(Un)Rest

Level Design Portfolio

1

Ideation & Planning

Concepts, Inspirations, Research, and Theory

Brief & Concept

This portfolio contains research, pre-production, implementation, and evaluation for my level, *(Un)rest*.

My chosen brief is *Psychology*.

The player plays as a person suffering from insomnia and hallucinations caused by their sleep deprivation. They must wander through their house and get ready for bed as the rooms around them shift and change locations. They experience auditory and visual hallucinations in the form of murmuring, shadows appearing in the corners of the rooms and figures appearing behind the windows.

The main goal is to make the player experience the feelings of unsettling, wary, and disturbance while performing tasks that are common practice to the player to hopefully partially imitate the experiences of what it is like to go through sleep deprivation inflicted hallucinations.

I have decided to go ahead with this idea as I have previously studied psychology in school and psychological horror is one of the genres of games I most enjoy playing and studying.

Early Concepts

Before deciding on my concrete concept, these are some ideas I was exploring:

Visible Portals vs. Invisible Triggers

- Initially considered using visible, seamless portals (similar to *Portal*) to create the non-Euclidean geometry.
- Decided to use hidden triggers instead as it played better into the simulation of visual hallucinations and unreliable memory of the player character

Large Map vs. Dense Loop

- Considered creating one large map that included copies of rooms and long hallways
- After looking through some of my inspirations, I realized that games similar to mine usually rely on the anxiety cause by repetition and claustrophobia, so I reduced the scale and went for a smaller but denser layout that forces the player to backtrack

Key Inspiration & Analysis

Layers of Fear (2016)	Instead of using complex portals, I will analyse how *Layers of Fear* uses simple triggers to swap room distinct assets when the player is not looking. This will help simulate the protagonist's unreliable memory due to sleep deprivation and the uncanny valley phenomenon.
P.T. (2014)	My level requires the player to perform tasks that are common practice (getting ready for bed) and *P.T.* proves that you do not need a large map to create "unsettling" feelings. I will use this inspiration to keep my level size small but dense with detail, forcing the player to backtrack through the same hallway and rooms.
Superliminal (2019)	My goal is to make the player feel the disturbance of insomnia; thus, I will analyse how *Superliminal* visually represents the breaking mind without using standard "horror" tropes (like blood or jump scares), implementing figures appearing behind windows and shadows instead.
The Uncanny	Freud's theory is that horror is most potent when something familiar becomes strange or foreign. By using a standard house setting where the player wanders to get ready for bed, I am establishing the *familiar*. The shifting rooms and murmuring introduce the *strange*, creating the uncanny experience.

Research & Theory

The Pathology

Insomnia and Sleep Deprivation

= Prolonged sleep deprivation leads to the brain's inability to filter sensory input, thus causing *perceptual distortions*

Pareidolia is a phenomenon wherein the human brain tends to "perceive likenesses on random images – such as faces animals, or objects" as part of our survival instincts (Psychology Today, 2023). When sleep-deprived, the brain's "filter" begins to fail, causing it to misinterpret the visual data it receives as a threat (e.g. mistaking a coat rack for an intruder).

Hypnagogic hallucinations are hallucinations that happen as a person is falling asleep that up to 70% of people experience at least once in their life. Up to 34% of hypnagogic hallucinations are auditory that may involve "words or names, people talking, and environmental or animal sounds" (Clinic, 2022).

Research & Theory

The Space

Non-Euclidean Level Design

= Non-Euclidean geometry breaks down the real-world rules of plane and solid shapes including, but not limited to, parallel lines remaining parallel, rooms having fixed coordinates, and light affecting shadows.

The ‘cognitive map’ hypothesis “proposes that brain builds a unified representation of the spatial environment to support memory and guide future action” (Epstein et al., 2017) By using non-Euclidean geometry in the level design, the player’s cognitive map is purposefully disrupted to create a sense of unease, helplessness, and confusion, feelings which fall into the game’s main goal for player experience.

Games such as *The Stanley Parable* and *Antichamber* use impossible (i.e. non-Euclidean) spaces to force the players to question their own perception of the environments around them.

Research & Theory

The Emotions

The Uncanny

= The Uncanny is Sigmund Freud’s theory that suggests true horror comes for something familiar suddenly becoming unfamiliar

“Uncanny Valley” usually refers to “the feelings of unease or revulsion that people tend to have toward artificial representations of human beings” (Dictionary.com, 2023). In architecture however, it can also refer to “the disconcerting effect that occurs when we can't quite sort out the relationship of an image to the world.” (Archinect, 2018) In the level design this can be achieved with silence where there should be noise, doors leading to nowhere, or hallways looping back.

Research & Theory

The Logic

Unreal Engine Mechanics

For the level design I have used the following YouTube video tutorials along with the class tutorial videos provided by the lecturer to help me achieve the aforementioned player experiences and psychological phenomenon using Unreal Engine mechanics:

1. *Door Opening*
   Gorka Games (2022c). Learn How to Open and Close Doors in Unreal Engine 5. Youtube.com. Available at: https://www.youtube.com/watch?v=O7vmp73ue4Y
2. *Pick-Up System*
   Gorka Games (2022b). How to Make a Simple Pick Up System in Unreal Engine 5 - Beginner Tutorial. Youtube.com. Available at: https://www.youtube.com/watch?v=qVtoemgM7wI

3. *Interaction Prompt*
   Gorka Games (2022a). How to Make a 3D Interaction Prompt in Unreal Engine 5. Youtube.com. Available at: https://www.youtube.com/watch?v=VU7jdKPdjLw

2

Pre-Production

Mood Boards, Sketches, and Flow Diagrams

Mood Boards

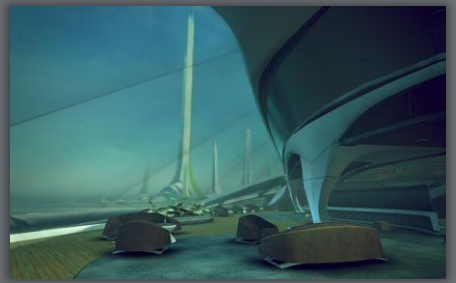
Visual Style & Colour

Trying to balance the feelings of familiarity and unease to create the slightly disturbing, uncanny valley feelings for the player

"Domestic Horror"
- Aiming for "uncanny valley", slightly dated that feels "off"

Colour Palette
- Browns, beiges, dark reds – warm but stifling

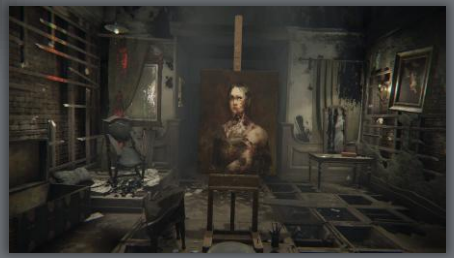
Visual Distortion
- Hypnagogic visual hallucinations



(Brink, 2011)

(University of New South Wales, 2016)

(Steamcommunity.com, 2023)



(Bloober Team, 2018)

Mood Boards

Architecture & Layout

Aiming to make the otherwise familiar environment of a standard home feel unwelcoming and break the player's cognitive map

Non-Euclidean Architecture

- Impossible geometry (door leading to a room bigger than the house, hallways looping etc.)

"Familiar" Layout

- Standard 1900s and 2000s homes

Claustrophobia

- Narrow hallways, low ceilings, cramped floorplans

(Escher, 1938)

(Pillow Castle, 2020)

(Escher, 1960)

(VELUX Skylights, 2021)

Mood Boards

Lighting & Atmosphere

Create the feelings of unease, as if something is hiding behind every corner by adding clear examples of pareidolia, the player's brain will continue to create further instances on its own, as it is expecting to see shadows and figures in ordinary objects

Harsh Contrasts

- Low light, flickering lights
- Single light source in a dark room

Shadows

- Pareidolia

(Sensebe, 2014)

(Becker, 2019)

(Young, 2023)

(roddiemacdonald8, 2023)

(Felicette_space_cat, 2022)

Mood Boards

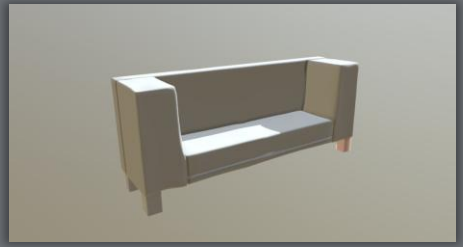
Mechanics & Props

Further help create the feelings of familiarity while still feeling a bit “off”. Also allow the player to keep a track of the objects they are interacting with

The “Routine” Objects
- Lunch, books, toothbrush, t-shirt, desk setup, washing machine

Item Icons
- Icons for the above mentioned

Low-poly Furniture
- Basic home furniture (couch, bookshelves, kitchen counters, desk, wardrobe, etc.)



