

CM50109 Software Engineering

Coursework 2: A Serious Game

Turquoise Group

Report

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Introduction

Welcome to our documentation for the “GeoGame” project, an educational game. This document is divided into two main sections: Process and Product Documentation.

The Process Documentation provides insights into our team’s methodology, including detailed records of team meetings, sprint goals, overviews, reviews, backlog analysis, and exception handling. At the end of the process section, you will find a table comparing planned vs. completed story points for each sprint, offering a transparent view of our project’s progress.

At the end of each sprint, we have captured a snapshot of our agile board, presented through Taiga board screenshots. These visuals concisely represent our project’s progress. The board is divided into columns representing different statuses: “New,” “In Progress,” “Ready for Test,” “Closed,” and “Needs Info.” Any columns without active tasks are collapsed in these screenshots for the sake of readability. Each screenshot encapsulates the state of our sprint at its conclusion, offering a transparent overview of our productivity and focus areas. These snapshots are instrumental in our reviews and retrospectives, allowing us to track our achievements and identify opportunities for improvement.

In contrast, the Product Documentation delves into customer interviews, user stories, tests, use cases, software design, and UI/UX design, all carefully enumerated and versioned. Our High-Level Project Definition and Scope at the beginning set the stage for understanding our project’s overall vision and constraints. This structured approach ensures a comprehensive understanding of our journey in creating “GeoGame.”

High-Level Project Definition

Goal: To create "GeoGame," a serious game designed to educate and engage players in geographical and cultural knowledge through an interactive puzzle and quiz format.

Description: GeoGame is an immersive adventure where players assume the role of a detective, travelling across various countries depicted as escape rooms. Each room presents country-specific questions that players must answer to progress. The game aims to educate about different cultures and geographies while maintaining a thrilling narrative. Features include time limits and a maximum number of incorrect attempts to increase challenge and discourage guessing.

Approach Used: Agile Development, allowing for iterative improvements and adaptations based on player feedback and testing results. This approach ensures a dynamic and user-centric game development process.

Project Scope

Project Objective

The primary goal of this project is to develop “GeoGame,” a serious game aimed at educating players about different countries through an interactive puzzle and quiz format. The game features a detective theme, where players travel through two countries depicted as escape rooms. The objective

is for players to learn about each country by answering specific questions and progressing to the next level. The project is planned to be implemented over several sprints, focusing on creating immersive and educational experiences.

Assumptions:

1. Game development stages and features are based on user requirements and feedback.
2. Priority is given to essential user stories and functionalities, mainly those upon which other game elements are dependent.
3. The complexity and implementation time dictate the allocation of story points for each feature.
4. Each sprint has a defined deadline, and features are expected to be completed within these timeframes.
5. The choice to use Godot as the game engine is based on its suitability for 2D game design, user-friendly interface, and our specific project needs, as compared to other engines like SDL2, Unity, and Unreal.

Constraints:

- The project is constrained by a fixed timeline and budget.
- Regarding team members or funding, additional resources are not available.
- The release schedule is predetermined and inflexible.
- Due to budget limitations, only free tools and software are utilised.

Success Metrics:

- Players successfully navigate through different levels, engaging with country-specific quizzes and puzzles.
- The game effectively educates players about various countries, enhancing their geographical and cultural knowledge.
- User engagement is high, with players finding the game challenging and enjoyable.
- Feedback from players indicates a positive learning experience and satisfaction with the game's design and content.

Out Of Scope

- Given the project's time constraints, certain features have been identified as out of scope, and include:
 - Implementing five distinct levels, each representing a different continent.
 - Offering players the choice to select their character at the start of the game.
 - Including more complex quiz formats, such as rearranging puzzles.
 - Multi-language support and internationalisation due to budget constraints and complexity.
 - Advanced player customisation options (e.g., pieces of clothes from every country).
 - Adding an additional, higher difficulty level once all rooms are discovered. This level would feature time-constrained quizzes, requiring players to quickly move between rooms (countries) to answer questions. These questions would appear sequentially and cover all previously discovered countries, significantly increasing the game's challenge and requiring quick, strategic thinking from the player.

Process Documentation

The process documentation provides a sprint-by-sprint breakdown of the process followed by the Turquoise team for the duration of this project. The link for the repository containing the code produced by this process can be found [here](#).

Justification for Sprint Lengths in the Project Timeline

The first sprint lasted for two weeks. We changed the spring duration to one week afterwards.

1. Initial Two-Week Sprint

Project Kick-off and Team Formation: The first sprint was extended to two weeks to accommodate the initial team formation and project kick-off phase. This period was crucial for team members to get acquainted, establish communication channels, and set the groundwork for collaboration.

Idea Development and Conceptualisation: The extended sprint allowed enough time for brainstorming and refining game concepts. This period was essential for creative processes and provided a solid foundation for direction of the game.

Technology Evaluation and Selection: The extended duration of the first sprint was essential for a thorough evaluation of various game development tools and technologies. This phase involved hands-on testing and analysis of game engines (Unity, Godot, SDL2), which was crucial to selecting the most effective and suitable option for our game development needs. For detailed insights into the decision-making process behind choosing the game engine, refer to the Sprint 1 Review.

Team Dynamics and Methodology Familiarisation: The additional time in the first sprint also served as a valuable period for the team to gel and understand each other's unique skills and work approaches. Moreover, this phase was critical for all team members to grasp agile practices better and become proficient with project management tools like Trello and GitHub, laying a solid foundation for our subsequent agile process.

2. Shift to One-Week Sprints

Regular Customer Feedback: Since customer meetings were scheduled weekly, one-week sprints aligned perfectly with these interactions. This allowed us to integrate customer feedback and adjust our project direction accordingly.

Increased Project Momentum: Shorter sprints increased the project's speed, allowing quicker iterations and faster progression in development. This approach helped maintain a steady pace and kept the team focused on immediate goals.

Time Constraints: Considering the overall timeline for the project, shorter sprints allowed for a more frequent reassessment of our progress and priorities, ensuring that we stayed on track to meet the project's deadlines.

Agility and Responsiveness: One-week sprints enhanced our ability to respond quickly to changes, be they project requirements, team dynamics, or external factors. This flexibility was crucial in a dynamic project environment.

Sprint 1 (18 October – 1 November)

1.1. Team Meetings

1.1.1. The Initial Team Formation and Idea Generation – Wednesday, 18 October (1.5 hours)

Foundation and Team Diversity

Our first team meeting was foundational in setting the tone for our project. Our team comprised six members, coming together from diverse cultural backgrounds, representing five countries. This diversity was not just in nationality but also in our experiences and skills in programming and game design. As our team was composed of three pairs who had previously collaborated on coursework, each person presented their partner to the group, highlighting their academic and programming experiences and sharing insights into their interests, cultural backgrounds, and the dynamics of their prior collaborations. This exercise helped us understand each duo's working style and the diverse skills they brought to the table.

Brainstorming Game Concepts

As the meeting progressed, we delved into brainstorming for our game concept. The diversity of our team sparked the idea for our game – creating **a game to educate players about various countries around the world**. This concept emerged organically from our discussions, influenced by our experiences at a multicultural university where misconceptions and knowledge gaps about different countries were commonplace. The game could teach about various cultures, landmarks, and flags and delve into each country's unique aspects.

In addition to this concept, another team member developed a more complex idea: creating **a game based on MBTI personality types**. This game imagined as an interactive platform, would teach players how to communicate effectively with different personality types, akin to interacting with a virtual girlfriend or companion. While this idea was intriguing and offered a unique angle on communication skills, the complexity of implementing AI (Artificial Intelligence) for such an interaction was daunting. Given our limited experience with AI and the constraints of our project timeline, this idea, though promising, might be too ambitious for our current capabilities.

Another captivating idea we discussed was developing **a game centred around historical events**. This game would test players' knowledge of history and allow them to explore how different decisions could have altered historical outcomes. Changing history to see different future scenarios was engaging and thought-provoking. However, given our time and resource limitations, the historical game's complexity in content creation and mechanics, like the MBTI-based game, seemed challenging.

Establishing Communication Channels

By the end of our first meeting, we had laid the groundwork for several promising game ideas. We set up a group chat on WhatsApp to collaborate and share ideas and on Microsoft Teams for online meetings. We agreed to continue pondering these game concepts sharing further thoughts and developments in our chat.

1.1.2. Follow-up Meeting – Monday, 23 October (1.5 hours)

The next team meeting happened two days before our very first customer meeting. During this meeting, we explored additional game ideas.

One of the team members brought up a creative concept about a game that could help parents better understand their kids' culture by teaching them about modern memes. This idea also extended to teaching modern slang, targeting parents and foreigners in the UK. The concept was appealing due to its relevance in today's digital and interconnected world. However, our enthusiasm for this idea was tempered by the challenges in implementing it, such as sourcing and maintaining a relevant and culturally sensitive database.

Convergence to a Core Concept: Deciding on Primary Game Idea

Amidst these discussions, a consensus began to form around the idea of an international quiz game. It mirrored our team's diverse makeup and promised an educational and entertaining experience.

Preparation for Customer Meeting

In preparation for the upcoming customer meeting, we decided to present this idea as our primary concept while keeping the door open for integrating elements from our other brainstormed ideas.

1.2. Sprint Goals

1. **Refine Game Concept Ideas:** Following the brainstorming session and initial team meeting, refine the game concepts discussed, focusing on feasibility and educational value.
2. **Develop a Detailed Proposal for the International Quiz Game:** Based on the consensus and interest in the international quiz game, work on elaborating this idea into a more detailed game proposal. This includes outlining the game's structure, educational elements, and potential gameplay mechanics.
3. **Incorporate Customer Feedback:** Integrate feedback and insights from the customer meeting on the 25th of October into our game development process. Consider their preferences, address their concerns about the game being **more than just a quiz**, and brainstorming ways to add **interactive** and **gamified elements** to the concept.
4. **Prepare for Next Customer Interaction:** Ready the team for the next interaction with the customer, aiming to present a more refined and detailed version of the game concept, emphasising how it will be gamified beyond a basic quiz format.
5. **Establish Effective Communication and Collaboration Channels:** Ensure all team members are on the same page and actively contributing, using our established communication channels like WhatsApp for ongoing discussion and idea sharing.

