Development of a Game with Ambiguous Narrative

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To my mother

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Abstract

Nowadays, narrative is a key element in most video games since it adds depth and meaning to the gaming experience. It can enhance the immersion of the player in the gameworld and help create emotional connections to the characters and events. A well-crafted narrative can also create a sense of purpose and motivation for the player to progress through the game. It can also serve as a tool to convey important themes and messages, as well as provide a sense of closure and satisfaction when the game is completed.

Moreover, complex narratives not only create a memorable and engaging video game experience but also provide the game with multiple layers, deep character development, and various plot twists that keep the player engaged and immersed in the game world. It often involves non-linear storytelling, allowing the player to make choices that affect the outcome of the game's story. A complex narrative also involves themes that can be interpreted in multiple ways, creating a more nuanced and thought-provoking experience for the player. It can be a challenging and rewarding experience for players who seek a deeper and more meaningful engagement with video game storytelling.

A complex narrative in video games is typically characterised by having multiple storylines, branching paths, and non-linear storytelling. It involves elements such as player choice, consequences, and multiple endings that can affect the overall narrative. The complexity can also come from the depth of the story and characters, the use of symbolism and metaphor, and the integration of gameplay mechanics into the narrative. In this project in particular, my goal is to incorporate a non-linear narrative that diverges towards the end, with visual metaphors and narrative mechanics.

The final product results is a short demonstration (30 minutes) of a game called *Aisling* that implements these features. The main plot revolves around Rito, a young adult that wants to remember their childhood friend in order to reach her once again. The player must explore Rito's memories throughout three key locations in Rito's past: a FOREST, a SCHOOL, and an APARTMENT COMPLEX; to gather memories sorted in a non-linear way. There are three narrative mechanics where the player can obtain more insight into Rito's friend's past. In the end, after acknowledging the truth, the player can choose whether to stay in the memories with their friend, or move on. However, this is not as explicit as it is explained here, it is up to the player to interpret all of the elements.

Key Words

Narrative video game; Complex narrative; Narrative ambiguity; Non-linear narrative

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CHAPTER 1

INTRODUCTION

Contents

This chapter serves as a starting point to provide an overview of the project's work motivation, objectives, and environments, and initial state. It aims to provide a clear understanding of the project's context, outlining the purpose of the work. The chapter begins by explaining the motivation behind the project, the factors that influenced its conception and development. It then goes on to detail the objectives of the project, defining what I aimed to achieve and how I planned to do it. Additionally, it will describe the environments and initial state of the project, including the tools and resources used at the development process.

1.1 Work Motivation

I decided to make a narrative-oriented video game, mainly because I find it fascinating how both the ludic and narrative converge in one single product, making the player a participant in the storytelling. I believe narrative-oriented games provide not only the interactive nature of video games in general but also the opportunity to transmit a message to the player. As in other media like television or films, complex narrative in video games leaves open plots for the players to fill with their own judgement and understanding, which leads to a unique experience for each player. Narrative complexity alters the coherence of the plot and can be achieved, as we intend in this project, through narrative ambiguity (non-linear narrative specifically) and meta-discursive connotations.

That said, games with introspective themes where the main character explores their inner world, be it dreams or memories, have great narrative potential as reality has no limits making it suitable to bend it at will. As a result, I find games like *Omori* (OMOCAT, 2020) and *Yume Nikki* (Kikiyama, 2004) highly uplifting in this matter and, in fact, are the main inspiration behind this project.

Apart from basic narrative components such as dialogue, this project aims for a more visual and symbolic approach as it can add more implicit, non-verbal communication. The reason behind this lies in my professional profile, which is artistic. I want to take this project as an opportunity to expand and exhibit my artistic skills, resulting in personal portfolio items.

1.2 Objectives

- **Create a game with complex, non-linear narrative**

As the main focus of this project, the final result must be a game focused on its narrative; it must implement a previously designed narrative as explained in this document, and its main focus is telling a story. Moreover, it needs to be told in a complex way, meaning the story is not explicitly told; it is left to the player to interpret. The way it achieves its complexity is by telling it in a non-linear way using scattered fragments of the plot throughout the gameworld. These fragments represent the main character's memories, which will help the player find out what happened to their childhood friend.

Although it is described in detail in this document for the sake of evaluation, in the game it won't be like that. The plot is implicitly told not only through the memory fragments (which are short audiovisual products) but also through some mechanics (more on that later), the mood, and visual language on each level. As a result, it is up to the player to gather as much insight as possible from these elements before making the final decision that will determine the main character's fate after learning about their friend's whereabouts.

- **Implement narrative mechanics: two puzzles and a maze**

As mentioned before, apart from the main mechanics, there are additional ones that complement the storytelling. Not only are they memory themed (which is a very important aspect of the game), but they also provide key hints for the main plot, such as the forgotten friend's name and the fact that she and the main character may be, in fact, the same person. Again, this won't be as explicit as it is explained here. Finally, there will be a maze that, besides representing the complexity and confusion of navigating through the main character's past experiences, serves as a short recap of all of the memories before reaching the final one prior to the final decision.

- **Implement visual language to enhance narrative**

As described above, one of the main focuses of this project is visual storytelling. Being an artistic video game developer, I aim to explore the potential of using symbolism and colour theory to complement and enhance the game's plot and overall atmosphere. In fact, colour is essential for understanding the plot, as the memories are represented with colours of the visible spectrum (also known as the colours of the rainbow: violet, blue, cyan, green, yellow, orange, and red) that the player must sort to get the story in chronological order.

Lastly, it is worth mentioning that this is a solo project, so I am in charge of every aspect of the game, from conceptual and narrative design, to graphics and programming. Although I may employ already existing assets available online to address the narrative and graphic development.

1.3 Environment and Initial State

Since the beginning, I knew I wanted to develop a narrative game since they are the kind of games I enjoy the most. So, after reading my tutor's (Antonio Loriguillo) proposal, I already knew I wanted to work based on his proposal. Moreover, I not only like narrative games in general but also narrative (be it in games or other media) that is rather diffuse, where once it's over the spectator has more questions than answers. A big inspiration for this are *Yume Nikki* (Kikiyama, 2004), *Omori* (OMOCAT, 2020), and *Twin Peaks* (David Lynch, 1990). Lynch's repertoire in general, is a good example of this (apart for having a bizarre and surreal setting, which I find fascinating).

After commenting on this with my tutor, he suggested me some academic articles [1] [2] that would help me focus my project in one direction. After reading them, I came up to the conclusion that a complex narrative could be either emergent, non-linear, or meta-discursive, among others. I opted for a non-linear narrative with meta-discursive connotations since that could lead to multiple ideas.

Starting from this, I developed a simple plot that could be adapted into a complex, non-linear narrative structure suitable for a short game. I had already decided I wanted to create a dream/memory theme game, but I still couldn't find the main plot. After discussing this with my mother, she then suggested me a movie that revolved around memories, *Eternal Sunshine of the Spotless Mind* (Michel Gondry, 2004). To briefly describe it, the main character wants to erase his ex from his memories. After watching it, I thought that it would be interesting that instead of forgetting someone, the main character tried to remember someone that they had forgotten. That's how the main plot was conceived, more on that in the Narrative Design section.

Once the main plot was conceived, I needed to decide the overall technical aspects; that is, the mechanics, game flow, rules, etc. As I have mainly an artistic profile, I wanted to create my own designs instead of taking existing ones. In order to allow me to

focus on the graphics, I decided to develop a visually appealing walking simulator with challenging puzzles that enhance the narrative and difficulty.

CHAPTER 2

Planning and resources evaluation

Contents

The success of any project depends on effective planning and resource management. This chapter focuses on the planning and resource evaluation process that took place during the development of the game. In the initial stages of the project, time management was not efficient which led to some delays. However, as the development progressed, better time management practices were implemented to keep the project on track. This chapter will provide an overview of the planning and resource evaluation process.

2.1 Planning

This section is committed to showing how the planning was assembled, including multiple tasks that cover all sorts of roles, from documentation to art to programming. First, I divided the project into different tasks and assigned to each one an estimated completion time, as seen in Table 2.1. Then, based on that and taking into consideration the deadlines for different tasks, I sorted the time in a Gantt chart (see Figure 2.1).

As seen in Figure 2.1, the first tasks are mostly documentation apart from the Final Report (Game Design Document, Narrative Script, Narrative Structure and Strategies design, Visual Research, etc.). The reason behind this is that, as we will see in the next Section, it is a good practice to design everything from the beginning. Although some basic mechanics like the player movement can be developed in parallel as they are common amongst most games.

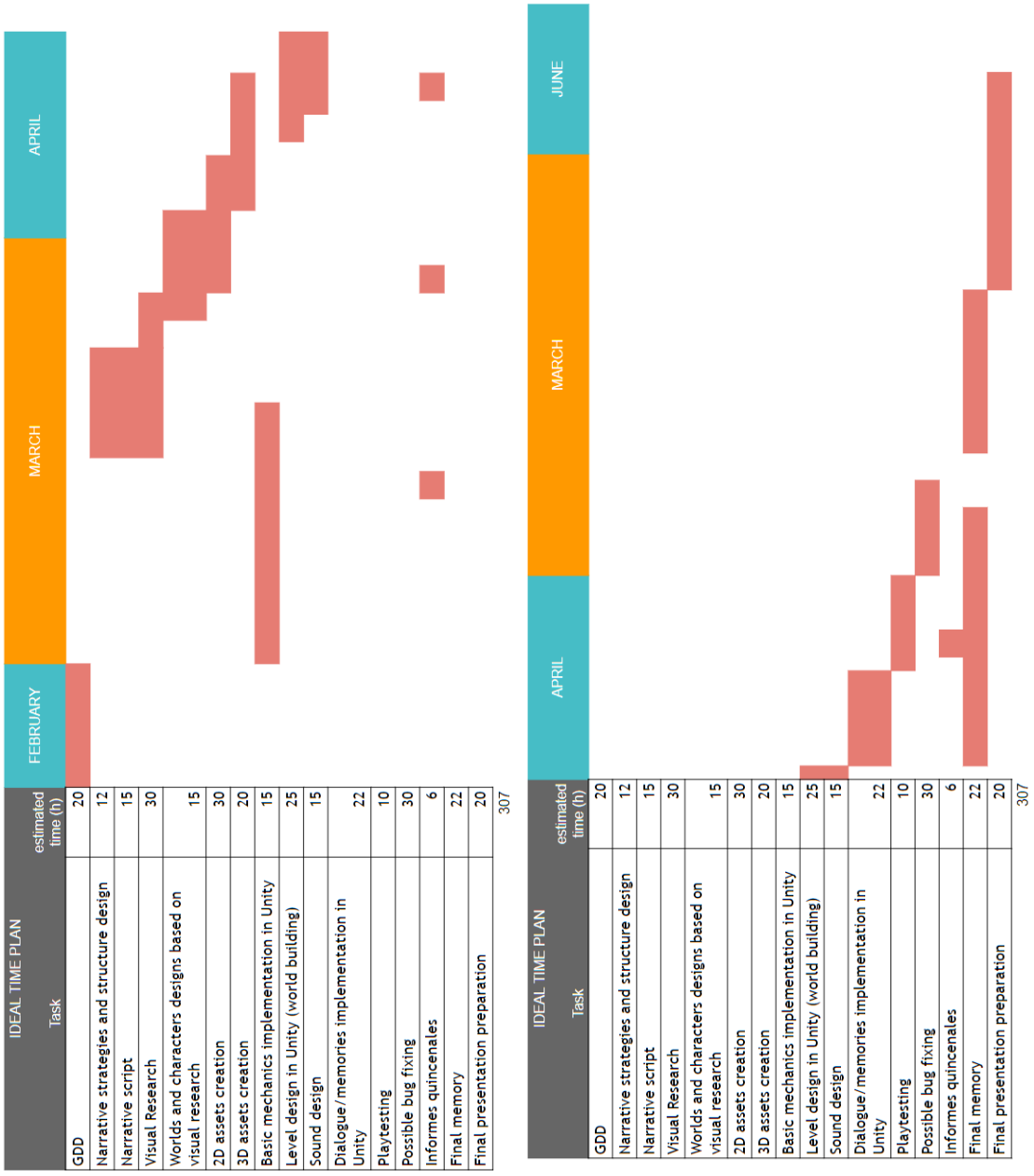

Figure 2.1: Gantt chart made with Google Sheets

Task	Duration (hours)
GDD	20
Narrative strategies and structure design	12
Script	15
Visual Research	30
Worlds and characters designs based on visual research	15
2D assets creation	30
3D assets creation	20
Basic mechanics implementation in Unity	15
Level design in Unity (world building)	25
Sound design	15
Dialogue implementation in Unity	22
Playtesting	10
Possible bug fixing	30
Final memory	22
Final presentation preparation	20
Total	301

Table 2.1: Tasks with estimated hours

2.2 Resource Evaluation

As for human resources, there is only one person in charge of everything, me. I consider myself more skilled in the artistic role so my main focus in this project will be the narrative and graphic design. Although, that does not exclude the programming aspect which will be rather simple as well as the game design. Regarding the economic cost, the ideal time dedicated to the game is around 260 hours, taking into account the average wage of a game designer in Spain [3], which would translate into (260 hours x 10.29€) 2675.4 €.