(ankitpassi, 2018)

(lucaboechat, 2023)

(Karolina Renkiewicz, 2021)

(mikan933, 2020)

(Freepik, 2019)

(Freepik, 2021)

(angicon, 2024)

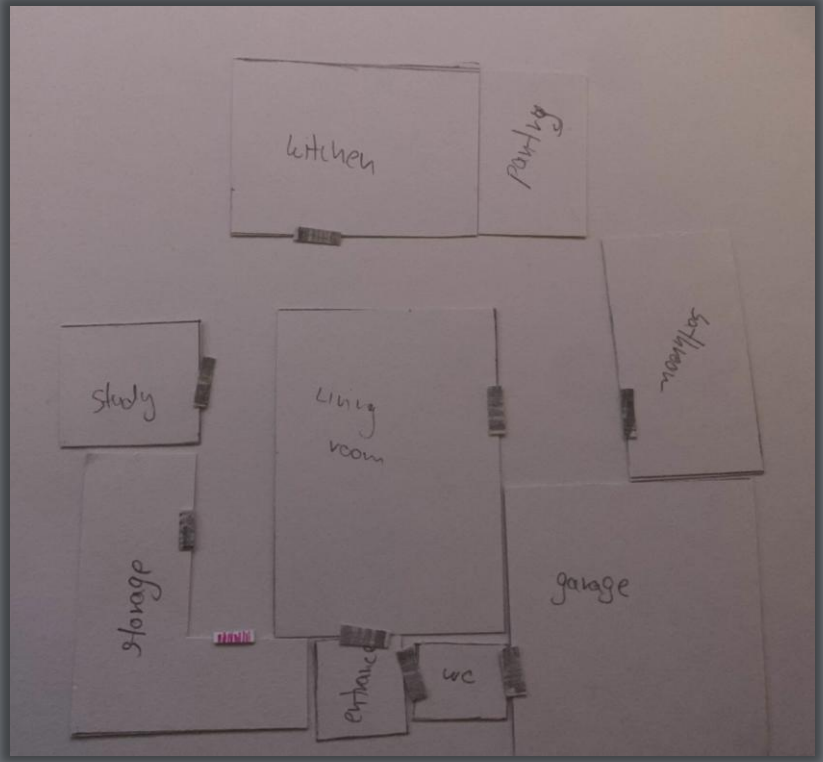
Sketches & Iterations

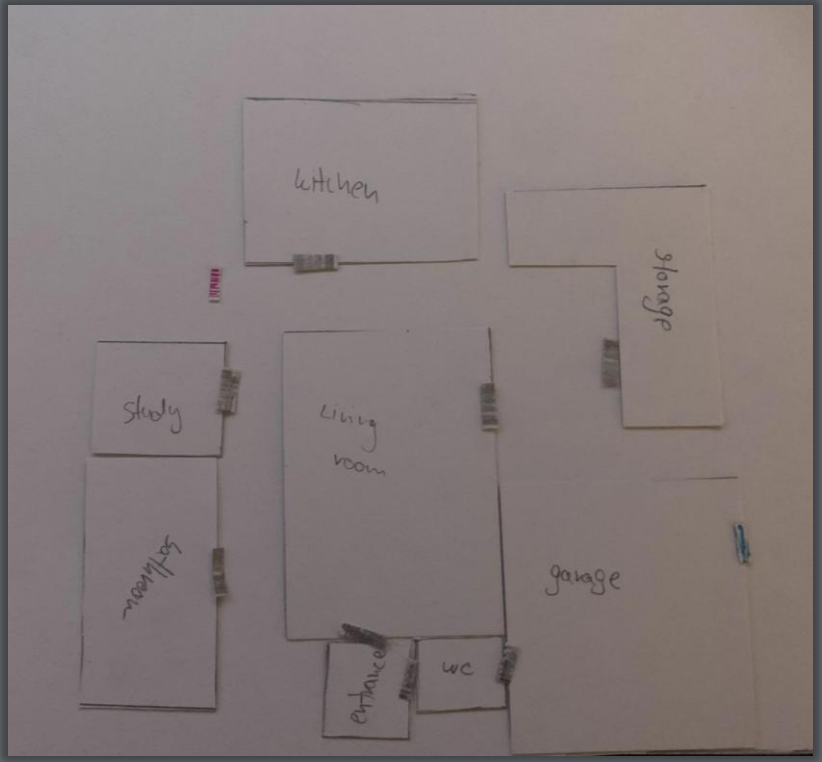
1

For the first iterations I have cut out the individual rooms out of paper and arranged them together into four different layouts.

I chose this method as it allowed me to try out many different layouts before settling on the ones, I liked the best.

At this point, I have only decided on the size ratio of each of the rooms, as opposed to concrete measurements, as I wanted to wait and see how everything looks in Unreal Engine first before making solid decisions.


kitchen
parking
study
living room
bathroom
storage
garage
entrance
wc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storage
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garage
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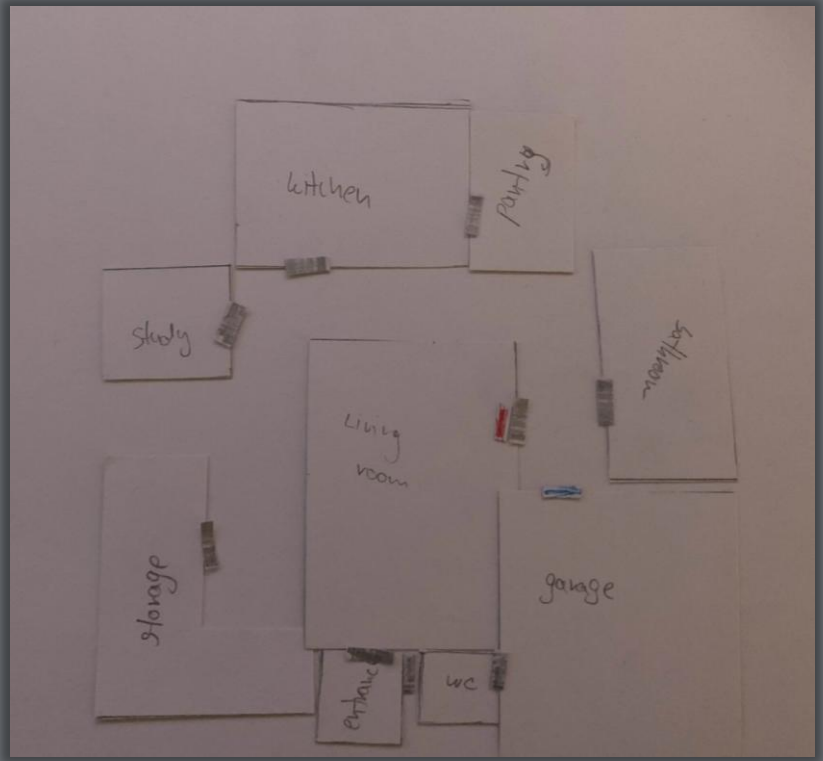
wc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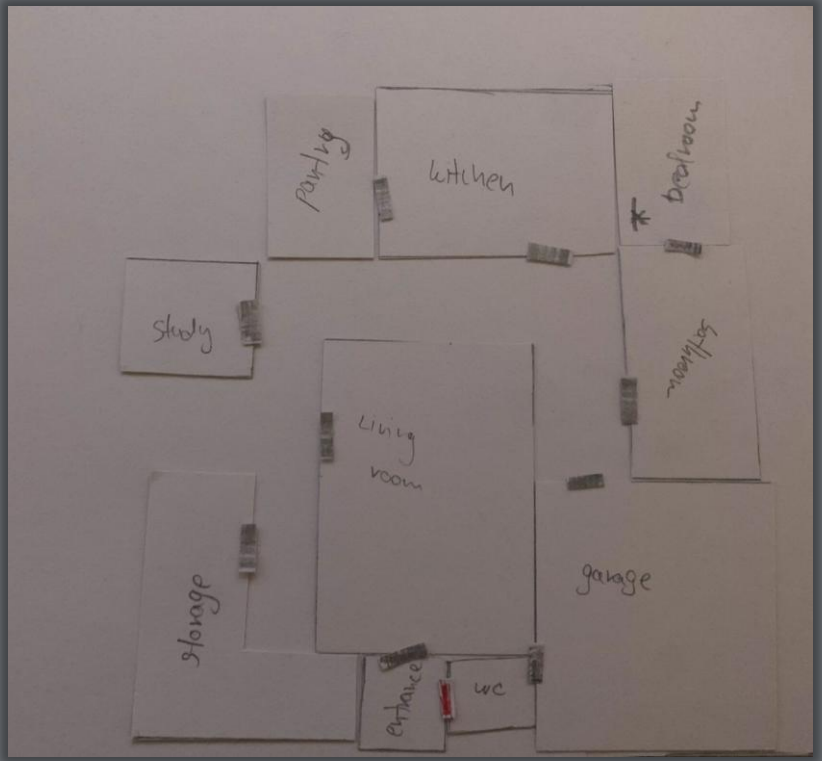
study
living room
storage
garage
storage
entrance
wc


parking
kitchen
bedroom
study
storage
living room
garage
storage
entrance
wc

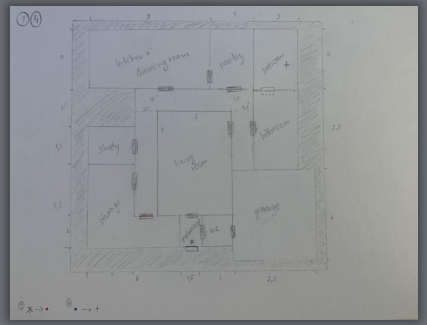
Sketches & Iterations

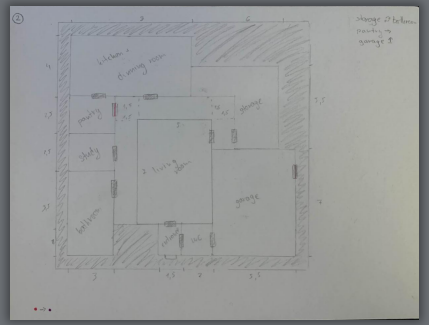
2

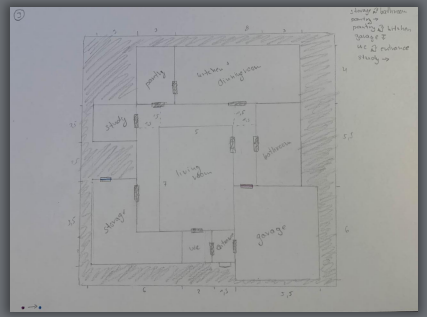
For the second and final iteration I have sketched the layouts with a pencil and paper, this time merging the first and fourth maps into one.

