

WEEK1 : Exploration of project themes

@2024/07/09

1. Background

About whimsy

I am deeply fond of those sentences filled with whimsical imagination. Some are short and vivid, with a strong sense of imagery; others are absurd and bizarre, yet brimming with philosophy; some are poetic but possess a sense of dislocation, breaking conventional logic. These sentences often bring me wonderful experiences and profound thoughts.

I hope to present these whimsical ideas in a concrete form, allowing more people to experience their beauty. Puzzle games are the perfect medium to share this marvelous feeling. Through the design of game scenes and interactive puzzles, players can gradually uncover the hidden meanings behind these sentences, enjoying the pleasure of exploration and discovery.

2. Some whimsical ideas

- The snowman was assassinated by the sun, leaving behind only a nose bought from the market.
- Clouds are water in the air, bubbles are air in the water, we are fish on land, and the bubbles we blow turn into clouds.
- Rooted in the moonlight, growing towards the earth.
- The moon is the light at the end of the tunnel.
- There are countless voices in the mind, but only one listener.
- The life of a plant begins with being buried, while the life of a human ends with burial.

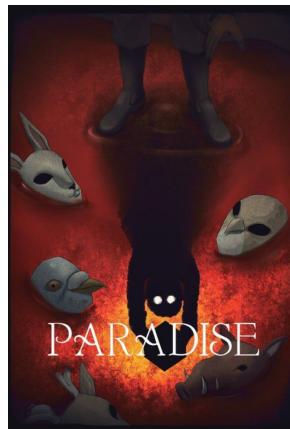
- I write on paper with a pencil, and at this moment, two trees meet in an incredible way.
- A knife cannot cut through sunlight, but a slotted spoon can.

3.Game Concept Description

The primary mode of this game is puzzle-solving, with each level being a standalone puzzle. I will set a title for each level, and the whimsical sentences will serve as the solution to the puzzles. Players need to interact with the scene, exploring step by step to uncover the solution. Through unique environmental storytelling and interactive puzzles, the game immerses players in a world full of whimsical ideas.

In each level, players explore the scene, collect clues, and interpret hints to ultimately solve the puzzle and reveal hidden, magical sights. This game is not just about solving puzzles; it's an experience where everyone will have different thoughts and feelings, leading to unique interpretations.

These whimsical ideas are not all filled with philosophical thoughts. Some will create a sense of absurd humor, others will showcase beautiful scenes with a sense of dislocation, and sometimes, changing perspective will yield different magical vistas.



4.For example

Level Title : Fish living in the air

The answer : Clouds are water in the air,bubbles are air in the water, we are fish on land, and the bubbles we blow turn into clouds.

After the player undergoes a series of guidance, misdirection, and puzzle-solving, it is ultimately revealed that the fish is actually themselves. As the truth comes to light, the mystery is unveiled. This absurdity creates a sense of dislocation, subverting conventional logic, while simultaneously hiding the wondrous symmetry of nature in the background—absurd yet rational.

Level Title : ROOT

The answer : Rooted in the moonlight, growing towards the earth.

In the nighttime forest, the player uncovers the mystery and gazes up at the sky. The moon, no longer merely a luminary hanging in the sky, appears as an inverted tree, emitting root-like beams of light. These beams stretch downward like roots, forming shimmering roots on the ground, creating a surreal visual effect. The player is profoundly shaken by this wondrous sight, feeling not only a powerful visual impact but also a deep emotional resonance.



WEEK3-4 : Learn Unreal Engine 5 through online resources

@2024/07/16 → 2024/07/30

The main task was to learn the Blueprint system of Unreal Engine 5 through online resources, focusing on the following two tutorial series videos:

<https://b23.tv/lfu4LnN>

<https://b23.tv/EEFt9Nn>

1. Learning progress

- Blueprint Basics:
 - Understand the node structure of blueprints, including the setting and use of **Event**, **Branch**, and **Variables**.
 - Learn common node operations, such as **Timeline** (timeline control), **Line Trace** (ray tracing) and other functions.
- Characters and Interactions:
 - Learned to implement simple character control logic through blueprints, including basic operations such as character movement, rotation, and jumping.
 - Implemented a basic interactive function, such as pressing the **E key** to pick up items and trigger special effects.
- **Scene construction and optimization:**
 - Learned the basic scene construction methods, including adding static meshes, setting up light sources, and creating simple collision bodies.

- Understood the concepts of materials and material instances, and tried to dynamically change the material of an object through blueprints.

2.Practical results

- Pickup interaction: By setting the Box Collision and On Component Begin Overlap events, the blueprint logic of item pickup is completed.
- Dynamic material switching: Timeline is used to achieve the gradient effect of object color, enhancing the visual effect of the scene.
- Light and shadow control: A preliminary attempt to control the intensity of the light source in the scene through Directional Light lays the foundation for the subsequent day and night switching function.

3.Learning gains

- Gained a preliminary understanding of the overall logic of the blueprint, especially in terms of event-driven and variable transfer.
- Mastered the basic interaction implementation methods of UE5, laying a solid foundation for the subsequent development of puzzle logic.