As for the equipment, it will be easier to describe in the form of a list both of the hardware and software used:

Hardware

- **ASUS R560UD-EJ393**. Cost: 1000€
  - **CPU**: Intel Core i7-8550U (4 cores up to 4.00 GHz).
  - **GPU**: NVIDIA GeForce GTX 1050 (4 GB).
  - **RAM**: 16 GB (DDR4).
- **MSI Optix G271 27"**. Cost: 180€.

Software

- **Operative system**: Windows 10 Home (22H2).
- **Overleaf** [4]: LaTex online editor, used to redact this document. Free
- **Grammarly** [5]: Spell and grammar check. Free
- **Google Drive** (including Google Docs, Google Sheets, etc.) [6]: Cloud service used to store and edit most of the documentation created. Free
- **Trello** [7]: Planning online board. Free
- **Unity 2021.3.12f** [8]: Cross-platform game engine. Free
- **Visual Studio code** [9]: Code editor. Free
- **Github** [10]: Version control desktop application. Free
- **PureRef:** [11] Desktop application that keeps track of images. Free
- **Coolors.co:** [12] Color palette online generator. Free
- **Krita** [13]: Open source raster graphics editor. Free
- **Blender** [14]: Open source 3D computer graphics tool. Free
- **MyEdit:** [15] Online voice modifier. Free
- **Specterr:** [16] Online lyric video editor. Free
- **ZapSplat**: [17] Online sound effect free library. Free
- **Open Game Art**: [18] Online free game assets library. Free

In conclusion, if this project were to be develop under professional circumstance within 3 months, the total cost of its production would be as follows:

- Human resources: 2676 €
- Hardware: 1180 €
- Electricity: 210 €
- Office rent: 750 €
- Internet services: 150 €

Total: 4966 €

CHAPTER 3

System Analysis and Design

Contents

This phase is an essential stage in the software development life cycle. It is during this phase that the project requirements are gathered, analyzed, and transformed into a detailed design. This chapter aims to document the process of analyzing and designing the system that has been developed, covering aspects such as system architecture, system design, requirements analysis, and interface design. The analysis and design phase is crucial as it sets the foundation for the development process and ensures that the system is designed to meet the specified requirements.

Additionally, this chapter covers the documentation required for video game development, including the Game Design Document (GDD), as well as artistic and narrative design. It outlines the core concept, features, mechanics, rules, and overall design of the game.

3.1 Game Design Document

As it is common in the game industry, before starting to produce any graphics and coding for the final product, it is good practice to create a document describing in detail every

aspect of the game so that the developers can have a useful reference when creating. Although only one person is working on this project, it is highly practical as a base for artistic, technical, and narrative design. Ultimately, the Game Design Document is the starting point for any game project.

Game platform: PC
Target age: 16 - 50
Rating ESRB: T

Game summary

Life circumstances force Rito to remember their childhood best friend. However, they no longer remember what made them apart, her face, her voice, even her name. Rito decides to explore their mind in search of their friend, so hopefully they can reach her in real life. Chase Rito's friend's shadow through surreal and dreamlike worlds, full of puzzles and unique characters along the way. Revive Rito's memories by interacting with different mementos, but be careful as the line between dreams, memories, desire, and fear, is thin. In the end, Rito finds out their friend, **Aisling**, was nothing but a product of their imagination. They (players) will have to decide whether they want to stay with her inside their mind, or face the truth and move on.

Distinct modes of gameplay

Aisling (pronounced Ash-ling) is a third-person psychedelic adventure game that finds Rito searching the corners of their mind, from the first years of middle school where they and their friend met, to the apartment complex where they both lived, for their lost forgotten childhood friend. Players explore different worlds, interact with unique characters, and unlock memories and new places through mementos.

Similar competitive products

Omori (Omocat, 2020), *Happy Game* (Amanita design, 2022), *Yume Nikki* (Kikiyama, 2004)

USP (Unique Selling Points)

- **Surreal and Psychedelic World:** The game features a surreal and psychedelic world with strong symbolic connotations, creating a unique and immersive experience for players.
- **Complex Narrative:** The game's narrative is obscure and intricate, taking players on a journey of self-discovery and exploring themes of memory, loss, and the power of the imagination.

- **Thought-provoking choices:** The game's ending presents players with a thought-provoking choice that has significant emotional weight and encourages players to reflect on their own experiences and perceptions of reality.

3.1.1 Game concept

Aisling is a single-player walking simulator that follows Rito in the search of their forgotten childhood friend. The player must explore Rito's psyche materialised in a dream-like world full of surreal and symbolic elements, which will serve as a setting for their flashbacks. In order to advance, the player moves through Rito's mind, exploring and interacting with the environment to uncover clues about their friend's whereabouts and their own memories. They may need to solve puzzles or overcome obstacles to progress through certain areas and collect memory fragments; such as navigating a maze, or answering questions from NPCs.

In the end, after collecting all of the flashbacks, it is suggested (but not exposed explicitly) that their friend was in reality an imaginary construct. They need to decide whether they want to stay with their friend (an idealised present version of her, that is) inside their head or embrace the truth and move forward without the weight of their friend's memory weighing them down. Overall, the player's choice at the end of the game will affect the outcome of the story, and the true nature of the childhood friend's existence is left up to the player's interpretation.

3.1.2 Demographics

- **Age:** Mainly for people between the ages of 16 and 50.
- **Gender:** *Aisling* is designed to be inclusive, and can be played by individuals of any gender. Its intended audience is not restricted by gender or gender identity.
- **Cultural references:** As *Aisling* has strong symbolic connotations, modern semiotics, and visual rhetoric have an important role both in the storytelling and mechanics of the game. Moreover, some works of art and literature are used as a reference to build the mood of the surrealist world, such as Salvador Dalí, Odilon Redon, and Lewis Carrol's *Alice in Wonderland*, among others.
- **Bartle profiles:** Although the Bartle profiles are stated in a multiplayer environment, two profiles match *Aisling* even though it is a single-player game:
  - **Explorers**: although the game is far from being an open world, there are areas of the world whose access is hidden and rather unintuitive to find. However, if the player decides to explore further, they may find a way to enter and easter eggs or hidden flashbacks.
  - **Achievers**: Linked with the explorer profile, there will be easter eggs and hidden/locked memories that, although they are not relevant to the main plot, collecting them reward the achiever player with a 100% completion rating and a special title screen.

3.1.3 Rules

Design decision

- **Objectives**: the main objective is to find the whereabouts of Rito's forgotten childhood friend by remembering their experiences together. The player makes an introspection into Rito's psyche, where they have to explore and interact with the environment to unlock memories.
- **Difficulty**: The challenges the player has to overcome will be gradually more difficult as they progress through the game: the puzzles will become more complex and new challenges will be introduced, like a maze or new implicit mechanics.
- **Variety**: As a walking simulator, *Aisling* has a few simple mechanics: explore, collect memory fragments, solve puzzles, and one final decision.

Operational rules

The main objective of the game is to find the whereabouts of Rito's forgotten childhood friend by exploring every corner of their mind. For this purpose, the game has three main rules that the player must follow without changing them:

- As a walking simulator, the player must move through the dreamlike world interacting with the environment and NPCs, to find memory fragments that will reveal more details about their past with their childhood friend.
- They may encounter obstacles, like mazes or puzzles that they have to overcome in order to continue.
- As a final rule, the player will have to choose what Rito will do after acknowledging the truth of their friend's non-existence.

Foundational rules

- The player can neither win nor lose in this game, as there are no enemies and they cannot die. However, there are two possible outcomes from which the player can choose near the end, that is, whether they want to stay in the main character's mind or face the truth and move on.
- In order to advance, the player must gather 7 memories in total. For this, they must explore the world and solve puzzles along the way. Every memory is split into fragments. To access a memory, the player must collect all of the fragments first.
- While exploring certain locations; if they find all of the fragments, increase the number of fragments found. If it's the last fragment, grant access to the next area and add memory to the memory book.

Written rules

Apart from a brief explanation of the controls accessible from the main screen and the pause menu, there will not be any tutorial or written rule, the player has to explore on their own every possible potential interaction to figure it out. The reason behind this is that since there is no explicit objective at the beginning, the player is forced to interact with everything, which reinforces the exploration mechanic and makes the immersion stronger.

Advisory rules

Although it is not mandatory gameplay-wise to explore every corner of the world, it is advisable to do so, since there are hidden rooms and easter eggs the player can find and will provide a better understanding of the main character's psyche thus a better context of the whole plot.

3.1.4 Mechanics description

Progression mechanics

- Find memory fragments: In every location of Rito's head, there are memories scattered throughout the environment. The player can find them to unlock memories from their past with Aisling and have access to new areas.

- Solve puzzles: with the help of the memories acquired, solve puzzles to move on to the next location.

Economic mechanics

- The player can find memory fragments scattered throughout the different locations that will help them gather together the pieces of the truth.

Core mechanics

- **Movement**: the player can move in 4 (up, down, right, left) directions using the arrow keys.

- **Puzzle-solving**: there are two puzzles the player must solve to gain access to the next location.

- **Resource management (memory fragments)**: Players can collect the fragments that will be stored automatically in the memory. The player has access to this book all the time and can visually arrange the memories (as if they were photos) as they will.

- **Dialogue and decision-making**: throughout the game, the player will find peculiar NPCs that, although not mandatory gameplay-wise to reach the end, will provide hints about the main character's psyche. However, there is one final decision the player must make: whether they stay with Aisling inside their head or face the truth and move on.

3.1.5 Mechanics operation design

This section aims to provide a detailed description of how the mechanics will operate within the game environment. By outlining these mechanics, it ensures that they are implemented effectively and efficiently.