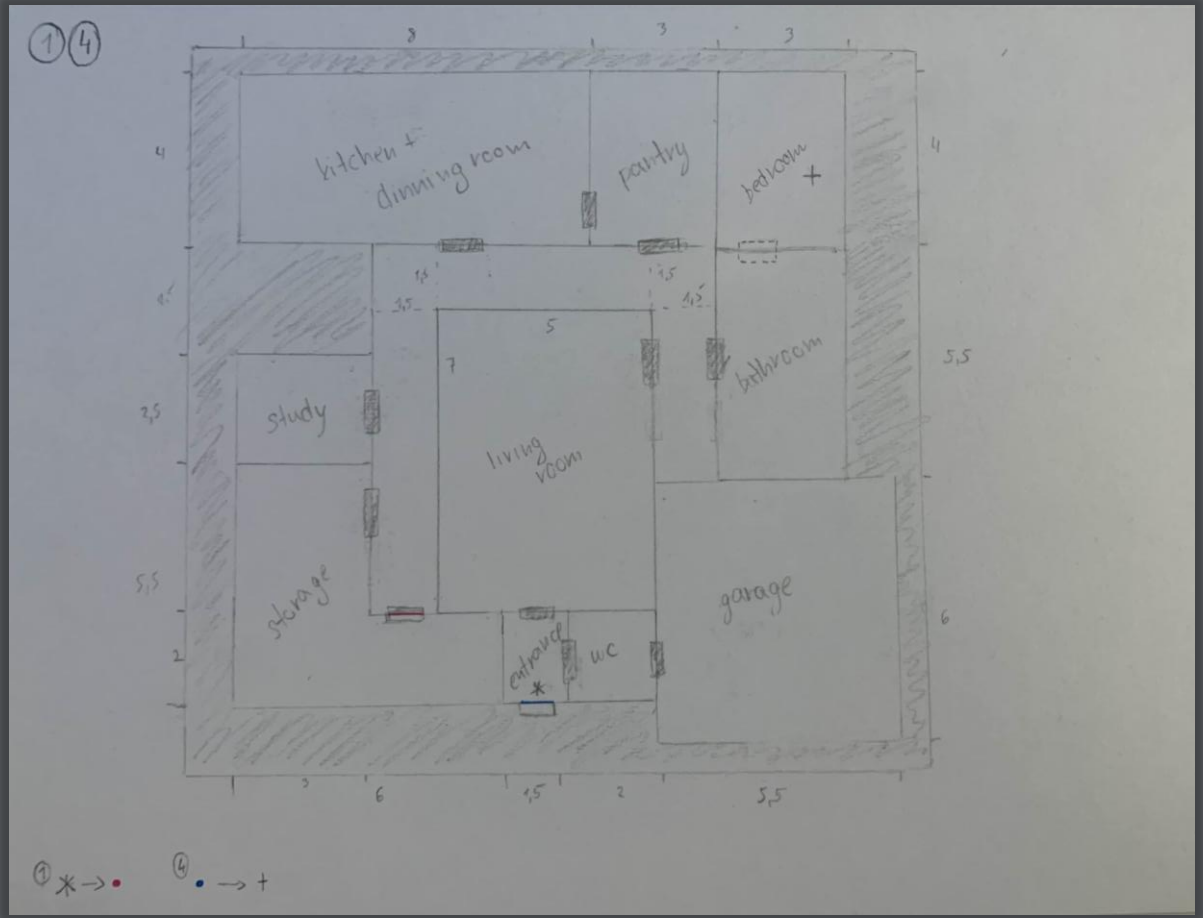
I have changed the room layouts a bit, adjusting the size ratios of the rooms as well, and most importantly, moving the room “portals” around.

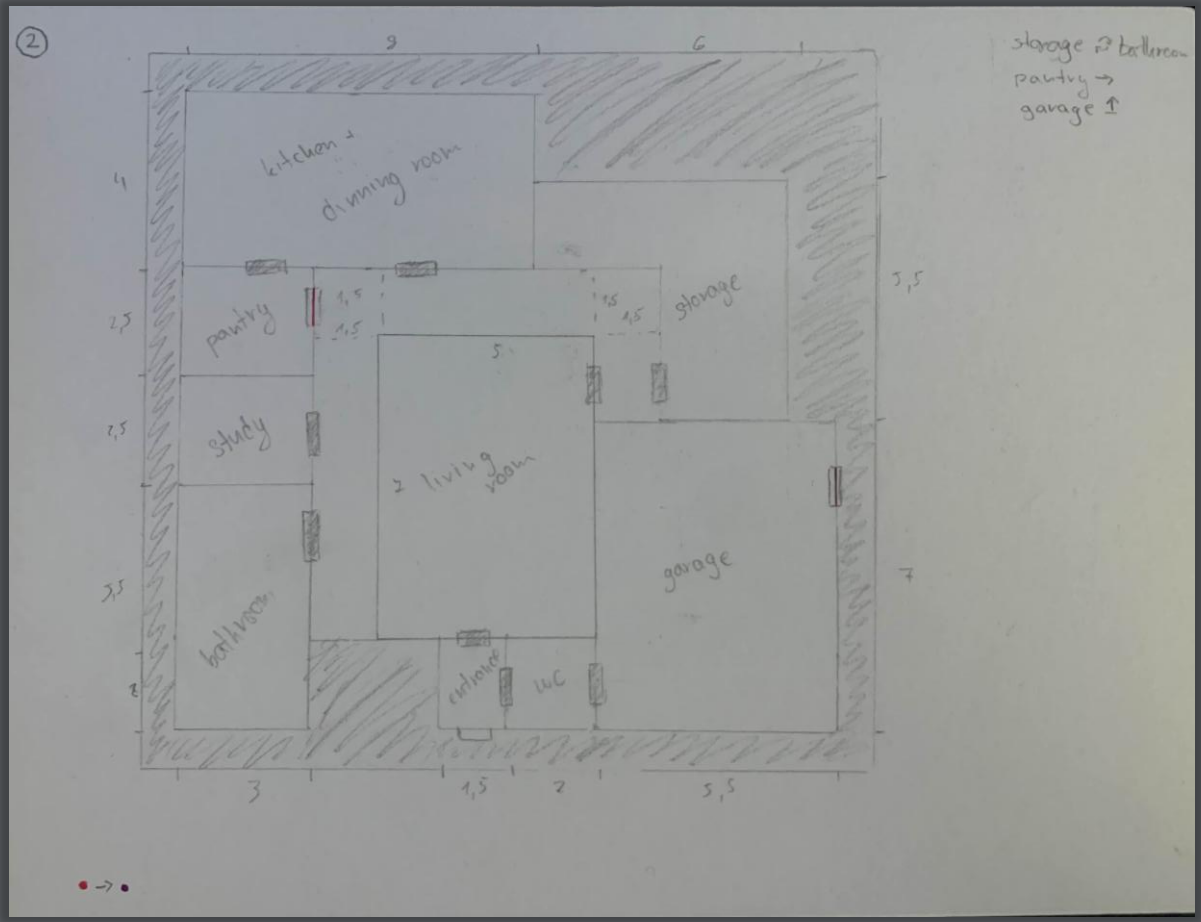
Lastly, I have made concrete decisions on the sizes of the individual rooms (1cm = 1m).








1 4
kitchen + dinning room
pantry
bedroom
study
living room
bathroom
storage
garage
entrance
wc
1 * → •
4 • → +


2
9
6
storage ↔ bathroom
pantry →
garage ↑
kitchen + dining room
pantry
study
living room
storage
garage
bathroom
entrance
WC
4
2,5
2,5
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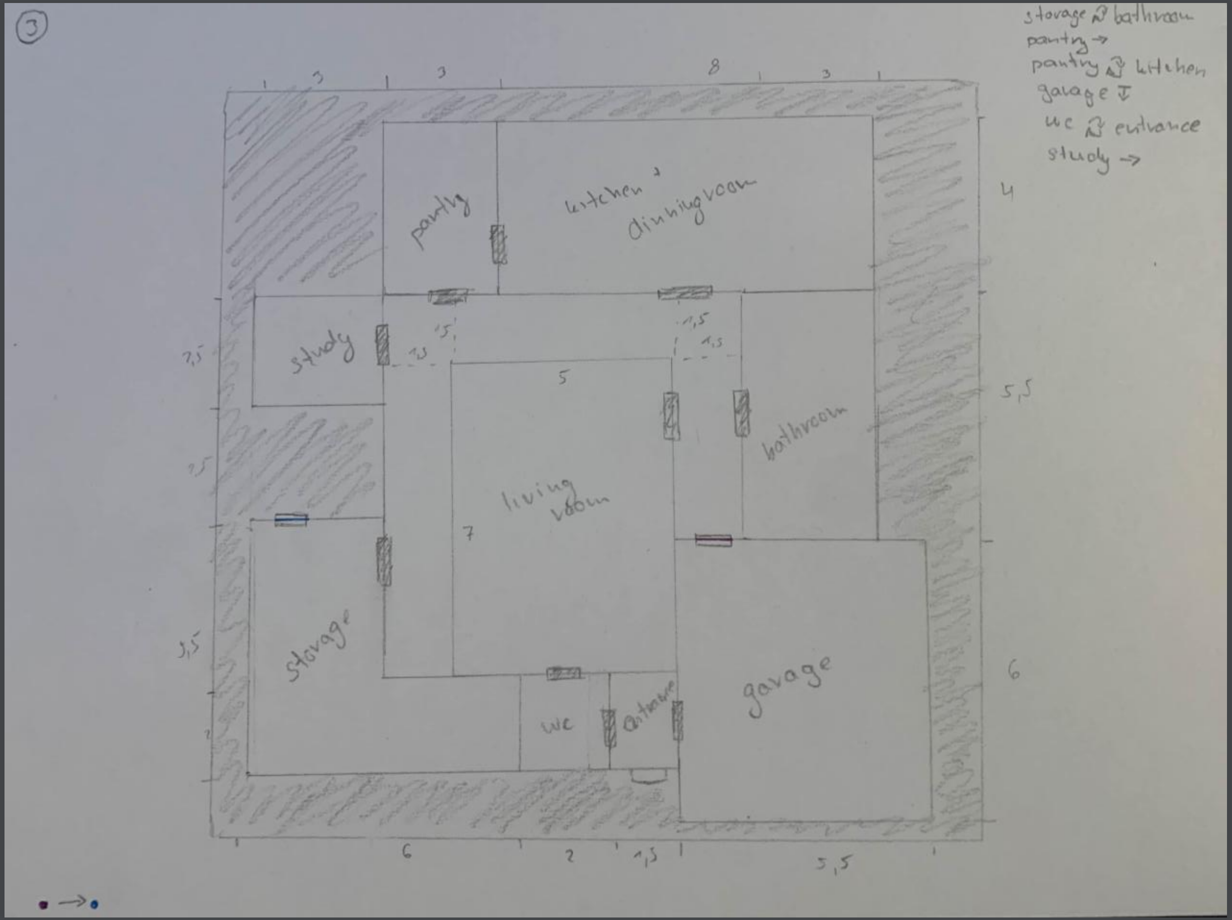
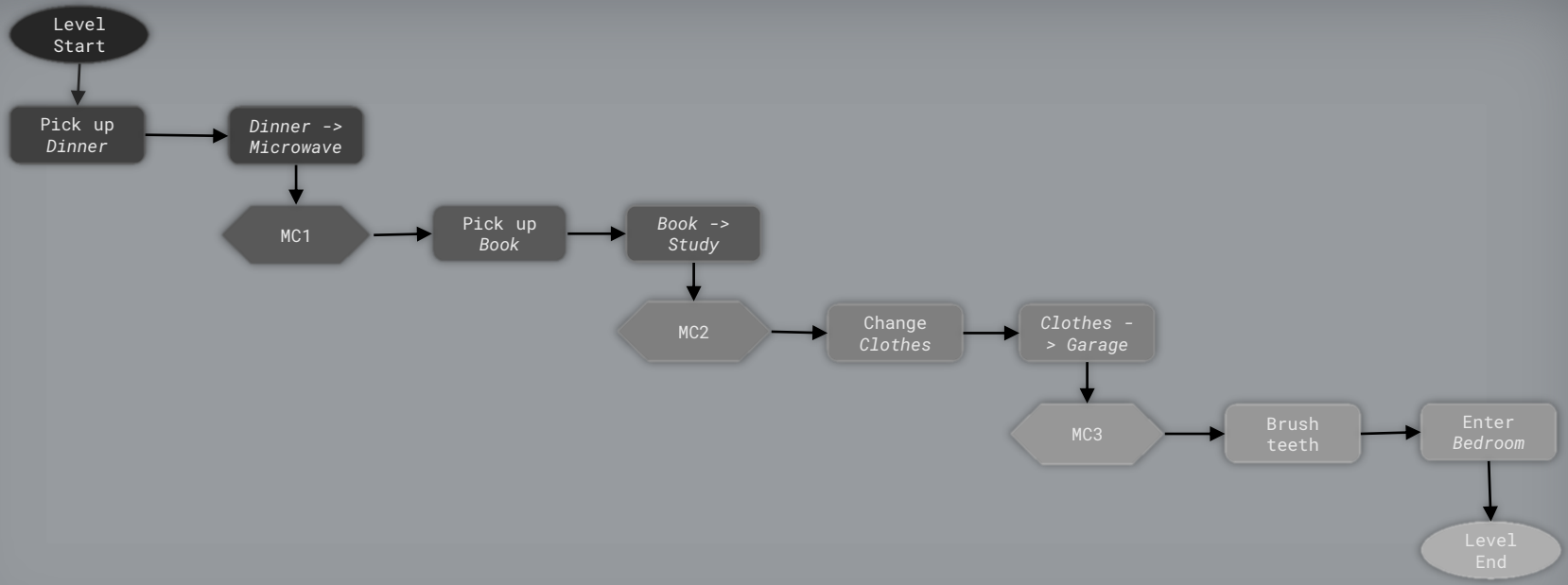