1.3. Sprint Review

1. The team successfully created a foundation for collaboration, with members introducing their backgrounds and experiences.
2. Several game ideas were proposed and discussed, including an international quiz game, a historical event game, and an MBTI-based communication game.
3. The team focused on an international quiz game, considering feasibility and team interest.
4. Decided to use Godot as the game engine for our project. This decision came after evaluating various options, including SDL2, Unity, and Unreal. SDL2 was considered too complex for those unfamiliar with in-depth C++ concepts. Unity and Unreal, while powerful, were more aligned with 3D game development, which did not match our project's scope. Godot was chosen for its user-friendly interface and suitability for our 2D game design needs.

5. Implemented Taiga as our project management tool. Its agile framework support, user-friendly interface, and features for collaboration and transparency made it an ideal choice. Taiga's capabilities are especially beneficial for managing agile processes like sprint planning and user story tracking, ensuring an organised and efficient workflow within the team.

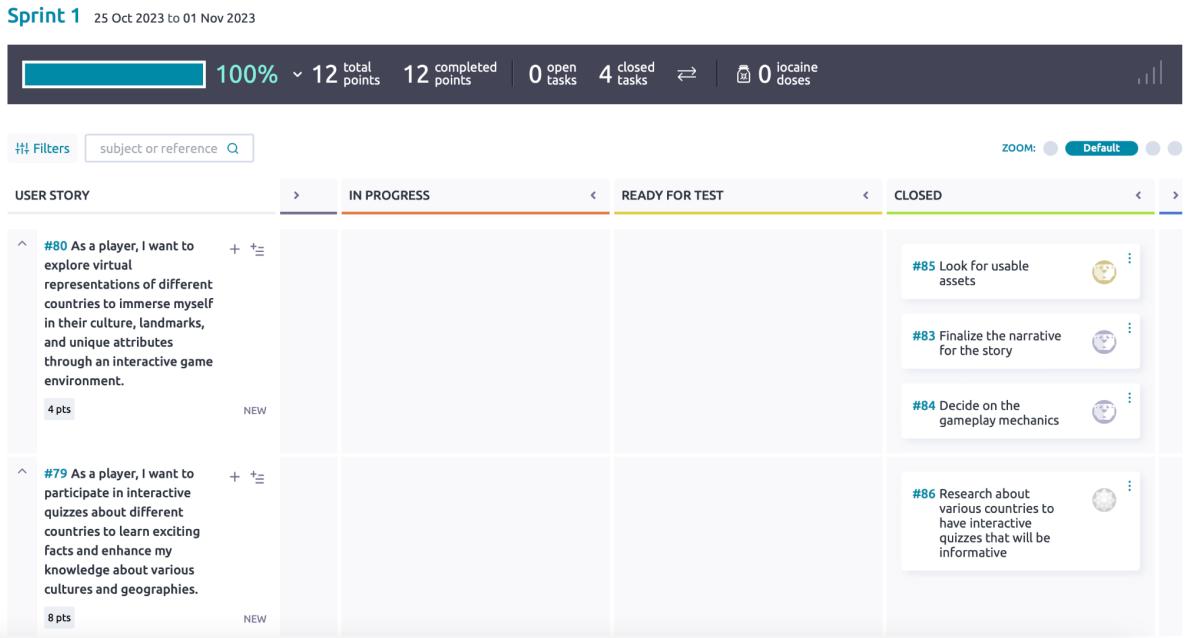


Fig. 1 Agile Board Snapshot for Sprint 1

1.4. Backlog Analysis

1. Initial Concept Generation and Exploration:

1. **Initial Ideas:** Generated various game concepts, including an international quiz, an MBTI personality-based game, a historical events game, and a modern meme and slang game.
2. **Backlog Creation:** These ideas were initially catalogued in our backlog for potential development.

2. Post-Customer Meeting Refinement:

- **Feedback Integration:** After the customer meeting, we reassessed the backlog, prioritising the international quiz game.
- **Concept Elaboration:** Focused on detailing the international quiz game, considering the customer's feedback about gamification and educational engagement.

3. Prioritisation and Streamlining:

- **Deprioritising Complex Ideas:** More complex concepts like the MBTI game were deprioritised due to feasibility within the project timeline.
- **Meme Game on Hold:** The meme and slang game concept were put on hold due to content sourcing challenges.

4. Enhancement of the Chosen Concept:

- **Interactive Elements:** Added tasks for designing interactive and engaging components for the international quiz game.
- **Country-Specific Research:** Included tasks for researching content related to various countries.

5. Current State of Backlog:

- **Focused Tasks:** Updated the backlog with a clear focus on developing the international quiz game.
- **Task Breakdown:** Broke tasks into research, design, and initial development phases.

6. Task Completion:

- **Initial Ideas Catalogued:** All initial game ideas have been documented and assessed.
- **Concept Refinement:** Preliminary refinement of the international quiz game concept completed.

1.5. Future Sprint Planning

- **Detailed Concept Development:** The next sprint will focus on further developing the international quiz game concept.
- **Customer Feedback Implementation:** Plan to integrate additional customer feedback and suggestions.
- **Game Mechanics Exploration:** Include tasks related to exploring engaging game mechanics and interactive elements.

1.6. Exception Handling

- Addressed the challenge of aligning multiple ideas into a coherent game concept.
- Managed uncertainties and concerns about the feasibility of specific ideas (especially the AI implementation for the MBTI game).

Sprint 2 (2 November – 8 November)

2.1. Team Meetings

2.1.1. Team Meeting - Tuesday, 7 November 2023 (2.5 hours)

Overview of Progress:

Presented a basic prototype developed in Godot (link shared in chat), featuring a user-controlled character in a furnished room (bookshelves, sofas, tables, etc.). The prototype allows character movement within the room.

Discussion Points:

1. **Game Concept:** Agreed upon moving from the detective-themed idea to an idea of escape room, or a quiz room.
2. **Room Design:** Discussed creating five rooms representing five continents. Player finds keys to these rooms by answering quizzes.
3. **Game Mechanics:** Proposed initially having one country-themed room at a time with a variety of quizzes (multiple choice, puzzles).
4. **Advanced Levels:** Explored the idea of a final round where all rooms are open, and player must recall and match countries to respective rooms for bonus points.

Decision and Next Steps:

1. **Game Development:** Decided to start with single-room scenarios, gradually building up to multiple rooms.
2. **Technology and Tools:** Agreed to use Trello for project management and tracking user stories.

2.1.2. Team Development Meeting - Wednesday, 8 November 2023 (1.5 hours)

Team Development Analysis:

Conducted an exercise to assess our stage in Tuckman's team development model and other team dynamics (Maslow's hierarchy of needs, McClelland's motivation theory, identification of conflicts, and the 3Cs - communication, coordination, cooperation).

Aimed to identify our current team status, strengths, weaknesses, and strategies for enhancing team cohesion.

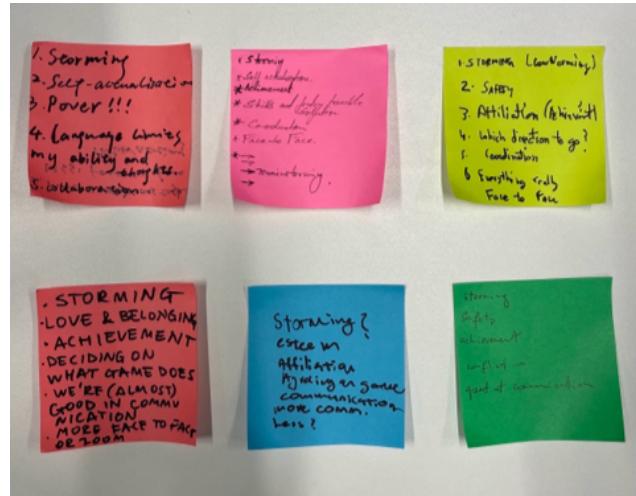


Fig. 2 Team's notes during session

2.2. Sprint Goals

- Prototype Development:** Continue the development of the game prototype in Godot, focusing on improving the user-controlled character and room environment.
- Game Concept Refinement:** Finalise the game concept, transitioning from the initial detective theme to an escape room or quiz room concept.
- Room Design and Mechanics:** Develop the design for five rooms representing five continents, each with unique quizzes and challenges.
- Advanced Level Planning:** Conceptualise advanced game levels where players recall and match countries to respective rooms for bonus points.
- Project Management:** Implement Taiga for effective project management and tracking of user stories.

2.3. Sprint Review

- Prototype Progress:** Reviewed Girish's prototype developed in Godot, featuring basic room design and character movement. The prototype was a crucial step in visualising potential of the game.
- Concept Evolution:** Successfully transitioned the game concept from a detective theme to a more dynamic escape room and quiz format, aligning more closely with our educational objectives.
- Room Design Strategy:** Made considerable progress in conceptualising room designs, deciding to represent five different continents. This decision laid the foundation for diverse and culturally rich game content.
- Game Mechanics Insight:** Began initial planning for game mechanics, including multiple-choice and puzzle quizzes. These mechanics are vital for ensuring the game is both engaging and educational.