WEEK5-7 : Scene construction and particle effects

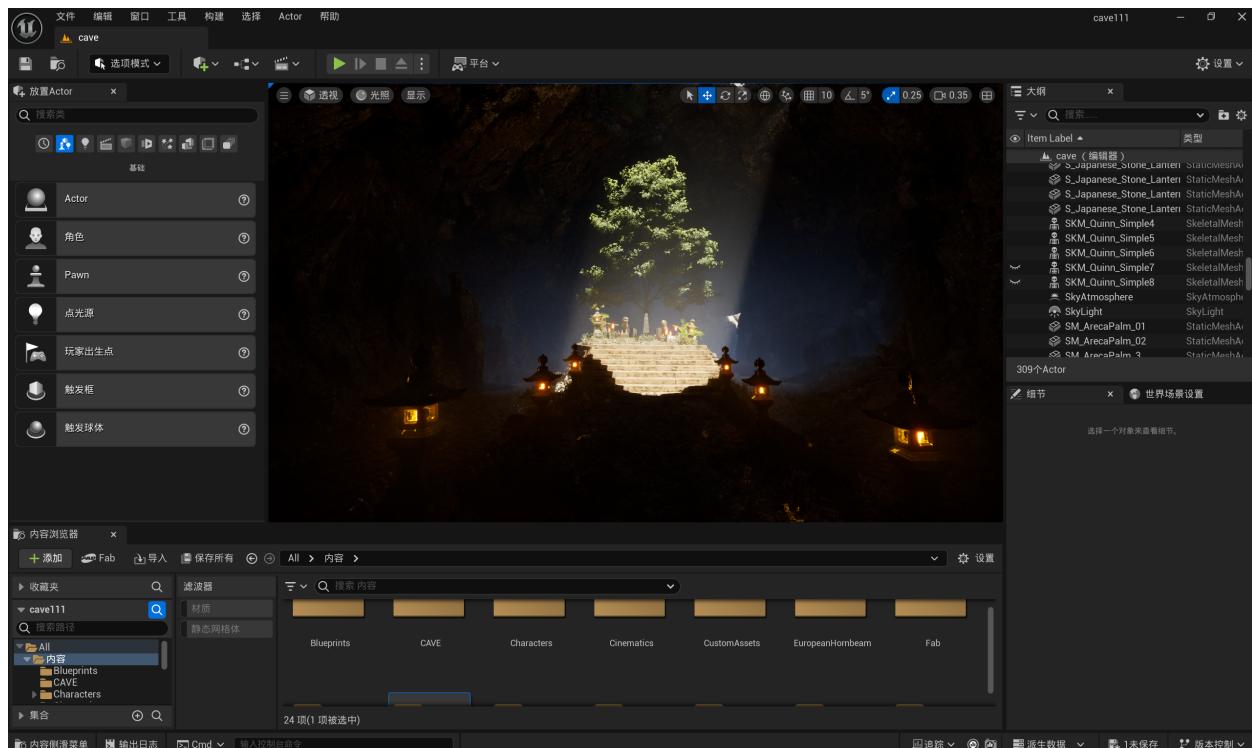
@2024/08/01 → 2024/08/20

The focus of this week's work is to complete the preliminary construction of the game scene and realize some special effects to enhance the visual expression and immersion of the scene.

1. Partial scene building

Terrain and structure:

- Utilized the **Landscape Tool** to construct the cave's terrain and water features.
- Incorporated unique cave elements, such as rocks, cracks, moss, and weeds, to create a natural and mysterious atmosphere.
- Enhanced the scene with details like candelabras, ancient lamps, broken wall fragments, and remnants of ruins, along with scattered rubble to evoke a sense of decay and antiquity.
- Configured a sunlight source and added subtle volumetric fog effects to enhance the visual impact of the light within the cave.