storage bathroom
pantry →
pantry kitchen
garage
wc entrance
study →
pantry
kitchen + diningroom
study
living room
bathroom
storage
wc
entrance
garage

Flow Diagram



*MC = map change

3
Production

Blockmesh and Testing

Blockmesh

Stage One
= *General Layout & Scale*
Using basic primitives (cubes, planes) to define the level layout of the first map, establishing correct room sizes, hallway widths, and ceiling heights, adding blockouts for bigger furniture, essential points etc.

Stage Two
= *Fine Details & Functional Objects*
Adding more detailed blockouts (shelves, decorations etc), adding lighting using lamps and ceiling lights

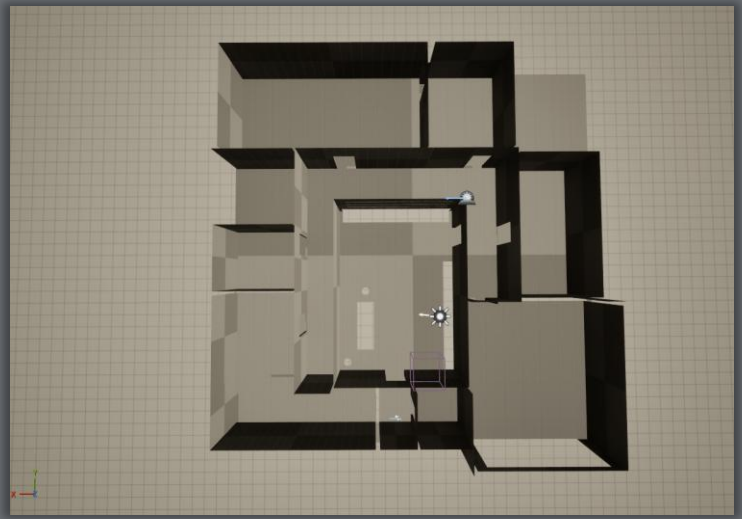
Stage Three
= *Visual Readability & Colour Coding*
Adding colours or textures to surfaces, cleaning up geometry, finishing mechanics

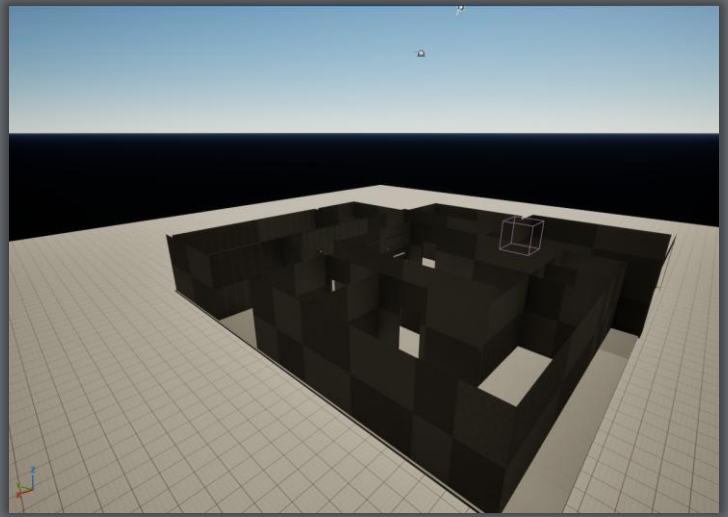
Stage Four
= *Concrete Layout & Playthrough Experience*
Copying the first map layout and mechanics to create the rest of the map, and adding transitions between maps

Blockmesh

Stage One

- Focusing on creating a claustrophobic layout with tight hallways and semi-uniform room scales





Blockmesh

Stage Two

- Using the engine’s built in geometry shapes to create low-poly furniture, keeping everything as generic as possible to allow the players to imagine themselves living in the house (building up the feeling of familiarity)

Blockmesh

Blockmesh

Stage Three

- Using mainly neutral and warm tones for the furniture and details, sticking to strict palettes and reusing colours and textures to “blend” the rooms together (will make it easier to confuse the players by moving the rooms around)

Blockmesh






Blockmesh

Stage Four

- Copying the first map to create three more and moving the individual rooms around, for map four added a bedroom (game end), kept everything else intact

Testing

Round One

= conducted in October during the grey boxing and blockmesh stage one and two

Area: restricted to map #1 only, at this point the environment consisted of only basic shapes and low-poly furniture blockouts without any detailed materials

Mechanics: testing basic navigation and the door opening mechanic, primarily looking for feedback on the “claustrophobic” layout and checking that the sizes of rooms and furniture were realistic relative to the player character

Tester Task: “Attempt to navigate from the Entrance to the Kitchen, then Garage, then Storage room. Interact with as many doors on your way as possible to check if they open and don’t clip into geometry.”

Testing

Round One

positives

- The "claustrophobic" layout with tight hallways successfully created a sense of unease
- The non-linear room structure disrupted the tester's cognitive map

negatives

- The player character got sometimes stuck on doors that open towards them
- The player height and the doorway height felt disproportionate to the rest of the map

changes

- Adjust the line trace length for the interaction prompt for the doors, as players had to stand too close to them to trigger them
- Make the player character 50% taller and heighten and widen the doorways

Testing

Round Two

= conducted in November during blockmesh stage three and four

Area: the full map, including the transitions between maps #1, #2, #3, and #4, already included all materials and lights

Mechanics: testing teleportation mechanic between the maps, the pickup/ put down mechanic and audio asset volumes

Tester Task: “Complete the full ‘get ready for bed’ routine. Report any bugs you think you have encounter.”

Testing

Round Two

positives

- The neutral and warm colour tones successfully blended the rooms, making the “teleport" mechanic smoother and more confusing for the tester
- The background audio (whispers) effectively increased tension

negatives

- The "Game End" fade-to-black happened too abruptly, breaking the immersion
- The ‘unlocking door’ audio was too quiet, making the players confused as to how to progress in the game if they missed the on-screen text

changes

- Increase the duration on the "Start Camera Fade" node from 1 second to 3 seconds
- Lower the volume of the background audio and increase the ‘unlocking door’ audio

4
Scripting

Mechanics and Systems

Mechanics

Interaction Prompts

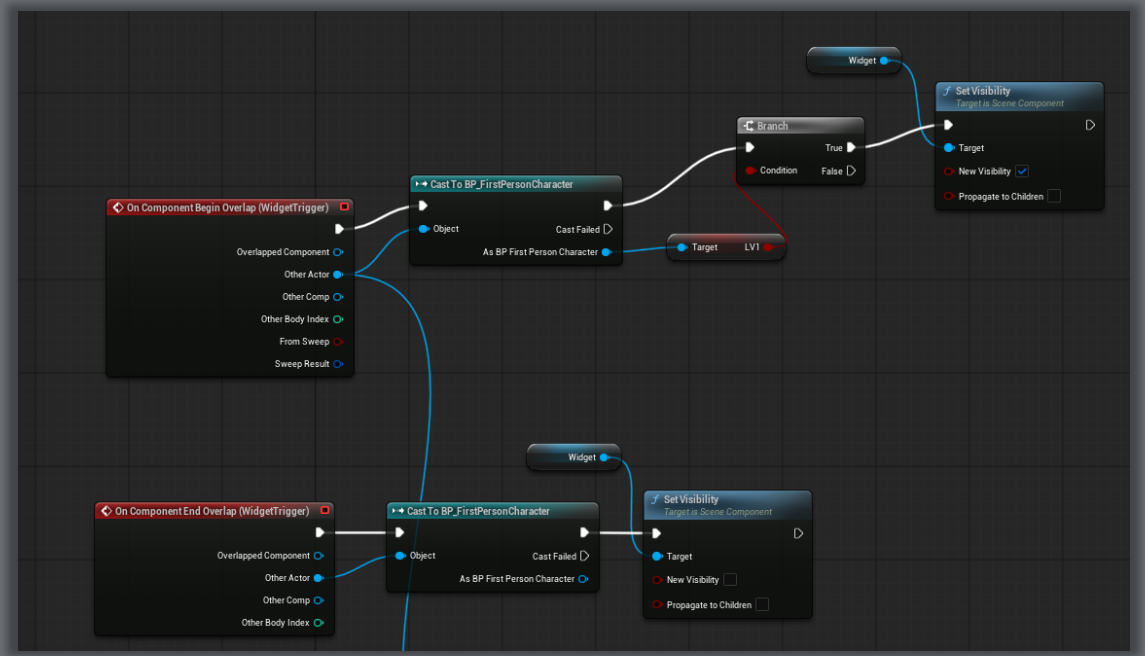
= Guides the player through the environment by visually signalling when they are within range of an interactable object (doors and items)

The system uses *On Component Begin Overlap* and *On Component End Overlap* events to detect the player's proximity to specific actors (doors, items).

