surge needs to work together to solve a mini game involving both characters at the Computer Terminal.*



Charging Field

Electric fields that are unlocked when Surge is in them.

Verbs:

- **Blocks** Date from passing without Surge
- **Reunite** the characters

Rules:

- Only Data can move between them.
- Its default state acts as a blocking wall, preventing the passage of Data.
- If Surge uses a wire and moves into a Charging Field, the Charging Field will no longer block the passage and Data will be able to cross it.
- When passing through the Charging Field, Data pulls Surge into her battery, and the Charging Field reverts to its default state.

Discharging Field

De-energizing fields that suck Surge when Data passes through them.

Verbs:

- **Blocks** Data from passing along with Surge

Rules:

- Only the Data can pass through them.
- If Data is carrying Surge on her battery, he is sucked into the Discharging Field when she passes.
- When Data crosses this Discharging Field again, if Surge still on it, Surge will return to her battery.
- If the Discharging Field is connected to an electrical network, Surge will be able to move out using the wires.
- If Data is not with Surge when passing through the Discharging Field, nothing happens.

Electric Connections

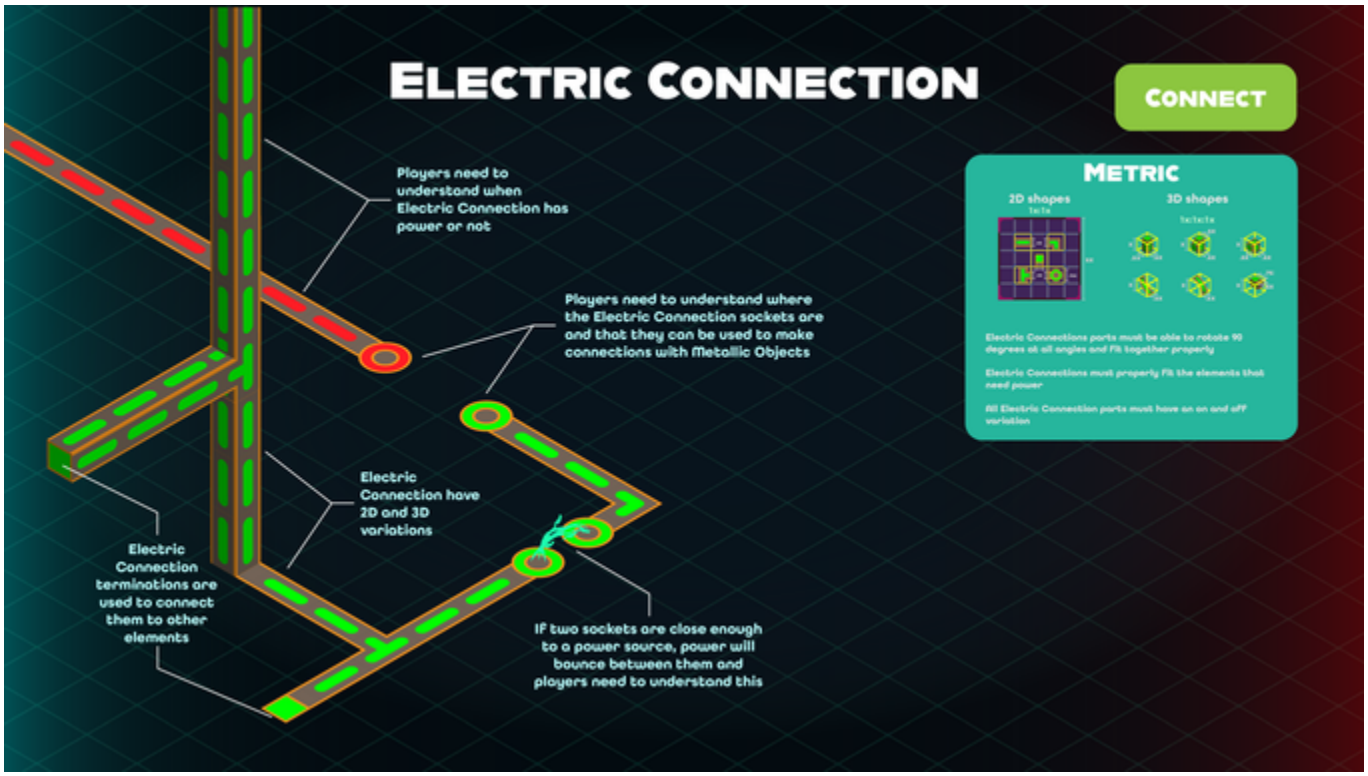
Used to indicate the link between one element and another

Verbs:

- **Indicates** the path of electric current
- **Indicates** the connection between elements

Rules:

- Make a clear and direct link between the elements.
- Change colour or shape if turned on or off.
- Disconnected paths can be connected using any Metallic Object
- Servo Tractors can move blocks that contain them.



Electric Gates

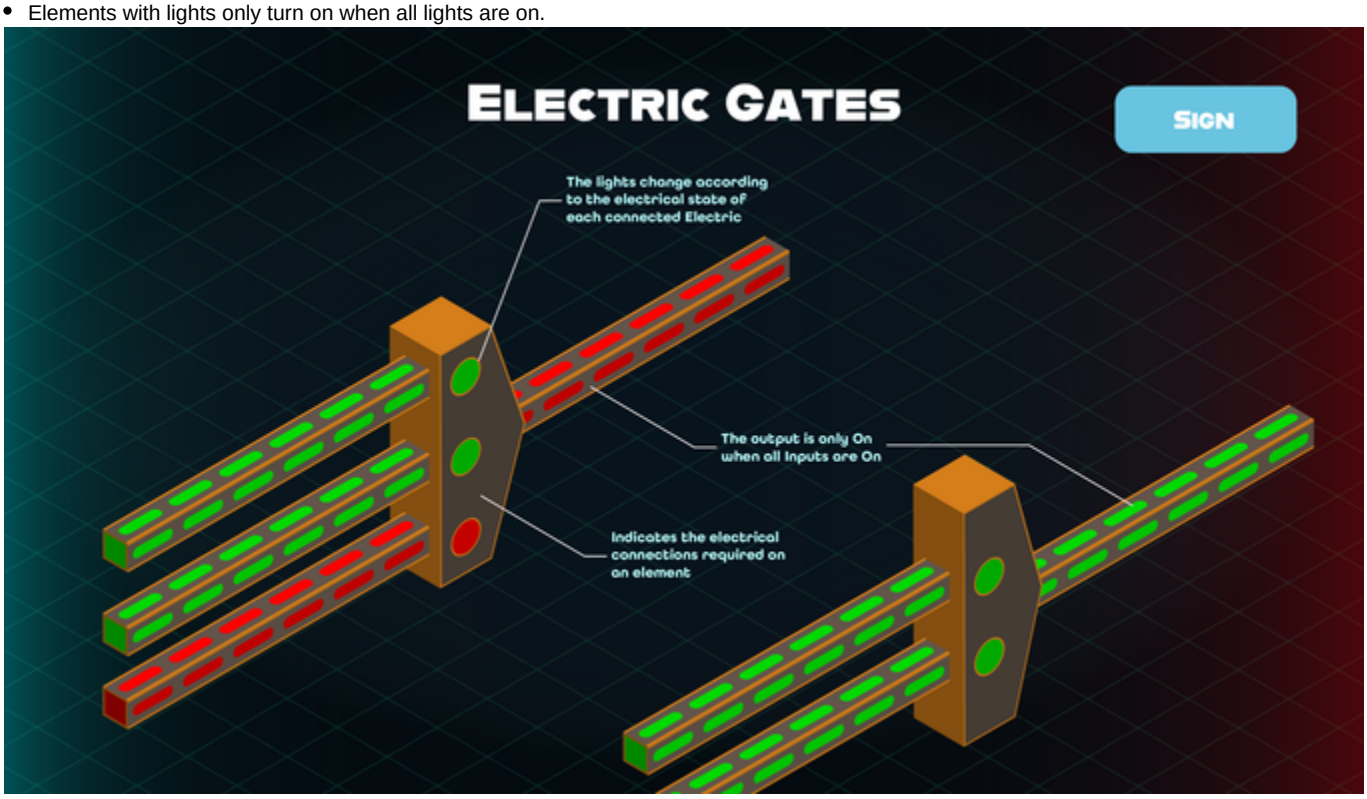
Used to indicate to the player the energy state of some elements.

Verbs:

- **Indicates** the electrical connections required on an element
- **Indicates** the powered electrical connection of an element

Rules:

- They change to on or off to indicate whether they are receiving power or not.
- Elements may have more than one light connected to them, indicating that the element in question needs more than one source of power to function.
- Elements with lights only turn on when all lights are on.



Data's Elements

Reflector

Reflective surfaces that can deflect Electric Beam from Surge.

Verbs:

- **Blocks** the passage of Electric Connections

Rules:

- They reflect the Electric Beam in an angular way referring to the incident angle of the Electric Beam on its surface.
- Can be moved by Servo Tractors.

Mechanical Piston

Platforms that move the moment they are turned on or off.