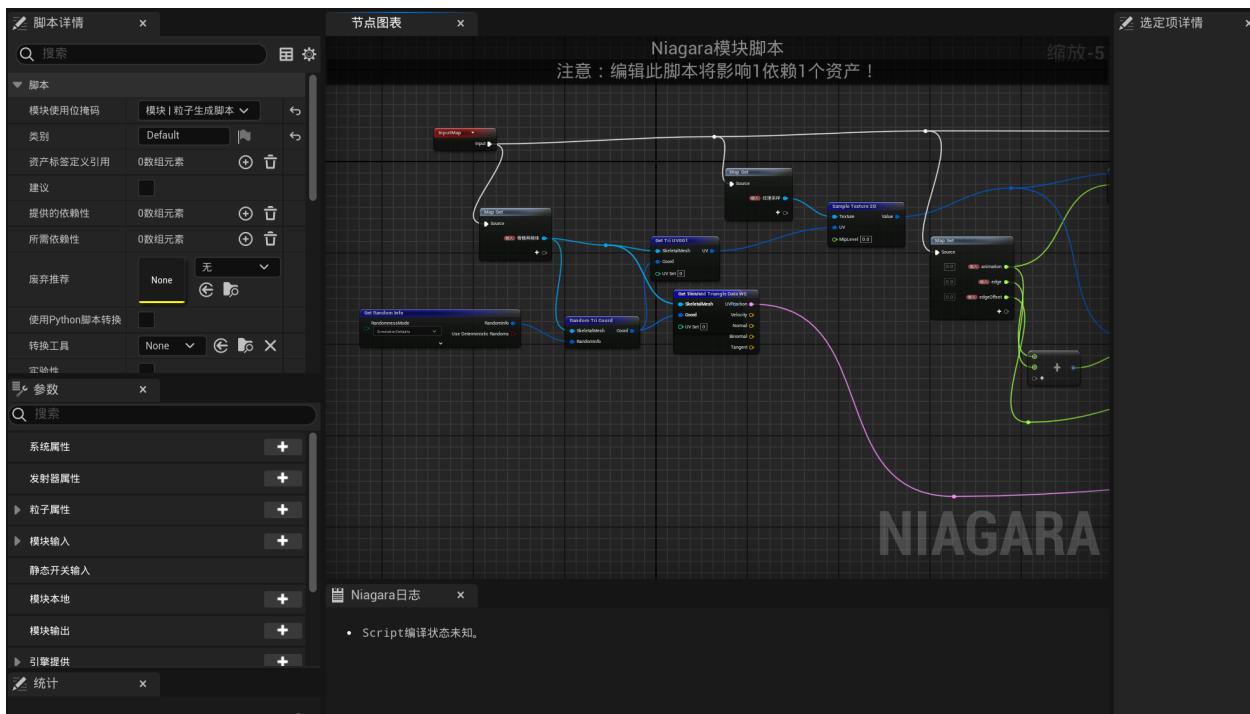
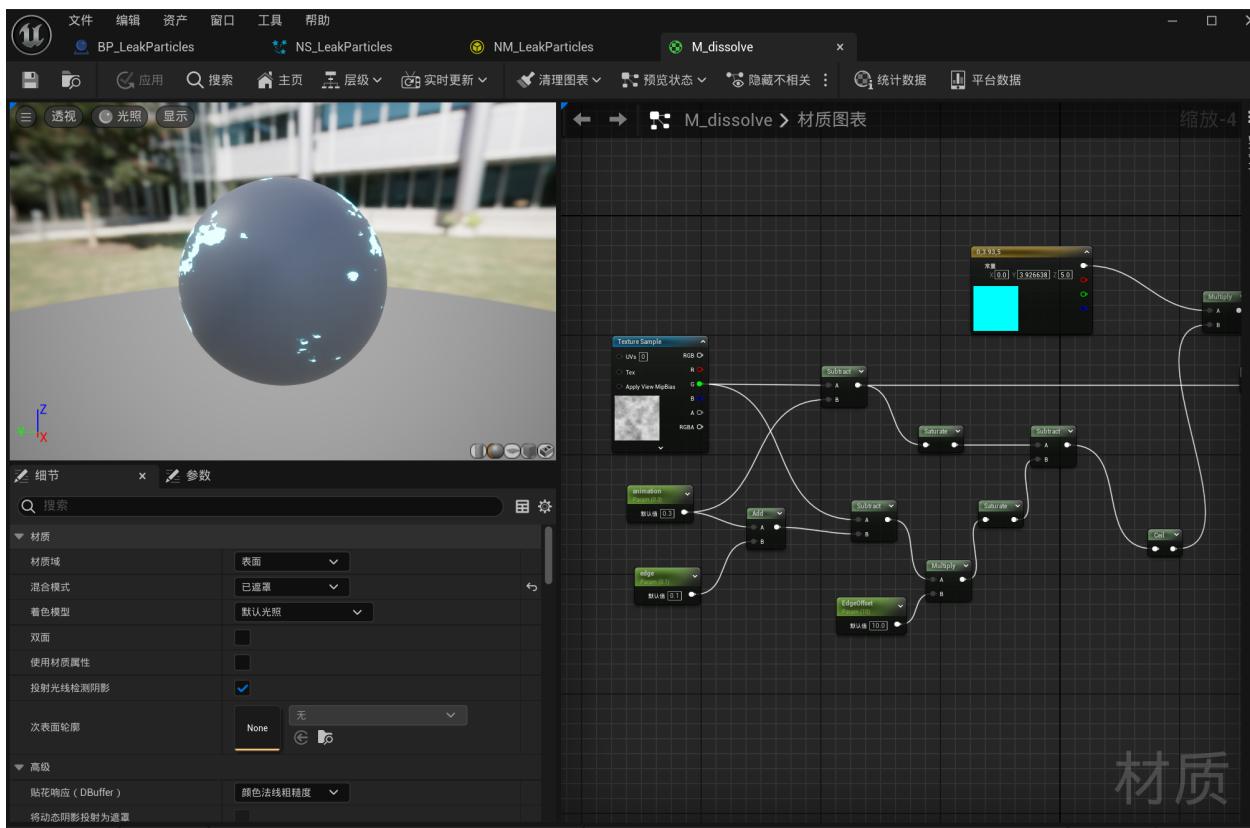
Challenges & Solutions:

- Lighting optimization:
 - Multiple point lights were used in the cave, but the initial frame rate was low. By using the Lumen rendering system and limiting the range of the light source, the performance was successfully improved.
- Collision problem:
 - The collision bodies of some cave walls were imperfect, causing players to penetrate the model. This problem was solved by manually adjusting the collision bodies and testing.

