

Rhythm Platform

#Rhythm #Platform #Cyberpunk

2022 NetEase University Minigame Challenge Finalist Entries (26/251)

My Role : Technical Artist, Programmer

Game Information

Keywords: Platform game, rhythm game

Development Engine: Unity3D 2021.3.6f1c1

Release Platforms: Windows

Development Team Size: 5

Download Link:

Game Duration: 30~40min



Story Overview

"Pistis" is a 2D platformer game centered around the theme of "Xin"(In Chinese, "Xin" has multiple meanings, such as "trust", "belief", "information", and "letter". In this game, we've chosen "information" and "trust" as the dual themes for our game named "Xin").

Players will utilize various abilities to dodge an array of traps, navigate through platforms, and collect scattered information throughout the levels until they reach the endpoint.

The story unfolds in the year 2000 of the Galactic Era, within the Pistis galaxy, which worships the "God of Trust".

On the edge of this galaxy lies a small, cerulean planet with a highly advanced civilization. Following a technological explosion, this civilization detected that other societies within their galaxy were perishing due to their planets collapsing. As a response, they initiated the "Rescuer" program. Unexpectedly, they faced betrayal during their rescue missions and suffered a catastrophic blow.

The player, as the sole survivor of the Harmonic Civilization's downfall, possesses the pinnacle of the entire civilization's technological advancements, enabling them to transform received information into musical senses. However, as you journey alone in search of a destination, mysterious messages seem to be guiding your path...

Roles and Responsibilities

Zhenxi Li: Project Manager,

Kaishu Wang: Designer, Music Composer

Leyan Wang: Programmer, Technical Artist

Hongjie Ge: Programmer

Yiting Wang: Artist

Gameplay Overview

The game has two core gameplay mechanics: traditional platforming and an added "Metronome" feature.

The platforming aspect is similar to "Super Mario", and has incorporated special abilities inspired by games such as "Hollow Knight", "HAAK", and "Splasher". Players will need to utilize abilities like jumping, dashing, grappling, and changing gravity to overcome various obstacles and reach the finish line.



Grappling hook in "HAAK"

Gravity direction shift in "Splasher"

The "Metronome" aspect is similar to games like "Crypt of the NecroDancer" and "BPM: Bullets Per Minute" (there's also another fantastic rhythm action game called "Hi-Fi RUSH" that came out later).

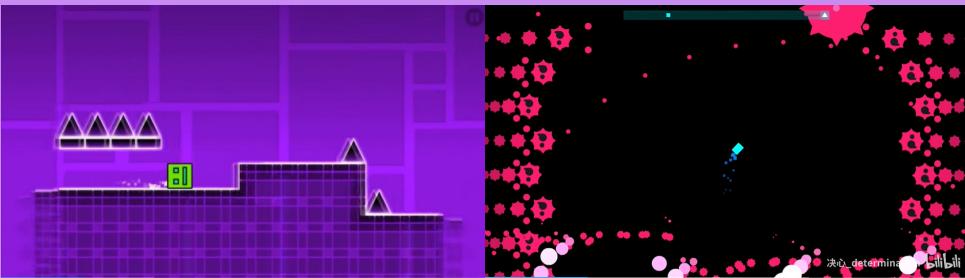
However, it doesn't strictly require players to move to the beat. Instead, it's designed so that when players press buttons in sync with the beat, the performance of character actions is enhanced, such as jumping higher or dashing further.



"Rhythm Dungeon" (left) and "BPM: Bullets Per Minute" (right) rhythm mechanics

Art Reference

Due to the presence of only one artist on the team, we opted for a minimalist aesthetic similar to games like "Geometry Dash" and "Just Shapes & Beats" to avoid overwhelming workload.



The visuals of "Geometry Dash" (left) and "Just Shapes & Beats" (right)

We also referenced examples of 2D games with a cyberpunk aesthetic like "Tales of the Neon Sea" and "SANABI", utilizing halos and glows to achieve a neon lighting effect.



The visuals of " Tales of the Neon Sea " (left) and " SANABI " (right)

How To Play

Players use a series of actions such as jumping, slamming down, dashing, crawling, and using a grappling hook. By strategically utilizing the rhythm beats, they can enhance their movements to challenge difficult terrains and progress through platformer levels.

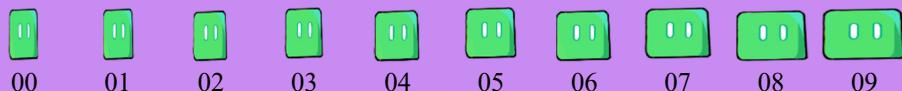
Action	Key	Condition	Function
Move	↔	/	Moving
Squat	↓	On the ground	Squatting
Crawl	↓ + ↔	Squatting	Passing through narrow areas
Rapid descent	↓	In the air	Rapid descending
Jump	C	On the ground	Jumping over obstacles
Double jump	C	In the air	Jumping over higher obstacles
Dash	X	/	Dashing

Dash	X	/	Dashing
Slide tackle	↓ + X	Squatting	Quickly pass through narrow areas
Ground pound	↓ + X	In the air	Instant descending
Grapple hook	Z	Within the range of the grappling point, and facing the Grappling point	Quickly move towards the grapple point
Interact	/	Passing through interactive objects	Trigger dialogue

The player has 10 HP. When the player's health drops to zero, they have to retry the current level. If the player steps on spikes or gets hit by a pendulum hammer, they will be sent back to the last save point. Reaching the end of each level will automatically allow the player to progress to the next. There are three levels in total in the game, and reaching the end of the third level is considered clearing the game. Based on the player's performance in the third level, there are two different endings to the game.