Sprint 2 02 Nov 2023 to 08 Nov 2023

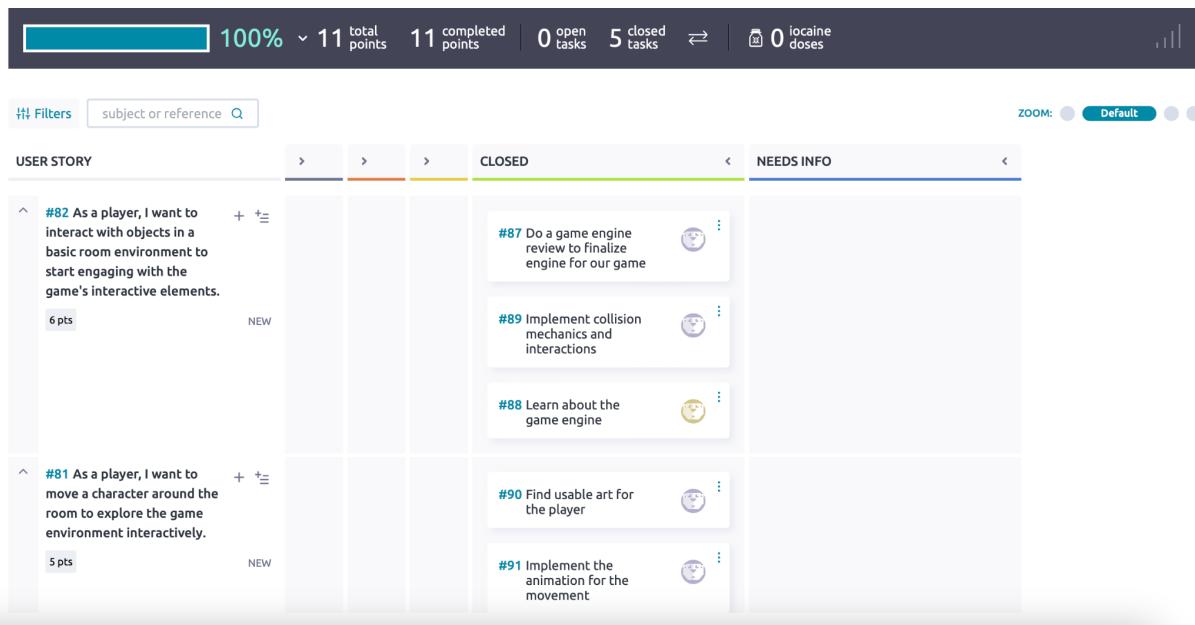


Fig. 3 Agile Board Snapshot for Sprint 2

2.4. Backlog Analysis

- Task Prioritisation:** The backlog was reorganised to prioritise tasks related to the new game concept. This included room design, quiz development, and character interaction.
- New Additions:** New tasks for developing advanced levels and integrating educational elements into each room were added.
- Progress Tracking:** Began using Taiga for backlog management, which helped in visualising task completion and pending activities.

2.5. Exception Handling

- Adapting to Concept Changes:** Addressed challenges related to changing the game concept by facilitating team discussions and ensuring everyone was aligned with the new direction.
- Project Management Optimisation:** Implemented Taiga to overcome challenges in task tracking and sprint management, ensuring a more organised approach to our project.

Sprint 3 (9 November – 14 November)

Link: [Sprint 3 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

3.1. Team meeting – 11 November, Sunday (2.5 hours):

For Sprint 3, we conducted an offline meeting and focused on the development of our game. We covered several essential aspects of the project.

Key discussion points:

1. **Theme selection for the first room:** the team reasoned on the choice of the first room's theme. The discussion oscillated between India and Japan, with some work already initiated towards Japanese-themed decorations.
2. **Gameplay and interaction:** we talked about introducing engaging and educational quizzes in the game. For instance, placing somewhat stereotypical items or cultural symbols in the room as clues for the player. These could include items like sushi or a samurai sword for a Japan-themed room. Another idea was to use these items as a basis for quiz questions, which could be about the country's cuisine, history, or cultural practices. The idea of increasing the game's difficulty with each level was also considered, introducing more challenging questions and less obvious clues.
3. **Technical challenges:** we discussed importance of using GitHub effectively for collaborative development. A significant focus was on mastering GitHub for collaborative work. We detailed the process of cloning the repository, pushing changes, and managing merges. We talked about the importance of regular commits and effective branch management to maintain a consistent codebase.
4. **Game mechanics:** there was a suggestion to create a scenario where the player chooses a country at the beginning of the game, and the room's clues and questions are tailored to that choice. Alternatively, the game could start without revealing the country, challenging the player to deduce it from the clues and questions provided in the room. At the end of the meeting, we rejected the first idea because of the difficulty of implementation.
5. **Narrative development:** we discussed a need for a narrative to make the game more engaging and bring the reasons behind the player's journey through different rooms. This narrative could guide the player through the rooms.
6. **User stories and documentation:** we discussed in detail about how to frame user stories from the client's perspective and the importance of maintaining accurate documentation for each sprint.

3.2. Sprint Goals:

1. Develop a more comprehensive game demo allowing the user to start, engage in an activity, and complete a level.
2. Integrate interactive learning elements and cultural aspects into the game to make it more engaging and instructive following the customer meeting e.g. implementing objects related to a country's culture such as Sakura tree (Japan).
3. Begin Oracle development.

3.3. Sprint Overview and Review:

Sprint 3 was primarily focused on laying the foundational elements for our educational game. Our main achievements included the development of a welcoming start screen and the integration of an interactive quiz element, aligning with our user stories and use cases.

Achievements:

1. Successfully implemented a visually appealing start screen with start and quit options, offering a user-friendly entry point to the game.
2. Developed an interactive feature where the player can engage with a bookshelf in the room, triggering a culturally informative question dialogue.

Challenges faced:

1. **Slow decision-making:** the team struggled with making quick decisions, particularly regarding the choice of the country for the first room and the specific interactive elements to be included.
2. **Game flow uncertainties:** there were uncertainties about implementing certain game functionalities (for example, if the user were to choose the country before starting the game) and how to use various tools and assets effectively.
3. **Narrative development:** while the idea of a narrative was suggested, the team did not finalise how it would be integrated into the game.
4. **Integration of interactive elements:** We encountered challenges in seamlessly integrating the interactive quiz element into the game. Even implementing the most primitive elements required attention to detail.

Learning:

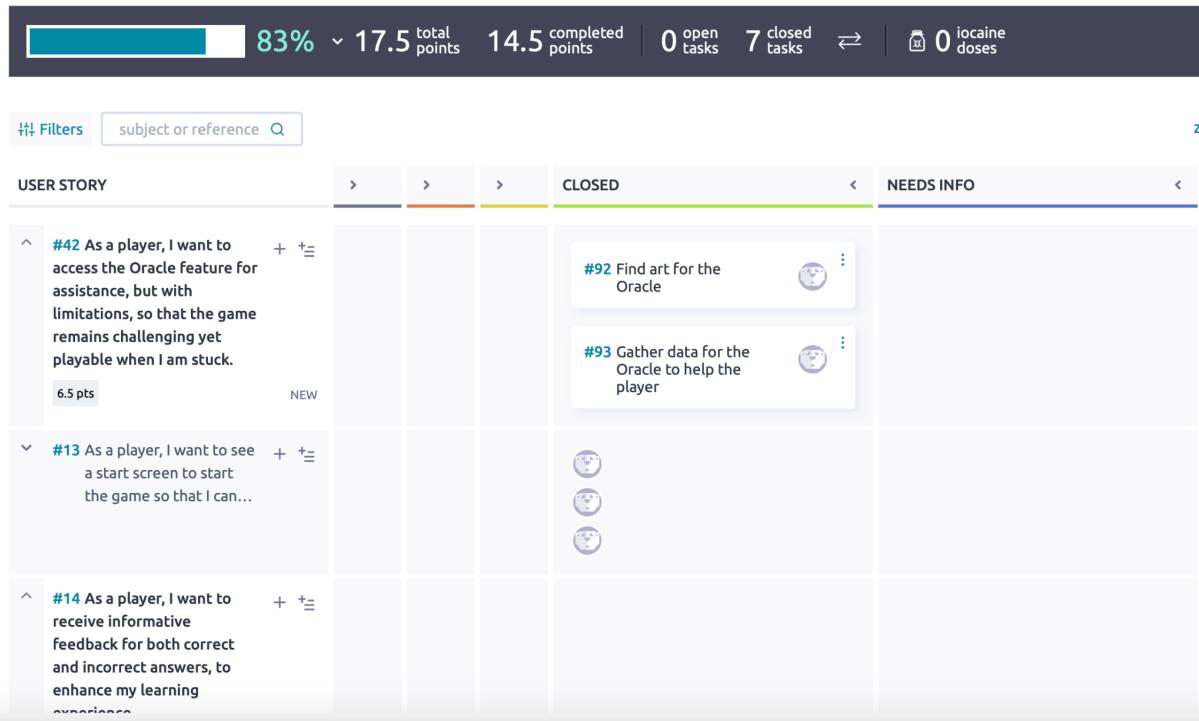
1. **Learning Curve with Godot:** We started learning the basics of the Godot game engine. It was an essential step as it laid the foundation for us to build the game's interactive features. Understanding Godot's robust capabilities allowed us to better align the game's functionality with our vision, particularly in the context of interactive elements like the bookshelf quiz. We started understanding what we could do and what would take us more time than we had to implement.
2. **Implementing Dialogues:** In addition to mastering the basics of Godot, we integrated the "Dialogue Manager" by Nathan Hoad ([Hoad, n.d.](#)), a robust tool for implementing interactive dialogues within our game. This open-source tool, accessible on GitHub, greatly facilitated our development process, particularly in crafting engaging dialogue sequences. Its implementation was vital for the interactive storytelling elements like the bookshelf quiz, further bridging the gap between our initial vision and the game's functionality.
3. **GitHub and Taiga:** A significant part of our learning involved becoming comfortable with GitHub for version control and collaboration. We ensured that every team member felt comfortable in using GitHub to manage our codebase efficiently. Additionally, we adopted Taiga as our agile task manager, similar to Trello, which greatly enhanced our project management capabilities. It allowed for better tracking of our tasks and user stories, ensuring that we stayed aligned with our sprint goals and agile methodologies.
4. **Balancing Aesthetics and Functionality:** Through the development process, we learned the importance of balancing aesthetic appeal with functional design. The start screen's development was a practical application of this learning, where we focused on creating an

inviting and visually appealing entry point that was also intuitive and easy to navigate for the player.