2. Snowman's dissipation effect



- Set the starting position of particle emission through Niagara's Mesh Renderer and Dynamic Inputs.
- Use the surface edge (boundary vertex) of the geometric body as the emission source of particles.
- The size, life cycle and color gradient of particles are adjusted through parameters to achieve the effect of dynamic particle dissipation.



WEEK7-9 : Studying the impact of narrative-driven puzzle design on the narrative structure of games

@2024/08/21 → 2024/09/10

1. Core Concepts of Narrative-Driven Puzzle Design

Narrative-driven puzzle design is an important design method in modern game development, which aims to make puzzle solving an important part of narrative advancement and emotional experience by deeply integrating puzzles with narratives. The core of this design method is that puzzles are not only a logical challenge of the game, but also a part of the narrative, which can provide players with a sense of plot participation and guide them to gradually deepen into the story world.

Features of narrative-driven puzzles include:

- **Narrative embedding:** The puzzle design is based on the storyline and world view, and is closely connected to the narrative background, plot development or character relationships.
- **Player-led:** Through puzzle solving, players can play the role of active explorers in the story, enhancing the player's sense of control over the narrative.
- **Emotional resonance:** Convey emotional tension and philosophical thinking through puzzle design, allowing players to establish an emotional connection with the narrative during the puzzle-solving process.

2. The impact of narrative-driven puzzles on story structure

Narrative-driven puzzles play multiple roles in the game's story structure, driving the plot forward, adjusting the narrative rhythm, and enriching the story through

puzzle solving.

(1) Promote the development of the plot

Puzzles are key nodes in the game narrative, and usually trigger plot progression after players solve them. For example, by unlocking a mechanism or cracking a symbol puzzle, a new area is opened or a hidden clue is revealed. This design allows players to feel that their actions directly affect the story process, thereby enhancing their sense of immersion.

(2) Adjusting the narrative rhythm

Narrative-driven puzzle design can adjust the narrative rhythm of the game by setting up puzzle-solving sessions. Inserting puzzle-solving sessions after tense battle scenes can help players relax and add transitions to the narrative.

Conversely, adding time-sensitive puzzle design to the slow exploration process can increase tension and make the narrative rhythm more varied.

(3) Enriching the story content

Puzzles are often not only logical challenges, but also metaphors or carriers of narrative. For example, solving puzzles can reveal character backgrounds, secret settings of the story world, or turning points of the plot. This method organically connects puzzles with narratives, allowing players to feel the depth of the narrative while reasoning logically.

3. Design Methods for Narrative-Driven Puzzles

In order to effectively integrate puzzles into narratives, system design is required from three aspects: narrative structure, interaction design, and information transmission.

(1) Design based on narrative structure

In the narrative structure, puzzles can serve as key nodes in linear narratives or as clues to connect open-world narratives. Designers need to clearly define the function of each puzzle in the narrative, such as advancing the plot, revealing the background, or providing a turning point:

- Linear narrative: The order of puzzles is usually consistent with the narrative order, and players experience the complete storyline by gradually solving puzzles.

- Non-linear narrative: Puzzles may be distributed in the game world in the form of fragmented information, and players piece together the information into a complete narrative through free exploration.

(2) Design based on interactive design

Interaction design is the core of narrative-driven puzzles, which convey narrative information through the interaction between players and scenes, props or characters. Designers can enhance the interactivity between puzzles and narratives in the following ways:

- **Environmental interaction:** Use visual elements in the scene (such as symbols, light and shadow, and object placement) to provide clues to solving puzzles while conveying narrative context.
- **Character interaction:** Guide the logic of the puzzle through dialogue between the player and the NPC or virtual narrator, or reveal the character's emotions and motivations during the puzzle-solving process.
- **Dynamic feedback:** When the puzzle is solved, give the player instant feedback through animation, sound, or environmental changes to strengthen the role of the puzzle in the narrative.

(3) Design based on information transmission

The transmission of information is the basis for the integration of puzzles and narratives. Designers need to cleverly embed narrative information into puzzles so that players can obtain necessary plot clues when solving puzzles:

- **Metaphorical Delivery:** Express narrative themes through puzzle design, such as using natural elements to reflect the relationship between people and the environment.
- **Progressive Delivery:** Decompose complex narrative information into multiple puzzles and convey it to players in a progressive manner.
- **Multi-sensory Delivery:** Combine visual, auditory and interactive experiences to allow players to perceive narrative content through multi-dimensional senses.

4. The design challenges of narrative-driven puzzles

In actual design, narrative-driven puzzles face the following major challenges:

1. The separation of narrative and puzzle solving:

- If the puzzle lacks an organic connection with the narrative, the player may feel that the puzzle solving process is irrelevant to the story.
- Solution: Through scene layout and visual clues, the puzzle logic is combined with the narrative background to make the puzzle a natural extension of the narrative.

2. Conflict between difficulty and narrative rhythm:

- Puzzles that are too difficult may interrupt the player's experience of the narrative, while puzzles that are too easy may appear redundant.
- Solution: Through multi-level prompt design (such as narration, visual prompts), the possibility of players getting stuck is reduced while maintaining the challenge of puzzle solving.