Character Design

The protagonist is a small square. The art team draws the keyframes for squeezing and stretching, and then the programmers choose the appropriate images. The character animation is produced with reference to the "Twelve Principles of Animation.



When creating animations, we allow the aforementioned sprites with different frame counts to play in sequence, recording animations with different effects. The animation expression looks like "a1(b1) – a2(b2)", where the number 'a' represents the sprite's sequence number; the number 'b' inside the parentheses represents the duration of the sprite in frames (60 frames per second); and the symbol '–' indicates playing the next image.

Animation	Expression
Idle	05(10) – 06(10) – 07(10) – 06(10)
Move	05(5) – 06(5) – 07(5) – 06(5)
Jump	05(1) – 08(2) – 04(1) – 03(1) – 00(4) – 02(1) – 03(1) – 04(1)
Fall	04(5) – 03(5) – 02(5) – 01(5) – 02(5)
Land	00(1) – 03(1) – 05(1) – 07(1) – 09(2) – 05(2) – 03(2) – 05(2) – 07(4) – 05(1)

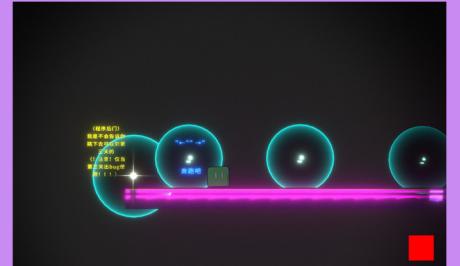
System Design

Rhythm and Metronome

The core of rhythm games is to prompt players to take actions on the beat, allowing their physical actions to synchronize with the rhythm, immersing them in the beat. We provide positive reinforcement to the player's actions on the beat, including functional enhancements (such as invincibility frames) and aesthetic enhancements (such as particle effects and trailing effects). In addition to this, all moving objects in the scene will move according to the beat. For instance, a heavy hammer will start to drop rapidly a short time before the beat to ensure it hits its end point precisely on the beat.

The game music maintains a constant BPM, so players don't need to worry about changes in rhythm and can easily enjoy the assured sense of beat.

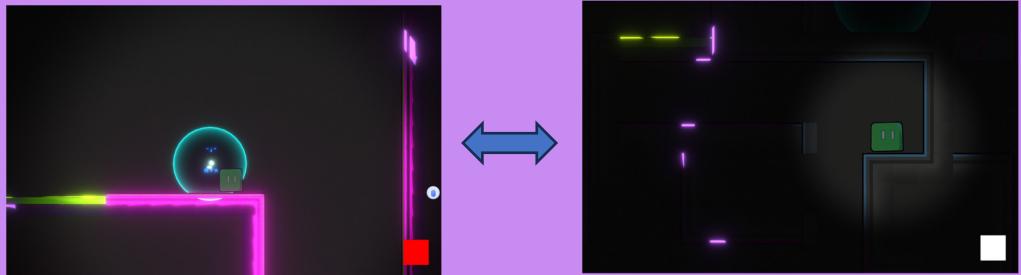
We have designed a visual metronome to help players find the beat again when they first start or if they lose their rhythm. The periodic movement of the metronome also adds a sense of rhythm to the overall UI, making the game visuals more dynamic and vibrant.



Basic Action	Enhanced effect
Jump / Jump twice	Jump height increases
Slide tackle	Movement distance extends, speed increases; invincible during movement
Ground pound	Descent speed increases; invincible during movement.
Grapple hook	Traction speed increases; invincible during movement

Field of view

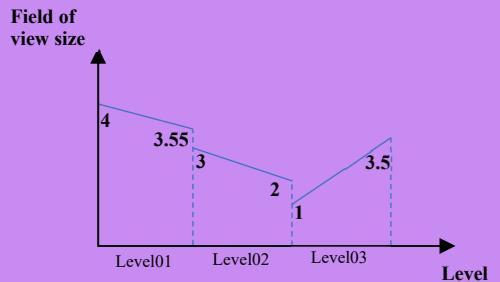
The game screen serves as visual information, influencing and supporting the player's decision-making and operations. The boundary of the field of view, also known as the "information horizon", determines the furthest distance for which the player can plan actions at any given time. In "Pistis", we use the field of view as a form of information resource provided to the player, making them experience the stress and confusion when this kind of information is taken away.



