Root: visual Blueprint Scripting

TAG: #OnlineCourse #Coursera

CREATED ON: Jul 08, Tuesday, 2025

LAST MODIFIED: Jul 10, Thursday, 2025

[Blackout Facility]

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Game Summary

"Blackout Facility" is a first-person puzzle-escape game where players awaken in a dark, abandoned industrial complex with no memory. Armed only with a flashlight, they must explore the environment, solve a series of interconnected, logic-based puzzles to restore power to the facility, and navigate a multi-story layout to find and secure the final objective, uncovering the purpose of the mysterious facility along the way.

Link to playtest video on YouTube: From Concept to Playable: "Blackout Facility" | An Unreal Engine 5 Blueprinting Capstone

Link to GitHub repo of the game: FahimKamal/UE5_MazeEscape

Game Design Pillars

1. **Systemic Interconnectivity:** The world is a single, complex machine. The core design philosophy is that actions have cascading, logical consequences. Turning on a power generator doesn't just open one door; it illuminates the entire facility, powers up electronics, and enables new systems like the lift. Every puzzle piece is part of a larger, interconnected whole.
2. **Environmental Transformation:** The game's central arc is built around a dramatic shift in the environment. Players begin in oppressive darkness, creating tension and mystery. The "Power On" event serves as a massive payoff, transforming the spooky, unknown spaces into a clean, understandable, and fully explorable industrial complex, completely changing the tone and feel of the game.
3. **Logical Deduction over Reaction:** Progress is gated by the player's ability to observe, remember, and think logically, not by their reflexes. Puzzles are environmental and intuitive, involving finding keys, understanding object states, and piecing together clues from the environment. The game respects the player's intelligence, rewarding them for thinking through problems methodically.

User Experiences

- "The way everything connected was amazing. When I turned on the generator and the whole facility lit up, it was such a cool moment!"
- "I felt so smart when I realized I had to go all the way back to the server room on the first floor. The password was there the whole time, but I couldn't get it until the power was on. That's a great puzzle."
- "It was genuinely tense exploring in the dark with just my flashlight. It made finding the power cells and finally getting the lights on feel like a huge accomplishment."

Core Gameplay

Aim of the Game

The aim of "Blackout Facility" is to immerse players in a high-stakes environmental puzzle, challenging them to unravel the logic of a complex and interconnected facility. Through exploration and deduction, players will experience the satisfaction of transforming a dark, mysterious world into a fully powered and understandable space, culminating in a final, rewarding escape.

1. **Summarize the Core Experience:** The fundamental activity is exploration in a first-person perspective, punctuated by observation, interaction with environmental objects, and logical problem-solving. The gameplay loop consists of identifying an obstacle (a locked door, a powered-down machine), exploring the environment to find the solution (a key, a power cell), and using that solution to progress to the next area.
2. **Define the Game's Objective:** The primary objective is multi-layered. First, the player must explore the ground floor to find three Power Cells. Second, they must use these cells to activate the main Power Generator. Third, they must use the newly-powered lift to access the second floor. Finally, they must solve a more complex, multi-stage puzzle to infiltrate a locked Meeting Room and retrieve the final objective, a mysterious floating crystal.
3. **Highlight the Unique Selling Points (USPs):** The game's uniqueness comes from its holistic puzzle design. Unlike games with a series of discrete puzzle rooms, "Blackout Facility" is one large puzzle box. Its key USP is the "Power On" event, a single player action that causes a dramatic, facility-wide state change, affecting lighting, electronics, and access to new areas simultaneously. Furthermore, its non-linear backtracking puzzle on the second floor rewards players for understanding the entire map as one cohesive unit.
4. **Explain the Emotional and Cognitive Engagement:** The emotional journey begins with tension and apprehension as the player navigates the oppressive darkness with a limited view. This gives way to curiosity and methodical thinking as they begin to understand the rules of the world. Key "aha!" moments of discovery provide intellectual satisfaction, culminating in a feeling of empowerment and relief when the facility is fully illuminated.
5. **Mention the Target Audience:** The game is aimed at players who enjoy puzzle, exploration, and escape room genres. Fans of titles like Portal, The Stanley Parable, or The Talos Principle who appreciate logical challenges over combat will find the experience engaging.
6. **Inspire and Motivate:** This document outlines a tightly-designed, single-player experience that provides a complete and satisfying narrative and puzzle arc. It is built on a robust and scalable architecture that not only serves the current game but lays the perfect foundation for a more complex social stealth game in the future, demonstrating potential for significant expansion.

Game Design Goals

1. **Engaging Puzzle Progression:** To create a series of logical, interconnected puzzles that build upon each other, culminating in a satisfying, multi-stage solution that makes the player feel clever.
2. **Immersive Atmosphere & Transformation:** To evoke a strong sense of place, starting with a tense, spooky atmosphere in the dark, and transitioning to a clean, awe-inspiring industrial environment. The "Power On" moment must be a memorable, impactful set piece.
3. **Robust & Reusable Systems:** To design and implement core mechanics (doors, lights, interactables) as self-contained, reusable, and easily configurable Blueprints, demonstrating clean, object-oriented design principles.
4. **Rewarding Exploration:** To encourage and reward players for thoroughly exploring every corner of the environment. Non-linear puzzle design and cleverly hidden items ensure that curiosity is a key tool for success.
5. **Clear Visual Feedback:** To provide intuitive visual and auditory feedback for all player interactions. Doors should have clear locked/unlocked states, buttons should visibly depress, and machines should change their

appearance when powered on.