3. Balance between player freedom and narrative control:

- Puzzle design needs to find a balance between providing players with free exploration and controlling the narrative process.
- Solution: Through non-linear narrative structure or multiple endings design, the player's freedom of exploration and narrative integrity are taken into account.

WEEK10 : Regaining direction and dream revelation

@2024/09/10 → 2024/09/17

Unfortunately, my laptop was stolen, and all my project data and research records were lost. This sudden change made me confused and depressed. I had to spend money and time to reissue documents and repurchase equipment. However, a strange dream made me regain my creative inspiration and helped me sort out a new direction for game design.

1.Dream content

The beginning is already blurry, but I clearly remember that I was fighting a monster in a dim cave. The battle lasted for a long time, and I finally defeated it, but before I could catch my breath, an ominous feeling came from the depths of the cave, as if another more terrifying thing was approaching me. I was exhausted and couldn't fight anymore, so I could only turn around and run desperately to the cave entrance.

While running away, I came to a broken bridge and jumped down without hesitation. After landing, I found that the ground under my feet was like the surface of the moon, bumpy and uneven. It seemed that some kind of sacrificial ceremony was being held here. A group of people formed five or six circles, and there were one or two children in the center of each circle. The adults laughed wildly at the children, and their laughter was neurotic and weird. As the laughter intensified, the children's bodies gradually showed a trace of purple light spots, as faint and bright as the stars in the night sky. The light spots became more and more, brighter and brighter, and the children's bodies began to become empty, with painful expressions on their faces. Although they struggled, they could not move, and their bodies were as stiff as stones.

I flew up, rushed into the crowd, kicked over two people, and tried to save the children. But when I approached them, the ceremony was not interrupted. The

children turned into star-shaped balloons one by one, floating in the air. I hurriedly grabbed the balloons, but found that they instantly turned into star-shaped stones and began to rotate around me according to their own orbits. The area centered on me seemed to have become a chaotic solar system. Their orbits were not concentric circles, but were as complex and changeable as interlaced longitude and latitude lines.

The sense of loss that I could not save the children swept over me, and I sat on a bench beside me in frustration. At this time, two men were talking in a low voice next to me. One of them said that things were not peaceful recently. Children frequently disappeared, and strange noises were often heard in the mountains. Some people suspected that wild monsters or mountain spirits had taken away the children. He revealed that he was in charge of investigating these cases and was very busy. From their conversation, I guessed that the man should be a policeman, and the other was his apprentice.

I listened to him for a while and felt that he was quite responsible, so I told them what I had just experienced. The police immediately invited me to the police station to provide more clues. He took me to the second floor and arranged a computer for me, asking me to input the information myself. Although something was wrong, I didn't think much about it at the time and started to input the information.

Soon after, a game interface suddenly popped up on the computer screen, and the scene was in that cave. The character I controlled was myself, fighting the monster. Just like my previous experience, when I defeated the monster, another monster suddenly jumped out, which was the one that forced me to run away before. I finally saw it clearly, it was exactly the same monster I had just killed. Its sudden appearance scared me, and I slapped the computer host reflexively, and unexpectedly found that the monster's health had dropped a little. I instantly realized that the monsters in the cave might be endless, and the only way to end it all was to destroy the computer.

While I was still thinking, many star-shaped holes suddenly appeared on the ceiling, and a lot of water poured down from the holes. I rushed out to find the policeman, but I couldn't find him. When I ran to the first floor, I found that the entire first floor was no longer a police station, but an ancient ruins. There was an almost dry pool in the middle, the water just covered the calf, and the surrounding

area was full of sculptured heads. In the pool, two police apprentices who looked exactly the same were fighting fiercely. The police held their guns, but they didn't dare to shoot because they couldn't tell which one was real.

In a hurry, I rushed up and separated the two apprentices, preparing to control them first and then make a judgment. At this moment, the stars around me suddenly fell from the sky and smashed into the pool, forming a circle of regular holes, and the water gradually flowed down along these holes. It suddenly occurred to me that the entire police station was actually a circular building, and the upstairs was exactly the downstairs - those star-shaped holes and the flowing water were part of this cycle.

At the end of the dream, I seemed to be in an endless Möbius loop, not knowing where to start or where to end.

2.Dream Revelation

The key points of this dream are highly consistent with the theme of my game, so I decided to redesign the following game content and puzzle logic with "sacrifice" and "cycle" as the core:

1. Symbolic connection between sacrifice and nature

The sacrifice scene in the dream inspired the puzzle design of the first level. Players need to follow the riddle "Clouds are water in the air, bubbles are air in the water; people are fish on land, and what they exhale is not bubbles, but floating clouds." The rune representing fish is placed in the bubble area, and the rune representing people is placed in the cloud area. This design combines the image of a child turning into a star in a dream, suggesting the complex connection between man and nature.

2. The Mobius Strip Narrative Cycle

The circular architectural structure of the upstairs and downstairs in the dream inspired me to re-plan the overall narrative of the game. In the redesigned story, the player will explore in an endless time loop, and the solution to the puzzle is both the key to escape and the only way to return. This circular narrative symbolizes the endless repetition of nature and the entanglement between humans and the environment.