Outcomes and Next Steps:

1. **Finalise the First Room:** the team needs to make a definitive decision on the first room's theme (Japan or India) and develop content around it.
2. **Develop Interactivity:** focus on adding interactive quizzes and elements to the first room to make the gameplay more engaging.
3. **Improve Technical Skills:** team members should seek additional resources or tutorials to overcome technical challenges and uncertainties. We must learn how to work with Godot game engine.
4. **Narrative Integration:** develop a narrative to add depth to the gameplay and improve player engagement.
5. **Documentation:** ensure that all discussions, decisions, and developments are well-documented, maintaining a clear record for future reference and sprint reviews.

Sprint 3 09 Nov 2023 to 15 Nov 2023



Sprint 3 09 Nov 2023 to 15 Nov 2023

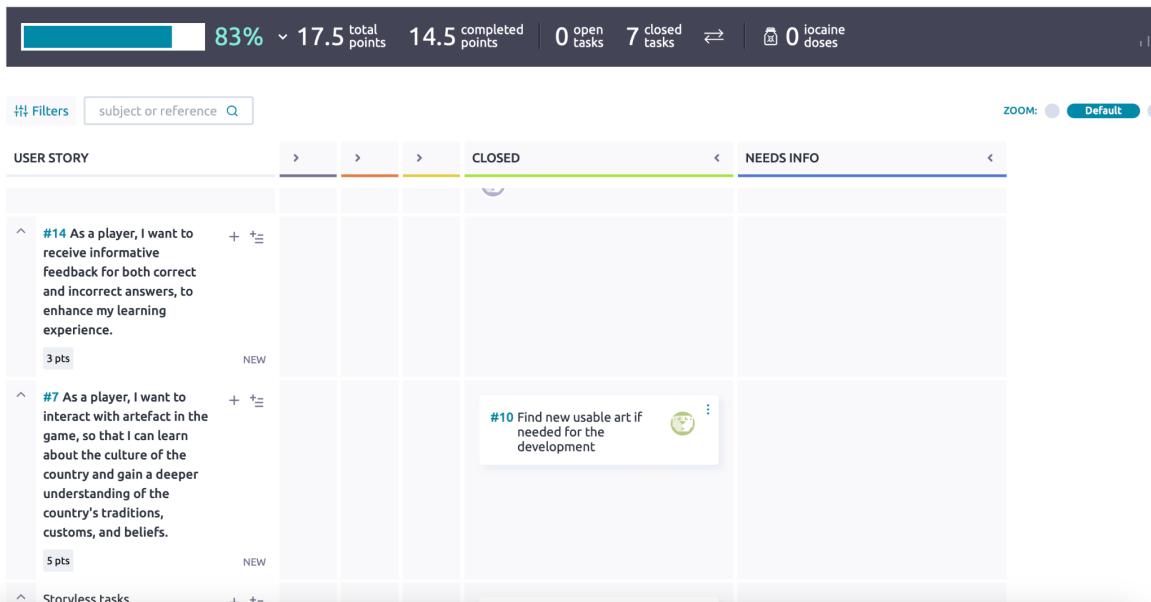


Fig. 4-5 Agile Board Snapshots for Sprint 3

3.4. Backlog Analysis:

- Current State of Backlog:** At the start of Sprint 3, we selected specific tasks from the overall project backlog to focus on developing the start screen and the initial interactive quiz feature.

As the sprint progressed, we updated the backlog to reflect the completion of these tasks and added new items based on evolving project needs and feedback.

- **Task Completion:** The successful implementation of the start screen and the quiz feature represented considerable progress on our sprint backlog. These completed tasks were marked accordingly in the backlog, demonstrating our progress towards the project's larger goals. We could not implement Oracle this time.

3.5. Future Sprint Planning:

- Our focus will shift to the remaining items in our backlog for upcoming sprints: developing more interactive elements and enhancing the game's narrative. We will update our backlog to include new tasks from our ongoing work and customer feedback.
- For this sprint we picked two user stories: the start screen and one interactive quiz element. We left the Oracle user story for the next sprint.

3.6. Exception Handling:

Identified Issues:

1. **Challenges with basic feature implementation:** We encountered difficulties in implementing even basic functionalities within the game. These challenges were rooted in a learning curve with the Godot engine and unfamiliarity with certain aspects of game development.
2. **Content development for cultural objects:** Selecting appropriate cultural objects for the game and designing the questions and feedback associated with them presented a challenge. This task required balancing educational value, cultural sensitivity, and engagement.

Response strategies:

1. **Using online resources and peer-led tutorials:** To address the technical challenges, we independently watched online tutorials to improve our understanding of the Godot engine and game development principles. Additionally, Girish conducted mini tutorial sessions for the team. These sessions were tailored to our project's specific needs and significantly improved the team's capability to implement game features.
2. **Collaborative brainstorming for content curation:** For content development, we organised brainstorming sessions that encouraged creative and collaborative thinking. These sessions involved discussions about cultural elements, their representation in the game, and how to create questions that are both informative and engaging for the player.

Sprint 4 (15 November – 22 November)

Link: [Sprint 4 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

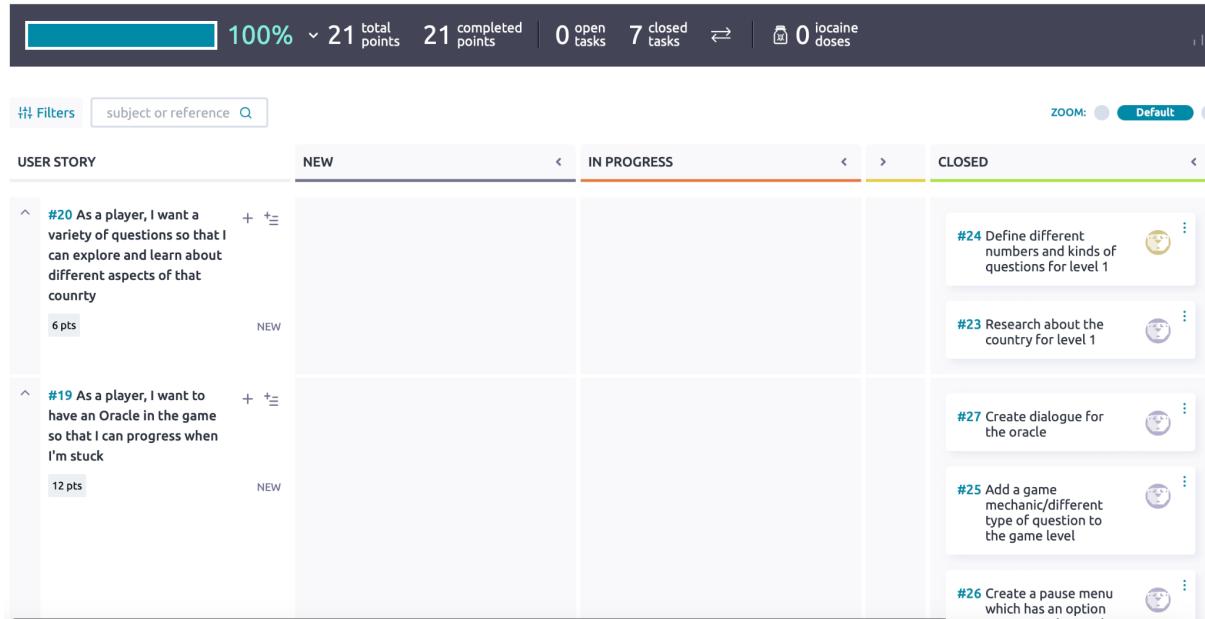
4.1. Sprint Goals:

- **Refine Game Mechanics:**
 - Add the pause menu functionality;
 - Improve the question mechanics by adding the number of answer attempts.
- **Enhance Oracle Integration:** Ensure the Oracle feature is effectively integrated into the game, providing helpful but limited assistance to player.
- **Expand Game Environment:** Expand the game level to offer a more immersive and exploratory experience.

4.2. Sprint Review:

1. **Pause Menu Functionality:** Successfully implemented. This addition has significantly improved game accessibility and player control, allowing users to pause the game as needed.
2. **Question Mechanics Improvement:** The integration of an answer attempts counter was completed. This feature aids players in understanding the difficulty level of the questions.
3. **Oracle Feature Integration:** The Oracle was effectively integrated into the game. Its design and functionality were adjusted to provide helpful hints without reducing the game's challenge, balancing assistance, and engagement.
4. **Game Environment Expansion:** Progress was made in expanding the game environment. The added elements contribute to a richer exploratory experience, though further enhancements are planned for subsequent sprints.