6. **Innovative Backtracking:** To implement a core puzzle that subverts player expectations by requiring them to return to a previously "completed" area, but in a new world state, to find the solution.
7. **Minimalist & Accessible UI:** To keep the User Interface clean and non-intrusive, relying on in-world prompts and temporary notifications rather than a cluttered HUD, ensuring the focus remains on the game world itself.
8. **Foundation for Longevity:** To build the entire project on a scalable foundation that can be expanded with more complex systems like NPCs and social stealth mechanics for a future portfolio piece.

Features

Core Gameplay Systems

- **Centralized Power & Light Grid:** This is the core system of the game.
  - **Description:** It consists of three main Blueprints: BP_PowerGenerator, BP_LightController, and BP_LightSource. The player must find 3 Power Cells to activate the Generator. The Generator then uses an Event Dispatcher to notify the Controller, which in turn broadcasts a "Power On" command to every Light Source in the level.
  - **Purpose:** This creates the game's most dramatic moment, transforming the entire environment in response to a single player action.
- **Dynamic Door System (`BP_Door`):** A highly versatile and reusable door system.
  - **Description:** Doors can be opened and closed by player interaction. They can be locked and require a specific unlock method: consuming a `BP_DoorKey` from inventory, a temporary unlock from a pressure plate, or a remote unlock from a `BP_Monitor`. They feature a red/green emissive light to clearly indicate their locked status.
  - **Purpose:** To serve as the primary obstacles and gateways for puzzles on the ground floor.
- **Automated Lift System (`BP_Lift`, `BP_LiftDoor`):** A fully automated elevator system.
  - **Description:** The `BP_Lift` transports the player between floors. It communicates directly with its dedicated `BP_LiftDoor` Blueprints, commanding the door on the current floor to close before moving, and commanding the door on the destination floor to open upon arrival. The lift itself is only usable after the Power Generator is turned on.
  - **Purpose:** To provide a seamless and immersive transition between the two distinct levels of the facility.
- **Stacking Inventory System:** A simple, non-intrusive inventory.
  - **Description:** A player component tracks the quantity of collectible items (e.g., "Power Cells: 2," "Door Keys: 1"). It does not require a menu; interactions are contextual. If the player has the required key, the door will use it.
  - **Purpose:** To manage puzzle items without breaking player immersion with complex UI menus.

Architectural Systems

- **Universal Interaction System (`BPI_Interactable`):** A Blueprint Interface that defines how players can interact with the world.
  - **Description:** Any Blueprint can implement this interface to become interactable. The player controller sends a universal InteractWithObject message, and the object itself decides how to react.
  - **Purpose:** To create a clean, decoupled, and highly scalable way to handle all player interactions.
- **Object-Oriented Hierarchy:** The use of Parent Classes to define base functionality.
  - **Description:** Abstract classes like `BP_CollectibleItem` and `BP_Electronics` contain the core logic for all items of that type. Child Blueprints (e.g., `BP_DoorKey` or `BP_Monitor`) inherit this logic and add their own specific functionality.
  - **Purpose:** To maintain a clean, organized, and efficient codebase that is easy to manage and expand.

Player Mechanics

1. **Movement:** Standard first-person controls.
   - **Controls:** WASD for movement, Mouse for looking.
   - **Mechanics:** The player can walk.
2. **Interaction:** The player's primary method of affecting the world.
   - **Controls:** 'E' key.
   - **Mechanics:** A line trace is projected forward from the player's camera on a custom "Interaction" trace channel. If the trace hits an actor that implements the `BPI_Interactable` interface, a UI prompt appears. Pressing 'E' calls the `InteractWithObject` event on that actor.
3. **Flashlight:** The player's only tool in the darkness.
   - **Controls:** 'F' key.
   - **Mechanics:** Toggles the visibility of a Spot Light component attached to the player camera, allowing them to see in the dark.
4. **Tutorial / Information System:**
   - **Controls:** Proximity-based.
   - **Mechanics:** Approaching an object with a `BP_Information` component will automatically display a helpful text prompt on the screen to guide the player.