We hope that as the plot progresses, players will experience: "The ability to perceive visually degrades over time, and they can only explore the path ahead through the rhythmic light pulses (feeling lost and powerless) — they gather the information fragments left by the survivors of an unknown civilization, gradually understanding the events leading to its impending doom. Guided and protected by

these fragments of information, they overcome challenges, and the trust ignited for this unknown civilization brings light back to the player (gradually fostering a sense of trust)."

Therefore, we designed the following field of view change curve, adjusting the size of the field of view based on the player's progress in the level.



Rhythmic Light Pulses

Combining the restricted field of view, we designed a gameplay mechanic that involves using light pulses to probe the terrain. We believe this is a viable solution in terms of both presentation effects and gameplay playability. It also serves as an appropriate compensation for the limited vision given to players.

The light pulse is emitted in sync with the beat cycle, firing once every four beats. On the fourth beat, the player character emits a ring-shaped light pulse centered on itself. The pulse spreads outwards, and when it passes through special materials, these materials glow with a neon halo. These special materials are interspersed among various scene objects and platforms, helping players locate the positions of scene objects to some extent.

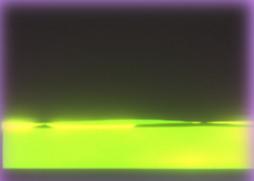


This mechanism allows us to design levels with platforms that are outside of the player's field of view. Players can detect distant landing platforms through the light pulse and plan their movement route accordingly. Moreover, this also enables us to design maze-like levels where players have to imagine and deduce unseen paths through the illumination provided by the light pulse.

Scene Item Design

Traps

Sulfuric Acid Pool



Fixed

Upon contact, it causes 1 point of damage every 0.3 seconds

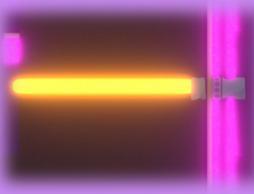
Spikes



Static & Rotate around axis

Touching causes 1 point of damage and teleports back to the nearest save point.

Laser Emitter



Fixed & rotation & reciprocating motion

When the player touches the laser, they will take 1 point of damage and be knocked back

Hammer

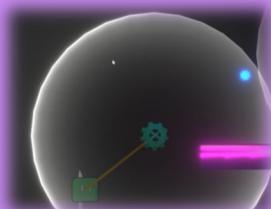


Smash, Lift up

Blocks the character when moving upwards. Causes 2 points of damage when smashing down and teleports back to the nearest save point.

Interactive Object

Grappling Hook



Fixed & Reciprocating motion

For the character to use the grappling hook.

Information light spot



Information fragment



Platform

Fragile platform



Fixed

Available for the character to stand on. It will be destroyed after a period of time and will recover after another period of time.

Special

Anti-gravity area



Change the character's gravity, pointing in the direction of the corresponding wall.

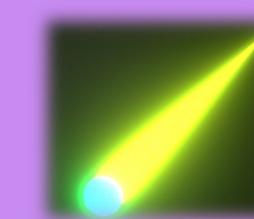
Bullets

Stars



Randomly appears around the player and, after a period of time, fades away.

Meteor

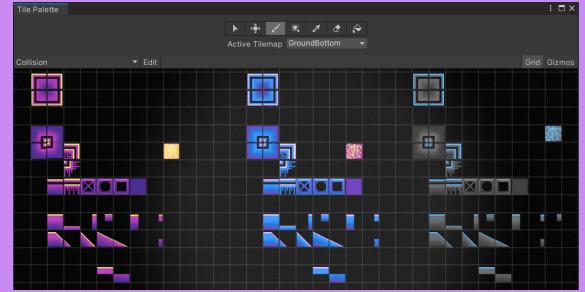


Charges at a fixed angle, dealing 2 points of damage to the player and causing a knockback of 1 unit when hit.

Level Design

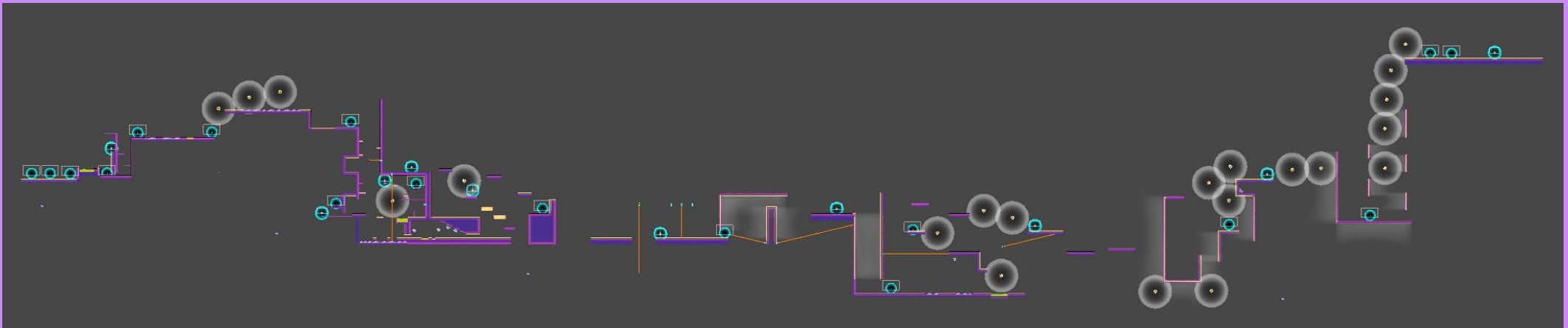
This project uses tile maps. The art team only needs to draw images for each tile, and the level designer can combine them in the levels. This method offers high reusability. Since there are 3 levels, a total of 3 sets of tile maps need to be drawn.