Sprint 4 17 Nov 2023 to 23 Nov 2023



Sprint 4 17 Nov 2023 to 23 Nov 2023

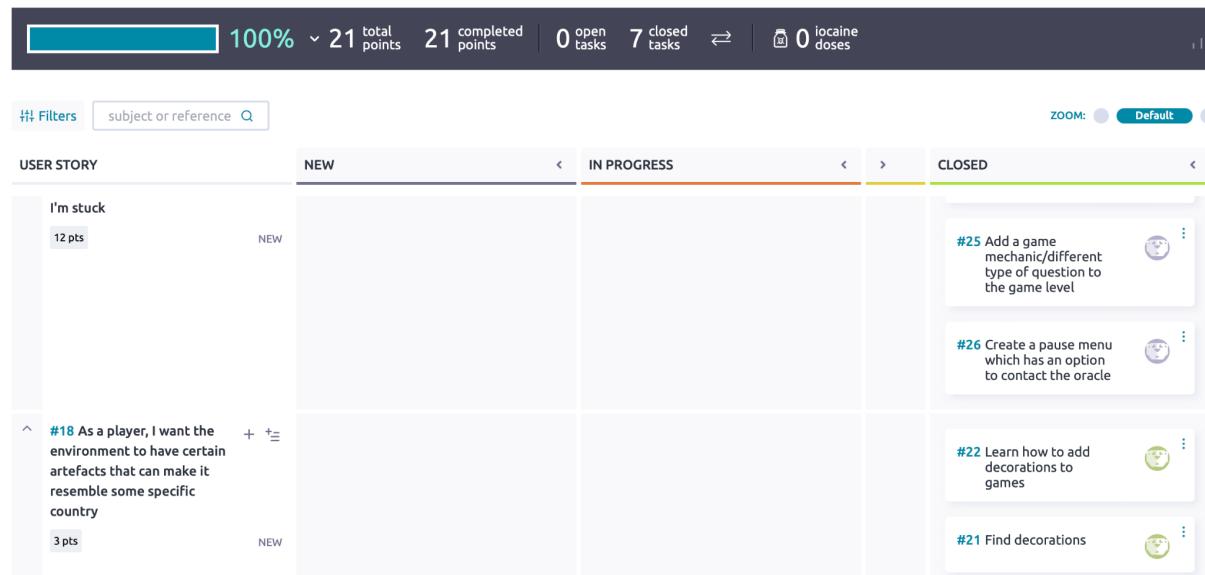


Fig. 6-7 Agile Board Snapshots for Sprint 4

4.3. Team Meeting – Friday, 17 November (2 hours)

Key discussion points:

- 1. Create Oracle:**
 - Design and implement an Oracle feature which serves as a guide and hint system within the game
 - Balance the Oracle's help to avoid making the game too easy or less engaging.
- 2. Add Pause Button:** Implement a pause button to allow players to temporarily stop the Game.

3. **Add Attempts Number:** It will show the number of attempts when player answering the questions so they will be able to skilfully change your answering strategies.

4.4. Backlog Analysis:

Current State: Sprint 4 focused on refining core gameplay elements, particularly enhancing the pause menu, question mechanics, and Oracle integration, while expanding the game environment.

Task Completion:

1. **Pause Menu:** Successfully implemented, greatly enhancing user experience.
2. **Question Mechanics:** Improved with an answer attempt counter, aiding player strategy.
3. **Oracle Integration:** Balanced for effective guidance without reducing challenge.
4. **Environment Expansion:** Significant progress made, contributing to a more immersive experience.

4.5. Retrospective:

1. Incomplete Level 1: The first level wasn't finished as the customer asked.
2. Lack of Room Content: We failed to add questions and objects to room.
3. We failed to assign clear tasks for each team member, not all the members were involved.

Future Sprint Planning:

- Prioritise further development of the Oracle and environment.
- Incorporate feedback for continuous improvement of gameplay and user experience.
- Explore additional features and enhancements for subsequent sprints.

Open Issue:

1. Bug with chat window and the player movement (the player moves when the window with a question is open)
2. User cannot move after they interacted with oracle – has to press resume the game
3. Make the background blurred when the pause menu is open

4.6. Exception Handling:

- **Technical Challenges:** We encountered difficulties integrating the Oracle feature with our existing game mechanics. This was resolved through a focused debugging session, leading to a successful integration by the end of the sprint.
- **Adaptation to Feedback:** Player feedback indicated a need for more intuitive navigation. We responded by redesigning our user interface, improving overall user experience.
- **Team Coordination:** Mid-sprint, our team faced coordination challenges due to differing time zones. We introduced a more flexible meeting schedule, enhancing our collaboration and productivity.
- **Risk Management:** We identified a potential risk in game performance stability. To mitigate this, we implemented additional testing phases, ensuring smoother gameplay.
- **Learning and Skill Development:** Our team learned new techniques in animation and scripting, greatly enhancing our game's visual and interactive elements. This skill development was crucial in overcoming technical obstacles.

Sprint 5 (23 November – 30 November)

Link: [Sprint 5 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

5.1. Sprint Goals

1. **Refine Game Mechanics:** Add transition scenes between levels to enhance narrative flow and player engagement.
2. **Enhance More Playing Methods:** Implement more questions and quizzes related to a specific country, enriching the educational content of the game.
3. **Add More Artifacts to each Level:** Ensure each level includes artifacts representing different countries. These artifacts should be interactive, allowing the player to learn about the culture of the respective countries.

5.2. Team Meeting – Tuesday, 28 November (2 hours)

For Sprint 5, we conducted an offline meeting and focused on the improvement of our game and make the game easier for the player.

Key discussion points:

1. **Make Oracle Setting Clearer to Users:** Rename the “Contact Oracle” option in the pause menu to “Get Help” to make its purpose clearer to generic users.
2. **Topic of Next Level:** Develop the next level with a focus on Egypt, incorporating relevant cultural, historical, and educational elements.

5.3. Sprint Review

Learning:

Game Engine (Godot). The team engaged in deeper learning of the Godot engine, focusing on aspects such as adding background music and creating opening settings. We chose a traditional Japanese soundtrack to represent this level. The artist for this soundtrack is MOJI ([MOJI, 2020](#)).

We also developed a prospective story for the game's narrative to provide players with a better understanding of the game's setting and story.

Challenges faced:

1. **Arrange Puzzle:** The team initially planned to include a jigsaw puzzle in the game to diversify the types of puzzles offered. However, it proved challenging to implement this feature effectively within the game environment. The decision was made to focus on refining the trivia game aspect instead of pursuing the jigsaw puzzle integration, prioritising the smooth functioning and coherence of the game.
2. **Foreground Animation Problem:** A foreground animation was set to play when the player clicked the “Start” button, with the intention for players to press the spacebar to skip the animation. However, during the first animation scene, pressing the spacebar did not skip to the next interface as expected, although it worked for subsequent animations.

3. **Location of Avatar:** After answering questions in the game, the player's avatar resets to its initial starting position, disrupting the game flow and potentially confusing players. We need to adjust the game's programming to maintain the avatar's location post-question answering, ensuring a more seamless and logical gameplay experience.

Outcomes and Next Steps:

- Develop the layout and design of the third level, ensuring it is engaging and informative. Select and integrate decorations that accurately represent the country's culture and enhance the educational aspect of the game.
- Research and draft culturally relevant and informative questions. Test these questions for clarity, difficulty, and educational impact, ensuring they align with the game's learning objectives and are engaging for the players. Integrate these questions into the gameplay, providing a seamless educational experience.

| USER STORY | NEW | IN PROGRESS | READY FOR TEST | CLOSED | NEEDS INFO |
|--|-----|-------------|----------------|--|--|
| that it makes the game more engaging 2 pts | NEW | | | can represent a particular country #31 As a player, I want to complete different kinds of quizzes and questions related to a specific country, so that I can progress to the next level 10 pts | #32 Integrate the music to each game level #33 Research about different aspects of the chosen country to create questions regarding it #34 Implement another game mechanic such as a rearranging puzzle to make the game more engaging |
| #31 As a player, I want to complete different kinds of quizzes and questions related to a specific country, so that I can progress to the next level 10 pts | NEW | | | #35 Add the interactive artefacts to the game #36 Research about usable assets related to countries that can be integrated to the game | #37 Add the interactive artefacts to the game #38 Create transition scene that introduces the player to the story #39 Make dialogue bubble more appealing by adding pictures and changing font. |
| #29 As a player, I want to have more interactive artefacts so that I can learn more about the culture of the country 7 pts | NEW | | | | |
| #28 As a player, I want to have transition scenes so that I can get to know about the story 3 pts | NEW | | | | |