USER ACTIONS				
Entity	Description	Dynamics-Actions	Triggers	Resources
Move character	The player can move within the environment	The player presses direction key ->Rito moves	Direction keys are pressed	-
Interaction with environment	The player interacts with NPC's or objects.	The player presses the "z" key near an interactive item -> Rito interacts with it.	"z" key is pressed near an interactive object	–
Open memory book	The player can access an inventory with all the memories collected so far	The player presses the "x" key ->Book is opened	The "x" key is pressed	Memories collected, Book

Table 3.1: Mechanics operation design for the user actions

FOREST and SCHOOL (they share exactly the same mechanics)				
Entity	Description	Dynamics-Actions	Triggers	Resources
Collect memory fragment	After finding a memory fragment, the player can pick it up by interacting with it.	The player presses the "z" key near the fragment -> That fragment is added to the memory book.	"z" key is pressed near a memory fragment	Memory fragments
Solve puzzle	In order to pass to the next location, the player needs to solve a puzzle related to the memories acquired in that area.	The player approaches the puzzle ->interacts with "z" to play it	The player has collected all of the memories corresponding to that area and has reached the end of said area.	Memory fragments

Table 3.2: Mechanics operation design for «FOREST» and «SCHOOL»

APARTMENT COMPLEX				
Entity	Description	Dynamics-Actions	Triggers	Resources
Collect memory fragment	After finding a memory fragment, the player can pick it up by interacting with it.	The player presses the "z" key near the fragment ->That fragment is added to the memory book.	"z" key is pressed near a memory fragment	Memory fragments
Maze	Before running into the last memory, the RED one, the player must get out of a generated maze.	The player reaches the entrance of the maze and enters	Player's position close to the entrance	-

Table 3.3: Mechanics operation design for «APARTMENT COMPLEX»

LIMBO				
Entity	Description	Dynamics-Actions	Triggers	Resources
Arrange the memories	With all the memories collected, the player can arrange them in the book	Player opened the book by pressing "x"	-	Memories, Book
Final decision	After finding all of the main fragments of the memories and arranging them, the player must choose Rito's next step. Whether they want to stay with Aisling inside their head, or face the truth and move on.	The player chooses between the two possible options by pressing the "z" on the desired one	The player reaches the end of the LIMBO.	-

Table 3.4: Mechanics operation design for «LIMBO»

3.1.6 Game balancing

Difficulty curve

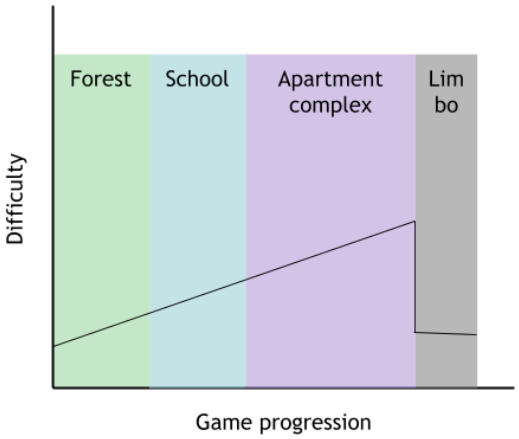

Figure 3.1: Difficulty curve as the game progresses

As a walking simulator, ***Aisling*** does not represent a big challenge to the player's skills. Instead of focusing on challenges, the game focuses on introspection and contemplation.

This may have a risk of boredom for players that seek challenges suitable for their skills, but this game is not aimed at that kind of player. There is, however, a small curve of difficulty regarding the puzzles the player must surpass before making the final decision.

3.1.7 Gameplay

This game has mostly mental challenges, such as solving puzzles and getting out of a maze. One of them is the classic Memory Match game, where the player is presented with a set of cards or tiles that they must flip over to reveal hidden symbols or images. The objective is to find matching pairs by remembering the locations of previously revealed cards, challenging their memory, concentration, and cognitive processing, making the puzzle an enjoyable and engaging brain-teaser. Moreover, there is a maze approaching the end where the player must analyse the layout, make decisions, and plan their movements to find the correct path. However, as mentioned before, this game does not aim to challenge the player's skills. Instead, it provides an emotional and thoughtful experience, as *Journey* (That Game Company, 2012) does.

There are 7 memories the player must find before making the final decision. These memories are provided to the player in a non-chronological order and can be found in the different locations they took place in, as shown in Figure 3.2. They are 3 in total: FOREST, SCHOOL, and APARTMENT COMPLEX.

Each location will have its own obstacle that will grant access to the next one. For the first two, there will be two logic puzzles using the memories collected so far; and for the last one, it will be a maze in which the player will find the last piece of their past with Aisling.

Although the memories are not provided linearly, the expected (and only possible) game route is. The player must first go to the FOREST, the SCHOOL, then APARTMENT COMPLEX, and finally LIMBO. having no other possible path to follow. This is summarised in the gameplay flow mental map (see Figure 3.2)

However, although they are not mandatory to finish the game, there are hidden rooms and easter eggs the player may encounter that will give more insights into the main character's psyche.

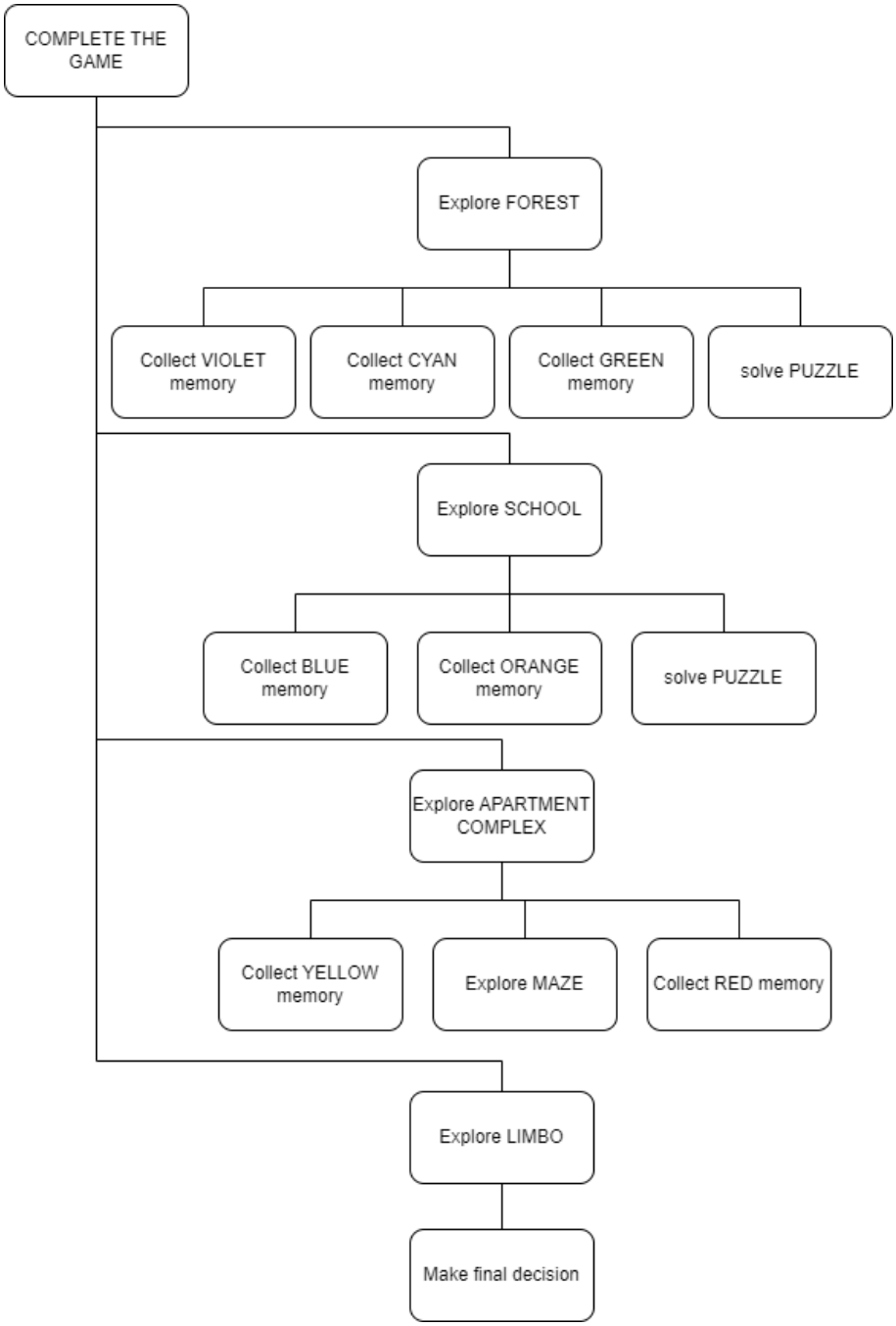

Figure 3.2: Mental map of the game's progression

3.1.8 Level design

	Forest	**School**
TOD (time of the day)	Day	Day
Story	In this location, the player collects the memories of their first meeting, and other two moments they spent in this place.	In this location, the player collects the memories of how Aisling used to defend Rito from the bullies and lately, how after Rito makes new friends, hang out with Aisling less and less.
Progression	Find the VIOLET, CYAN and GREEN memories. Solve PUZZLE to advance.	Find the BLUE and ORANGE memories. Solve PUZZLE to advance.
Estimated play time	5 minutes	5 minutes
Mechanics	core, puzzle	core, puzzle
Economy	3 memories	2 memories

Table 3.5: Level design for the «FOREST» and the «SCHOOL» level

	Apartment complex	**Limbo**
TOD (time of the day)	Night	N/A
Story	In this location, the player collects the memories of how Aisling always would find a way to cheer Rito up and the final memory where Aisling left. The final memory can be acquired after getting out of a MAZE.	After evaluating all of the memories together, the player interprets their own truth about the past. Based on this interpretation, Rito needs to make a final decision.
Progression	Find the YELLOW and RED memories. Get out of the MAZE.	Choose Rito's fate.
Estimated play time	10 minutes	3 minutes
Mechanics	core, maze	core, decision making
Economy	2 memories	-

Table 3.6: Level design for the «APARTMENT COMPLEX» and the «LIMBO» level

3.2 Narrative Design

After stating what the game is about and what the mechanics are, I proceeded with the narrative design taking into consideration the rules decided in the Game Design Document. First, I designed the overall narrative strategies for each level and then, I wrote the script for each of the 7 memories.

3.2.1 Narrative Structure and Strategies

As presented in Figure 3.3, although the memories (that is, plot sections) are not provided in a linear order, the game flow is only one and the player must arrange them in the last level before taking the final decision.

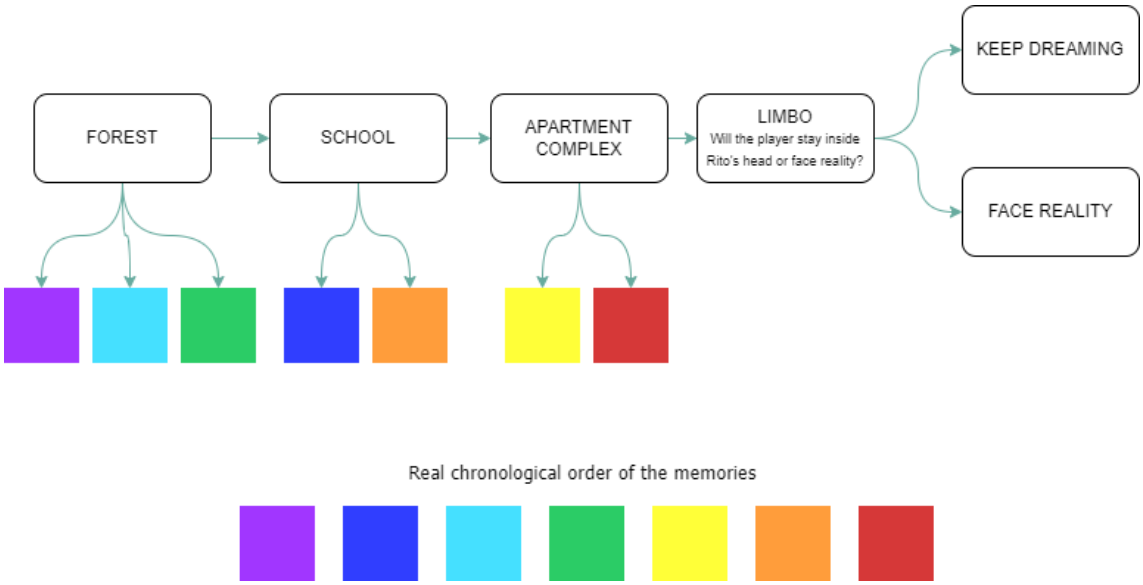

Figure 3.3: Narrative structure of the game

The elements of a classic narrative structure are distributed as illustrated in Figure 3.4.

Forest

- **Objective:** To introduce the main mechanics of the game: exploring, interacting, finding fragments of 3 memories, and solving puzzles. The player learns they are inside Rito's mind and that their ultimate goal is to find Rito's friend.
- **Gameplay**: The player can explore by moving the character, and interact with some objects and NPCs. Some of the interactive objects are collectibles (memory fragments).