I believe that as an interactive medium, games shouldn't limit their expression of themes solely to one-way conveyance through text or graphics. Instead, players should be allowed to complete their interpretation of the theme. Since players can make their own choices in the game by implementing their thoughts, **when the player's actions align with the game's intended message, the game system should provide positive feedback**. Additionally, efforts should be made to avoid eliciting any negative emotions from the player during this process. I believe this approach can reasonably shape the player's thoughts and even values within the game.



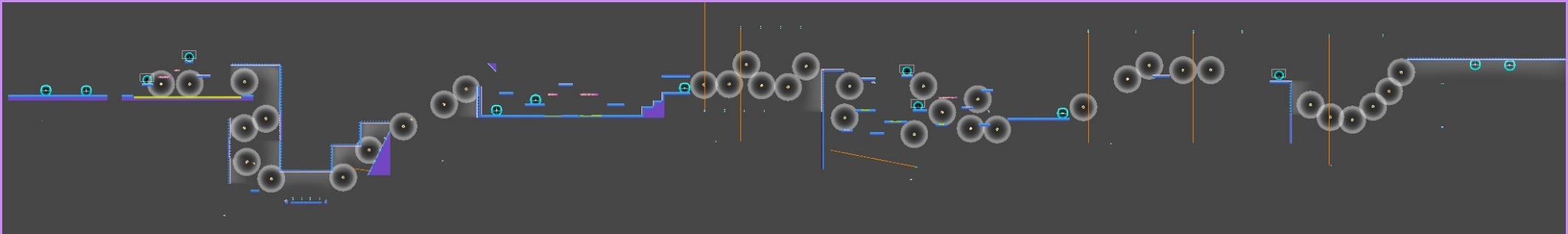
Level 1

In the first level, we mainly adopted a step-by-step level design, gradually introducing new scene items, and allowing players to familiarize themselves with them through repeated attempts. After players have some understanding of the basic operations and scene items, the main game mechanic of rhythm is introduced. This trains players to pass levels they couldn't before by operating on the beat points. Regarding the theme, players learn about the story of exploring an unknown civilization through information light points and information fragments.



Level 2

In the second level, the mechanism of the player's narrowed field of vision becomes more evident. Players start to rely on the "light pulse wave" to obtain information about the location of distant walls and objects. The game's protagonist emits sound waves at rhythmic points, using a "sonar" system to discern the position of scene objects. This concept aligns with the idea in physics that "sound has the capability to convey information".



Level 3

In the design of the third level, we have created two sections that focus on the theme of "trust." Depending on whether the player chooses to trust or not, we have designed two bifurcated routes to clear these sections. Both of these designs revolve around the information fragments left by an alien civilization.

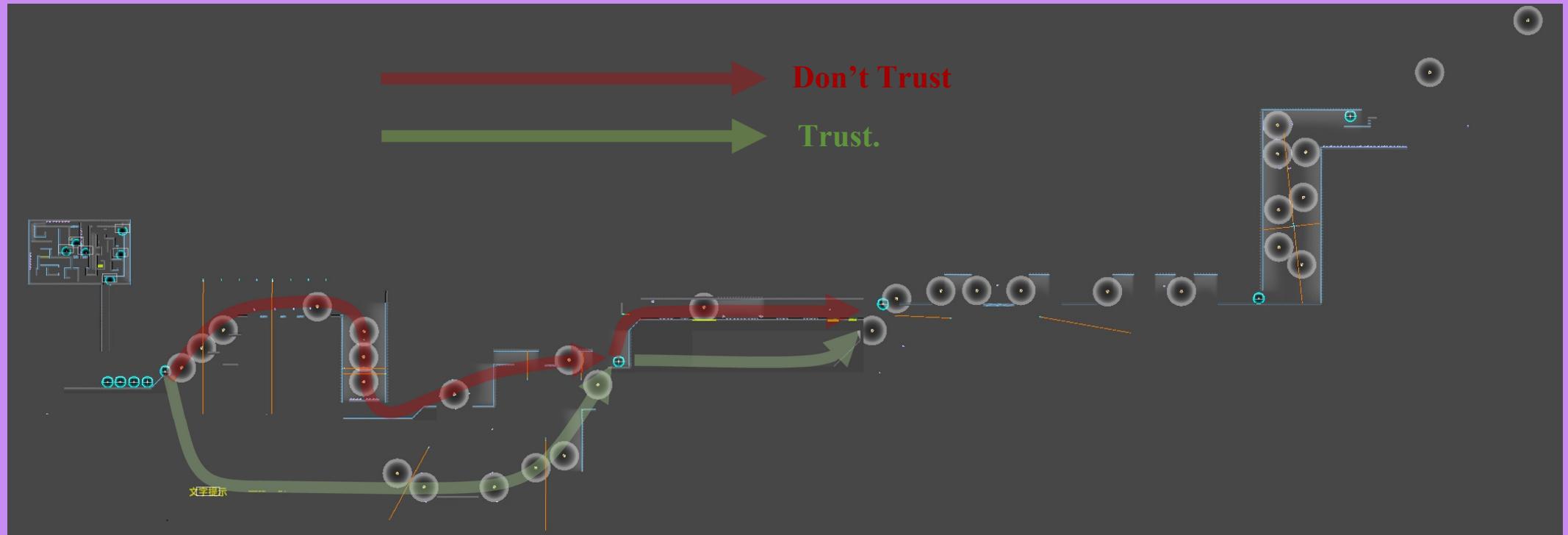
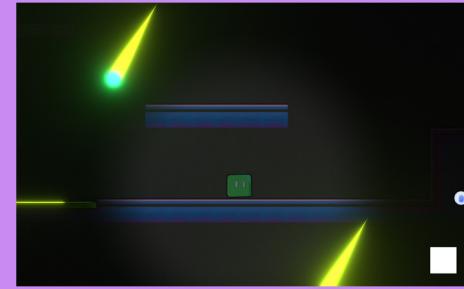
"Jump down here, it's safe!"