3. Symbolic design in dreams

In the dream, the image of those star balloons that were turning into stone tracks around me reminded me of the possibility of triggering specific environmental changes through puzzles in the game.

By combining dreams with game projects, I not only redefined the narrative theme of the game, but also greatly optimized the logic and philosophical depth of the puzzles. This week's reconstruction work was a rare process of reflection and re-creation, which not only helped me recover from setbacks, but also gave me a deeper understanding of how to design game narratives through narrative-driven puzzles.

WEEK11 : Learn puzzle design and narrative methods from classic games

@2024/09/17 → 2024/09/24

This week, we will focus on case studies of existing narrative-driven puzzle games, study the characteristics of the integration of narrative design and puzzles, and extract design methods that can be applied to projects. These cases include the classic "The Witness" and the Raid in Destiny 2, which represent the paradigms of single-player narrative puzzle solving and multiplayer cooperative puzzle solving, respectively.

1. Raid in Destiny 2

- **Core mechanism and design highlights:**
 - Raid copies combine puzzle solving and combat. Players need to complete complex puzzle tasks through teamwork, such as symbol matching, energy transfer, and mechanism triggering.
 - The puzzle design in the copy is closely integrated with the scene narrative. Players must solve the puzzle to unlock the path to the next area, and even cause damage to the boss through specific puzzle solving methods.
 - Narrative information is conveyed through symbols, light and shadow, and environmental changes, allowing players to gradually understand the world view and character background behind the copy while solving puzzles.
- **Inspiration and reflection:**
 - The combination of teamwork and narrative is the highlight of Destiny 2. Its puzzle design encourages players to complete complex tasks through

cooperation, which can enhance players' sense of participation.

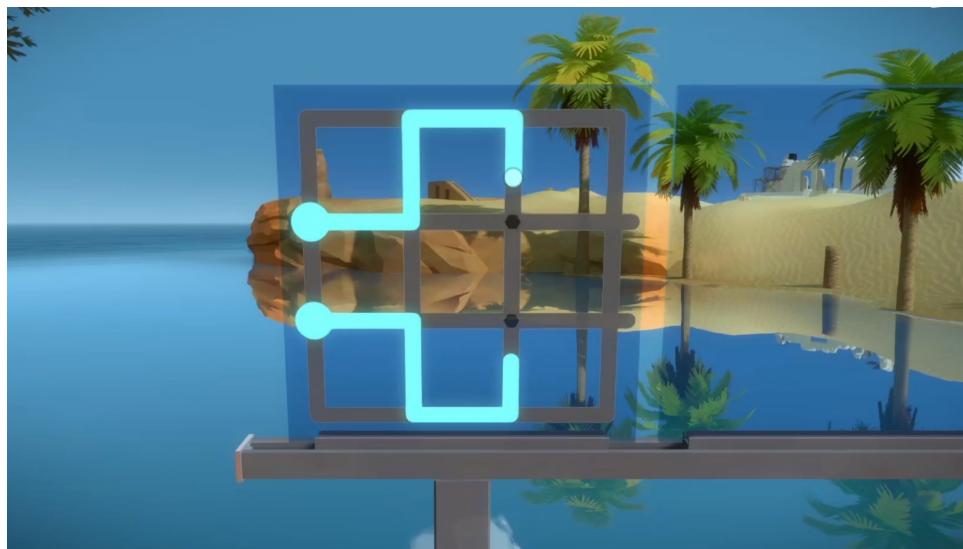
- In particular, the interaction between symbols and light and shadow can be applied to projects, such as conveying the state of puzzle solving through the color change of light beams, combined with the dynamic environmental changes of puzzle unlocking, to enhance narrative expression.



2. 《The Witness》

- **Core mechanism and design highlights:**

- The game is centered around a series of line-based puzzles, and the complexity of the puzzles gradually increases as the player explores.
- Environmental narrative is one of its highlights. The solutions to many puzzles rely on the player's observation of the surrounding environment, such as tree shadows, reflections, and natural scenery, which become important clues to solving puzzles.
- The game expresses narrative themes through the layout and metaphors of visual elements. Although there is no direct textual narration, players gradually feel the philosophical meaning conveyed by the designer in the process of solving puzzles.



- **Inspiration and reflection:**

- Embedding puzzles directly into environmental design not only enhances narrative immersion, but also makes puzzles part of the world of exploration.
- You can learn from its dynamic feedback mechanism to give players instant emotional feedback through visual effects such as light and sound after solving the puzzle, thus enhancing the sense of achievement of solving the puzzle.



3. Summary and Application

1. A fusion of narrative and puzzles:

- Both cases emphasize that puzzles are an important means of narrative advancement, rather than an independent challenge.
- The environmental puzzles in The Witness inspired me to incorporate dynamic environmental feedback into my projects, such as using water flow, light and shadow to allow players to more intuitively feel the narrative role of puzzles.
- The teamwork mode in Destiny 2 made me realize that even single-player puzzle games can create multi-dimensional narrative levels through symbols and visual language.

2. Dynamic feedback mechanism:

- Visual puzzle feedback (such as light beams and dynamic environmental changes) can not only enhance the player's immersion, but also convey narrative clues more intuitively.
- In the design of the project, light and shadow changes can be used as a sign of puzzle completion, while further promoting the development of the story.