Sprint 5 23 Nov 2023 to 30 Nov 2023

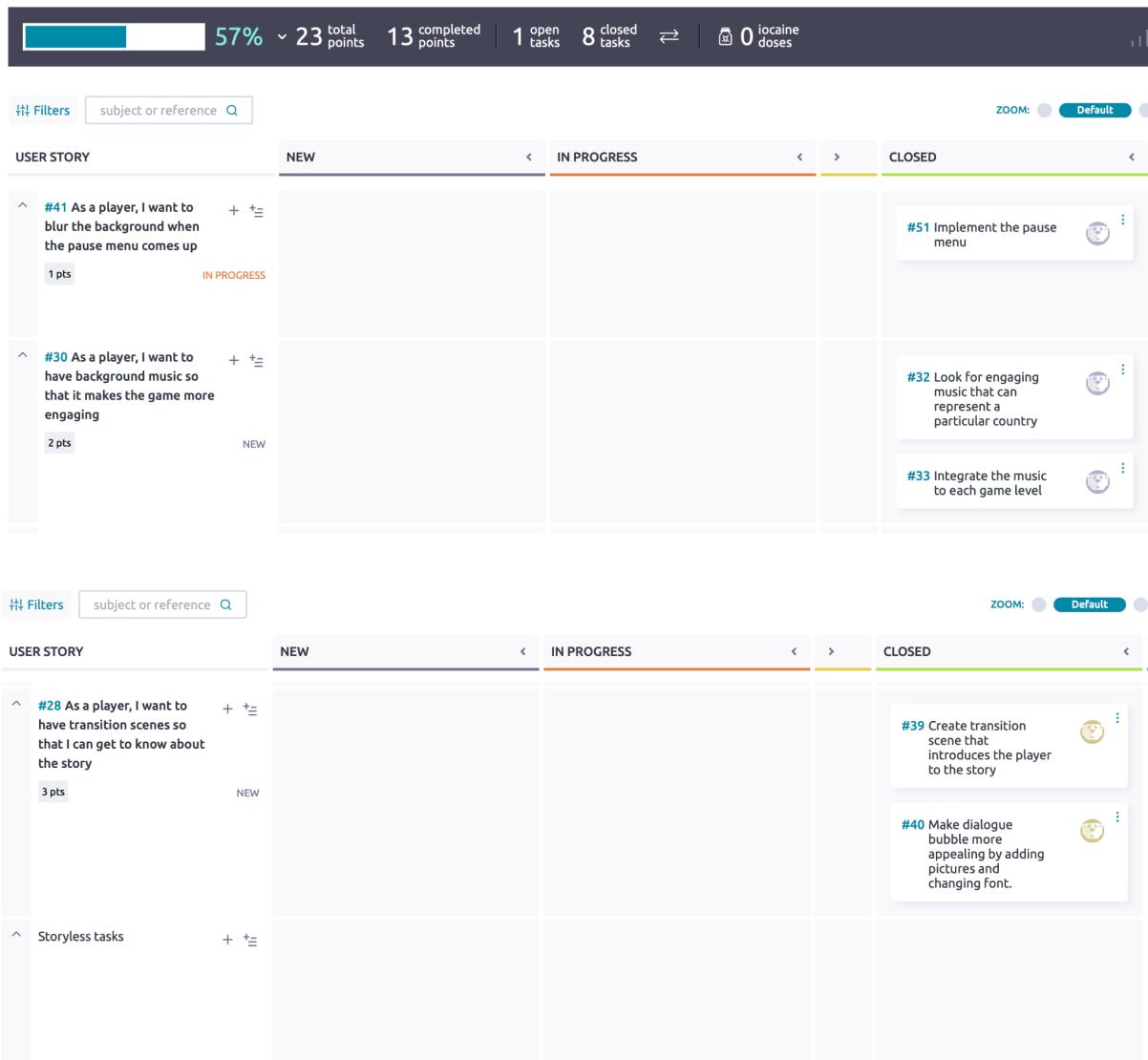


Fig 8-10 Agile Board Snapshots for Sprint 5

5.4. Backlog Analysis

- Transition Scene Integration: We evaluated the progress of engaging transition scenes between levels, ensuring they align with the narrative and enhance player immersion.
- Quiz and Question Expansion: Analyzed the development and integration of various quizzes and questions specific to each country, aiming to enrich the educational content and gameplay depth.
- Artifact Implementation: Reviewed the inclusion and interactivity of cultural artifacts at each level, ensuring they accurately represent the respective countries and contribute to the educational aspect of the game.

5.5. Exception Handling

- **Puzzle Feature Adjustment:** Initially, a jigsaw puzzle was planned to diversify gameplay, but due to implementation challenges, the focus was shifted to refining the trivia aspect of the game.
- **Foreground Animation Issue:** Addressed the problem where pressing the spacebar did not skip the first animation scene, ensuring a consistent user experience.
- **Avatar Positioning:** Implemented a fix for the avatar resetting to the starting position after answering questions, maintaining continuity in gameplay.
- **Team Member Illness:** Adjusted workflows and redistributed tasks to compensate for a team member's illness, ensuring project continuity and maintaining momentum.

Sprint 6 (30 November – 6 December)

Link: [Sprint 6 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

6.1. Sprint Goals:

1. **Refine User Interface:** Improve clarity in the pause menu options, making navigation intuitive and less ambiguous for players.
2. **Level Progression and Learning Enhancement:** Implement a seamless transition to the second level, featuring distinctive cultural artifacts to enrich the educational aspect of the game.
3. **Narrative Closure and Recognition:** Develop a satisfying ending stage that provides closure and a sense of achievement.
4. **Cultural Contextualisation:** Clearly label each game level with the country it represents to set the stage for the player's journey immediately.
5. **Visual Engagement:** Enhance question dialogue boxes with engaging images to create a more visually stimulating and memorable learning experience.

6.2. Team Meeting – Tuesday, 5 December (2 hours):

During this meeting, the team focused on two main areas:

Game Review and Documentation: We carefully reviewed the game's current state, ensuring alignment with the goals set in the previous sprint. This involved a detailed assessment of the game's features and mechanics, leading to the preparation of a comprehensive status report to be presented in upcoming meetings.

Preparation for Stakeholder Engagement: The team dedicated time to prepare for critical discussions with customers and teaching assistants. This preparation was twofold: first, we pinpointed main issues and progress updates to communicate; second, we drafted the game's user manual, aiming to provide clear and helpful guidance for players.

Background Music for the Second Level: We found the soundtrack for this level was created by Angels of Venice ([Angels of Venice, 1999](#)).

Challenges Encountered:

Transition Scene Development: Although the narrative aspect of the transition scenes was finalised, their technical implementation still needs to be completed. The coding required to integrate the scenes between levels seamlessly is yet to be perfected, highlighting a significant area for immediate attention.

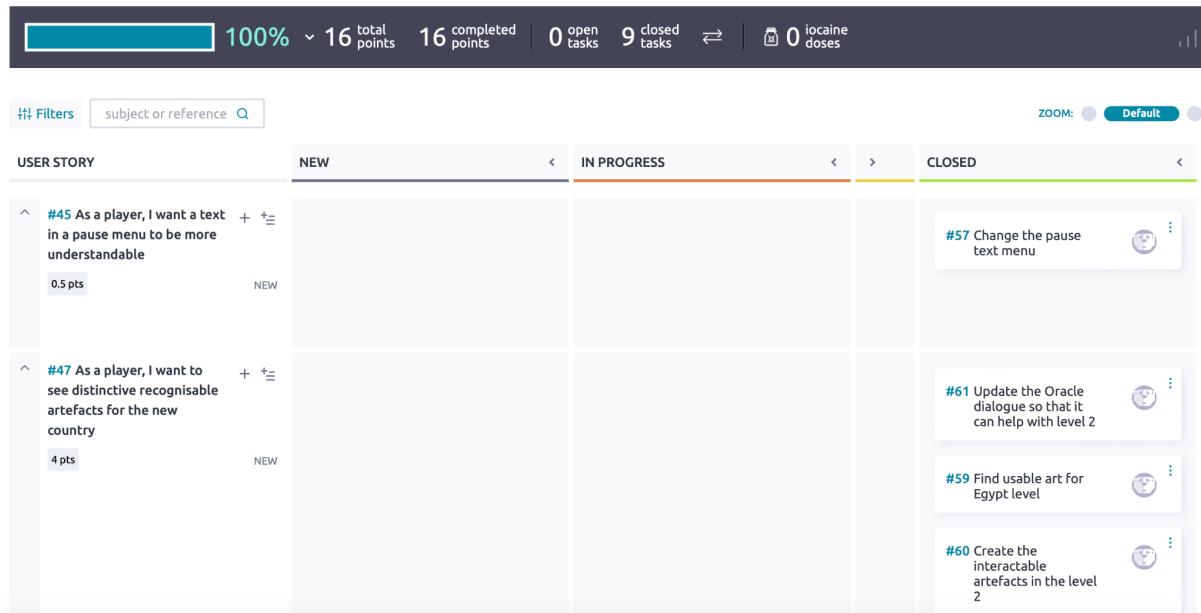
Naming Conventions: A creative challenge emerged during the user manual drafting process. The game, temporarily titled “Geo Game,” and its main characters, Simon (the thief) and Samantha (the detective) require more fitting and final names. This aspect of branding and character development is crucial for the game's identity and player connection.

6.3. Sprint Review:

Sprint 6 was a blend of achievements and challenges. We improved the user interface's clarity (the pause menu), aligning with our goals and User Story 6.1. The development of seamless level transitions and integration of cultural artifacts (User Stories 6.2 and 6.3) progressed well, though some technical aspects still need refinement. We advanced towards creating a conclusive ending stage for the game, resonating with User Story 6.4. The labelling of levels for cultural context (User Story 6.5) and the improvement of question dialogue boxes with engaging images (User Story 6.6) were important in elevating the educational and visual appeal of the game.

Challenges included the technical complexity of implementing transition scenes and deciding on final names for the game and characters. We adapted to these challenges through collaborative problem-solving and creative brainstorming sessions. The illness of a team member tested our adaptability, leading to a quick redistribution of tasks and flexible deadlines, ensuring continuity of work without compromising the project timeline.

Sprint 6 30 Nov 2023 to 06 Dec 2023



The image displays two screenshots of an Agile board interface. Both screenshots show a grid of user stories categorized by their current status: NEW, IN PROGRESS, and CLOSED.

Top Screenshot (Agile Board Snapshot for Sprint 6):

| USER STORY | NEW | IN PROGRESS | CLOSED |
|---|-----|-------------|--|
| #46 As a player, I want to get to the second level and enter the next room so that I could learn interesting facts about another country 5 pts | NEW | | #62 Add transition from level 1 to level 2 after answering all the questions correctly #63 Add informative questions to level 2 |
| #54 As a player, I want the question dialog boxes to have engaging pictures 3 pts | NEW | | #55 Make all dialogue boxes have portraits |
| #48 As a player, I want to have an ending stage to complete the game | + | | #56 Create final scene to show that the player has won the game |

Bottom Screenshot (Agile Board Snapshot for Sprint 6):

| USER STORY | NEW | IN PROGRESS | CLOSED |
|--|-----|-------------|---|
| #48 As a player, I want to have an ending stage to complete the game 3 pts | NEW | | #56 Create final scene to show that the player has won the game |
| #44 As a player, I want to know which country the room represents at the beginning of the level 0.5 pts | + | | #64 Create a text that appears once the room is loaded, indicating the name of the country. |
| Storyless tasks | + | | |

Fig 11-13 Agile Board Snapshots for Sprint 6

6.4. Backlog Analysis:

- Conducted a retrospective review, focusing on improving game graphics to fit the game's style better.
- Prioritised tasks to improve user experience and visual appeal.
- Discussed open issues and formulated strategies for future development.

6.5. Exception Handling:

Managed the impact of a team member's illness and ensured it did not significantly hinder project progress. To manage this effectively, we:

- Quickly redistributed the ill member's responsibilities among the team, ensuring no critical tasks were delayed.
- Adjusted internal deadlines where reasonable to accommodate the reduced workforce without compromising the project timeline.
- Enabled the ill team member to contribute remotely to less demanding tasks.

Sprint 7 (7 December – 15 December)

Link: [Sprint 7 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

7.1. Sprint Goals:

1. Implement alternative game endings based on player success or failure.
2. Develop and incorporate narrative transition scenes between levels for enhanced storytelling and context.
3. Introduce a timer to increase the gameplay challenge.
4. Provide a progress indicator showing the completion of required questions.
5. Link multiple questions to single objects to deepen the gameplay.
6. Determine the logo and name of our game.
7. To conduct final testing and polishing of the game, ensuring a seamless player experience.
8. To integrate feedback from playtesting and customer suggestions to refine game mechanics and narrative elements.