Verbs:

- **Blocks** part of Data's scenario
- **Move** Data from point A to B

Rules:

- Electric pistons move from point A to point B when they change their power state.
  - They need to have their electrical state altered to change their position.
- Interactions with the Electric Pistons can be done by Data or Surge, depending only on the puzzle construction.
- Electric Pistons have **two variations** (Expansion and Contraction), where one contracts when receiving energy and the other expands when receiving power.
  - Electric pistons can contract or expand when turned on or off, depending on their variation.
  - **Expansion** Electric Pistons will contract when turned off and will expand when turned on.
  - **Contraction** Electric Pistons will expand when turned off and will contract when turned on.
- When an Electric Piston moves, it can move Data and other elements from point A to B.
  - Another Electric Piston interaction is needed to move Data or other elements back from point B to A.
- Electric Pistons can move objects such as Metallic Objects, Grid Plates, Reflectors, Catwalks, Blocks with Electric Paths, Sentinels, Servo Tractors, Electric Bridges, or other Electric Pistons.
- When an Electric Piston receives power, it does not transmit the power to whatever is in it.
- If an Electric Piston has a catwalk attached to its piston, it can create paths between two points when the catwalk is positioned in the correct position.
- e.g. an Expansion Electric Piston that expands upwards with a catwalk attached to its piston. Above the Electric Piston are two segments of unconnected catwalks. When the Electric Piston expands, its piston moves up with the catwalk (from point A to B), positioning the catwalk between the two upper segments mentioned before, now functioning as a bridge connecting the two sides.

Blocking Field

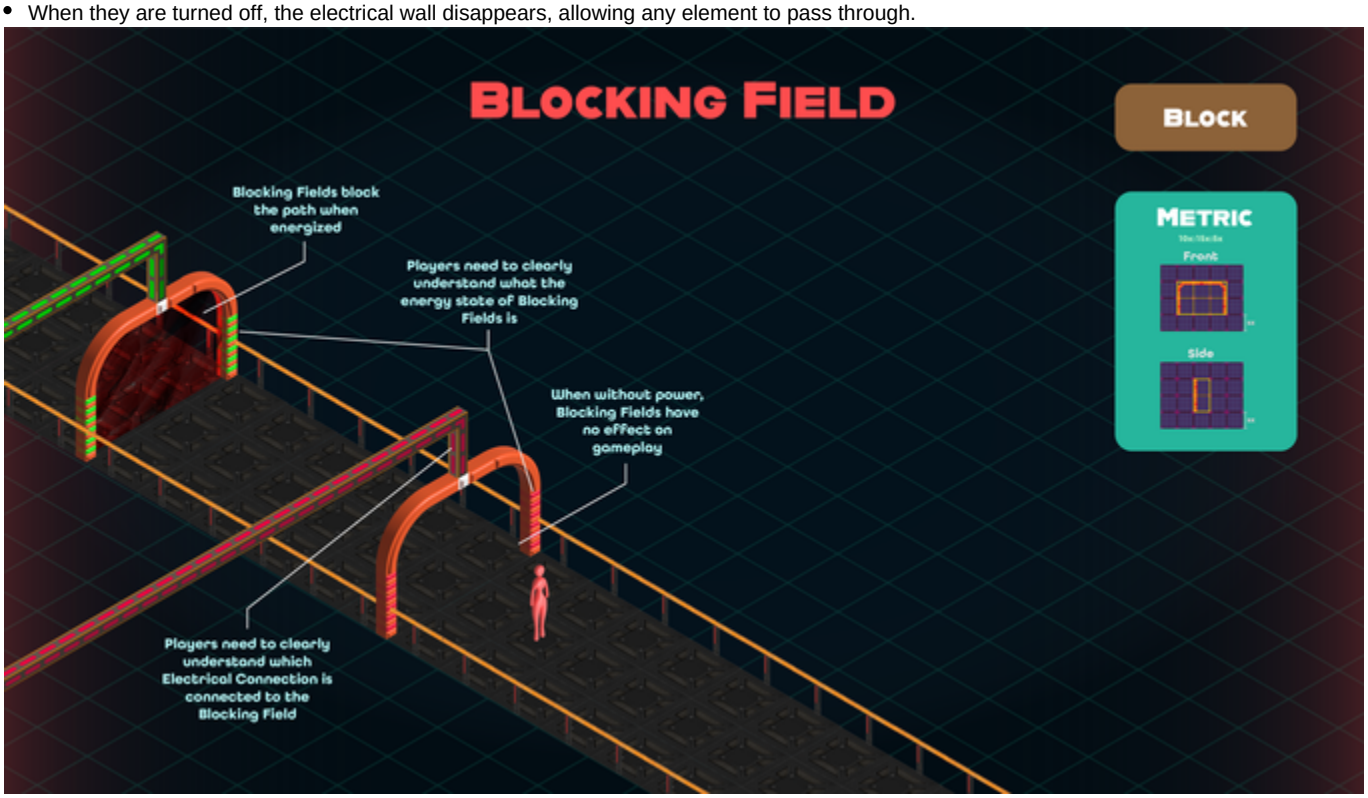
Electric fields that block the passage of any element

Verbs:

- **Blocks** part of Data's scenario when charged

Rules:

- When energized, they create electrical walls that block the passage of Data or any element.
- When they are turned off, the electrical wall disappears, allowing any element to pass through.



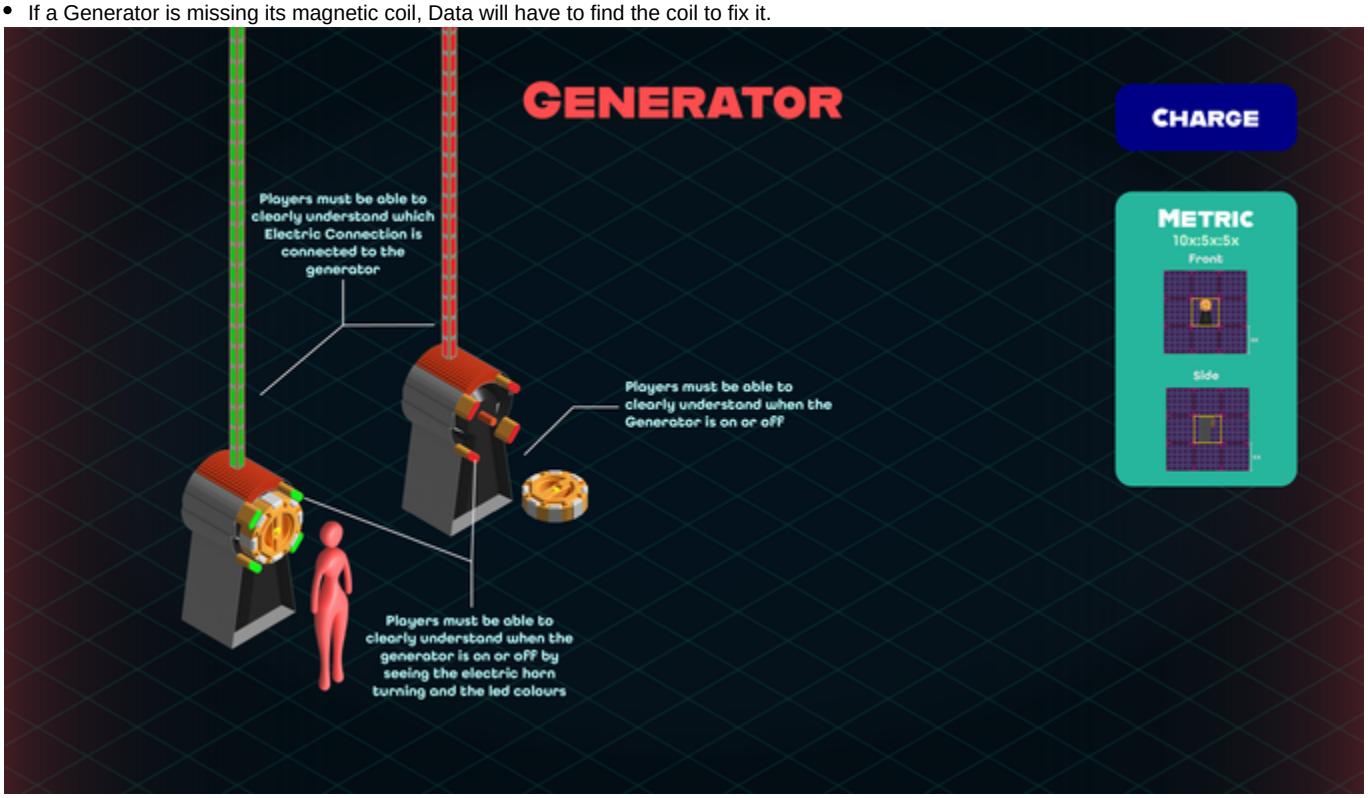
Generator

Data can activate them to generate a continuous and independent source of energy.

- **Generates** energy when Data start it
- **Turns off** when Data stops it
- Data sometime needs to **Move** the Generator Coil back to it to make it work

Rules:

- When the generator is stopped, Data needs to press the space bar to start it.
- When the generator is running, Data needs to press the L Ctrl key to stop it.
- The Generator independently generates power when turned on, requiring no extra Data or Surge interactions.
- If a Generator is missing its magnetic coil, Data will have to find the coil to fix it.