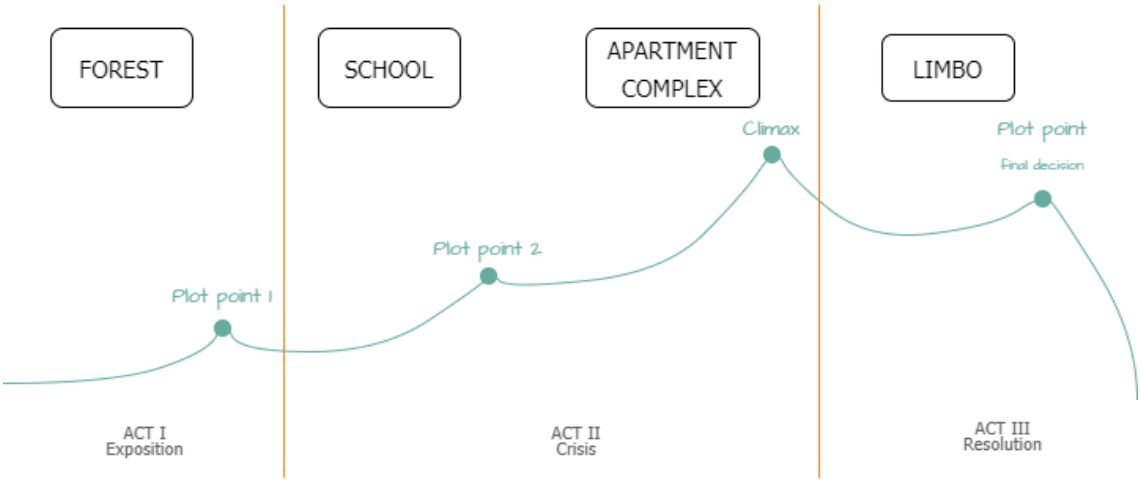

Figure 3.4: Classic narrative structure of the game

- **Story**: Rito is inside their own head trying to remember their childhood friend and what did them apart. In this location, the player collects the memories of their first meeting and the other two moments they spent in this place.
- **Characters**:
  - **Rito:** The main character of the story. They're quiet and introverted and have no friends to play with, so they used to wander in the forest, looking for bugs and plants.
  - **Aisling:** Rito's childhood friend. She is extroverted and cheerful, always making Rito's days better.
- **Setting**:The forest is where Rito used to spend most of their time. Rito used to be a loner until they met Aisling in this location. This is a dream-like version of the real forest they used to hang out in, altered by Rito's feelings related to this place. Everything is bright and warm, and the plants around seem to be more animated.
- **Narrative strategy:**
  - **Memories**: this has an important role in the story. They are in the form of text (short poem), a short animation, and a 4-panel comic. The three of them tell their adventures in the forest where Rito used to spend their childhood.
  - **Setting**: the mood of this level (bright and warm colours, animated environment, relaxing sound effects) tells how the protagonist feels about this place, and how placid and peaceful the memories here.

  - **Memory Recall game:** Through this first puzzle, the player discovers Aisling name by filling the gaps in a given picture.

School

- **Objective:** The player keeps exploring Rito's mind and discovering new memories, this time both unpleasant and pleasant ones. The objective is to gather two memory fragments and solve a final puzzle in order to move on to the next location.

- **Gameplay**: The mechanics are the same: the player explores the world, gathers fragments, interacts with some objects, and solves a final puzzle to move on.

- **Story**: School days weren't the best for Rito. As a result, one of the memories at this level is both uncomfortable and unpleasant. However, being with Aisling made it somewhat bearable, to the point Rito started feeling more and more self-confident, which led them to meet new friends.

- **Characters**:

  - **Student Rito**: At first is still a loner, has no friends, and is bullied. However, after meeting Aisling they gain a bit of self-esteem and are open to more people.
  - **Aisling**: Always sticking it out with Rito. She tries to chase off the bullies but it never works, they always ignore her.

- **Setting**: School is a dark place for Rito, they didn't enjoy being there as they were bullied and had no friends to play with. Even after meeting Aisling, school was still a place they wanted to avoid.

- **Narrative strategy:**

  - **Setting**: the mood of the world will show how uncomfortable and unpleasant it is for Rito to be here. The setting is dark and eerie, with low saturated shades and very low exposure. The soundtrack is just objects falling and doors smashing, a school bell ringing occasionally, along with some whispers.
  - **Memories**: the main narrative component. In this level, there are two: one audio recording of how Rito used to be bullied and one 4-panel comic about how Rito started having more friends.
  - **Memory Match game**: With this second puzzle, the player discovers a bit more about Aisling. Not all of the cards are exactly the same, so by the end the player will end up with two apparently different cards, hinting that they may actually be the same.

Apartment complex

- **Objective:** The player keeps exploring and interacting with what used to be Rito's childhood apartment. As the game reaches its climax, the player must overcome a maze that mixes all of Rito's feelings, both good and bad. There are two memories in this location, one before and one after the maze.
- **Gameplay**: The player explores the apartments where there is only one memory to be found. After this, the player faces a maze that leads to the final memory and last stage of the game.
- **Story**: Home never felt like home, everything was grey and lifeless. There were only busy adults here whom Rito rarely saw. Rito explores the last place of their childhood memories to end up in a maze where all of the collected memories so far converge and helps both Rito and the player understand what ever could happen to Aisling.
- **Characters**:
  - **Rito**: An only child, their parents are always busy working. On rainy days when they couldn't go out and play in the forest, Rito stayed in their room staring at the ceiling.
  - **Aisling**: Always used to sneak into Rito's room to cheer them up. Rito never wondered how she managed to do that.
- **Setting**: The apartments where Rito used to live were already dull and grey in real life, so Rito's perception of it is even more lifeless. Everything is in greyscale apart from the yellow light Aisling's presence brings.
- **Narrative strategy:**
  - **Setting**: the lifeless and grey mood serves as evidence of how boring this place was for Rito.
  - **Small text flashbacks**: As the player advances through the maze, there are small texts that refer to each of the memories uncovered up to this point.
  - **Memories**: As usual, the memories are key to uncovering the whereabouts of Rito's friend. This time it's a 4-panel comic showing how Aisling always cheers Rito up and a short final animation about the last memory with Aisling.

Limbo

- **Objective:** After acknowledging the last memory where Rito saw Aisling, the player must face the truth and make a final decision.
- **Gameplay**: The player must walk through Limbo until a certain time passes and they are forced to make a final decision, which leads to two different endings. One

where Rito stays in their pleasant memories with Aisling completely ignoring the truth about their friend and another where they accept the truth and decide to move on.

- **Story**: Rito is left alone in Limbo to reflect upon their memories until the time to decide what to do comes.
- **Characters**:
  - **Rito**: this time, they're alone with their thoughts and their reflection.
- **Setting**: The limbo is just an endless blackness, there's only Rito in their reflection under them there.
- **Narrative strategy:**
  - **Last dialogue**: Reaching the end, there is an omniscient narrator that asks the player what they want to do next.

3.2.2 Narrative Script

The memories of the main character are split into 7 coloured pieces, each one of which has a small story about Rito and Aisling's relationship. As stated in the Game Design Document and the Narrative Strategies and Structure Design, each one is split into smaller fragments that the player needs to collect through the different locations of the game. The colours of the memories are provided as a hint for the player to arrange them following the order of the visual range of the light, starting from violet to red.

VIOLET

How they met: Consists of 4 pieces of paper that together form a poem. It can be found at FOREST.

In a sea of shadows, lost and alone,
A stranger adrift, with no place to call home.
A creature of the night, an enigma,
Hiding in the shadows, away from the stigma.

But then a beacon shone, a light in the distance,
A chance encounter, a glimmer of existence.
A kindred spirit, with an open heart,
A new beginning, a fresh start.

Together they walked, two shadows in the night,
A journey of discovery, a shared delight.
They danced in the rain, gazed at the stars,

Their friendship growing strong, like steel bars.

No longer adrift, no longer alone,
The stranger found solace, a place to call home.
For in this kindred spirit, they found a reflection,
A connection that transcends all perception.

BLUE

She is their saviour: Consists of 3 pieces of a cassette that together form an audio recording. It can be at found SCHOOL.

Bully 1: *Come one, Rito. Don't be a coward. Just eat it.*
Bully 2: *Look at them, they're even trembling hahaha.*
Rito: *Please, just leave me alone* *sniff*
Bully 1: *What? Are you going to cry?*
Aisling: *HEY!! What are you doing to Rito this time? Leave them alone!!!*
Bully 2: *You just have to eat a single worm and we'll leave you alone. Come on!*
Aisling: *HEYY! DON'T IGNORE ME. I'M SPEAKING TO YOU.*
Rito: *sniff* *sniff*
bell rings*
Bully 1: *ugh, it's time to go back. Don't think you're free from this, Rito.*
Bully 2: *Anyway, let's go. The teacher is scary when we're late.*
steps leaving*
Aisling: *Yes, you better go, you peanut brain poopy-heads. HAHAHAHAHA wait, we have to too. Let's go, Rito.*
Rito: *Thank you, Aisling* *sniff*

CYAN

They share the same reflection: Consists of 2 pieces of a CD that together form a short video. It can be found at FOREST.

It had rained and there were poodles everywhere, Rito looked at their reflection at one of them. For a moment Rito only sees Her reflection instead of theirs.

GREEN

She's as light as a feather: Consists of a single View-Master reel. It can be found at FOREST.

They were hanging out in the old playground. Rito wanted to play at the seesaw but She didn't as she felt insecure about her weight. Instead, She suggested using the swings.

1. They are at the old playground in the forest. Rito points at the seesaw.
2. Aisling says she's not heavy enough to play it.
3. Aisling points at the swings.
4. Rito is high in the swing while Aisling is sitting still in the swing next to them.

YELLOW

Emotional support whenever needed: Consists of a 4 panel comic. It can be found at APARTMENT COMPLEX.

1. Rito was in their black and white room in bed.
2. (close up to their face, they had a swollen eye) They were staring at the ceiling after a bad day.
3. She (yellow) surprises him by the window
4. After entering to cheer them up, everything turns yellow.

ORANGE

Rito makes new friends: Consists of a 4 panel comic. It can be found at SCHOOL.

1. Rito is playing on their own when some classmates call them to play.
2. Rito goes with them.
3. Aisling stays behind some bushes full of orange butterflies.
4. The butterflies fly covering most of her face, revealing an eye.

RED

Rito makes new friends: Consists of single VHS tape in an old TV with a short animation. It can be at APARTMENT COMPLEX.

Rito sits on a swing, looking melancholic. Suddenly, Aisling appears and sits on the swing next to him.

Aisling: *Hey, Rito. I've missed you.*
Rito: (surprised) *Aisling! It's been a while. How have you been?*
Aisling: *Oh, you know, just hanging around.* (smiles) *What about you?*
Rito: (sighs) *I've been feeling a bit nostalgic lately. I miss our old times together.*
Aisling: (sympathetically) *Yeah, me too.* (pauses) *You know, Rito, the last visible colour of the visible light spectrum is RED? Well, it can be violet too. It depends on how you interpret it, but for me I like to think it's RED. RED is the last colour.*

As Aisling says this, her form begins to gradually fade away, leaving Rito alone next to an empty swing.
Rito: (concerned) *Aisling?*

But it's too late. Aisling has completely vanished, leaving Rito alone with his thoughts.

3.3 Requirement Analysis

Once the overall structure of the game is defined, I can then proceed with the technical factors, which, as mentioned before, are rather simple. For this, it is necessary to first describe in detail how the game works and what the player can see and do.

After opening *Aisling*, the first thing the player sees is the main menu: a screen with the game title *Aisling* followed by two buttons: PLAY and QUIT. The PLAY button will show a short text story to give context to the player and then load the first level: FOREST. The QUIT button will just shut the application down.

Once the player is in the game world, they can move the main character with either the WASD key, arrow keys, or the controller joystick. The movement is limited to the X and Y axis except when there are stairs. The player can explore the world freely and interact with multiple objects in the scene by pressing the E key, Return key, Z key, or the A button on the controller. These interactions can result in two different actions: trigger dialogue or pick up that item and save it in the inventory. The player's mission is to find memory fragments that are scattered throughout the world. When finding one, the player only needs to approach and interact with it which will save it in the Memory Book, which is another name for a simple inventory. The player can access it by pressing the I key, X Key, or the B button in the controller. When the player clicks on any of the memories (with all of its fragments), depending on what kind of media is (video, audio, image), the game will ask if the player wants to revive that memory and after the

player's confirmation, it will (dis)play said memory. Also, the player can exchange the objects stored in the inventory slots, that is, rearrange the order in which they are held.