In front of the player is a normal platform level, but the information fragment suggests that the player should jump into the gap between the platforms ahead. Based on the experience from previous levels, this seems like certain death. However, the player has already established a certain level of trust with the unknown civilization. If the player chooses to trust, after a long fall, they will be caught by a very long, text-covered transparent platform. The player can then move to the right, pass through the platform, overcome a simple level challenge, and enter the next area. If the player chooses not to trust or ignores the information, they will continue to face more difficult level challenges until they successfully overcome them to reach the next area.



"Crouch! To the right →→"

If the player chooses to trust, sprinting towards a wall that appears very ordinary will reveal a hidden space within the wall. Passing through this "meteor shower" hidden space, the player can also bypass some of the more difficult level challenges.



These two points are designed such that if players choose to trust the unknown civilization, they can save a considerable amount of time; otherwise, they must complete more difficult challenges. In the third level, we have set up branching endings, where if the player reaches the finish line within ten minutes of the timer starting, the alien civilization survives and is rescued, and the protagonist reunites with the alien civilization; otherwise, when the player reaches the end, they will only see cosmic ruins and meet the Bad Ending in solitude.



In the third level, we have constructed a maze which best demonstrates the functionality of the pulse wave. Combined with slow music, it creates an immersive feeling of searching for a way out while being lost.



My Contributions to Pistis

Design Part

I designed the representation and gameplay of the light pulse wave, took part in the level design process, and developed the two mentioned level details that reflect the theme of "trust." Additionally, I contributed to the design of in-game props, including devising the movement of scenic props and ensuring their movement aligns with the musical beats for enhanced rhythmic integration.

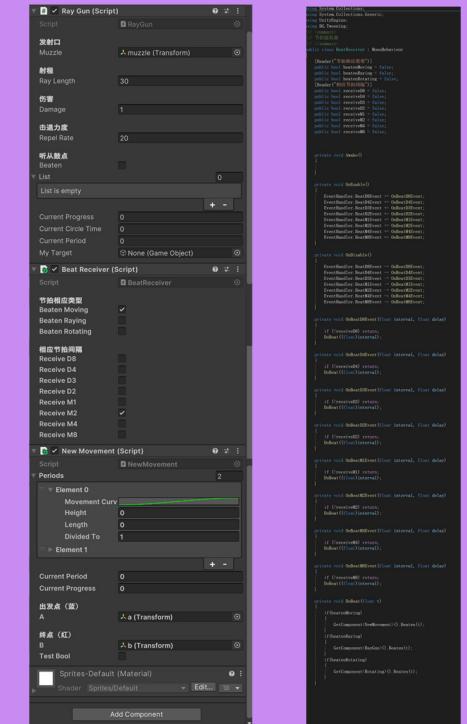
Programming Part

Summary of Work Content

- Completed the implementation of scene item functions, including the inherent or beat-responsive behavioral functions, movements / rotations of scene objects including the heavy hammer, sulphic acid pool, spikes, laser emitters, and fragile platforms.
- Implemented the display and protective shield functionality for information light spots and fragments.
- Wrote code related to bullet generation, life cycle, damage, and knockback effects.

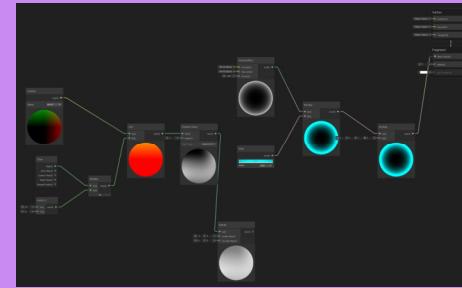
Detail Display (Selected Excerpts)

The left image displays the configuration editing panel for the laser emitter, including the fraction of the beat it responds to, the type of response, a list of response action cycles, range, damage, knockback intensity, and the speed curves and range for movement/rotation.