Mechanical Bridge

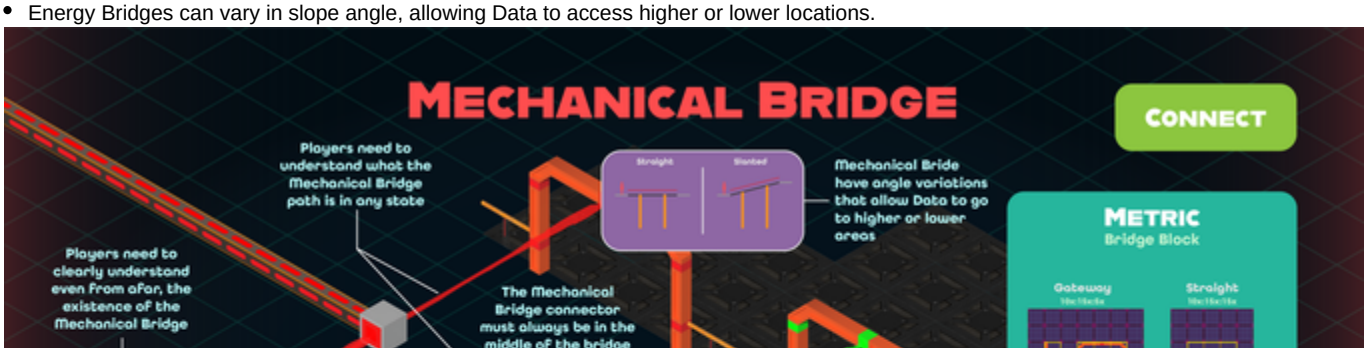
Projection platforms that create paths between points A and B.

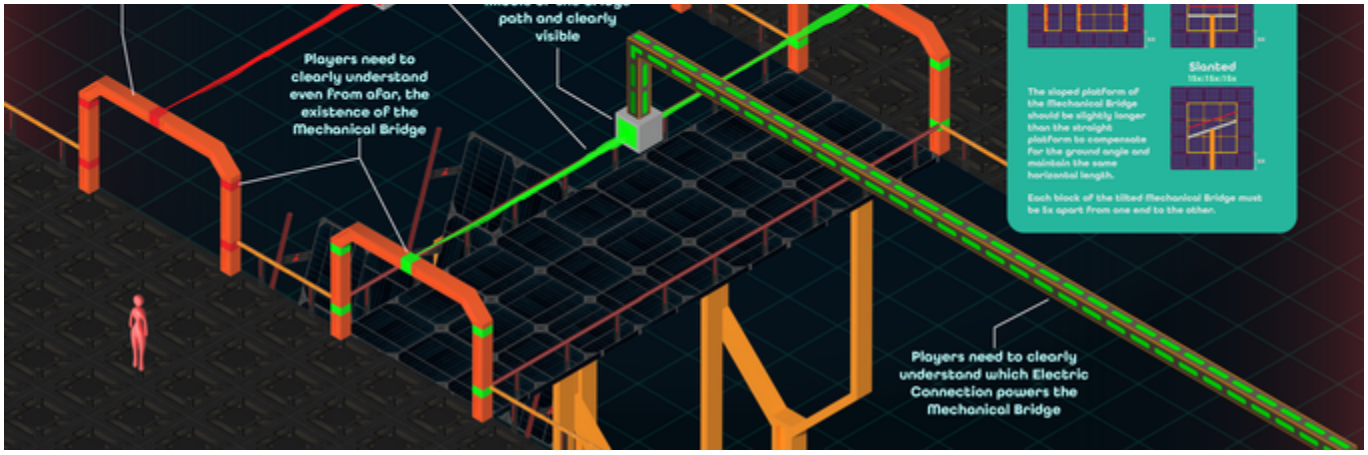
Verbs:

- **Blocks** part of Data's scenario
- **Connect** point A to B in the Data scenario

Rules:

- Energy Bridges need to be on to work.
- When an Energy Bridge is on, it creates a permanent vertical path/barrier between points A and B until it is turned off.
- Energy Bridges can be powered by either Data or Surge, depending only on the puzzle design intention.
- Data can use Energy Bridges to move between points A and B.
- Energy Bridges can vary in slope angle, allowing Data to access higher or lower locations.





Switch

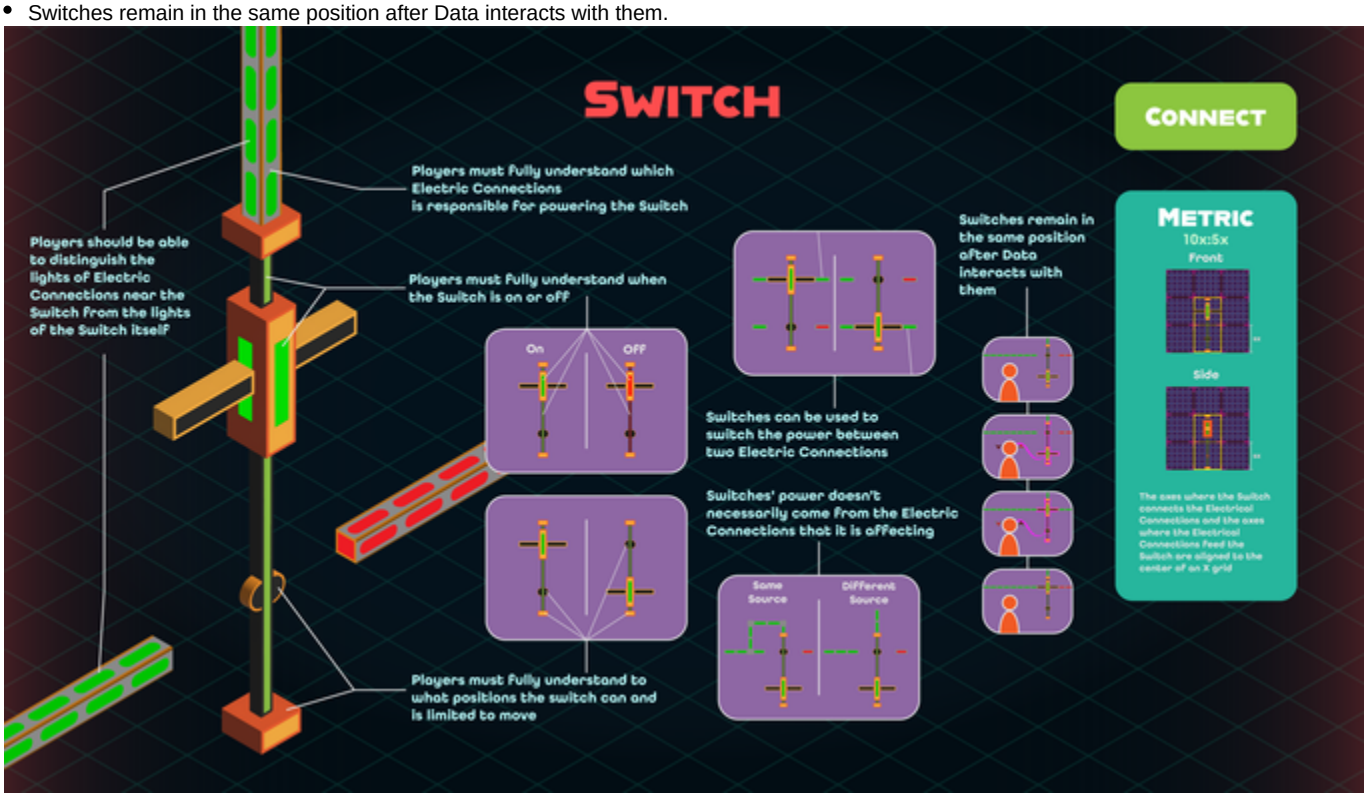
Switches change the state of the elements connected to them according to their position.

Verbs:

- **Connect** two Electric Connections
- **Disconnect** two Electric Connections

Rules:

- Data can interact with them.
- Switches need to be powered to work
  - Switches' power doesn't necessarily come from the Electric Connections that it is affecting
- Switches can be used to turn elements on or off if they are receiving power.
- Switches can be used to switch the power between two Electric Connections.
- Switches remain in the same position after Data interacts with them.



Circuit Breaker

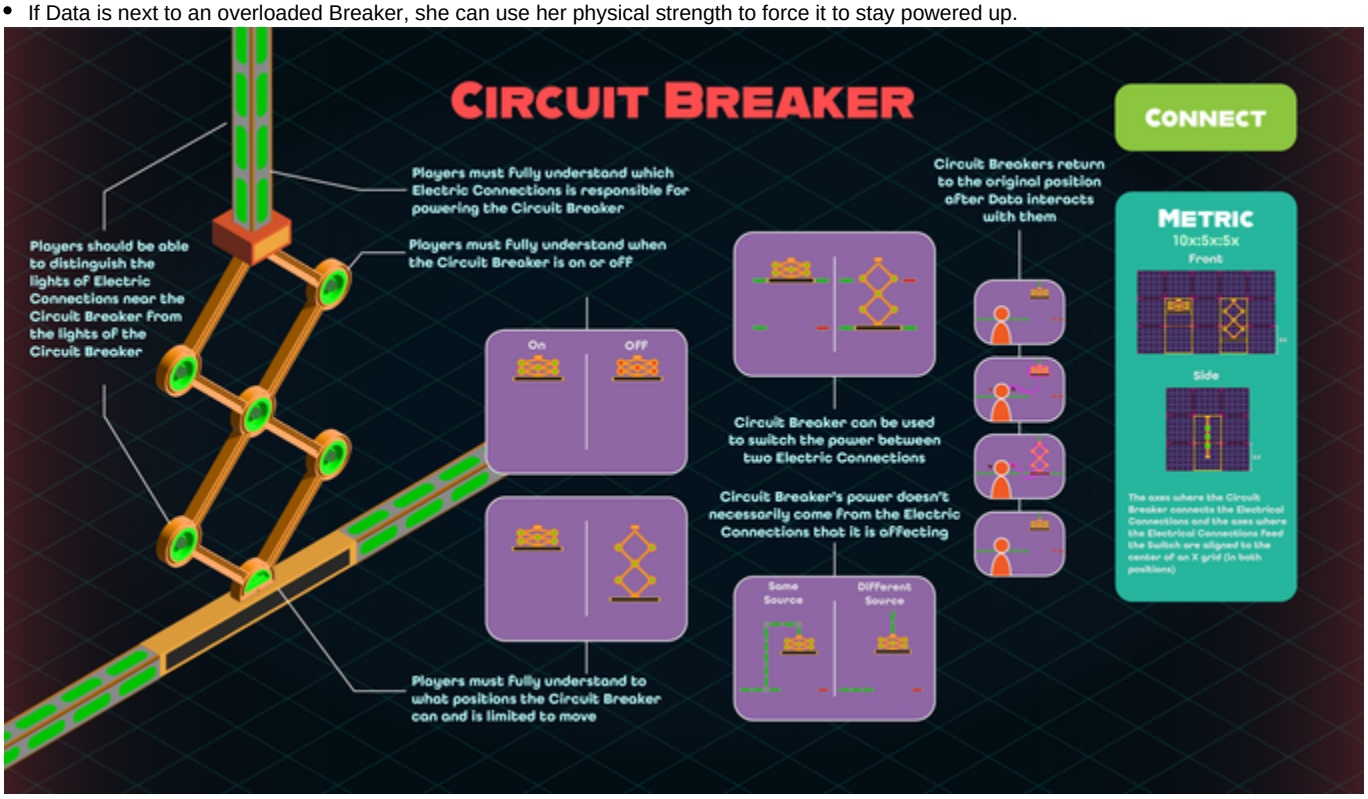
Circuit breakers can be turned on or off and automatically turn off if overloaded.