There are four locations in total, after finding all of the fragments in the first two (FOREST and SCHOOL), the player needs to solve a simple puzzle to move on to the next location. Each puzzle will spawn when the player tries to go to the next level through the door and they have all of the memories of that area.
The first one can be found at FOREST and is a memory recall game, where the player is given an initial main picture and multiple missing elements on the side. The player needs to put each one of these missing elements in the right position in the main picture. The second one, found at SCHOOL, is a memory match game where the player needs to match a few identical cards with images related to the memories of that location.

After completing the APARTMENT COMPLEX level, the player encounters a MAZE that leads to the end. In this MAZE, glimpses of all of the memories collected so far are triggered in the form of dialogue texts as the player advances. At the end of this MAZE, the player collects the last memory and is redirected to the next and last level, LIMBO.

After collecting all of the memories and learning about the truth of the main character's past, the player must face a dichotomy that will lead to one ending or another. Either of both endings only triggers a short video.

3.3.1 Functional Requirements

R1. The player can start the game.
R2. The player can quit the game.
R3. The player can move the character.
R4. The player can interact with objects in scene.
R5. The player can trigger dialogues.
R6. The player can pick up objects.
R7. The player can open the inventory.
R8. The player can display memories (videos, audio, images).
R9. The player can rearrange the order of the objects in the inventory.
R10. The player can drag 2D sprites across the inventory.
R11. The player can click on different cards to match them.
R12. The player can choose between two different options.

3.3.2 Non-functional Requirements

R13. The game can be played on PC.
R14. The game is a walking simulator.
R15. The game uses 2D sprites in a 3D environment.

R16. The game has simple mechanics that are easy to learn.
R17. The game has an immersive ambience.

3.4 System Design

Requirement:	R1
Actor:	Player
Description:	The player starts the game by selecting the PLAY button on the main menu
Preconditions:	1. The player is on the main menu
Steps normal sequence:	1. The player selects the PLAY button on the main menu. 2. The first scene is loaded.
Alternative sequence:	None

Table 3.7: Functional requirement «CU01»

Requirement:	R2
Actor:	Player
Description:	The player quits the game by selecting the QUIT button in the main menu
Preconditions:	1. The player is on the main menu
Steps normal sequence:	1. The player selects the QUIT button on the main screen. 2. The application is shut down.
Alternative sequence:	None

Table 3.8: Functional requirement «CU02»

Requirement:	R3
Actor:	Player
Description:	The player moves the character using the WASD keys, arrow keys or joystick
Preconditions:	1. The player is in a playable scene.
Steps normal sequence:	1. The player uses the WASD keys, arrow keys or joystick in any direction. 2. The Character Controller is moved in the indicated direction. 3. The animation is updated according to the new direction.
Alternative sequence:	[1.1] The player presses SHIFT at the same time. Movement and animation speed increases.

Table 3.9: Functional requirement «CU03»

Requirement:	R4
Actor:	Player
Description:	The player interacts with a nearby intractable object
Preconditions:	1. The player is within the interacting range of an object.
Steps normal sequence:	1. The player presses the E key, Z key or A button on the controller. 2. The object's interactive actions are triggered. (See CU05 3.11 and CU06 3.12)
Alternative sequence:	None

Table 3.10: Functional requirement «CU04»

Requirement:	R5
Actor:	Player
Description:	The player triggers a dialogue by interacting with an object
Preconditions:	1. The player has interacted with a dialogue interactable object (See CU04 3.10)
Steps normal sequence:	1. The dialogue is displayed. 2. The player clicks, presses the Z key, E key or A button on the controller to pass to the next dialogue line.
Alternative sequence:	None

Table 3.11: Functional requirement «CU05»

Requirement:	R6
Actor:	Player
Description:	The player picks up an object by interacting with it
Preconditions:	1. The player has interacted with a pick up object (See CU04 3.10)
Steps normal sequence:	1. The object is deleted from the scene. 2. A new instance of an inventory slot is created using its data (name and sprite). 3. This instance is added to the inventory. 4. The inventory is updated with the new object in it.
Alternative sequence:	None

Table 3.12: Functional requirement «CU06»

Requirement:	R7
Actor:	Player
Description:	The player opens the inventory
Preconditions:	1. The player is in a playable scene.
Steps normal sequence:	1. The player presses the I key, X key or B button in the controller. 2. The player movement is restricted. 3. The inventory is displayed.
Alternative sequence:	None

Table 3.13: Functional requirement «CU07»

Requirement:	R8
Actor:	Player
Description:	The player displays collected memories
Preconditions:	1. The player has collected all of the fragments of a memory. 2. The inventory is open.
Steps normal sequence:	1. The player clicks on the memory in the inventory slot. 2. A confirmation request pops up. 3. If the player says yes, load media associated with the memory. 4. Display the memory.
Alternative sequence:	[2.1] If the player says no, do nothing.

Table 3.14: Functional requirement «CU08»

Requirement:	R9
Actor:	Player
Description:	The player exchanges the positions of the items in the inventory slots
Preconditions:	1. There is more than one item in the inventory. 2. The inventory is open.
Steps normal sequence:	1. The player clicks and drags an item in the inventory. 2. The player drops that item on top of another item. 3. Both of the inventory slots are updated with the new items within them.
Alternative sequence:	[2.1] The player drops the item in an empty slot, do nothing.

Table 3.15: Functional requirement «CU09»

Requirement:	R10
Actor:	Player
Description:	The player drags and drops 2D sprites across the screen
Preconditions:	1. The first puzzle is in progress.
Steps normal sequence:	1. The player clicks and drags an object from the given series. 2. The player drops that object somewhere on the screen. 3. If it's the right position, update the main picture.
Alternative sequence:	[2.1] If it's in the wrong position, put the object back to the options series.

Table 3.16: Functional requirement «CU10»

Requirement:	R11
Actor:	Player
Description:	The player clicks in different cards to match them
Preconditions:	1. The second puzzle is in progress.
Steps normal sequence:	1. The player clicks on a card. 2. That card is revealed. 3. The player clicks on another card. 4. That card is revealed. 5. If they are the same, remove them from the hidden cards list.
Alternative sequence:	[5.1] If they are not the same, hide them again.

Table 3.17: Functional requirement «CU11»

Requirement:	R12
Actor:	Player
Description:	The player starts the game by pressing the PLAY button on the main screen.
Preconditions:	1. The player has reached the end of LIMBO and has had the dialogue prior to the final decision.
Steps normal sequence:	1. The player selects one option or another. 2. The video correspondent to that option is displayed. 3. Show credits. 4. Go to the main menu.
Alternative sequence:	None

Table 3.18: Functional requirement «CU12»

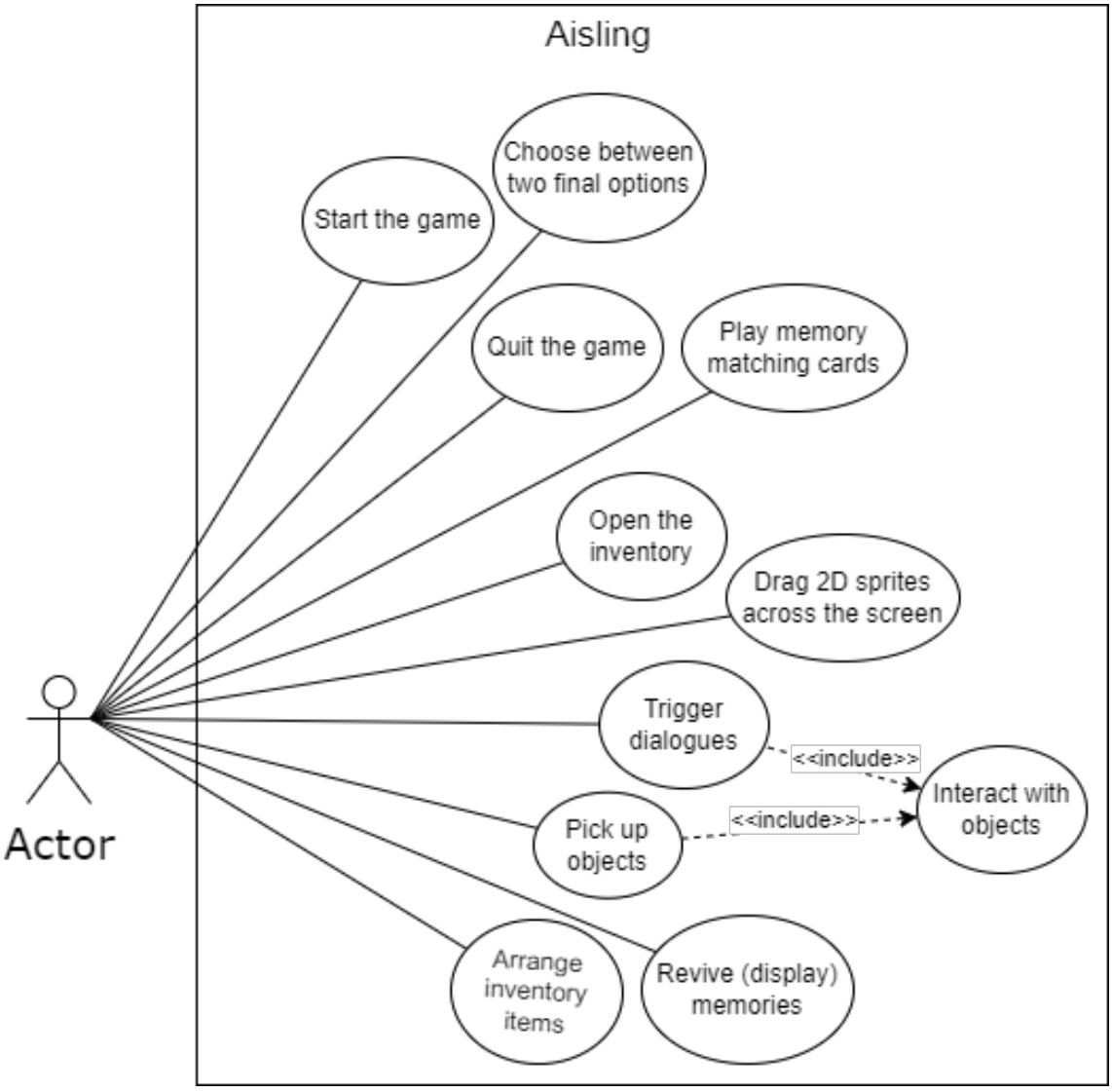

Figure 3.5: Case Use diagram

3.5 System Architecture

Taking as reference a similar game with the same or even slightly higher requirements in terms of graphics and storage, *Don't Starve* (Klei Entertainment, 2013) [19] is a good starting point. Its minimum requirements are the following:

- **OS:** Windows XP/Vista/Windows 7/Windows 8.
- **Processor:** 1.7+ GHz or better.

- **Memory:** 1+ gigs of RAM GB RAM.
- **Graphics:** Radeon HD5450 or better; 256 MB or higher.
- **DirectX®:** 9.0c.
- **Hard Drive:** 500 MB HD space.
- **Sound:** 100% DirectX9.0c compatible sound card and drivers.

3.6 Interface Design

As of now, there is not much to discuss regarding the user interface, so this section will be rather brief. First, the main screen is still a placeholder made with the basic UI tools provided by Unity (see Figure 3.6).

Figure 3.6: Temporary main screen

The remaining UI elements are the dialogue box and the inventory/memory book. As for the first one, it's fairly basic. It displays the name of the NPC and the text which is printed letter by letter to give it more dynamism (see Figure 3.7). The inventory, on the other hand, consists of a page with different slots acting as a photo album (See Figure 3.8).