Upon overlap, the blueprint casts to the *BP_FirstPersonCharacter* to ensure it is the player triggering the event.

It toggles the visibility of a *widget* (different for each actor) on the player's HUD. The visibility is set to true when entering the *WidgetTrigger* and false when leaving, ensuring the screen remains uncluttered

Mechanics



(Gorka Games, 2022a)

Mechanics

Door Opening

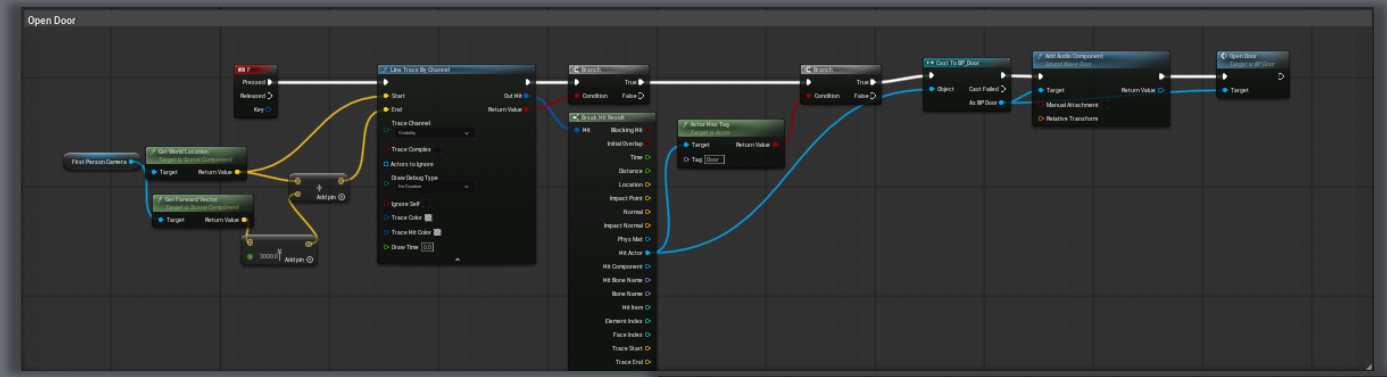
= Provides a standard method of movement between rooms, makes the level more claustrophobic

The interaction is initiated by the player pressing a specific key (Input Action 'F'), which fires a *Line Trace By Channel* from the *First Person Camera* to detect objects in front of the player.

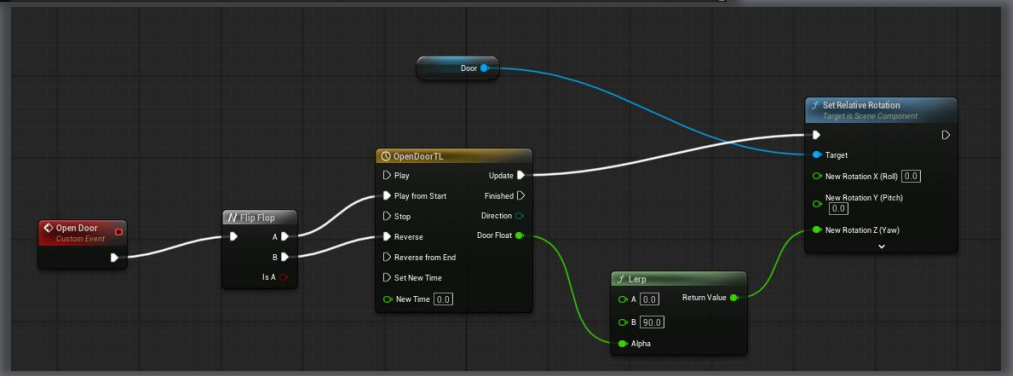
The system checks the hit result for a specific actor tag ("*Door*") to prevent the script from running on non-door objects.

Instead of snapping the door open instantly, a Timeline node (*OpenDoorTL*) is used to smoothly update the door's rotation over time. A Lerp (Linear Interpolation) node calculates the rotation between 0 and 90 degrees.

Mechanics



(Gorka Games, 2022c)



Mechanics

Pick Up

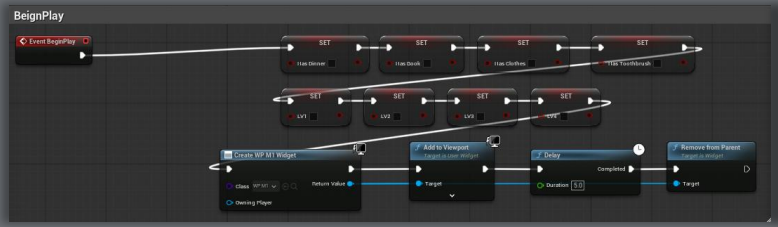
= Manages the inventory system, allowing the player to collect essential items (Dinner, Book, Clothes) required to progress

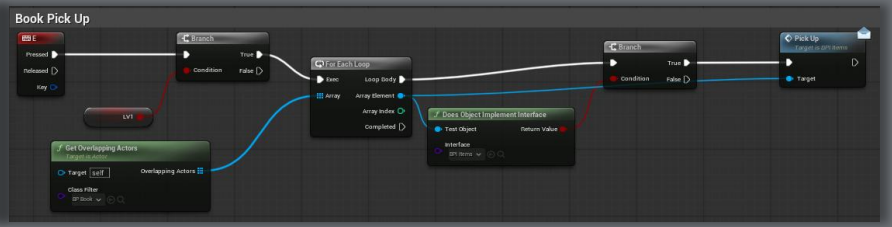
The script utilizes boolean variables (e.g., *Has Dinner*, *Has Book*) to track the player's inventory state.

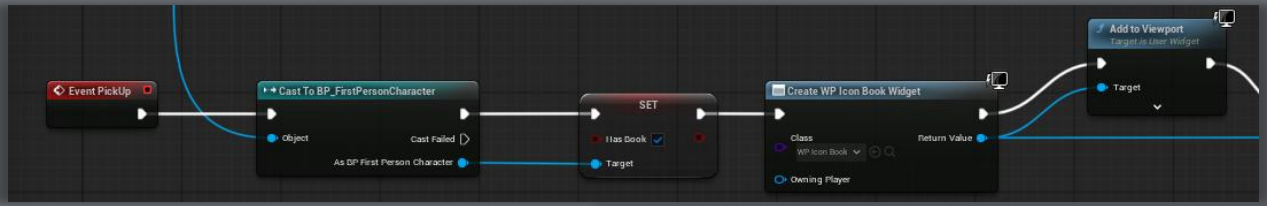
Upon a successful pick-up event, the system creates a specific UI widget (e.g., *WP Icon Book*) and adds it to the viewport to confirm the action to the player.

After the item is collected and the UI feedback is shown, the script calls *Destroy Actor* to remove the mesh from the game world, preventing duplicate interactions

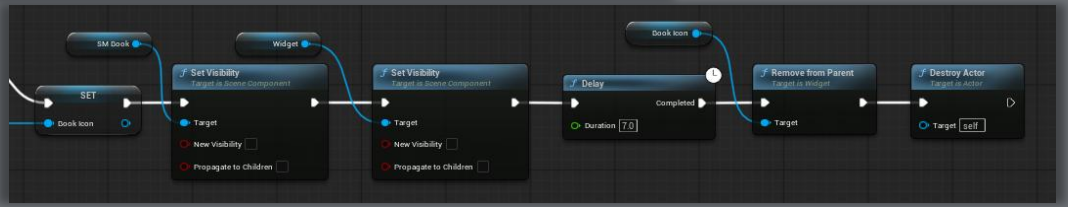
Mechanics







(Gorka Games, 2022b)



Mechanics

Put Down

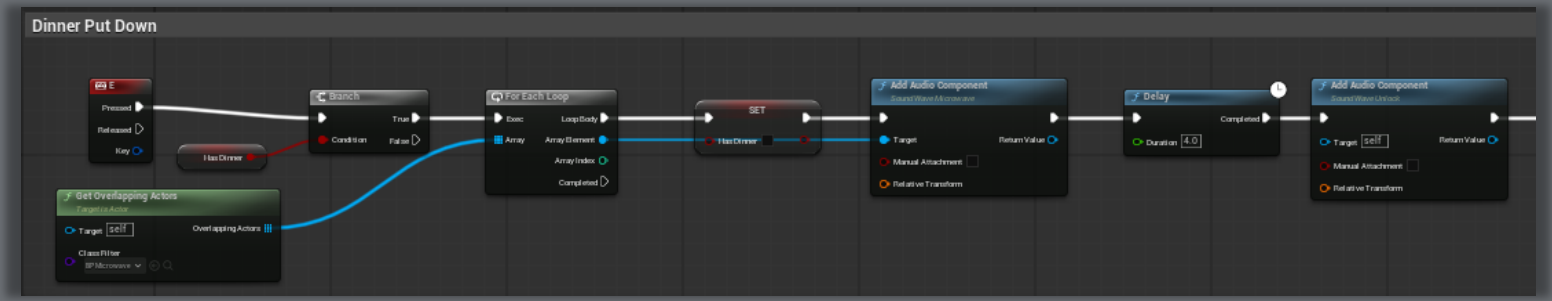
= Handles the completion of objectives by allowing the player to place collected items in their designated locations (e.g., placing dinner in the microwave).