Verbs:

- **Blocks** the passage of Electric Connections
- **Shutdown** when overloaded
- Data can **force it** to keep on

Rules:

- Data can interact with them.
- Circuit breakers can be used to turn elements on or off if they are receiving power.
- Circuit breakers stay in the same position after Data interacts with them, unless they are overloaded.
- If a Circuit Breaker is overloaded, it automatically shuts off.
- Circuit breakers can have different capacities and their state of charge is indicated by a power bar on them.
- If Data is next to an overloaded Breaker, she can use her physical strength to force it to stay powered up.



Servo Tractor

Electric motors lights that Data can control and move when they are powered on.

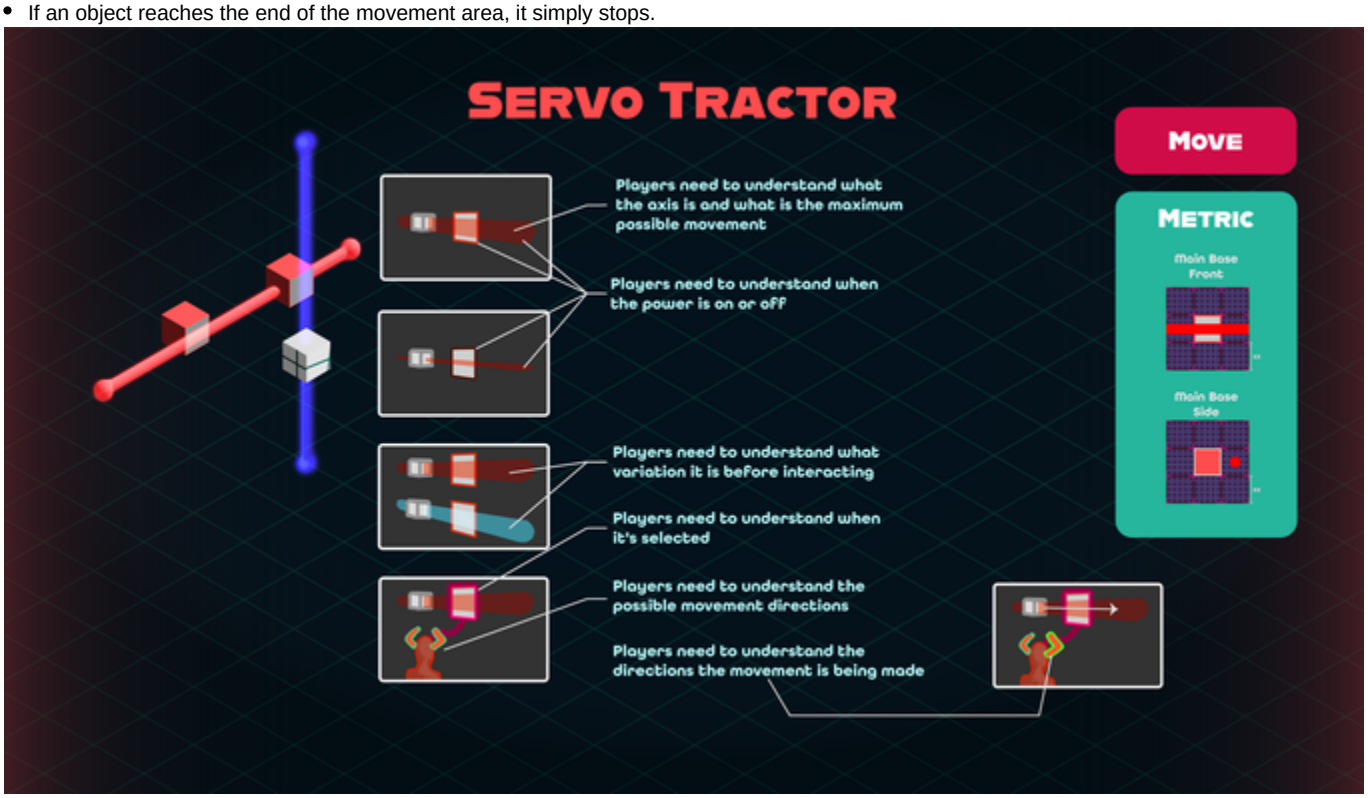
Verbs:

- **Move** large objects around the scene
- **Rotate** large objects around scenery
- **Establishes** connections between Electrical Connections
- **Create paths** to Surge when moving Electric Grids

Rules:

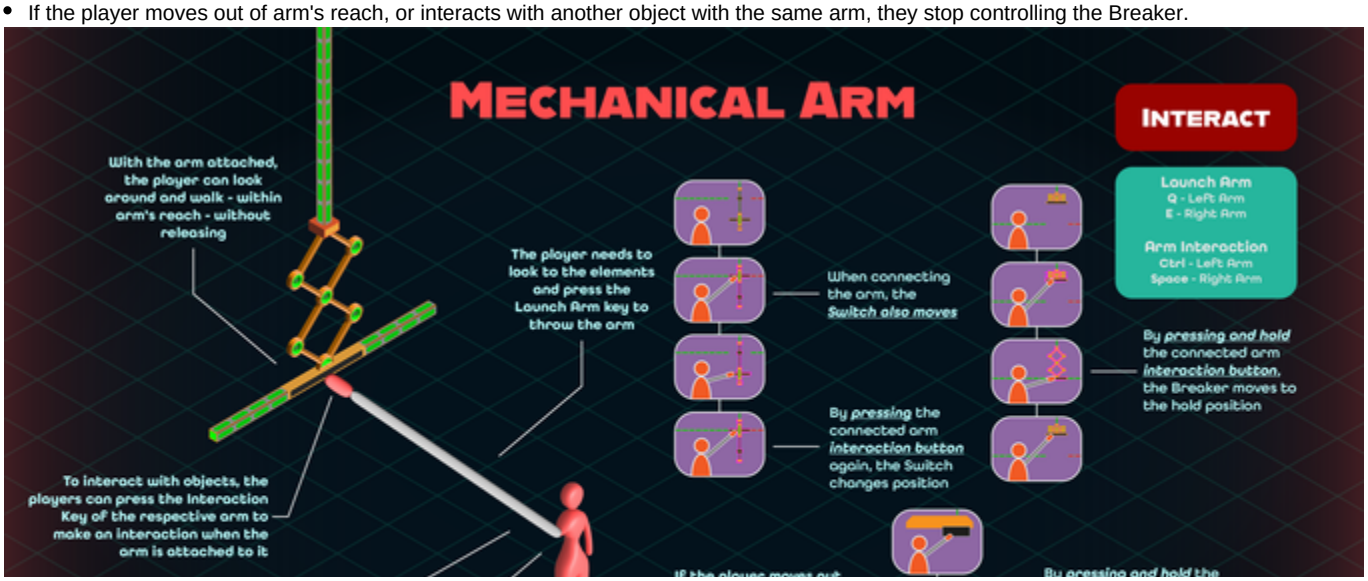
- Data can only be connected to one Servo Tractor at a time
- Can move in both directions of a single axis or perform rotations instead of axis movements.
  - Servo Tractors that make rotations have their rotation limited to 90-degree movements
- They can be interconnected, where one Servo Tractor moves another Servo Tractor.
- If a Servo Tractor is turned on, all elements connected to it are turned on together.
- Servo Tractor **can be powered by either Data or Surge**, depending only on the puzzle design intention.
- Servo Tractors have **two variants**, which vary the way they behave when not receiving interactions from Data.