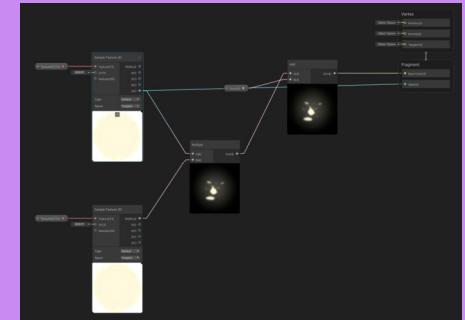


Fresnel effects

(For shields and grappling hook points)



Self-luminous object

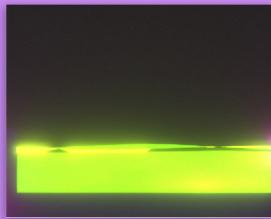


The right image shows an item with beat-response functionality. It subscribes to delegate events upon initialization to callback corresponding functions upon response, and includes the logic code for unsubscribing when the item is destroyed.

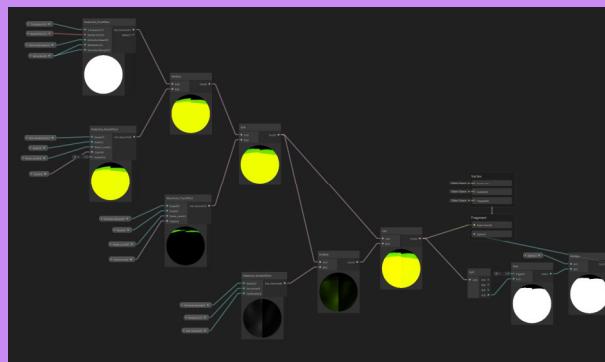
Technical Art Part

In terms of technical artistry, I was responsible for writing the noise rendering effects, post-processing effects of the field of view and the light pulse wave, and the neon bloom effects of glowing objects.

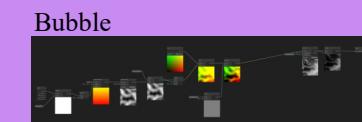
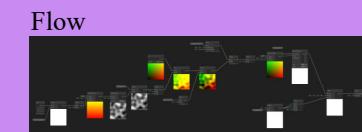
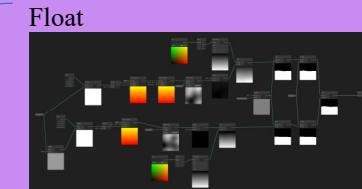
Sulfuric Acid Pool



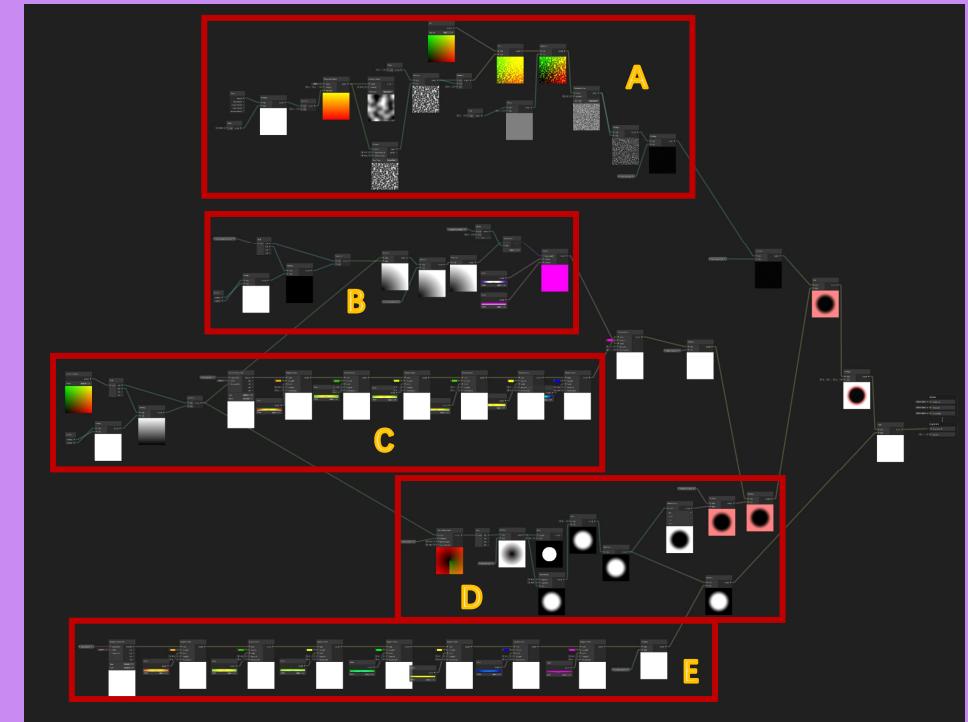
Shader Graph



Sub Graph



Post-processing (noise + field of view + light pulse wave + neon bloom)