7.2. Sprint Review - Team Meeting – 14 December, Thursday (3 hours)

- Team discussions focused on refining the new Egypt level and ensuring its integration into the game narrative.
- We found the Egypt assets pack to use in the new level ([Kimssuki, n.d.](#)).
- Emphasis on improving player guidance at the game's start through clear dialogue systems.
- Discussed innovative UI features like a progress bar to keep players informed of their progress.
- Planning and execution of narrative transition scenes between levels.
- Comprehensive testing and debugging sessions to refine gameplay and address any existing issues.
- Final preparations for the project's concluding presentation or meeting.

Sprint 7 06 Dec 2023 to 13 Dec 2023

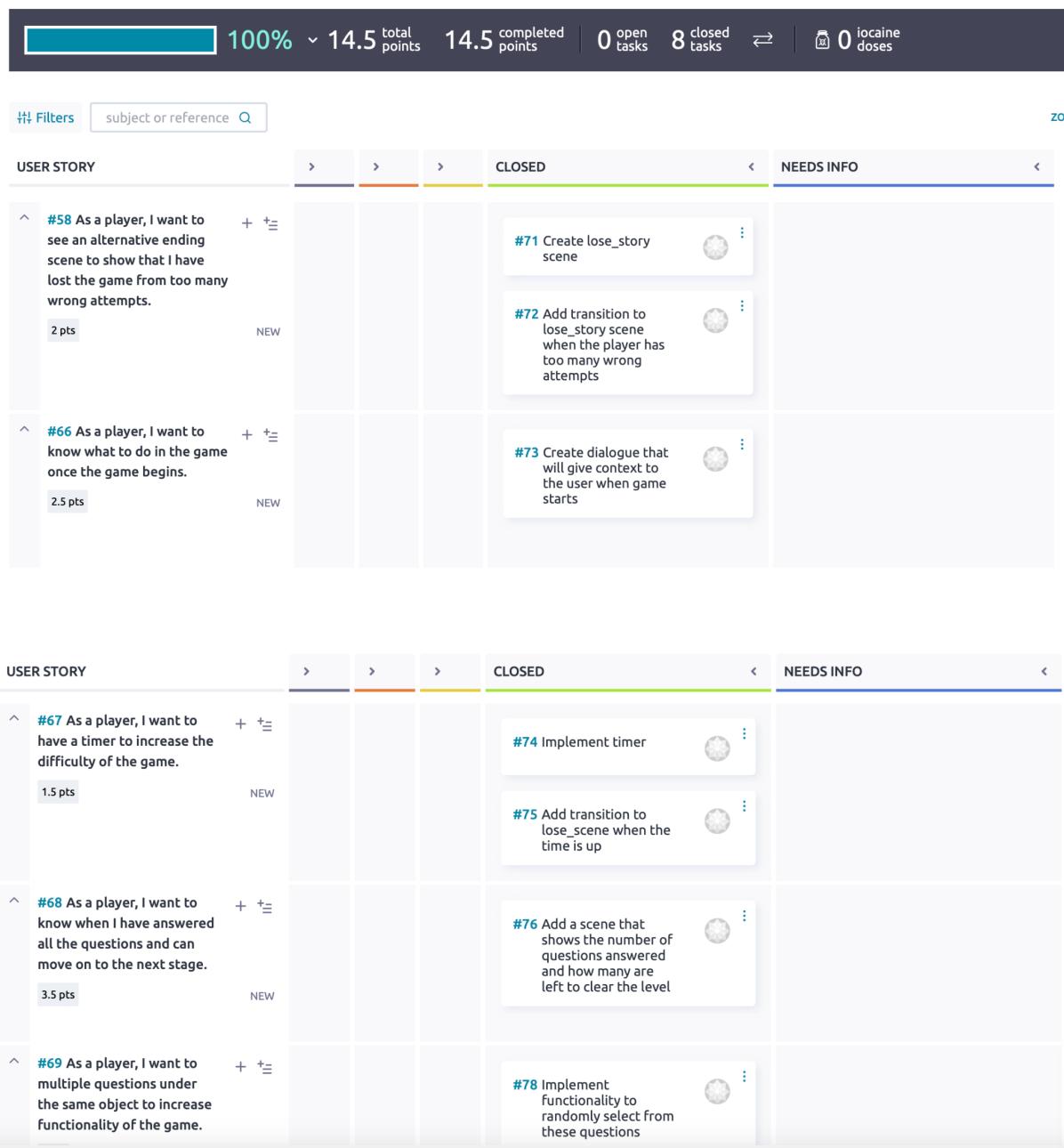


Fig. 14-15 Agile Board Snapshots for Sprint 7

7.3. Backlog Analysis:

- Review of the remaining tasks and features to be implemented, including the new dialogue system and progress-tracking UI.
- Evaluation of the current state of the new Egypt level and its alignment with the overall game narrative and mechanics.
- Analysis of feedback from previous playtesting sessions to identify areas for improvement in gameplay and narrative.

- Prioritisation of tasks for final testing and polishing of the game.

7.4. Exception Handling:

- **Level Transition Errors:** Implemented checks to handle unexpected issues during level transitions, ensuring players smoothly progress from one stage to another without crashes or data loss.
- **Timer-Related Exceptions:** Incorporated error handling for the new timer feature, addressing potential overflows and synchronisation issues to maintain consistent gameplay.
- **Progress Indicator Errors:** Added safeguards against bugs in progress tracking, especially when multiple questions are linked to a single object. This ensures an accurate representation of player progress.
- **Game Endings Handling:** Developed specific exceptions for alternate game endings, preventing unintended behaviour or game crashes when players succeed or fail.
- **Feedback Integration:** Careful handling of edge cases and rare scenarios identified through playtesting feedback, enhancing game resilience and reliability.
- **Logging and Monitoring:** Strengthened logging mechanisms for better tracking and resolution of unexpected errors, facilitating smoother post-launch support and maintenance.

Breakdown of Story points planned vs. completed per sprint

| Sprint Number | Planned | Completed |
|---------------|-------------|-------------|
| Sprint 1 | 12 | 12 |
| Sprint 2 | 11 | 11 |
| Sprint 3 | 17.5 | 14.5 |
| Sprint 4 | 21 | 21 |
| Sprint 5 | 23 | 13 |
| Sprint 6 | 16 | 16 |
| Sprint 7 | 14.5 | 15.5 |
| | Total = 115 | Total = 102 |

Fig. 16 Breakdown of planned story points and completed per sprint

Product Documentation

Sprint 1 (25 October – 1 November)

1.1 Customer Meeting - Wednesday, 25 October 2023

1. **Presentation of Game Concepts:** Our team presented the various game ideas we produced during the initial team meeting. This included the international quiz game, an MBTI personality-based game, and a modern meme and slang game.
2. **Feedback on Game Ideas:** The customer provided valuable feedback on each concept. They expressed concerns about the feasibility of the MBTI game, considering the complexity and resource requirements. The idea of a meme and slang game was intriguing, but questions regarding content sourcing and maintenance were raised.
3. **Emphasis on the International Quiz Game:** The customer showed a particular interest in the international quiz game. They liked the educational aspect and the potential for broad appeal.
4. **Concerns about Gamification:** A key point raised by the customer was the need to ensure the game was more than just a quiz. They emphasized the importance of gamifying the experience to make it engaging and interactive.
5. **Request for Detailed Concept Development:** The customer asked us to focus further on developing the international quiz game concept. They requested more details regarding game mechanics, interactive elements, and educational content.

Next Steps and Expectations:

1. We were encouraged to refine the idea of an international quiz game, integrating more game elements to enhance learning and engagement.
2. The customer expressed interest in seeing a more fleshed-out proposal in the next meeting.

Outcomes and Action Items:

1. **Refining the International Quiz Game:** Our team focused on enhancing the international quiz game concept, incorporating the customer's feedback about gamification and interactivity.
2. **Task Assignments:** Specific tasks were assigned to team members, including researching various countries' cultures and landmarks, exploring potential game mechanics, and beginning the initial design phase.
3. **Preparation for the Next Meeting:** We planned to prepare a detailed presentation for the next meeting, highlighting the developed concept of the international quiz game with more concrete elements and examples.

1.2 User Stories, Use Cases

| User Story: | Requirements Use Case | UC 1.1 Flow of Events for the Engaging in Country-Specific Quiz Use Case |
|--|--|--|
| As a player, I want to participate in interactive quizzes about different countries to learn exciting facts and enhance my knowledge | Use Case: Engaging in Country-Specific Quiz Scope: Game Level Interaction | Scope: Game Level Interaction Level: User Goal |

| | | |
|--|--|---|
| <p>about various cultures and geographies.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. Each quiz should be centred around a specific country's culture, history, or geography. 2. Quizzes should be interactive, engaging the player in various questions (e.g., multiple choice, true/false). 3. Completing these quizzes should provide educational value and unlock new game levels or content. | <p>Level: User Goal</p> <p>Context: The player encounters a quiz as a part of the game, focusing on the educational aspect while maintaining an engaging gameplay experience.</p> <p>Frequency of Occurrence: Quizzes are a standard feature in each game level, tailored to the specific country in focus.</p> <p>Open Issues: Ensuring a diverse range of questions and balancing difficulty levels to suit a broad player base.</p> | <p>Primary Actors: Player</p> <p>Dependencies: None</p> <p>Assumptions: The player is interested in learning about different countries and cultures.</p> <p>Preconditions: The player has started a level featuring a quiz about a specific country.</p> <p>Main Flow: The player engages with the quiz, answers questions, and receives instant feedback on their responses.</p> <p>Sub Flows: Additional information or fun facts provided upon answering questions.</p> <p>Alternative Flows: If the player answers incorrectly, they are given a brief educational note about the correct answer.</p> <p>Post Conditions: The player gains knowledge about the country in focus and progresses in the game.</p> <p>Frequency of Occurrence: Regular occurrence in each level.</p> <p>Open Issues: Keeping the quiz content updated and culturally accurate.</p> |
| <p>User Story:</p> <p>As a player, I want to explore virtual representations of different countries to immerse myself in their culture, landmarks, and unique attributes through an interactive game environment.</p> | <p>Requirements Use Case</p> <p>Use Case: Virtual Country Exploration</p> <p>Scope: Interactive Learning Experience</p> <p>Level: User Goal</p> | <p>UC 1.2 Flow of Events for the Virtual Country Exploration Use Case</p> <p>Scope: Interactive Learning Experience</p> <p>Level: User Goal</p> |