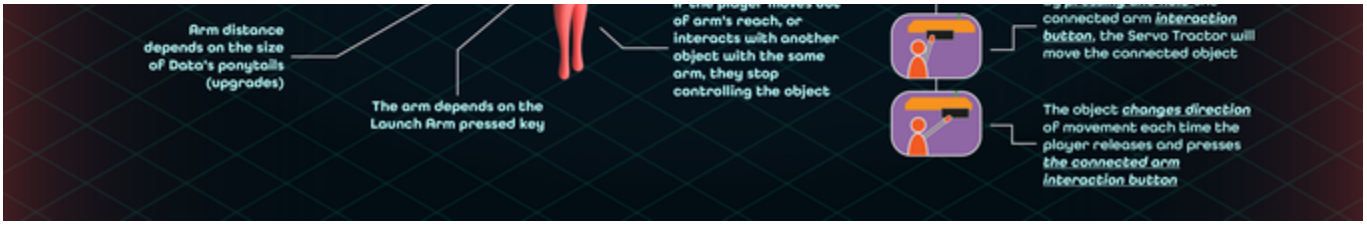
- **Passive Servo Tractors** maintain their positioning in the final position when Data stops interacting with them. Always needing Data's interactions to move.
- **Active Servo Tractors** return to their initial position prior to the movements made by Data. Requiring Data's interactions only for the initial move, but autonomously moving back to its source state after Data's interaction ends.
- Servo Tractors can move objects such as Metallic Objects, Grid Plates, Reflectors, Catwalks, Blocks with Electric Paths, Sentinels, Servo Tractors, Electric Bridges, or other Electric Pistons.
- If two Servo Tractors have their drive axes aligned, the object they are moving can be moved between the axis of one Servo Tractor to the axis of the other Servo Tractor.
- If a Servo Tractor has two objects in its movement area, the objects move equally.
- If an object reaches the end of the movement area, it simply stops.



Mechanical Arm

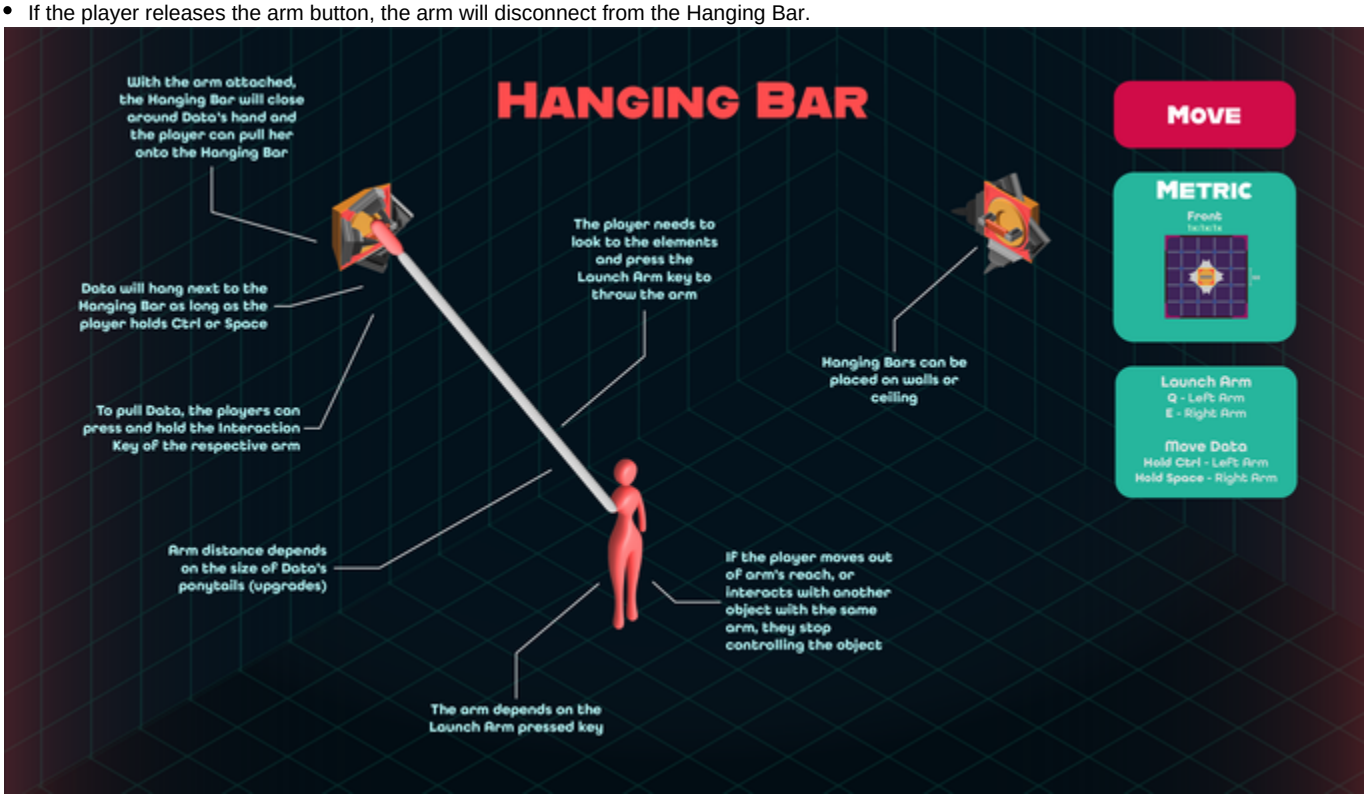
- The player needs to look to throw the arm (by press the key)
  - The arm depends on the pressed key.
  - Arm distance depends on the size of Data's ponytails (upgrades)
- With the arm attached, the player can look around and walk - within arm's reach - without releasing the Breaker.
- By **pressing and hold** the connected arm button, the Breaker moves to the hold position.
- If the player moves out of arm's reach, or interacts with another object with the same arm, they stop controlling the Breaker.





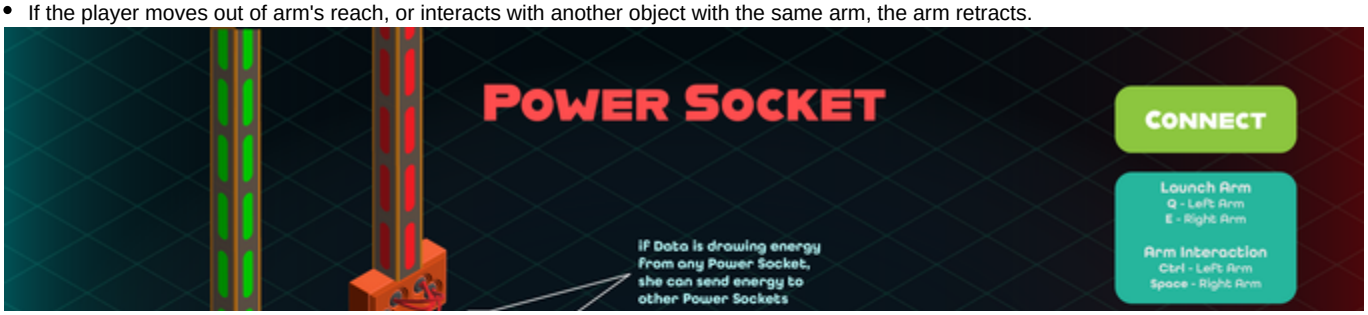
Hanging Bar

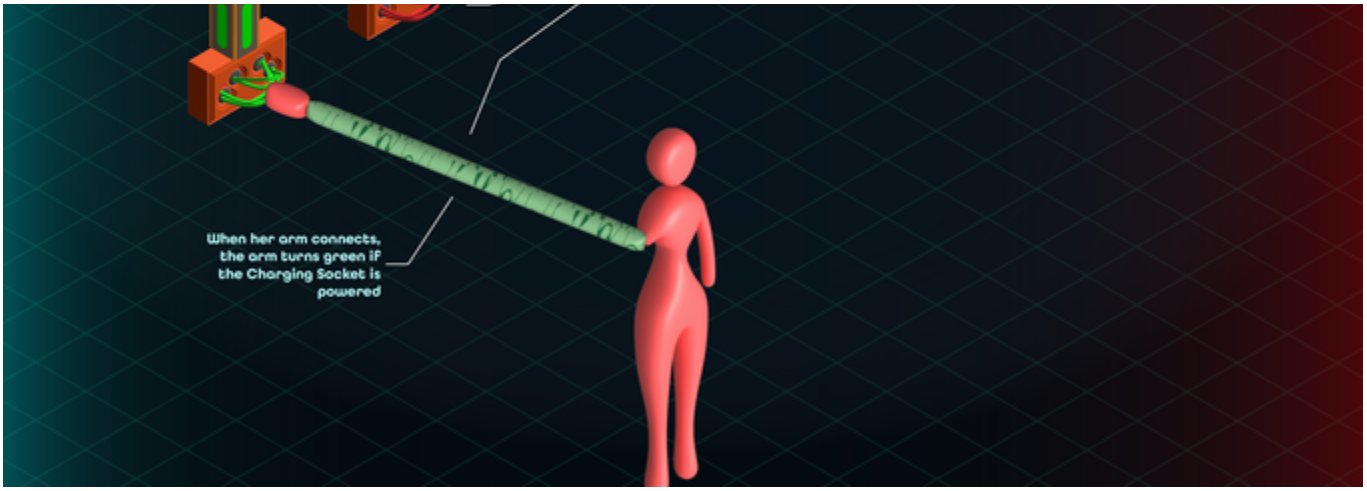
- The player needs to look to throw the arm (by press the key)
  - The arm depends on the pressed key.
  - Arm distance depends on the size of Data's ponytails (upgrades)
- The player must **keep holding the button** pressed to keep the arm attached.
- With the arm attached, the player can look around and throw the other arm - without the need to releasing the Hanging Bar.
- If the player releases the arm button, the arm will disconnect from the Hanging Bar.