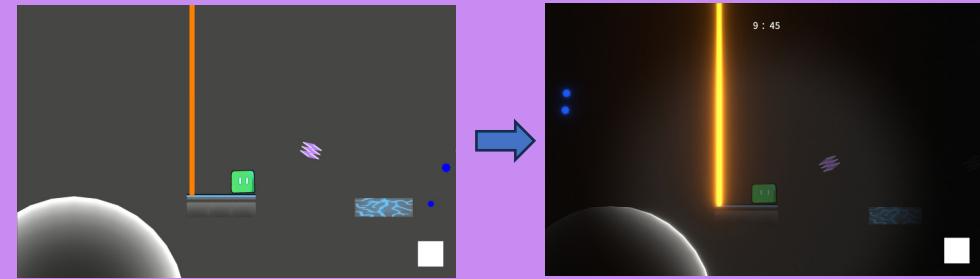


- A. Noise effect
- B. Light pulse ring
- C. Color registration area for bloom effect within the field of view
- D. Field of view range
- E. Color registration area for bloom effect outside the field of view

Due to the default post-processing in Unity's URP projects having a Bloom effect, which must be utilized in conjunction with Shadergraph to change the HDR brightness of textures to take effect, we needed a differentiated and dynamic Bloom effect for our items, hence a pre-marking of objects for the Bloom effect was necessary. Distributing this process across the independent materials of each luminous object, where each material would need to read the player's position and current field of view radius in real time and execute corresponding logic, would undoubtedly be a redundant use of memory.

Therefore, I wrote this part of the Shader into the screen post-processing, to traverse the screen pixels and complete data transmission and calculation in one go, thus reducing memory usage. However, this post-processing needed to be inserted before Unity's default post-processing via a modification of the rendering pipeline in the code. I have designed the following color-marking method in my custom post-processing stage, which is original (although not necessarily the first of its kind), and I will briefly introduce it below.

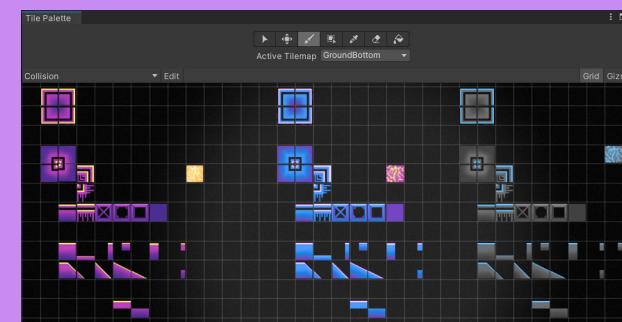
For luminous objects that do not need to respond to the beat, we need to register their identifier colors in Shadergraph and, during the custom post-processing phase, replace the colors of pixels that match the identifier colors with colors that have HDR brightness. Moreover, since we want the luminous objects to glow outside the field of view with a brightness slightly lower than inside the field of view, in the Shader system I designed, if the luminous objects use a constant HDR brightness, they will be completely darkened when they move outside the field of view. If we do not increase the HDR brightness of the luminous objects outside the field of view, they will turn dark, which is not the expected effect. Therefore, I designed two color registration areas for inside and outside the field of view, allowing the same object to replace different brightness levels or even different colors of the Bloom effect when inside or outside the field of view.