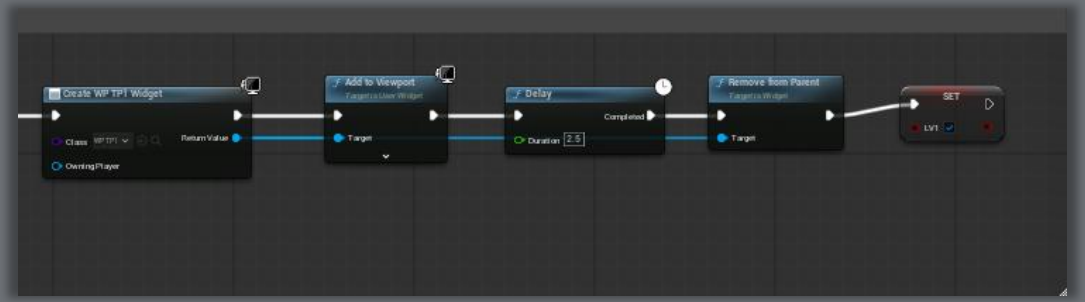
When the interaction key is pressed, a Branch node checks if the relevant inventory boolean (e.g., *Has Dinner*) is set to true. If false, the action fails.

The script triggers specific sound effects, such as a microwave humming, using *Add Audio Component*. A *Delay* node creates a pause before playing a secondary sound (“*Unlock*” sound) to let the player know a new part of the map has been unlocked.

After the action sequence is complete, variables are updated (e.g., setting LV1 to true) to mark the objective as finished.

Mechanics


Dinner Put Down
E
Pressed
Released
Key
Has Dinner
Branch
Condition
True
False
FOR Each Loop
Exec
Array
Loop Body
Array Element
Array Index
Completed
SET
Has Dinner
Add Audio Component
Target
Manual Attachment
Relative Transform
Return Value
Delay
Duration
4.0
Completed
Add Audio Component
Target
self
Manual Attachment
Relative Transform
Return Value
Get Overlapping Actors
Target is Actor
Target
self
Class Filter
Overlapping Actors


Create WP TP1 Widget
Class
Owning Player
Return Value
Add to Viewport
Target
Delay
Duration
2.5
Completed
Remove from Parent
Target
SET

Mechanics

Teleport

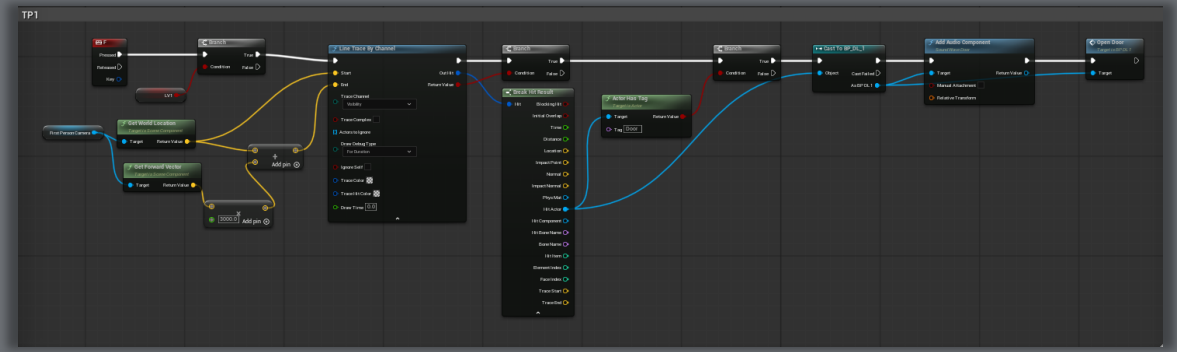
= This is the core mechanic for the "Non-Euclidean" design. It creates the illusion of shifting rooms by instantly moving the player to a different map section

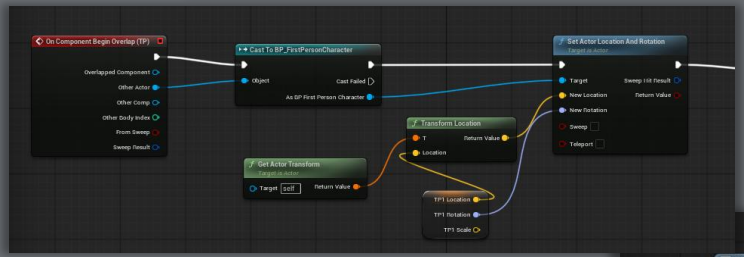
Similar to the door mechanic, this uses a *Line Trace* to detect a specific interaction point. However, instead of animating a door, it triggers a *Set Actor Location and Rotation* node.

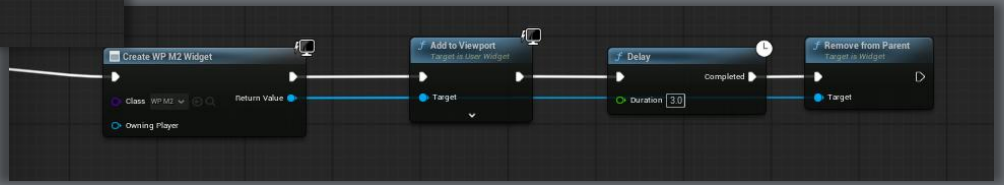
The script takes a target location and rotation (*TP1 Location*) and instantly snaps the player character to those coordinates.

By skipping the physical travel time and changing the environment instantly, this script disrupts the player's cognitive map, simulating the confusion of sleep deprivation.

Mechanics


TP1


On Component Begin Overlap (TP)
Cast To BP_FirstPersonCharacter
Set Actor Location And Rotation
Transform Location
Get Actor Transform


Create WP M2 Widget
Add to Viewport
Delay
Remove from Parent

Mechanics

Background Audio

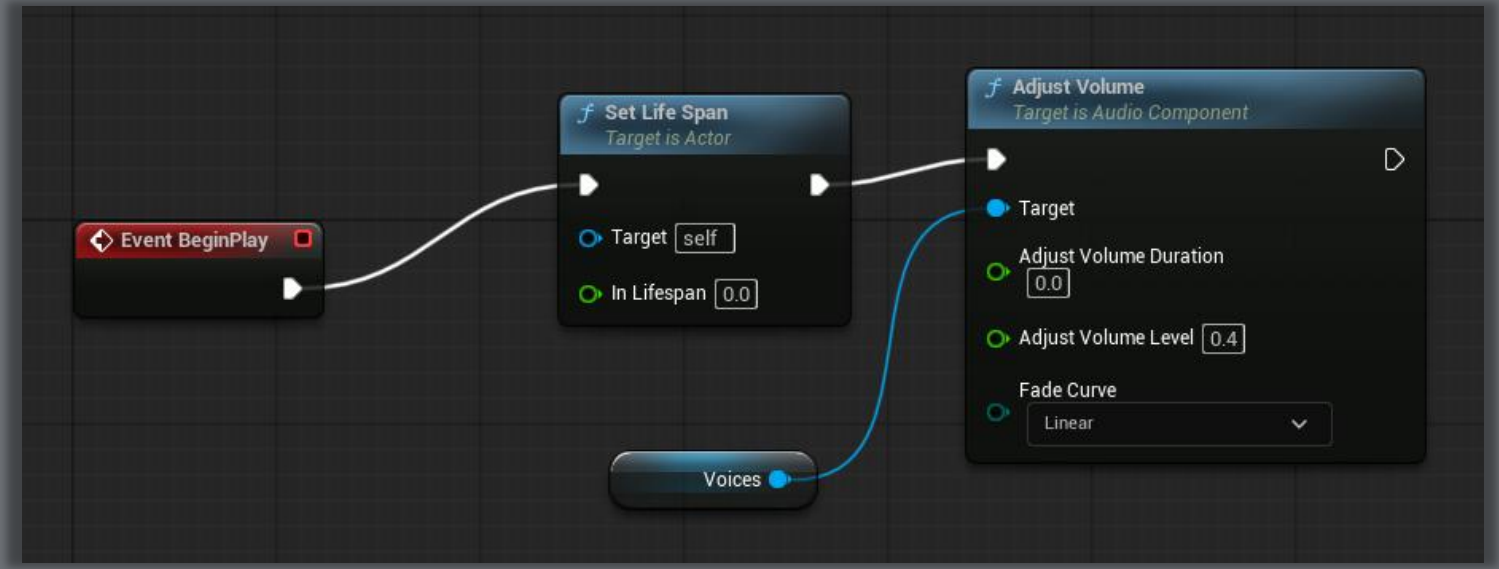
= To simulate auditory hallucinations and build atmospheric tension using whispers and murmuring

The script uses *Set Life Span* on *Event BeginPlay*, ensuring that the audio actor exists in the world for a specific duration before automatically destroying itself.

An *Adjust Volume* node is utilized to set specific volume levels.

This mechanic supports the game's psychological horror theme by introducing sounds that are fleeting and difficult to pinpoint, mimicking the effects of insomnia.

Mechanics


Event BeginPlay
Set Life Span
Target is Actor
Target self
In Lifespan 0.0
Adjust Volume
Target is Audio Component
Target
Adjust Volume Duration 0.0
Adjust Volume Level 0.4
Fade Curve
Linear
Voices

Mechanics

Game End

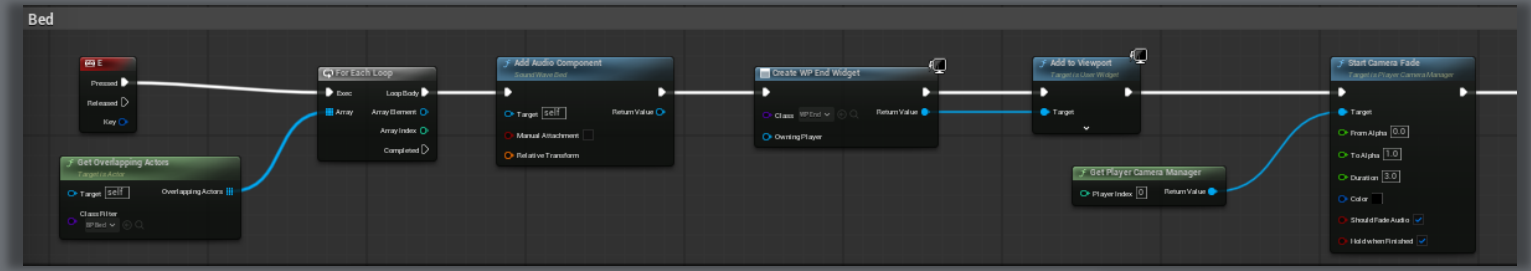
= Marks the conclusion of the narrative loop, triggered when the player finally manages to go to bed.