3. Combined with own projects:

- Apply the experience in the case to my project, such as designing symbol-based puzzles and combining dynamic changes in light and shadow to show the unlocking process of the puzzle.
- In the design of the "Sacrifice" puzzle in the project, it is planned to add dynamic water flow and starlight trails as the core interaction to unlock new areas.

WEEK12-15 : Scene reconstruction and construction of sacrificial scenes

@2024/09/24 → 2024/10/15

Due to the theft of my laptop, all the development materials and scene design data were lost, and I had to rebuild the scene from scratch. The focus of this redesign is the "sacrifice scene", a puzzle area full of philosophical metaphors. In this scene, "clouds" and "bubbles" symbolize the relationship between natural elements, showing the connection between man and nature through the interaction of runes. Although this was a difficult reconstruction, it also gave me the opportunity to rethink and optimize the scene.

1. Initial layout planning

- **With "sacrifice ceremony" as the core theme, a closed cave scene was designed:**
 - The main visual focus of the player from the birth point is the mysterious sculpture and the kneeling sacrificed person, symbolizing the center of the ceremony.
 - There are two small interactive areas around: the bubble **area** and the **cloud area**, corresponding to the symbolic meanings of bubbles and clouds respectively.
- **In order to highlight the combination of nature and supernatural, multiple elements are designed as guiding clues:**
 - Clouds: As an altar for placing runes representing people, the surrounding environment is cold-toned and will emit mist as a guide.

- Bubbles: As an altar for placing runes representing fish, the surrounding environment is warm-toned and will emit bubbles as a guide.
- Candles are also placed around interactive items to provide visual cues for players.



2. Optimization of scene details

- **Ground Design:**
 - Use static meshes with different materials to draw uneven terrain to show the natural texture of the cave.
 - Add details such as vegetation and water flow to make the whole scene more natural.
- **Bubble area:**
 - **Niagara particle system** is added to the scene to simulate the generation and floating effects of bubbles.
 - The water body is changed to dark blue to enhance the mysterious feeling.
- **Cloud area:**
 - Use volumetric fog effect to simulate the clouds suspended on the ground, so that players can be in an atmosphere of alternating blur and clarity.
 - Use **Niagara particle system** and **Blueprint** to create a looping animation of cloud spray.

4. Integration of dynamic environmental effects

- **Interaction and changes of light and shadow:**
 - Players need to find a way to cast their shadows on the rune representing the fish to solve the last step of the puzzle, which is also a reflection of the puzzle "Water and air reflect each other like mirrors".
 - After successfully solving the puzzle, a floating moonstone will be generated on the altar as a visual feedback after the puzzle is unlocked. The light of the gem will illuminate the surroundings in blue.

WEEK15-18 : Implementation and optimization of interactive design 1

@2024/10/16 → 2024/11/06

The development focus this week is to complete the core interactive functions of the sacrificial scene, ensuring that players can drive the narrative through dynamic feedback of picking up runes, placing runes, and triggering puzzles. Interaction design is an important part of the game's immersion. This week, multiple interaction nodes were implemented through blueprint logic, and the feedback mechanism was optimized to enhance the player experience.

Interactive function implementation

1. Rune Pickup Logic

- **Design purpose:**
 - Player can pick up runes from the scene and store them as usable props.
- **Implementation steps:**
 - Add **Box Collision** component in the rune blueprint to detect whether the player is close to the rune.
 - Bind **Key event (E key)** through blueprint logic, and trigger the pickup logic when the player presses the key.
 - Store the state of the rune as a character variable (`CurrentRune`), and use a Boolean variable (`HasRune`) to record whether the player holds the rune.
 - After successfully picking up the rune, the rune is destroyed from the scene, and the pickup prompt is displayed on the screen.

2. Rune placement logic

- **Implementation steps:**
 - Add a **Box Collision** component to the altar blueprint to detect if the player is close.
 - Add an altar type variable (`AltarRuneType`) to match the rune type (`currentRune`).
 - When the player presses the **E key**:
 - Check if the player has a rune (`HasRune` is True).
 - Verify that the rune type matches the altar type.
 - If a successful match is made, the rune is placed at the specified location on the altar (implemented by `Spawn Actor` in the blueprint).
 - Reset the player's rune variable to stateless and the boolean variable (`HasRune`) is set to False.
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Challenges and solutions of interaction design

1. Rune placement mismatch:

- The initial blueprint logic did not correctly verify the rune type, resulting in the rune being placed incorrectly.
- Solution: Add branch judgment logic to ensure that the altar only accepts specific types of runes.

1. Feedback delay:

- There is a delay in dynamic feedback triggering, which interrupts the player experience.
- Solution: Optimize the blueprint logic to trigger the feedback event and the placement logic at the same time.

1. Complexity of multi-rune processing:

- There are multiple runes and altars in a scene, which increases the complexity of variable management.

- Solution: Use enumeration (`Enum`) to uniformly manage rune and altar types and simplify variable calls.
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Gains and insights

- This week, the core interaction function of picking up and placing runes was implemented through blueprints, which not only improved the game mechanism, but also provided good technical support for the narrative.
- Dynamic feedback design makes the interaction process more intuitive, strengthens the connection between puzzles and narratives, and improves the player's immersion.
- By refining the interaction logic and variable management, potential errors in complex interactions were successfully avoided, laying a solid foundation for subsequent development.