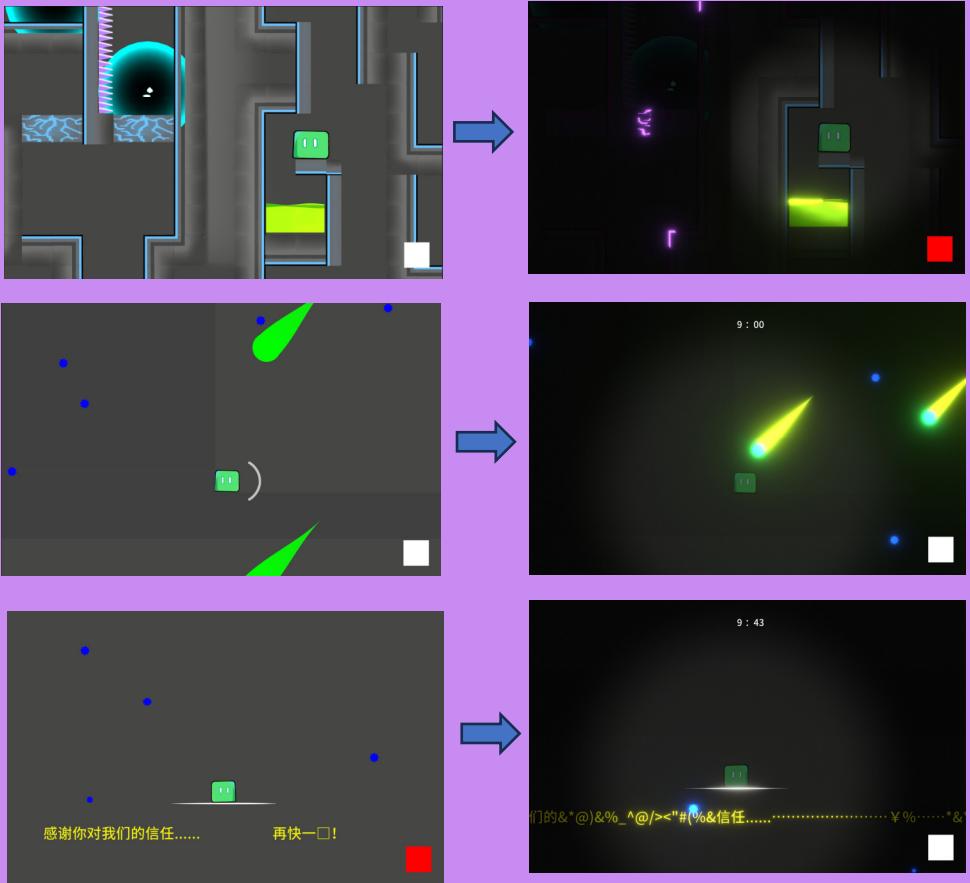


For regions requiring a beat-responsive light pulse wave effect, we calculate the distance from the pixel points of the "special material" on the screen to the current pixel point of the player's position. When the distance exceeds the player's field of view radius and falls between the radii of the inner and outer circles of the ring at that moment, we set the pixel's HDR color to a luminous brightness.

We needed a way to identify this "special material" on the screen. To reduce the number of textures, I designed a method to mark the location of the "special material" with a marking color on the texture itself. When the post-processing reads a screen color that matches the marking color, that pixel is determined to be "special material."

After planning the technical implementation, I coordinated with the artists in my team to propose a requirement for artistic materials: to mark the "special materials" that need to respond to light pulses with specific colors. During the post-processing, the bloom effect corresponding to the marked color is displayed. As shown in the diagram, each level uses a fixed theme color to identify the special materials with the corresponding theme color.





This approach is not only straightforward but also offers considerable flexibility. It ensures that shaders correctly identify the "special material areas" that respond to the light pulse and that the colors inside and outside the post-processing effect area are displayed accurately. In the later design phases, artists simply need to mark the corresponding theme colors when creating textures, and developers can then enter the new indicator colors along with the intended bloom effects into the designated area of the shader.

Theme Interpretation

The design of Pistis is inspired by Liu Cixin's "Dark Forest" theory from various angles. The universe is a perilous "dark forest" where every civilization is like a hunter in the woods, cautiously avoiding detection to not become a target of others' hunts. For every civilization, survival is the prime need, and mutual understanding and trust among civilizations are luxuries. Due to such uncertainties and potential threats, a civilization might choose to conceal itself to avoid discovery by others.

In the Dark Forest theory, "Xin Xi" (information), "Xin Hao" (signals), and "Xin Ren" (trust) are thoroughly integrated. Emitting signals exposes information, leading to an asymmetry of information. Due to the presence of "distrust," the party that reveals information first might be preemptively struck as a potential threat to be eliminated. We designed similar scenarios to explore these themes.

In Pistis, an unknown civilization faces annihilation because it naively believed in the outreach of other civilizations. Yet, even on the brink of extinction, they chose to leave behind beacons of information and fragments, trusting and guiding us. The game encourages players to trust through its mechanics, allowing them to relish the feeling of trust and being trusted. However, reality is often harsh, and we attempt to address this content dialectically within the game, encouraging players to ponder the meaning of trust - whether it is a beautiful sentiment or a lie within the fabric of relationships. works and to approach each step of creation with an increasingly professional game designer's perspective, thereby progressively producing work that meets a higher standard of satisfaction.

Feedback

评审点评:

"很好玩！画面酷炫，氛围拉满，操作爽快，欲罢不能，我愿意steam付费hhhhh。
"非常完善的小游戏，体验完整，操作性十足，机关设定有趣味且有一定难度，引导和反馈可以再强化一些会非常优秀。但是稍长时间游戏会眼花，美术效果可以再提升一些。"

Minigame Challenge Official Entry Finalist Work Review
https://mp.weixin.qq.com/s/2nL6GQMAYtSGgiJmb_jp4Q

"Super fun! The graphics are cool, the atmosphere is immersive, the gameplay is exhilarating, I just can't stop playing, I would pay for it on Steam hhhhhh."

"A very well-rounded mini-game, with a complete experience and full of playability. The puzzle setting is interesting and challenging. The guidance and feedback could be strengthened a bit to be excellent. However, playing for an extended period can be visually overwhelming, and the artistic effects could be further improved."

Insights and Reflections

In Pistis, I made my first attempt at rendering 2D game graphics in a cartoonish cyberpunk style, a process that diverged from following tutorial cases. I needed to design an implementation method that was economical in terms of performance consumption and highly malleable in effect, while also ensuring that the design was flexible and adjustable for later stages, providing systemic support.

Moreover, in terms of thematic expression, I experimented with giving players choice-based feedback beyond direct textual expression, utilizing the advantages of gaming as an interactive medium to better shape the emotions and thoughts of players during gameplay, allowing them to contemplate the theme more personally.