Game World

- **Overview:** The game takes place in "Blackout Facility," a sterile, modern, and mysterious industrial/corporate complex. The theme is one of sterile isolation and discovery, transitioning from a tense, dark thriller to a bright, clean puzzle box.
- **Visual Style and Atmosphere:** The initial atmosphere is dark, tense, and claustrophobic, relying on the player's dynamic flashlight to create pockets of light and deep shadows. After the power is restored, the style shifts to clean, bright, and clinical, with white and grey tones accented by the glowing emissive materials of powered-on electronics. All assets are custom-modeled in a blockout/greybox style within Unreal Engine.
- **Key Locations:**
  - **Floor 1: The Industrial Zone**
    - **The Storage Room:** The starting area. A cramped room filled with racks and boxes. It contains the first key and a cleverly hidden Power Cell.
    - **The Central Hub:** The nexus of the first floor. Connects all other rooms and houses the main Power Generator and the Lift.
    - **The Server Room:** A room filled with rows of server racks. It contains a Power Cell and, crucially, a computer terminal that holds a password needed much later in the game.
    - **The Office Room:** A small, auxiliary office. It is technically optional but contains a key that makes navigating the floor's puzzle easier. It serves as a clever piece of misdirection.
    - **The Weapon Room:** An unlocked armory containing environmental storytelling props and the third Power Cell.
  - **Floor 2: The Corporate Offices**
    - **The Hallway & Lounge:** The entry point to the second floor. A well-decorated corporate space designed to feel distinct from the industrial floor below.
    - **The General Office:** A large open-plan office with multiple workstations. Contains a key needed to access the adjacent Break Room.
    - **The Break Room:** A cozy, non-essential room containing a humorous environmental diorama of frightened employees watching a horror movie.
    - **The Assistant's Room:** The office of a high-ranking employee. It contains the password-locked computer that controls the final door.

- **The Meeting Room:** The final room. A large, formal boardroom where the final objective, the floating crystal, is located.

Characters & Enemies (Future Implementation)

The current version of the game for the course project features no NPCs or enemies to focus purely on the environmental puzzle design. However, the game is architected to support the following characters in a future, expanded version.

- **Characters (Future Implementation):**
  - **Technicians:** Employees found on the ground floor, working on the facility's machinery. Their uniforms would serve as a low-level disguise.
  - **Corporate Employees:** Found on the upper floor, working at desks. Their attire would allow access to the corporate areas.
  - **The "Boss":** The primary target for a potential assassination objective, located in the final Meeting Room.
- **Enemies (Future Implementation):**
  - **Security Guards:** The primary antagonists. They patrol both floors of the facility. Their behavior would be based on line-of-sight and suspicion. If they detect the player in an unauthorized area or without the proper disguise, they will become hostile.

Levels

The game is composed of two levels (floors), connected by a single elevator. The level design philosophy is to present the player with a semi-open puzzle box that requires backtracking and a holistic understanding of the entire map.

Floor 1: The Industrial Zone

- **Progression:** The player must explore the four interconnected rooms to find three Power Cells. The puzzle is non-linear; the order in which rooms are explored matters. The player is given one key and must decide which of two doors to unlock, a choice that changes their immediate path. Solving this key-and-lock puzzle requires exploration and discovering another hidden key. The floor culminates in the player returning to the Central Hub with all three Power Cells to activate the generator.
- **Challenges:** Navigating in the dark, solving the key-and-lock puzzle, and remembering to thoroughly search every room.

Floor 2: The Corporate Offices

- **Progression:** The player explores the corporate floor, which initially seems linear. However, they soon hit a hard wall: a password-locked computer. The solution requires the player to realize that the password is on a computer in the Server Room on the first floor, which was inaccessible before the power was turned on. This forces the player to backtrack through the entire facility, use the lift to go down, retrieve the password from the now-powered Server Room, and travel all the way back up to finally unlock the Meeting Room.
- **Challenges:** The primary challenge is the critical thinking required to solve the backtracking puzzle. The player must connect two seemingly separate areas of the game to find the solution.

User Interface (UI)

- **Overview:** The UI philosophy is minimalist and non-intrusive, designed to keep the player immersed in the game world. All feedback is delivered contextually.
- **UI Elements & Layout:**
  - **Interaction Prompts:** A simple text element (e.g., "Press [E] to Open Door") appears in the center of the screen when the player looks at an interactable object.
  - **Notification Pop-ups:** A temporary text element (e.g., "Power Cell Acquired") briefly appears on the side of the screen to confirm actions.
  - **Tutorial Messages:** Larger text boxes (BP_Information) appear in-world to deliver critical hints or guidance.
- **Functionality:** All UI elements are informational and automatic. There are no player-managed menus for inventory or quests during gameplay. The Main Menu and Pause Menu will be simple, with standard "Start," "Quit," and "Resume" options.

Player Experience

The intended player experience is a journey of escalating discovery and empowerment.

1. **Initial Tension:** The game starts with the player feeling vulnerable and disoriented in the dark. The limited visibility from the flashlight creates tension and encourages cautious exploration.
2. **Intellectual Engagement:** As the player begins to find keys and unlock doors, a sense of methodical purpose takes over. They are no longer just surviving; they are solving a complex problem.
3. **The "Aha!" Moment:** The design is filled with moments of satisfying discovery, from finding a hidden key to realizing the solution to the backtracking puzzle. These moments make the player feel intelligent.
4. **The Power Trip:** The most memorable moment is designed to be the "Power On" event. The sudden transition from darkness to light is a massive sensory reward that gives the player a feeling of accomplishment and power over their environment.
5. **Final Satisfaction:** Successfully navigating the final puzzle and retrieving the crystal provides a sense of closure and mastery over the game's complex systems.