Figure 3.7: Dialogue UI

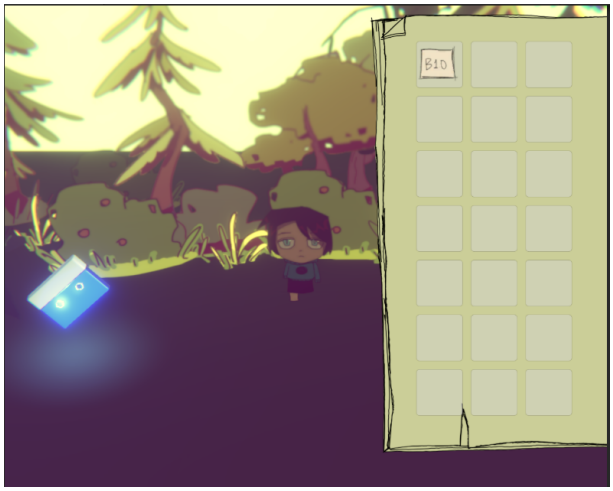

Figure 3.8: Inventory UI

3.7 Artistic Design

As any other visual media, the graphics take an important role in the development of a game. Graphics help create an immersive, engaging experience for players, enhance the game's aesthetic appeal, aid in storytelling, and provide valuable feedback to players. Since *Aisling* is a game focused on storytelling, the graphics serve as an additional method of conveying the narrative. As the player progresses through the game, they can interpret Rito's (main character) emotional state towards a specific location based on the visual elements, such as lighting, hues, contrast, and more.

3.7.1 World

In order to achieve this outcome, it's necessary to conduct visual research for each location: FOREST, SCHOOL, APARTMENT COMPLEX, MAZE and LIMBO. To do this, I started by creating a reference board using PureRef [11] (See Figure 3.9). I collected a variety of images from different sources, such as games, photos, and artworks, that were relevant to each location and the user interface discussed in the previous section (See Interface Design section).

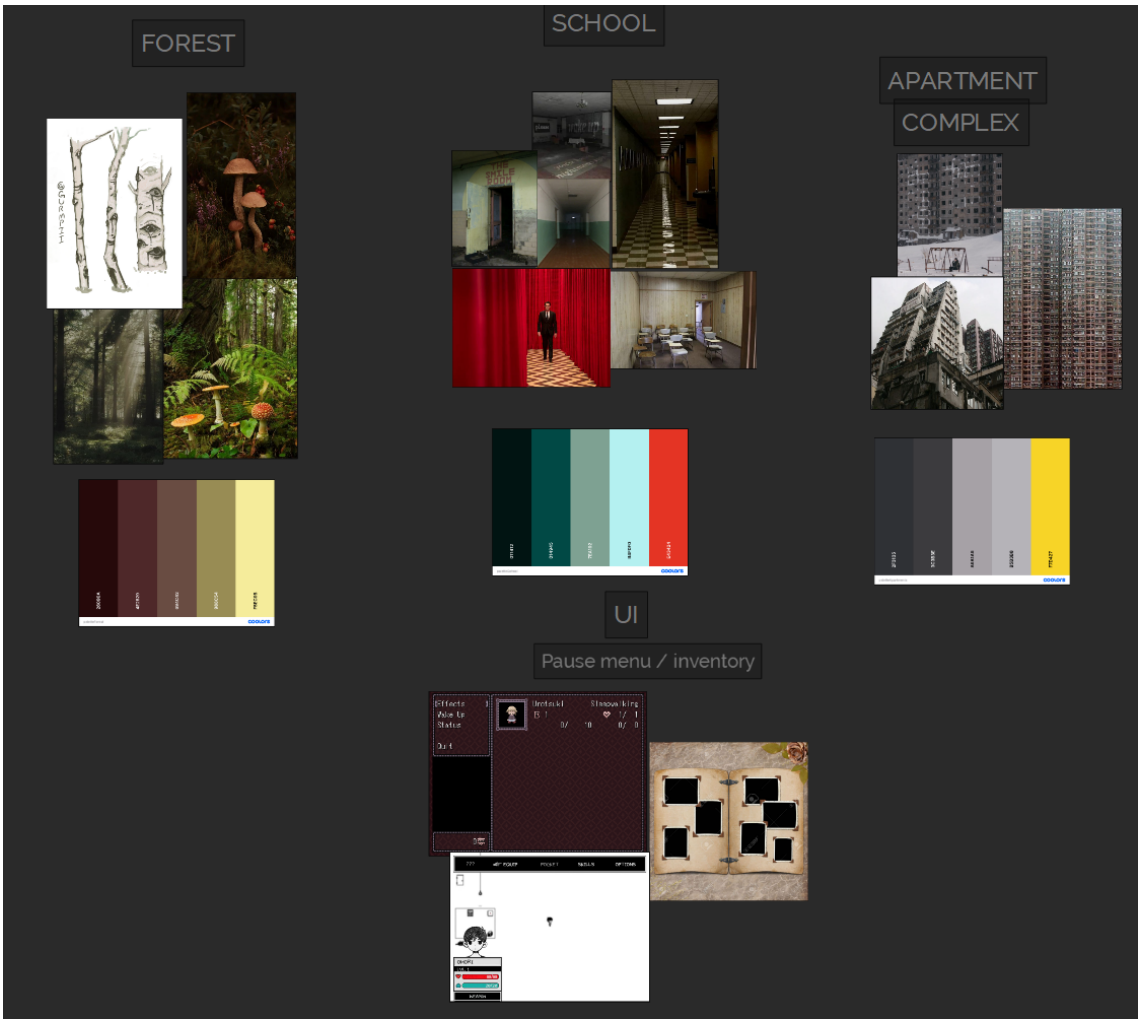

Figure 3.9: Moodboard

The forest in the game takes inspiration from real-life temperate forests that are home to a wide range of life forms, such as mushrooms, different types of trees, animals, and more (See Figure 3.10). In this level, Rito reminisces about how they first met their

friend, Aisling. The forest is a place where the two used to spend time together and have all kinds of adventures in an old playground. In this level, everything appears vibrant and full of life, with the primary colour being yellow, which evokes a sense of nostalgia.

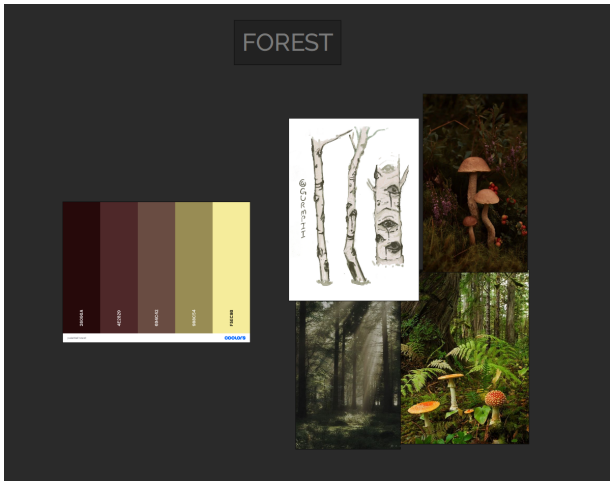

Figure 3.10: Reference board for the «FOREST» level

The second location is not very pleasant for Rito as it takes place in their former school - or at least, how they remember it - as a dark and gloomy place. The references for this place are mainly *Twin Peaks* (David Lynch, 1990) and liminal spaces, that is, places that evoke a feeling of disorientation and ambiguity (See Figure 3.11). This place is not as lively as the previous one which serves to amplify the contrast both in terms of the visual language and the overall mood of this level.

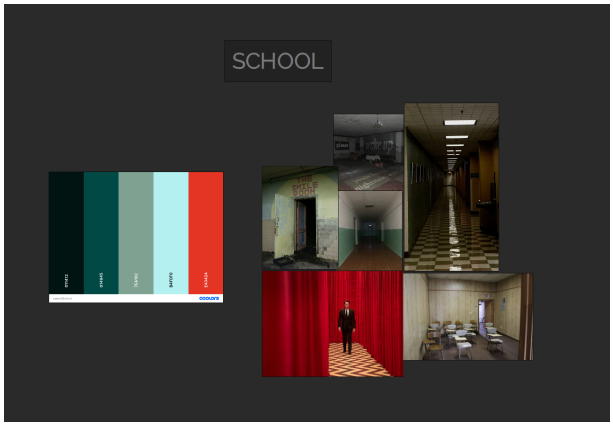

Figure 3.11: Reference board for the «SCHOOL» level

The final location in the game is based on Rito's memories of the apartment complex they used to live in when they were younger. On gloomy days or when Rito was feeling

low, they would often stay here with little to do. This location is not as unsettling as the school, but it is far from welcoming. The building is empty and lifeless, which is reflected in the monochromatic hues and sharp edges of the environment (See Figure 3.12). The only glimpse of colour is Aisling (See Yellow Memory)

Figure 3.12: Reference board for the «APARTMENT COMPLEX» level

The next stage is the maze, which is inspired by *Yume NIkki*'s (Kikiyama, 2004) Hell level (See Figure 3.13). Although it is not gonna be as big and complicated, this place is the first abstract location on Rito's mind. This level adds a layer of psychological depth and challenge that represents the complexity and confusion of navigating through Rito's past experiences. The player may feel disoriented and uncertain while navigating the maze, which can reflect the feeling of trying to remember and make sense out of the memories collected so far.

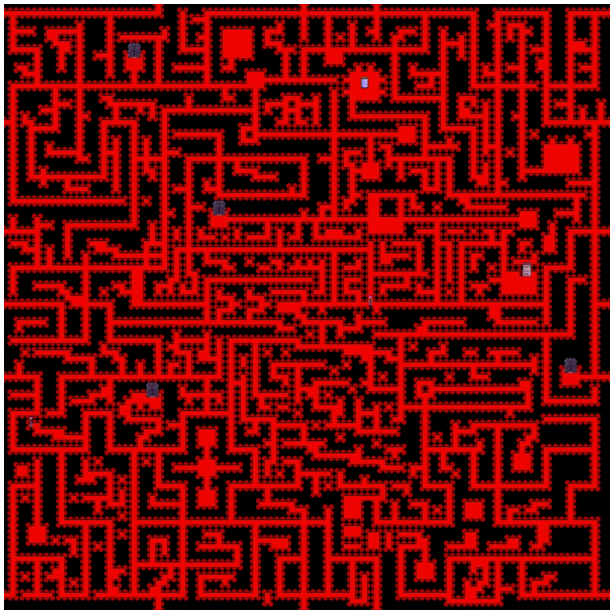

Figure 3.13: *Yume Nikki*'s Hell room. Taken from *Yume Nikki*'s Wiki

The final abstract location in the game is Limbo, where Rito is left alone to reflect upon their memories. This place is a void of emptiness and darkness, where there is nothing but Rito and their reflection (See Figure 3.14).

Figure 3.14: Concept for the «LIMBO» level

3.7.2 Characters

With the worlds defined, the next step is to create the characters, although there aren't many in this game. The main character, Rito (See Figure 3.15), has a simple design that can be altered in different versions to reflect their mood at each level. For example, the colour of their sweater is yellow in the FOREST, blue in the SCHOOL, and grey in the APARTMENT COMPLEX. The black circle on their chest represents their sense of loss, specifically the loss of their friend that resides in their memories.

Figure 3.15: Main character, Rito, in different stages of the game

Aisling's character design is an important aspect of the game, as it reflects her energetic and cheerful personality. Her design features bright and playful colors, mismatched clothing, and hair accessories (See Figure 3.16), all of which contribute to her childlike appearance. This design choice was made with the intention of creating a character that players would find endearing and empathetic, while also reinforcing the game's narrative themes, which is childhood memories.

Figure 3.16: Secondary character, Aisling

Chapter 4

Work Development and Results

Contents

This chapter is a crucial part of this report, as it provides an analysis of the processes and challenges encountered during the development of the project. This chapter highlights the technical and artistic decisions made throughout the process. Additionally, the chapter will showcase the final result, comparing the initial objectives with the final result. Through this chapter, readers will gain a comprehensive understanding of the project's development and the journey that led to its final version.