Power Socket

- The player needs to look to throw the arm (by press the key)
  - The arm depends on the pressed key.
  - Arm distance depends on the size of Data's ponytails (upgrades)
- When her arm connects, the arm turns green **if the Charging Socket is powered**.
- With the arm attached, the player can look around and walk - within arm's reach - without releasing the Charging Socket.
- By **pressing** the connected arm button, the arm retract back to Data.
- If the player moves out of arm's reach, or interacts with another object with the same arm, the arm retracts.





Surge's Elements

Electric Grid

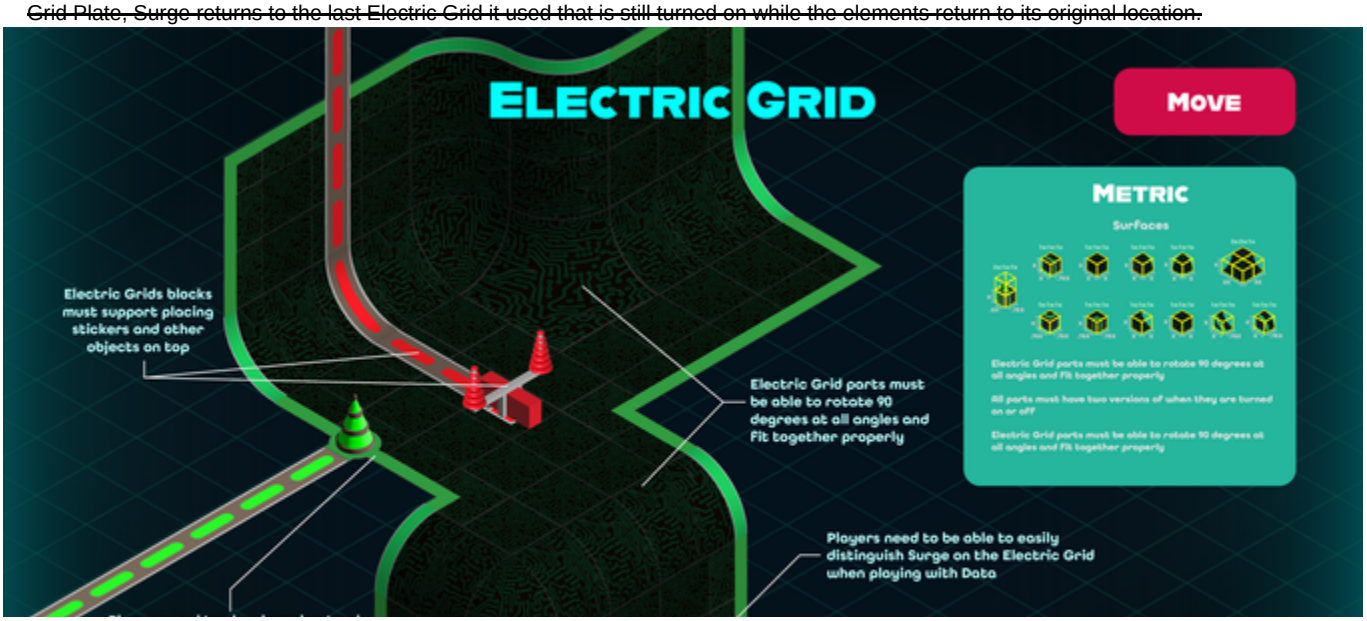
Electrical surfaces that Surge can walk on.

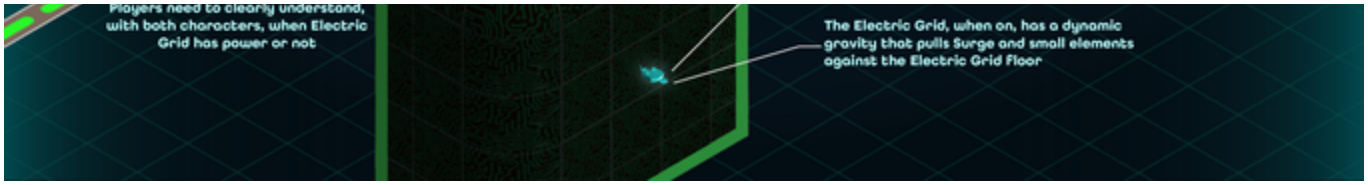
Verbs:

- Surge can **move** on it when powered
- **Keeps** elements that Surge can interact with
- **Blocks** part of Surge's scenario when discharged

Rules:

- When powered up, Surge can freely walk on them.
- They have a power point, which must be energized for the energy to spread across the surface.
- May contain Electric Connections that will be energized if connected to the power source.
- Can be moved by Servo Tractors.
- Surge and small elements have a dynamic gravity over them, which always pulls them against the Electric Grid floor, no matter the direction.
  - If an energized Electric Grid has more than one side (e.g., a cube) and they are connected, Surge will be able to walk freely on all sides, and its gravity will dynamically change, keeping it always with its feet connected to the plate.
  - In other words, if it's at the top of the cube, it can move to the bottom, where it's literally upside down.
- If an Electric Grid is disconnected with Surge on top, Surge reverts to the last used Inductor.
- ~~If Electric Grids are located in positions such as walls or ceilings, when turned off, objects on them will now be affected by normal gravity. Being able to land on Electric Grids that are located below them.~~
- ~~If the Surge or other elements start to fall due to an Electric Grid becoming unpowered and landing on a surface other than an electrocuted Grid Plate, Surge returns to the last Electric Grid it used that is still turned on while the elements return to its original location.~~





Arc Ladder

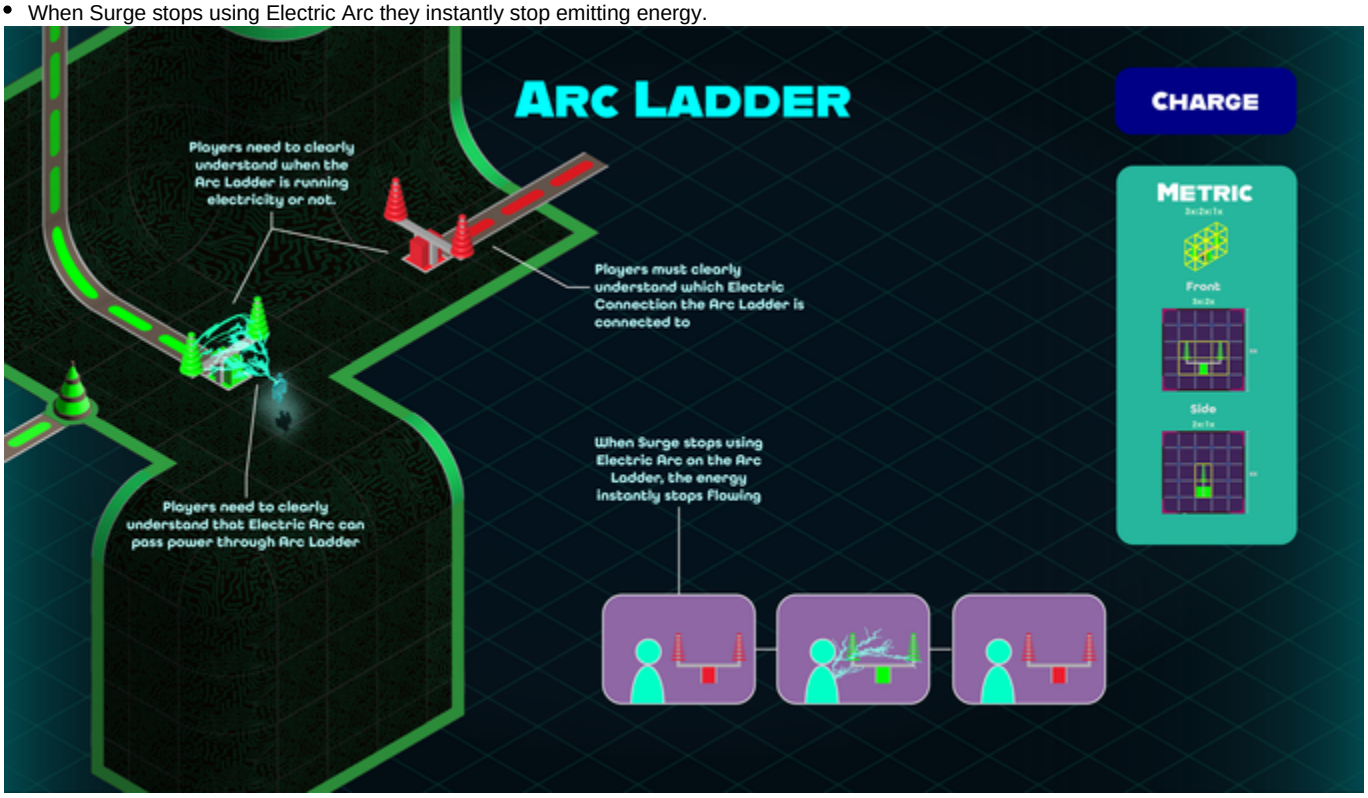
Small generators that emit energy through an Electrical Path when Surge uses Electric Arc on them.

Verbs:

- **Generates** energy when Surge is **charging** it
- **Turns off** when Surge stops charging it

Rules:

- They only work when Surge is using Electric Arc on them.
- When Surge stops using Electric Arc they instantly stop emitting energy.



Capacitor

Batteries that can be charged by Surge's Electric Arc and hold a charge for a short period of time.