WEEK19-20 : Implementation and optimization of interactive design 2

@2024/11/07 → 2024/11/20

The development focus this week is to improve the dynamic scene of "Snowman Chase" and the function of players making the snowman disappear by triggering the day and night conversion. This link is not only one of the core puzzles of the game, but also an important part of promoting the development of the narrative. Through the visual effects of day and night changes, the combination of natural elements and narrative themes is further strengthened.

Functional implementation and design details

1. Snowman Chase Logic

- **Design purpose:**
 - Simulate the tense scene of the snowman chasing the player to increase the rhythm of the game.
- **Implementation steps:**
 - **Snowman AI logic:**
 - Use **Behavior Tree** to create simple chasing logic for the snowman.
 - Configure **AI Controller** to let the snowman automatically follow the player's current position.
 - Set the chasing range: when the player enters the snowman detection range (**Sphere Collision**), the snowman starts chasing; when the player leaves the range, the snowman stops moving.

- **Stop chasing logic:**
 - When the player triggers a day-night transition event, the snowman stops chasing and enters the dissipation phase.

2. Day-night transition events

- **Design purpose:**
 - Switching from night to day is achieved through player interaction, and the change in light has a significant impact on the game scene and narrative.
- **Implementation steps:**
 - **Triggering the day-night transition:**
 - Set a trigger (**Box Collision**) in a specific area to detect whether the player enters the area.
 - After the player enters, trigger the day and night conversion through blueprint logic.
 - **Day and night conversion dynamic effect:**
 - **Light source control:**
 - Use **Directional Light** to simulate the intensity change of sunlight.
 - Call **Set Intensity** node in the blueprint to gradually increase the intensity of sunlight.
 - **Environmental changes:**
 - Adjusts the color of the volumetric fog, transitioning from cool blue to warm yellow.

Challenges and solutions of interaction design

- **Snowman chasing path optimization:**
 - Issue: Snowman AI path occasionally gets stuck in complex terrain.
 - Solution: Rescaled NavMesh Bounds Volume and added dynamic obstacle handling.

- **The visual effects of day-night transition are insufficient:**
 - Issue: The initial day and night switching was too abrupt and lacked a sense of hierarchy.
 - Solution: Control the gradual change of light and fog effects through the timeline in the blueprint to enhance the smoothness of dynamic changes.
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Gains and insights

This week's development further enhanced the game's dynamics and narrative expression. The snowman's chase and the day-night transition complement each other, adding tension and visual impact to the game. This development gave me a deeper understanding of the implementation of blueprint logic and dynamic effects, and also made me realize the importance of detail optimization.

WEEK21-22 : Player feedback and thesis closing

@2024/11/20 → 2024/11/29

This week, I focused on collecting feedback from the game through player testing and improving the game's narrative design and puzzle logic based on the test results. At the same time, I completed the final stage of the thesis, including incorporating player feedback into the research content, bringing the thesis to a successful conclusion.

Collection and analysis of player feedback

1. Test Method

- **Participant selection:** 10 players with rich experience in various games were invited.
- **Test content:** Let players experience the core content of the game, including altar rune puzzles, day-night conversion, snowman chasing and day-night conversion.
- **Feedback collection method:**
 - Observe the players' game behavior and record their puzzle-solving process.
 - Conduct semi-structured interviews after the test to ask them about their views on the game narrative, puzzle design and overall experience.
 - Further quantify the players' scores on various aspects of the game (such as immersion, puzzle difficulty and narrative performance) through online questionnaires.

2. Player Feedback Summary

- **Positive feedback:**

- **Narrative design:** Most players approve of the combination of puzzles and narrative in the game, and believe that puzzles promote the development of the plot and make the experience more coherent.
 - **Visual effects:** Dynamic scenes such as day and night conversion and the disappearance of snowmen left a deep impression on players, especially the performance of light and shadow and particle effects enhanced the sense of atmosphere.
 - **Puzzle logic:** Players generally believe that the difficulty of rune placement and day and night conversion puzzles is moderate, and the prompt information is clear and easy to understand.
- **Improvement suggestions:**
 - **Rhythm optimization:** Some players think that the snowman chase scene is too tense, and it is recommended to add a short buffer stage.
 - **Hint design:** There is feedback from novice puzzle game players that there is a lack of obvious hints for key elements of the puzzle during the puzzle-solving process, such as the visual guidance of the rune area, which can be further optimized.

3. Improvement Plan

- Add visual guidance to the rune area, using a more clever way.
 - Optimize the rhythm of the snowman chase, and use animation or narration prompts to give players a short respite in the tense rhythm.
 - Enrich the sound effect library, design more unique sound effects for different scenes and events, and enhance the diversity of auditory feedback.
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Summarize

This week is the final stage of the project and thesis. Player feedback has provided me with valuable references, and the completion of the thesis has also given me a deeper understanding of my research direction. The combination of game development and academic research has made me realize that theory can provide guidance for practice, and practice can feed back to theory, opening up more possibilities for future research.