4.1 Work Development

4.1.1 Technical development

Once knowing what the game needs in terms of engineering and graphics, I then could proceed with the development itself. As the main focus of this project is the narrative and artistic design, the technical matters will be briefly explained without going into detail unless it is related to these two aspects. I started first with the basis of the game, a moving character and a world. Using Unity's Character Controller [20] and Input Actions System [21], I achieved the first; the player can move the character using either the *WASD* keys, the arrow keys, or the controller's joystick. And using ProBuilder (See Figure 4.1) (Unity's tool to design, prototype and play-test levels) [22] I created a basic layout for the world. Also, I used a virtual camera that follow the player.

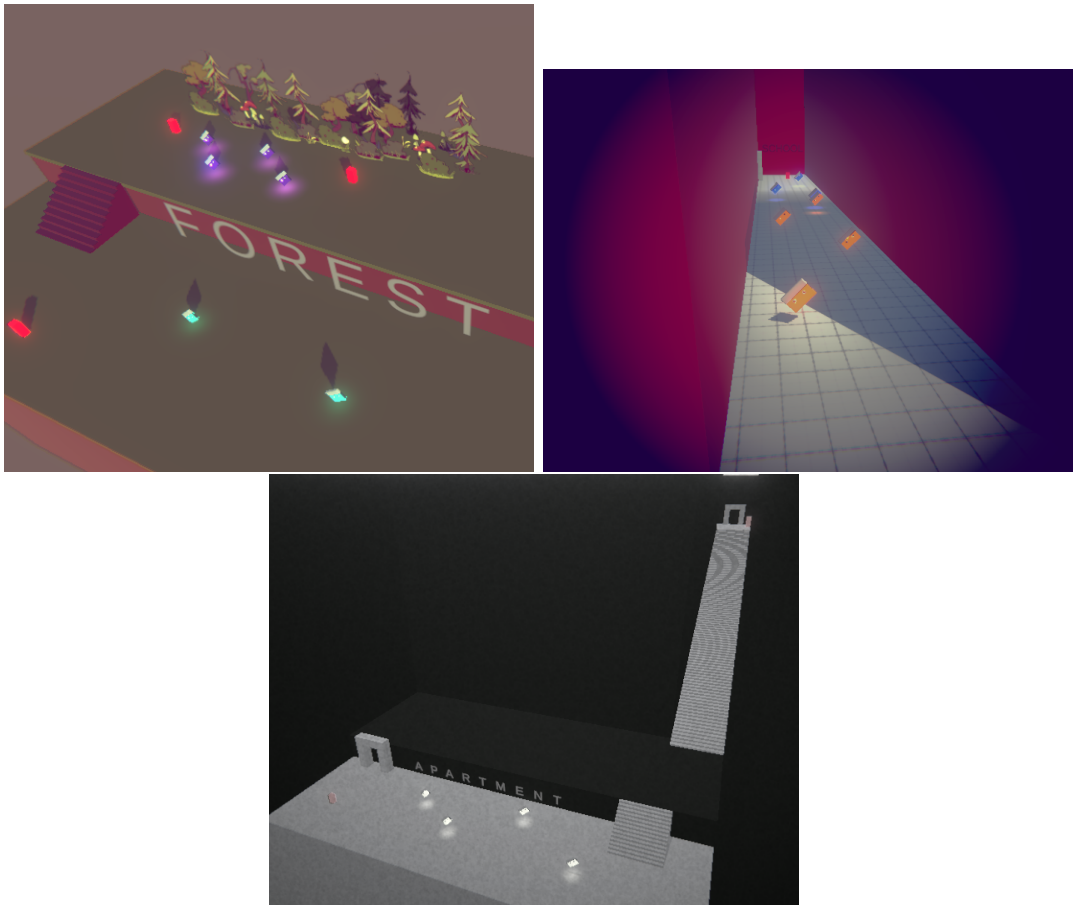

Figure 4.1: Main levels' prototypes made with Unity's ProBuilder

The character not only needed to move but to interact with the world. So, again, using the Input Actions System and creating some Prefabs with a basic *InteractableObject.cs* class (from which specific objects like dialogue triggers and pick-up objects will derive), I had intractable objects whose actions are triggered by the player being nearby and pressing the E key, Z key, or A button in the controller. From these basic objects, I made Prefab variations and added different behaviours. The first one is a dialogue trigger and the other that allows the player to pick up objects and store them in the inventory.

The inventory was implemented following *Brackeys*' tutorials [23] [24] [25]. I had to make some changes to the *Inventory.cs* script so that it can function across different scenes, I made it a Singleton. The basic flow is: player interacts with a pick-up object (with an *Item* object attached, more on that later), said object is destroyed from the game space, and a new inventory item is created from the *Item* object populating an empty slot in the inventory. The *Item* object is a scriptable object that stores basic information about pick-up objects, such as name, inventory sprite, and optional description. The

inventory can be opened by pressing the I key, X key, and B button on the controller.

Lastly, the last basic technical feature to implement is the doors and spawners that connect all of the game scenes. To make it simple and scalable I just created a spawner Prefab that stores a *spawnerID* and a door Prefab that stores the level it leads to and the *spawnerID*. Each door has a spawner that depending on where the player comes from, will be spawned in front of the corresponding door.

Now that the basic technical features are covered, I can then proceed with the specific features of *Aisling*. That is the memory collection, the puzzles in the first two levels, and the final maze. Let's talk about the memory fragments first. Starting from the Item scriptable object, I created a *MemoryFragment* class that descends from it, with additional attributes like a *fragmentID* and *memoryID*. These scripts can be attached to any *GameObject* in Unity through a *PickUpItem.cs* script, but let's not go into details on that matter and move on to the memories. These are scriptable objects too that hold a *MemoryFragment* list along with a boolean list (to keep track of which fragment has been collected) and a *memoryID*. This way, any time the player picks up an object with a *MemoryFragment* object attached to it, it will be stored in the inventory and the Memory it belongs to will update its boolean array. Once all of the fragments have been collected, depending on whether it's a key memory game-flow-wise or not, it will trigger an event that will allow the player to advance. Be it spawning a puzzle or giving access to the next level.

To summarise it (See Figure 4.2):

- **Memory**: Scriptable object that stores a memoryID, and a list of boolean values.
- **MemoryFragment**: Scriptable object that stores a memoryID and a fragmentID.
- **MemoryManager**: Script attached to a GameObject that holds a Memory list and a list of boolean values.

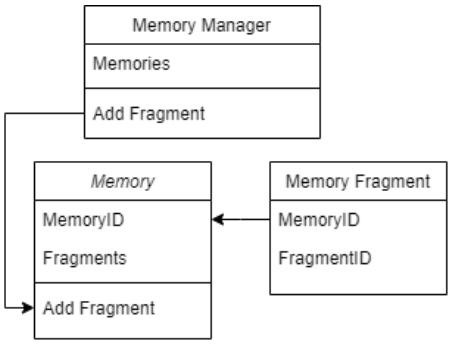

Figure 4.2: Memory class structure

This way, when the player interacts with any game object containing a MemoryFragment, it is uploaded to the inventory, and if it's the last one, all of the fragments are

destroyed and a new item is created: the complete Memory (See Figure 4.3), which makes the content of said memory accessible by clicking on it; in other words, revive that memory (See Figure 4.4). There are two types of memories:

- **Image sequence:** When the player opens it, they can click on the arrow on the side to slide through the images.
- **Video:** Be it an audio or a short animation, when the player clicks on it, a video player pops up displaying the memory.

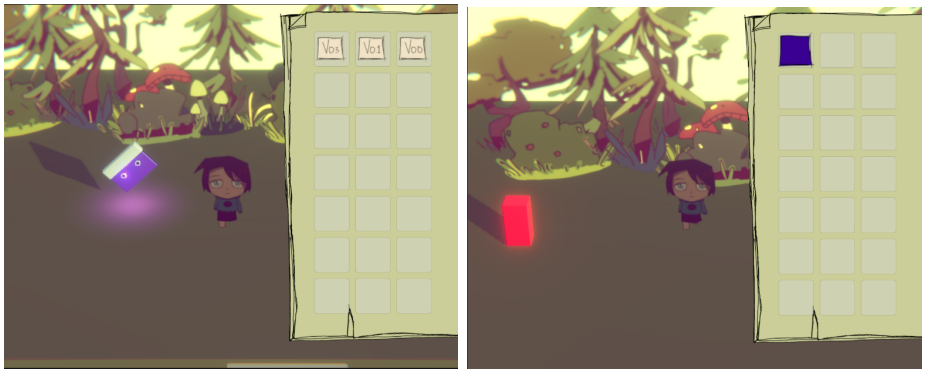

Figure 4.3: Fragments becoming a complete memory

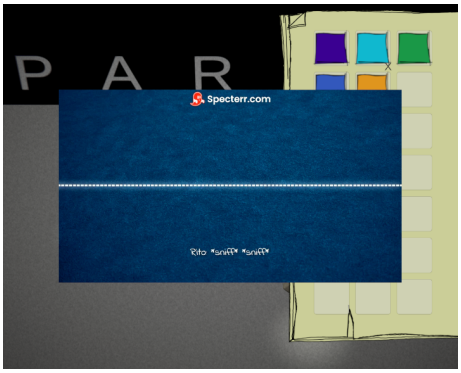

Figure 4.4: Memory being revived by clicking on it in the inventory

Next, the puzzles at the end of the FOREST and SCHOOL levels, which not only have ludic purposes, but also narrative as there are plot elements hidden in the mechanics, more on that later. The puzzles are:

- **Memory recall game:** the player is given a main picture with some missing parts and they need to fill in the gaps with a series of sprites.

- **Memory match game:** the player needs to match a few (not so) identical cards with images related to the memories.

For the memory match game, I used Ka Hian's [26] asset package to start (Figure 4.5) from. I made some tweaks to adapt it to what my game needed and changed the sprites to match the theme.

Figure 4.5: Base game by Ka Hian on GitHub

Finally, the last technical feature for the narrative design is the maze. I used an already existing procedural generator that implements the Depth First Search algorithm provided by Cobra-117 on GitHub [27] (I personally contacted him and he granted me his permission to use it in my game). The maze is generated at the moment the scene is loaded, so every time the player enters, it will be different. However, I made some changes so that it spawns some dialogue triggers along the correct path (See Figure 4.6). These dialogues consist of only a couple of lines recalling some of the memories collected so far and are displayed in the same order every time.

4.1.2 Artistic development

After having the basic mechanics implemented with placeholders, I started producing the first 2D assets based on the previous visual research made (See Artistic Design): the main character sprite sheet (See Figure 4.7) and the FOREST, SCHOOL and APARTMENT COMPLEX environment assets (See Figures 4.8, 4.9, 4.10).

Figure 4.6: Adapted maze by Cobra-117

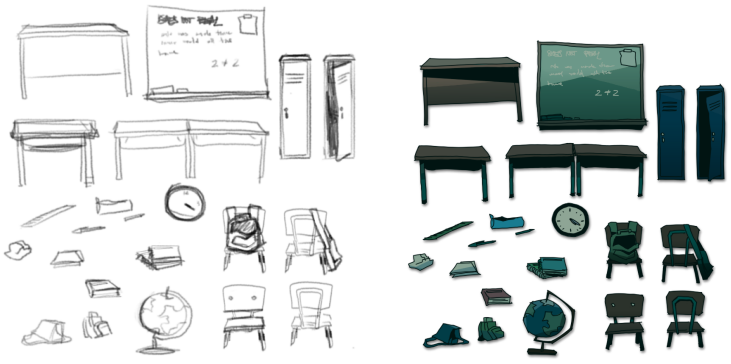

Figure 4.9: SCHOOL's sketch and final assets

Figure 4.7: Section of the main character's walk cycle sprite sheet

Figure 4.8: FOREST's sketch and final assets

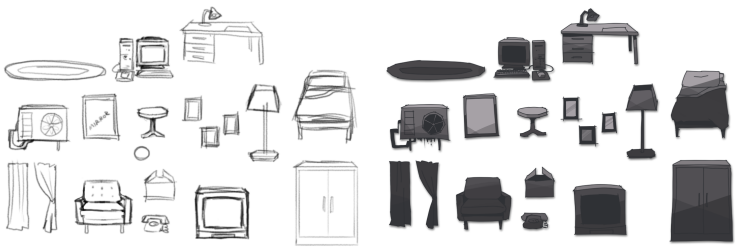

Figure 4.10: APARTMENT COMPLEX's sketch and final assets

To integrate them in the 3D environment, I used a Billboard script that will make them face in the direction of the camera, so that the player always sees the front face of the sprites. This includes both the environment and the main character(See Figure 4.11).