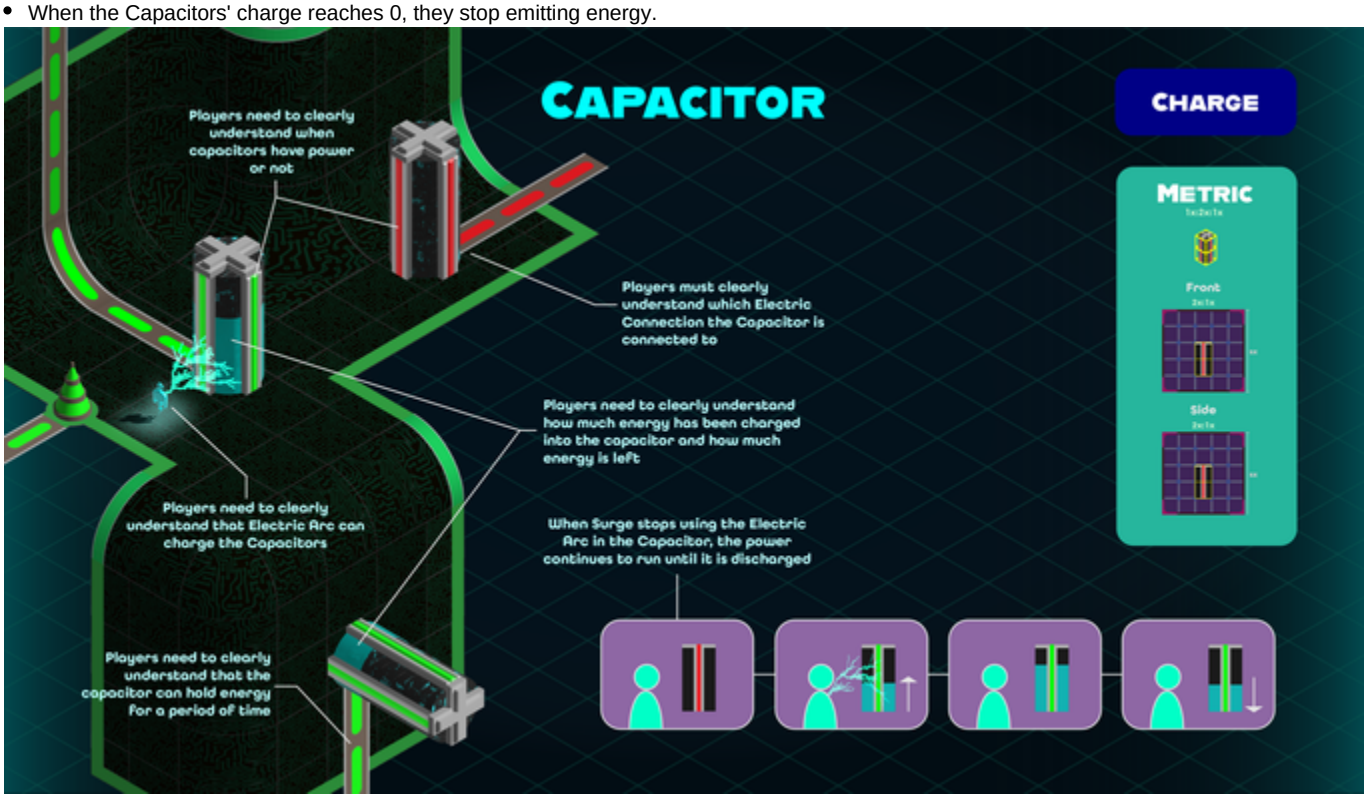
Verbs:

- **Generates** energy after Surge **charged** it
- **Turns off** after a while when Surge stops charging it

Rules:

- They need to be charged by Surge's Electric Arc to start emitting energy.
- After being fully charged, they maintain a maximum charge if Surge keeps using Electric Arc on them.
- From the moment the Capacitors' charge is greater than zero, they start to emit energy and turn on whatever is connected to them.
- When Surge stops using Electric Arc on them, the Capacitors' charge will begin to drop regardless of whether or not they are connected to something.

- When the Capacitors' charge reaches 0, they stop emitting energy.



Metallic Rail

Metal rails that Surge can use to slide from one location to another when electrocuted.

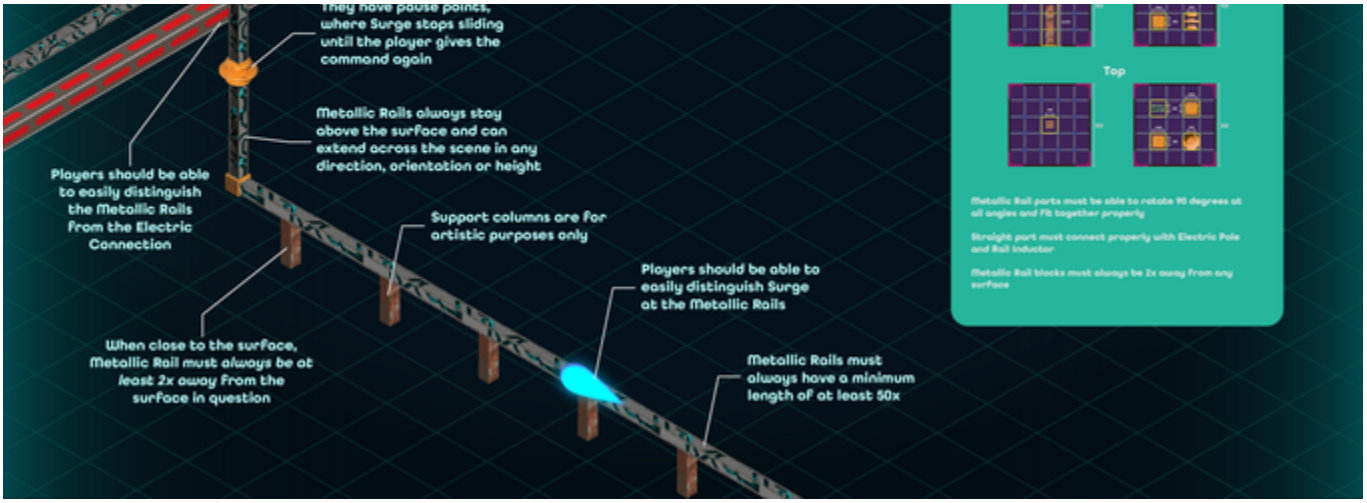
Verbs:

- **Move** Surge from one point to another

Rules:

> ⚠️ **Metallic Rails must always have a minimum length of at least 50x**

- They are used for moving **Surge** between **Electric Grids**
- The player can **move the camera freely** while **Surge** slides through them.
  - If the player leaves the **camera idle**, it will move **behind Surge**.
- Metallic Rails have **no power state** and are **always functional**.
- **Surge** can **access** the Metallic Rails via **Electric Pole** or **Rail Inductor**
  - When Data places **Surge** on the **Electric Pole**, he will automatically be sucked into the Metallic Rail but **will not start moving** until the player gives the command.
  - When **Surge** enters by the **Rail Inductor**, he will automatically be sucked into the Metallic Rail and **start to move immediately**.
- They have **forks** where Surge can **choose which way** to go.
  - When Surge reaches a fork, he stops, and the player can choose which way to go.
- They have **pause points**, where Surge **stops sliding** until the player gives the **command** again.
  - Players can use these points to move the camera and observe the puzzle.
  - Players can use these points to keep moving forward or return the way they came.



Rail Inductor

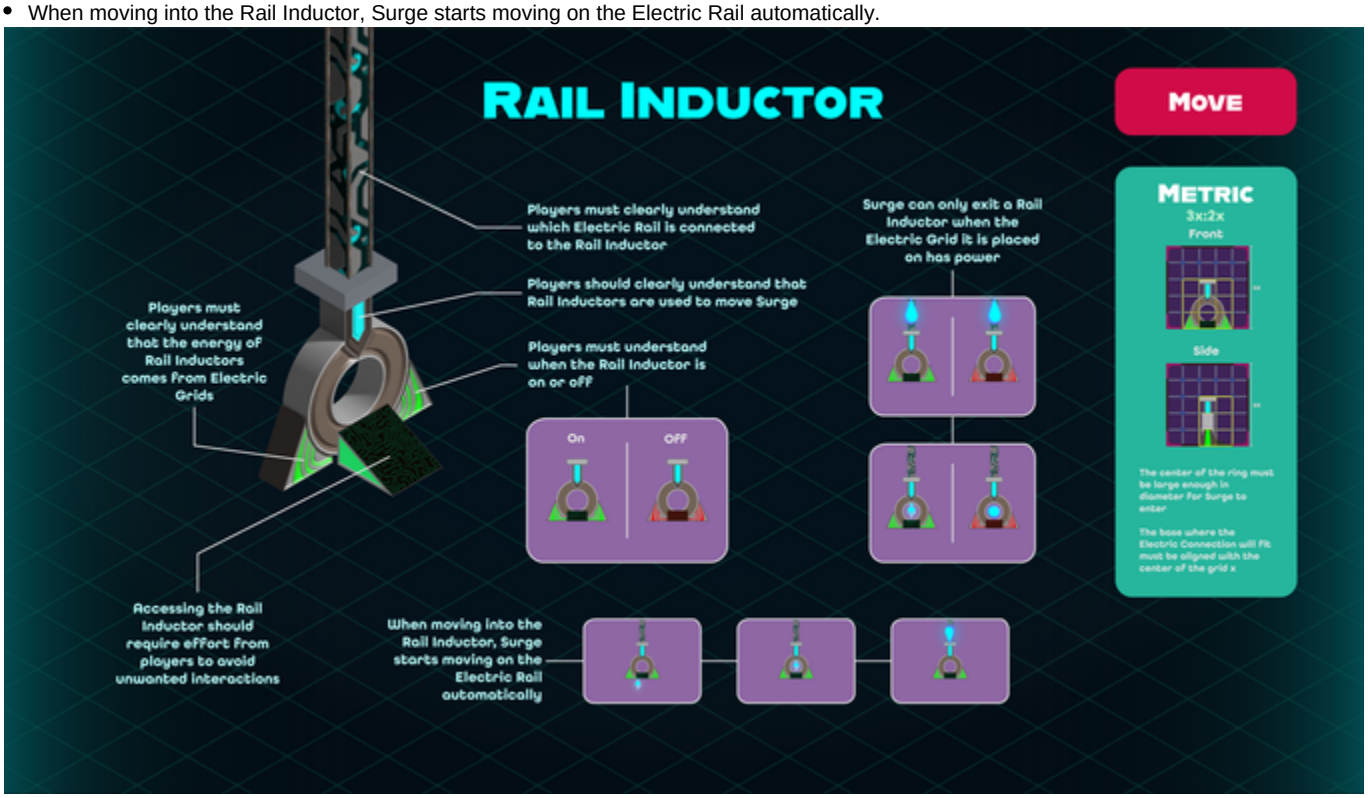
Rail Inductors are the elements that allow the Surge to enter or exit the Electric Rails