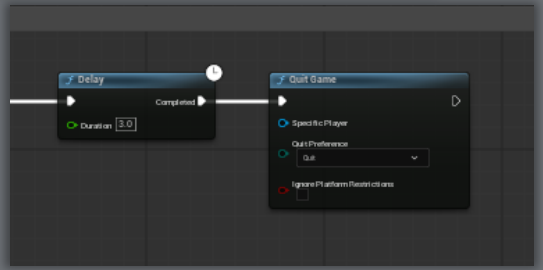
Triggered by interacting with the bed, the script immediately plays a "Bed" sound effect and displays an ending widget.

A *Start Camera Fade* node is used to transition the player's view from the game world to solid black over a set duration (3.0 seconds), simulating falling asleep.

After a short delay to allow the fade to complete, the Quit Game node is executed to close the game cleanly.

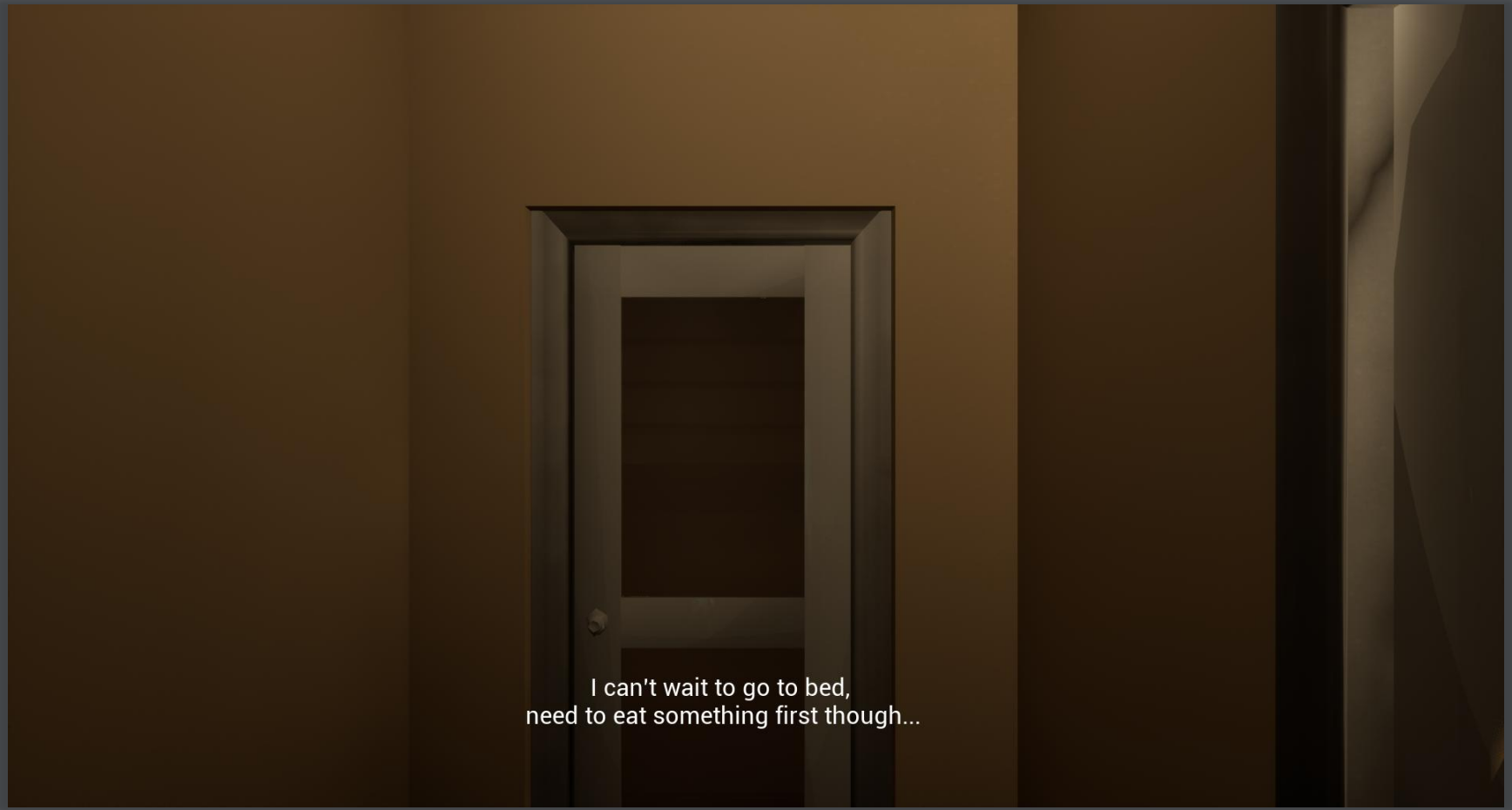
Mechanics


Bed
E
Pressed
Released
Key
Get Overlapping Actors
Target is Actor
Target
self
Overlapping Actors
Class Filter
BP_Bed
For Each Loop
Exec
Array
Loop Body
Array Element
Array Index
Completed
Add Audio Component
Sound Wave Bed
Target
self
Return Value
Manual Attachment
Relative Transform
Create WP End Widget
Class
WP End
Return Value
Owning Player
Add to Viewport
Target is User Widget
Target
Get Player Camera Manager
Player Index
0
Return Value
Start Camera Fade
Target is Player Camera Manager
Target
From Alpha
0.0
To Alpha
1.0
Duration
3.0
Color
Should Fade Audio
Hold when Finished


Delay
Completed
Duration
3.0
Quit Game
Specific Player
Quit Preference
Quit
Ignore Platform Restrictions

5
Final Renders

Finished Level Design


I can't wait to go to bed,
need to eat something first though...

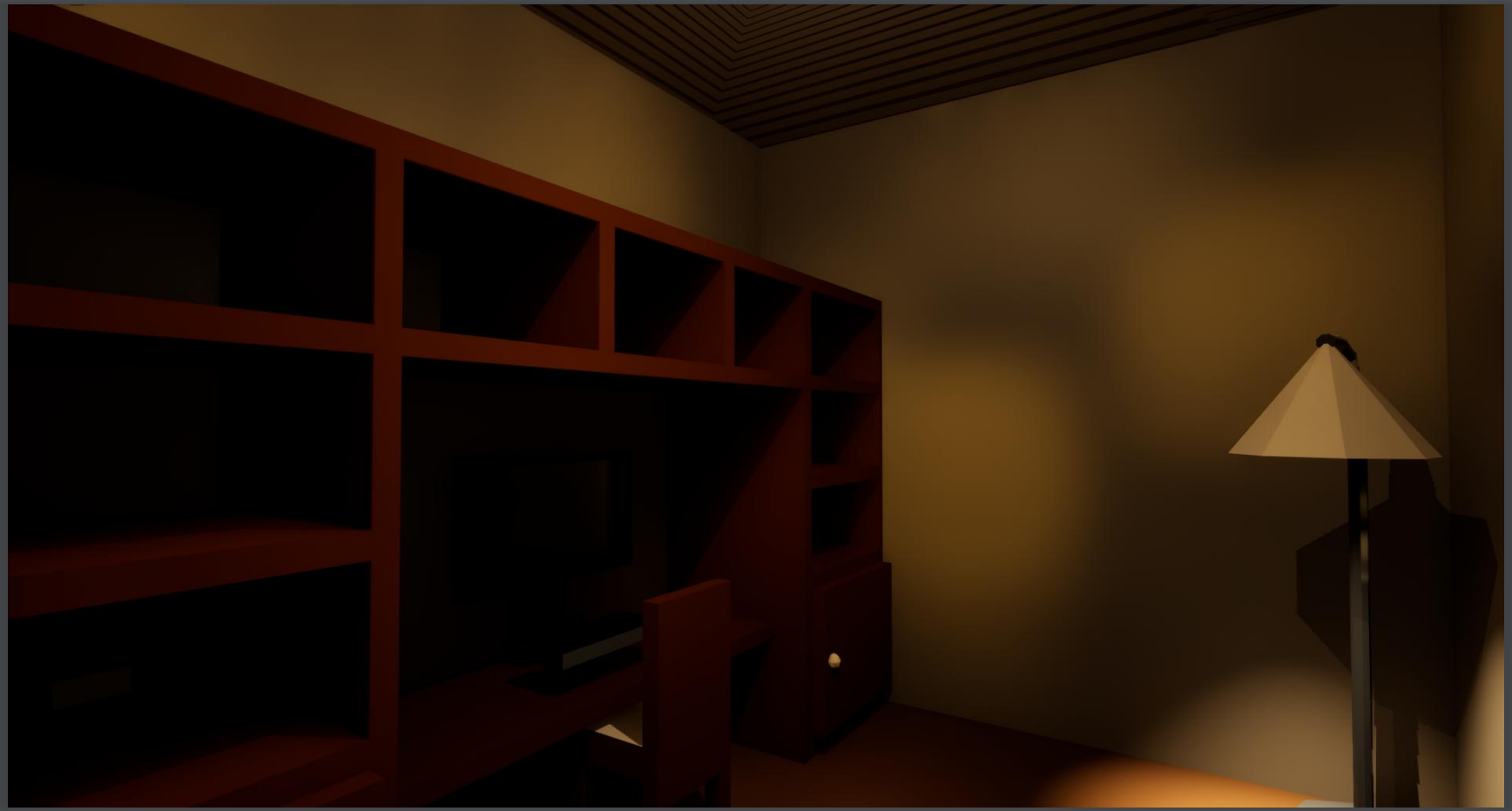

Pick Up [E]