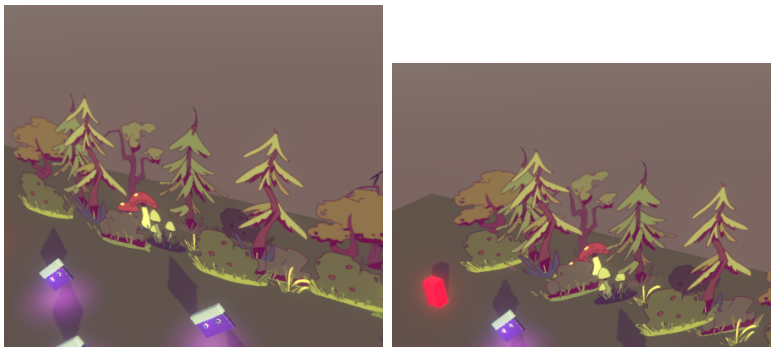

Figure 4.11: Environment assets facing the camera (left) and in original rotation (right)

Also, as for the memory fragments I modelled some low poly 3D assets on Blender: a cassette, some jigsaw pieces, a CD, Master-View, VHS tape and an old TV. (See Figure 4.12). Additionally, for the memories per se, I created a series of short content: videos and image sequences.

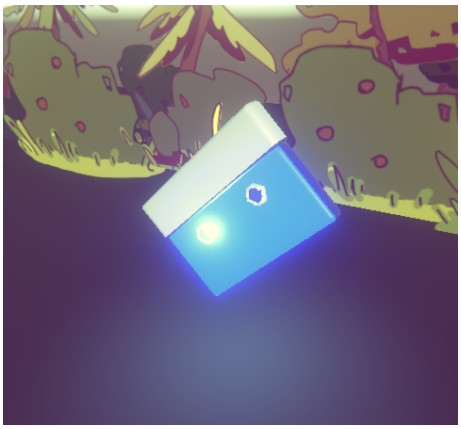

Figure 4.12: 3D Cassette in Unity

The image sequences serve as a medium for both comic strips and text. All of them were created in Krita [13] and the comics were hand-drawn taking into account the colour that it represents (See Figures 4.14 4.15 4.16). As for the text memory (the violet poem), instead of drawings, there is just a text on each slide (See Figure 4.13).

Figure 4.13: Violet memory image sequence

Figure 4.14: Green memory image sequence

Figure 4.15: Yellow memory image sequence

Figure 4.16: Orange memory image sequence

The video type displays both audio memory and short animation. For the audio memory (See Figure 4.17) I recorded myself and a friend for the voice acting, then using an online voice filter MyEdit [15] made them sound more childlike. I added some

ambience and sound effects from Zapsplat [17] to finally add a megaphone filter on MyEdit. To give a visual element and subtitles, I used Specterr [16].

Figure 4.17: Blue audio

Finally, complementary to the game assets and their colour palettes, each level has a different post-processing that enhances the mood of each one. For the FOREST, as seen in figure 4.1, the intended mood is nostalgia, and this is achieved by using low saturation, a yellow tint, the bloom effect, and warm colours. The SCHOOL being an uncomfortable place for the main character, the odd is rather dark and unwelcoming, with an intense vignette to give the sensation of imprisonment and an uncanny feeling (see Figure 4.1). The APARTMENT COMPLEX, as a lifeless place in Rito's eyes, is monochromatic black with some film grain to simulate an old TV. However, the only colour in there is the yellow memory fragments. For this reason, I had to implement two different cameras in this level: a normal post-processing camera that excludes the objects belonging to the *noPost* layer and a camera with no post-processing that overlays the normal one and only renders the objects on the said layer. Lastly, as previously mentioned, I took *Yume Nikki*'s Hell level as inspiration for the MAZE, which makes it have a red tint and is overall dark to represent how disoriented and confused the main character feels at this point.

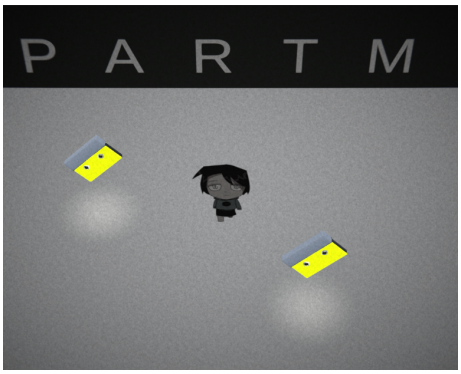

Figure 4.18: Memory fragments with no post-processing applied

Figure 4.19: Maze with post-processing applied

Finally, another key element of any audiovisual content is sound design. There are two main distinctions: ambience and sound effects, most of which are taken from ZapSplat or Open Game Art [18] for free. For the FOREST, I used a melancholic soundtrack to evoke nostalgia along with windy forest ambience. For the SCHOOL, I used a dark ambience with distant classroom noises. The APARTMENT COMPLEX has a windy ambience with a minimalistic soundtrack to enhance how lifeless the main character perceives this place. The MAZE, where Rito is in a state of confusion and disorientation, has a soundtrack that is rather chaotic. Finally, being an empty place to reflect, LIMBO has only brown noise.

4.2 Results

The final result can be considered as a demo of what I had pictured originally. It consists of a game where the player can explore the world and gather different memory fragments. Although it's not as immersive and it's missing some features, it's playable and an entertaining experience in my opinion.

Hereafter, I'm quoting my initial objectives (See Objectives section) and comparing them with the actual result.

"Create a game with complex, non-linear narrative". From a conceptual point of view, the narrative has been completely designed, encompassing both the essential game mechanics and the core storyline. In terms of the narrative delivery, a combination of audiovisual, visual, and audio elements contents were created to represent each memory fragment. The intentional non-linear distribution of these memories, as initially envisioned, has been successfully implemented, thereby achieving the intended objective.

"Implement narrative mechanics: two puzzles and a maze". Although borrowed from GitHub repositories, both the memory match game and the maze were implemented and adapted to the game's theme. The maze triggers conversations about the main character's past, while the memory match game provides clues about Aisling's true identity. However, the first puzzle, the memory recall game, could not make it into the final result, so it was replaced with a short dialogue instead. Overall, this objective is considered accomplished as these gameplay elements were successfully integrated and utilised to enhance the overall storytelling.

"Implement visual language to enhance narrative". Considering not only the hand-drawn assets and memories but also the post-processing effects, this objective is considered to be the most satisfactorily accomplished. The post-processing effects significantly enhance the mood of each level, effectively complementing the narrative. Additionally, the game assets have received positive feedback for their appeal..

In conclusion, I designed the entire game conceptually, and I could accomplish most of my initial goals in practice. However, I will keep working on its development and hopefully achieve what I initially wanted. The project repository and playable demo build can be found at the following links:

- GitHub repository:

  https://github.com/VnssJT/Aisling

- Drive folder with build:

  https://bit.ly/3ASMo1B

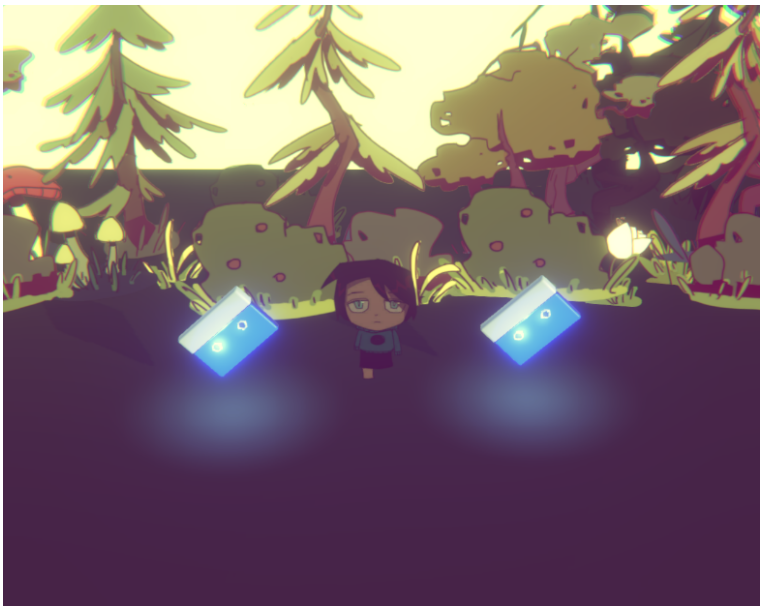

Figure 4.20: Ingame screenshot

Chapter 5

Conclusions and Future Work

Contents

5.1 Conclusions

Initially, when I started working on my Bachelor's Thesis, I was unsure about the direction I wanted to take with the project. I was inclined towards a narrative or artistic approach since those were my areas of interest and expertise. However, this led to a delay in the development process as I struggled to define the game's mechanics, plot, characters, and other important aspects. Despite having designed simple mechanics, my lack of experience posed a significant challenge during the development phase. In addition, I struggled with time management early on, which caused some delays in the project and the fact that I was constantly stuck in minor details that were not essential to the main functionality didn't help.

The project had its challenges, but there were also positive experiences. As the game began to take shape both technically and visually, it provided motivation to continue. In programming, small functional features are considered victories after struggling with them for a significant amount of time. Additionally, seeing the worlds created in my imagination come to life in the virtual world was a satisfying experience.

The contents of some of the degree's subjects were useful in the creation of this report. For instance, VJ1224 - Software Engineering taught me how to design the application and plan the development. VJ1222 - Video Game Conceptual Design provided me with

the skills to write the Game Design Document, and, of course, art and narrative-related subjects such as VJ1223 - Video Game Art, VJ1218 - Hypermedia Narrative and Video Games Analysis contributed to the project's development.

In summary, this project was a valuable learning experience for me. Working on it allowed me to both practice and acquire new technical skills in Unity. Additionally, it taught me important lessons regarding project planning and management. I realised the need to plan and organise better from the early stages of development, as well as to focus on the bigger picture instead of getting lost in minor details, which slowed down my progress.

All in all, although the result is far from polished as I envisioned it, I still had a good time developing it and I could say that it is a game I would be likely to play had it been finished, as it shares similarities with other games I enjoy, such as *Yume Nikki* (Kikiyama, 2004) and *Omori* (OMOCAT, 2020).

5.2 Future work

I knew the Thesis' deadlines imposed a big time challenge, so I didn't want to be too ambitious and even so, there wasn't enough time for me to complete it. Since this is a game I personally would enjoy, I will be most likely inclined to polish it and even implement relatively more sophisticated features like a save and load system, more random places and NPCs as I planned since the beginning, etc. I recognize that there was not enough playtesting conducted for the game, and I intend to address this in order to receive feedback and improve it.

Furthermore, I admit that I may not possess expertise in all roles of game development and may seek collaboration with more experienced people in certain areas, such as sound design. This way I aim to enhance the overall quality of the game, ensuring a polished and professional outcome that meets the standards expected for online release.

This online release can be complemented with marketing materials (such as gameplay and narrative trailer, teasers, artwork, devlogs, and more) to engage potential players, establishing a strong online presence and even cross-promotion with other indie games that are in their growing process as well. However, unlike AAA titles, *Aisling* does not aim for a large audience, as its primary focus is indie games players.

Lastly, to ensure *Aisling* is accessible to individuals with visual limitations, such as colour blindness, it is important to consider methods that enhance their experience. One approach is to improve visibility by increasing colour contrast throughout the game. Another effective strategy is to implement a dedicated colorblind mode, providing alternative colour schemes or additional visual cues that make it easier for colour-blind players to differentiate memories and overall elements of the game. By implementing these accessibility features, *Aisling* can be enjoyed by a broader range of players.

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