Verbs:

- **Move** Surge between the Electric Grid and the Electric Rail

Rules:

- They are positioned at the top of the Electric Grids.
- Its energy state is equal to the energy state of the Electric Grid it is on.
- Surge can only exit a Rail Inductor when the Electric Grid it is placed on has power.
- Surge needs to move inside the Rail Inductor ring to be moved into the connected Electric Rail.
- When moving into the Rail Inductor, Surge starts moving on the Electric Rail automatically.



Ferromagnetic Object

Ferromagnetic Objects that can be manipulated by Surge when he uses his Electric Attraction ability.

Verbs:

- **Connect** Electric Connections
- **Mimics** Surge's moves

Rules:

- Surge needs to be close to Ferromagnetic Objects in order to use its ability.
- When a Ferromagnetic Object is under the control of Surge's ability, it will mimic Surge's movement, moving in the same direction as he moves.
- Ferromagnetic Objects move between grid blocks and only mimic Surge's movement when he moves from one grid to another. Ignoring the moves he makes within a grid block.
- Ferromagnetic Objects can levitate in the air and leave the area of Grid Plates to mimic Surge's movement.
- Ferromagnetic Objects leave a trail of energy when moving as a result of Surge manipulation. When the manipulation ends, the Magnetic Objects travel back to the same point of origin, retracing the path made by following the trail of energy.
- Surge can intercept Ferromagnetic Objects returning to their point of origin and re-manipulate them without needing them to return to their point of origin.
- When a Ferromagnetic Object is touched by another Ferromagnetic Object under Surge's control, both Ferromagnetic Objects are now under Surge's control while he is using the power.
- Ferromagnetic Objects can be used to connect two Electrical Paths
- If any obstacles prevent the Ferromagnetic Object from mimicking Surge's movement, it will remain in place until a possible move is made.

Metallic Object

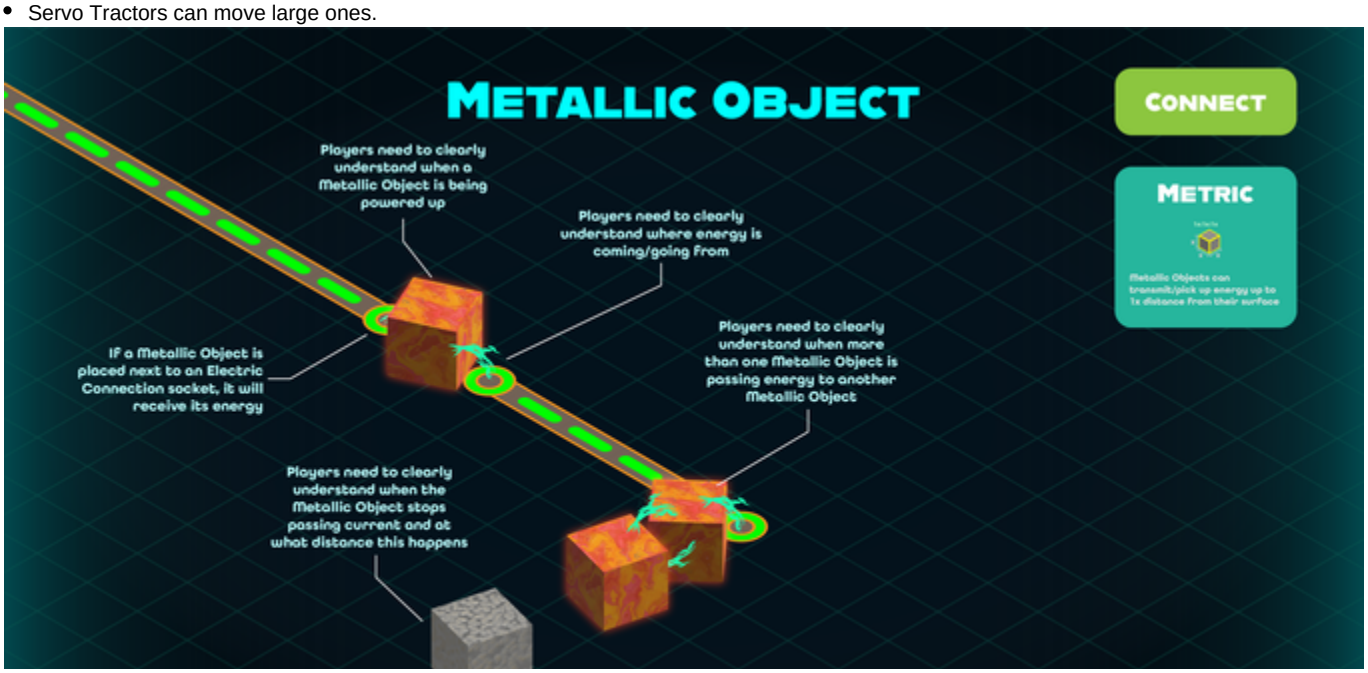
Metallic objects that can conduct energy.

Verbs:

- **Connect** Electric Connections

Rules:

- Surge cannot walk on them, even if they are powered up.
- They glow incandescently when they have energy passing through them.
- Their gravity is always directed at the Grid Plate they are standing on.
- If they are close to two ends of two Electric Paths, they will run power from one to the other.
- Metallic Objects can pass the electric current between them
- Players can use various Metallic Objects to make a connection between two more distant Electric Paths.
  - When a Metallic Object is close to an electrocuted Metallic Object, the electric current will flow and both will be electrocuted.
- If Surge holds the metallic object in the air, he can use the object to make connections between two terminals of two suspended Electric Paths.
- Servo Tractors can move large ones.



Energy Receptor

Power receivers that can be linked with the Surge's Energy Beam.

Verbs:

- **Indicates** the electrical connections required on an element
- **Indicates** the powered electrical connection of an element

Rules:

- They are off by default if they are not receiving an Energy Beam.
- When Surge uses the ability Energy Beam on them, they turn on the elements that are connected to them as long as they continue to receive energy.
- Surge needs to use the Energy Beam from a correct angle to turn them on.
  - The Energy Beam beam needs to hit the inner area of the Energy Receiver.
- Servo Tractors can move them

Enemies

Electric Spider

Small creatures that feed on electrical energy.

Verbs:

- **Eliminates** Surge when he gets close
- **Blocks** part of Surge's scenario

Rules:

- They move in a pre-established patrol pattern.
- They can make Surge vanish if he gets close to them.
- When they pass over Electric Paths they suck the energy out of them, shutting down whatever is connected to them.
- There exists only at Grid Plates that are electrocuted.
- If the Grid Plate they are on is turned off, they vanish.
- Can be blocked by Blocking Fields.
- Can be blocked by Metallic Objects.
- Can be blocked by Ferromagnetic Objects.
- If their patrol pattern is blocked, they turn around and continue patrolling the area as much as possible.
- If they are spotted by Sentinel, they vanish.

Sentinel

Creatures that monitor the Facility for abnormalities such as security cameras.

Verbs:

- **Eliminates** Surge when he is seen
- **Generates** power when Data is seen
- **Blocks** part of Surge's scenario

Rules:

- If Surge enters the line of sight of a powered Sentinel, Surge will vanish.
- If Data comes into view of a powered Sentinel, the Sentinel will emit a signal via its Electric Path.
- If an Electric Spider enters the line of sight of a powered Sentinel, the Electric Spider will vanish.
- Sentinels can move autonomously in some puzzles by rotating their point of view as a security camera.
- Sentinels can be turned off or on by changing the Energy Path that powers them.

- Sentinels can be moved by Servo Tractors.

Gameplay Guidelines

1. **The outcome of interactions must always be clear.** Players need to see and understand what their actions are doing.
2. Puzzles have to **rely on interactions between both characters** as much as possible.
3. **Avoid blocking doors!** If the player cannot access some area he must be free to try and understand the possibilities.
4. **Players should be able to remake the puzzles.**
5. **People play puzzle games to feel smart!** Let them learn from their mistakes and let them have the pleasure of figuring out a solution on their own! **No handhold!**
6. Sometimes **getting stuck in the puzzle** is how players **learn to solve it.**