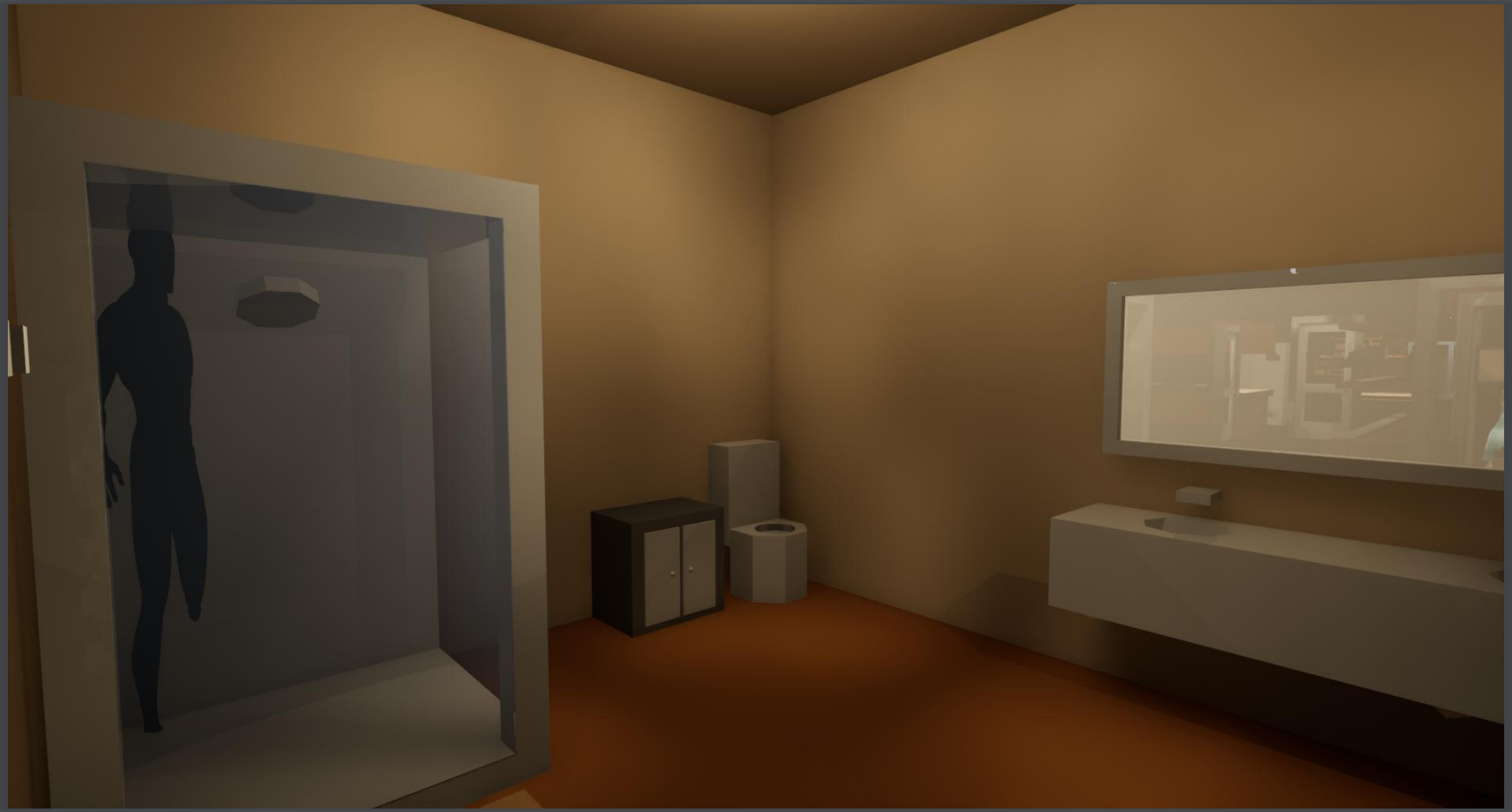

Warm Food Up [E]
Cold pizza doesn't sound too bad, but I still better put this in the microwave for a bit

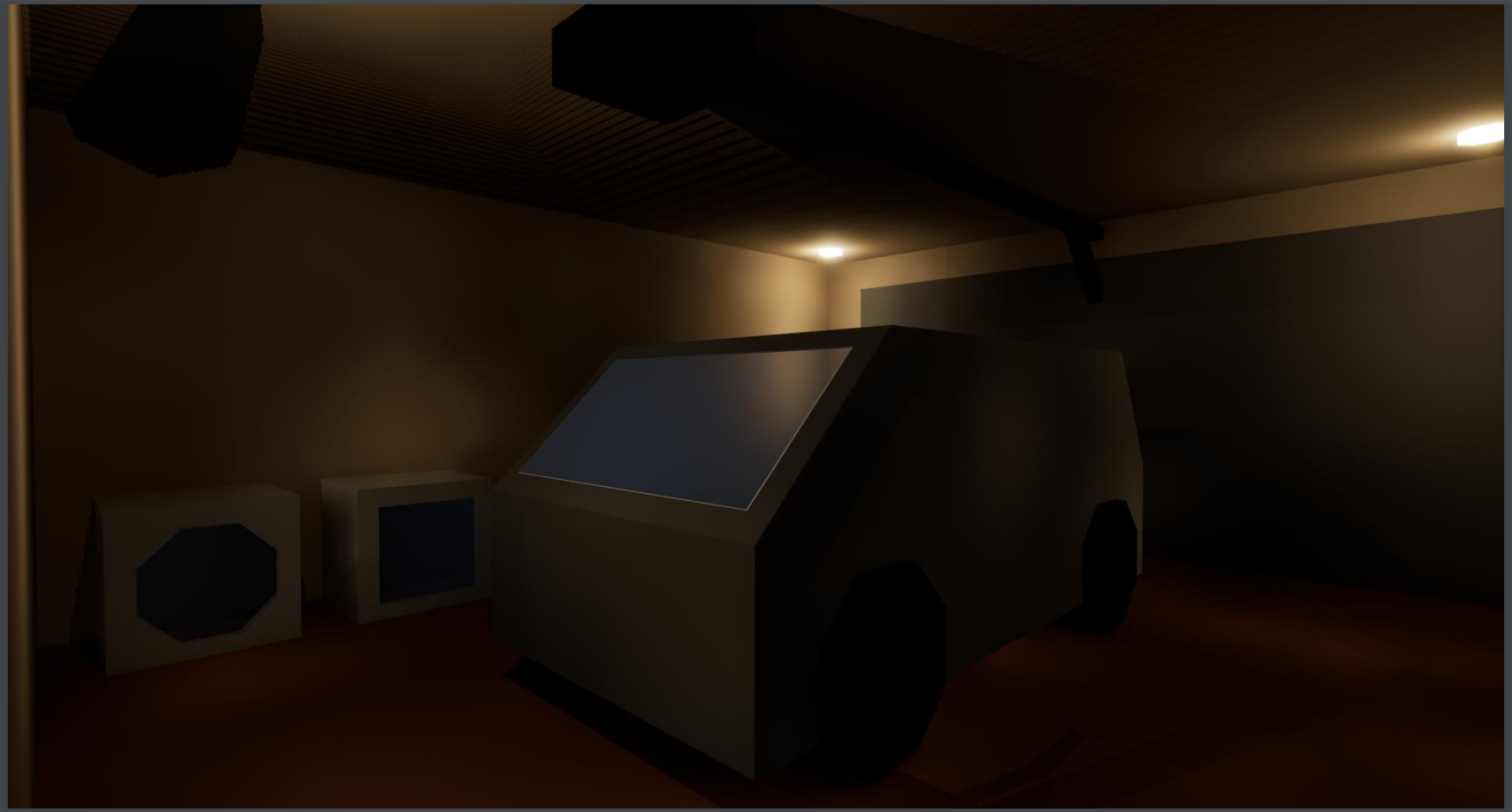

Put Down [E]


Change clothes [E]


Open [F]
No reason to go outside








Open


Open [F]


Go to sleep [E]


Go to sleep [E]
Finally...

6

Critical Reflection

Evaluation and References

Evaluation

What went right

I believe I successfully met the criteria of the Psychology brief with my level, (Un)rest, by simulating the disorientation associated with insomnia and sleep deprivation. I consider my implementation of non-Euclidean geometry a major success, as I used it to effectively disrupt the player's "cognitive map." By choosing to use invisible triggers rather than visible portals, I was able to simulate unreliable memory and visual hallucinations more effectively.

Through testing, I confirmed that my decision to keep the level layout dense and claustrophobic (rather than building a large map) was the correct design choice, as I saw it evoke the intended feelings of unease and anxiety in players. I also employed a visual strategy using consistent warm, neutral tones and re-used textures, which allowed me to blend the rooms together. I found that this made my teleportation mechanic smoother, and I was pleased that testers in the second round felt the "shifting" of rooms was natural and confusing in the way I intended. Finally, I implemented an interaction prompt system that I feel succeeded in keeping the HUD uncluttered while guiding the player through the level.

Evaluation

What went wrong

The initial production phase faced some challenges regarding scale. During the first round of testing, it became apparent that the player character's height was disproportionate to the environment and the door opening mechanic caused frustration as the line trace logic required players to stand too close to interact, causing the opening doors to clip into the player character. Later on, audio balancing issues also came up, with the specific sound cue for unlocking new areas was too quiet, leading to confusion where testers missed the cue and did not know how to proceed.

There were also a few bugs which I did not manage to fix during the production due to time constraints, as I chose to prioritise other major bugs related to the mechanics. One of those is the mirror effect used in the bathroom, windows, car, and living room. The specific way I chose to create a mirror like material only reflected static meshes, which worked well with the individual items in each room, however, the rooms themselves remained simple brushes as by the time I realised this problem turning them into static meshes completely broke the game's collisions, hence why I opted for making peace with the fact the mirrors did not work as intended.

Evaluation

What you would do differently in future

In future projects, I would establish concrete metrics for player character height and environmental architecture (such as door frames and ceiling heights) during the paper prototyping phase, instead of waiting until the blockmesh stage to identify scaling issues. This would prevent the need for significant geometry adjustments mid-production.

Regarding mechanics, I would refine the interaction system earlier. Instead of a simple forward vector line trace, I would implement a more complex collision check for the doors to prevent them from opening if the player is obstructing the path.

Lastly, I would like to conduct more testing stages with more participants to get as much feedback as possible all throughout the production.

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