| | | |
|---|---|--|
| <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. Each game level should represent a different country, featuring key landmarks, cultural elements, and unique attributes. 2. The exploration should be educational, providing information and facts about the country. 3. The virtual environment should be engaging, encouraging players to explore and interact with various elements. | <p>Context: The player navigates through virtual environments representing different countries, gaining educational insights through exploration.</p> <p>Frequency of Occurrence: Each game level offers a new country for exploration.</p> <p>Open Issues: Creating accurate and immersive virtual environments for each country.</p> | <p>Primary Actors: Player</p> <p>Dependencies: None</p> <p>Assumptions: Players are motivated by exploration and discovery.</p> <p>Preconditions: The player starts a level featuring a specific country.</p> <p>Main Flow: The player explores the virtual environment and interacts with elements representing the country's culture, landmarks, and history.</p> <p>Sub Flows: Interactive elements provide educational content about the country.</p> <p>Alternative Flows: Opportunities for mini-games or quizzes embedded in the exploration mode.</p> <p>Post Conditions: The player better understands the country's culture and geography.</p> <p>Frequency of Occurrence: Each level offers a different country to explore.</p> <p>Open Issues: Ensuring the virtual environments are engaging and informative.</p> |
|---|---|--|

Sprint 2 (2 November – 8 November)

2.1 Customer meeting - Wednesday, 8 November 2023

Customer Feedback and Queries:

1. **Game concept confirmation:** Reiterated our commitment to the geographical quiz concept.
2. **Gameplay mechanics:** Discussed simulating an escape-room-style game where player interact with their environment to find keys and solve puzzles.

3. **Level design:** Explored the possibility of representing countries as different rooms and integrating a maze-like structure for the challenges.
4. **Advanced level design:** Explored an idea for the final levels, where the player, having opened all rooms, faces a quest requiring them to recall and associate different countries with specific rooms. This would increase the game's difficulty and serve as a revision tool for the information learned.
5. **Oracle integration:** Discussed limiting Oracle usage to providing hints for exploration and puzzle-solving.
6. **Customer concerns:** Addressed queries about the number of countries to be included and how the Oracle will engage in the learning experience.

Action items for next meeting:

1. **Specific design elements:** Focus on solidifying the game's design, making it specific and detailed, narrowing it down.
2. **Game walkthrough:** Prepare a complete walkthrough demonstrating game start, interaction, and exit – a demo.
3. **Cultural integration:** Ensure the game environment and clues are deeply integrated with each country's culture. The clues must relate to the country's culture.

Reflections:

1. **Integration of customer feedback:** Plan to incorporate customer suggestions on making the game more educational and immersive.
2. **Challenges identified:** Need to balance educational content with engaging gameplay and address the integration of the Oracle in a meaningful way.

2.2 User Stories and Use Cases

| User Story | Requirements Use Case: | Design Use Case: U.C. 2.1. Flow of Character Movement in Room Use Case |
|---|--|---|
| <p>As a player, I want to move a character around the room to explore the game environment interactively.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The player should be able to move the character freely within the room. 2. Movement controls should be intuitive and responsive. 3. The character's movement should allow the player to | <p>Use Case: Character Movement in Room</p> <p>Scope: Basic Game Mechanics</p> <p>Level: User Goal</p> <p>Context: The player navigates a character within the game's initial room, exploring the environment and interacting with objects.</p> <p>Frequency of Occurrence: Movement is a constant feature as the player explores the room.</p> | <p>Scope: Basic Game Mechanics</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 1.2. - Virtual Country Exploration</p> <p>Assumptions: The player has basic motor skills for game control.</p> <p>Preconditions: The player controls a character in the game room.</p> |

| | | |
|--|--|---|
| | <p>interact with different objects in the room.</p> <p>Open Issues: Ensuring smooth and responsive character movement.</p> | <p>Main Flow: The player uses controls to move the character around the room, exploring and interacting.</p> <p>Sub Flows: Interaction with specific objects may require the player to move the character to specific locations.</p> <p>Alternative Flows: If the character cannot move as intended, the player may need to adjust their approach or check controls.</p> <p>Post Conditions: The player has explored the room and interacted with key elements.</p> <p>Frequency of Occurrence: Continuous as the player is in the game room.</p> <p>Open Issues: Refining the character movement for a better player experience.</p> |
| <p>User Story:</p> <p>As a player, I want to interact with objects in a basic room environment to start engaging with the game's interactive elements.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The room should feature basic interactive objects like bookshelves, sofas, and tables. 2. Interaction with these objects should be simple, such as clicking or approaching. 3. These interactions should provide immediate feedback to the player, such as a | <p>Requirements Use Case:</p> <p>Use Case: Basic Room Interaction</p> <p>Scope: Initial Game Interaction</p> <p>Level: User Goal</p> <p>Context: The player engages with objects in the game's initial room setting, laying the foundation for more complex interactions in future levels.</p> <p>Frequency of Occurrence: These basic interactions are foundational and occur frequently in the initial stages of the game.</p> <p>Open Issues: Expand the interaction possibilities and</p> | <p>UC 2.2 Flow of Events for the Basic Room Interaction Use Case</p> <p>Scope: Initial Game Interaction</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 2.1. - Display Room Content</p> <p>Assumptions: The player is new to the game and is getting accustomed to the basic mechanics.</p> <p>Preconditions: The player has started the game and is in the initial room.</p> <p>Main Flow: The player interacts with various objects</p> |

| | | |
|-----------------------------------|---|--|
| text popup or a simple animation. | ensure they are intuitive for the player. | <p>in the room, triggering simple responses or actions.</p> <p>Sub Flows: Each interaction could lead to a brief description or dialogue about the object.</p> <p>Alternative Flows: The game provides feedback or guidance if an interaction is unavailable.</p> <p>Post Conditions: The player becomes familiar with the game's basic mechanics.</p> <p>Frequency of Occurrence: Regularly, in the initial game room.</p> <p>Open Issues: Developing more complex interactions for future levels.</p> |
|-----------------------------------|---|--|

2.3 Use Case Tests

| U.C.# | User Story | Preconditions / Data | Number | Steps To Execute | Expected Results | Pass/Fail | Defect/Comments |
|------------|--|--|--------|---|--|-----------|------------------------|
| <u>2.1</u> | As a player, I want to move a character around the room, so that I can explore the game environment interactively. | The game features a character that the player can control. | 1 | Launch the game and start controlling the character. | The character should move according to the player's input without delay. | PASS | Completed, as Expected |
| | | The game room is designed with interactive objects. | 2 | Test the responsiveness of movement controls (e.g., keyboard or joystick) for moving the character. | Interaction with room objects should be possible wherever the character moves. | PASS | Completed, as Expected |

| | | | | | | | |
|------------|--|---|---|---|--|------|------------------------|
| | | | 3 | Move the character to different parts of the room and observe the interaction with the environment. | Navigation and control should be intuitive and straightforward for the player. | PASS | Completed, as Expected |
| | | | 4 | Attempt to interact with various objects in the room using the character. | All interactive objects in the room should be accessible through character movement. | PASS | Completed, as Expected |
| | | | 5 | Test for any control lag or issues with character movement responsiveness. | There should be no technical issues or glitches affecting the character's movement. | PASS | Completed, as Expected |
| <u>2.2</u> | As a player, I want to interact with objects in a basic room environment, so that I can start engaging with the game's interactive elements. | The game's initial room contains basic interactive objects like bookshelves, sofas, and tables. | 1 | Start the game and enter the initial room. | Each object in the room should be interactable as per the game design. | PASS | Completed, as Expected |
| | | The interaction mechanism (e.g., clicking, approaching) is enabled. | 2 | Approach various objects in the room, such as bookshelves, sofas, and tables. | Interaction with objects should result in immediate and noticeable feedback. | PASS | Completed, as Expected |
| | | | 3 | Execute the interaction with each object | Feedback can vary from simple | PASS | Completed, as Expected |

| | | | | | | |
|--|---|---|---|--|------------------------|--|
| | | | (e.g., click or 'approach' command). | animations to text popups, providing context or information. | | |
| | 4 | Observe and record the type of feedback received from each interaction (e.g., text popup, animation). | All interactions should be consistent in response and intuitive for the player. | PASS | Completed, as Expected | |
| | 5 | Test the interaction with all available objects in the room. | No technical issues should occur during interactions, such as game freezes or unresponsive mechanics. | PASS | Completed, as Expected | |
| | 6 | Evaluate the intuitiveness and responsiveness of the interaction mechanics. | The interactions should contribute to the player's understanding of the game environment and mechanics. | PASS | Completed, as Expected | |

2.4 Software Design Documentation

| | |
|--|---|
| Class Name: Detective | Version: 1 |
| Description: The main player character that moves around the room | Associated Use Cases: UC2.1, UC2.2 |
| Responsibilities: Moves around the room. | Collaborators: AnimationPlayer, Sprite2D |

| | |
|---|------------------------------------|
| Class Name: Sprite2D | Version: 1 |
| Description: The character art for the main player | Associated Use Cases: UC2.1 |
| Responsibilities: Display the art for the main player. | Collaborators: Detective |

| | |
|---|------------------------------------|
| Class Name: AnimationPlayer | Version: 1 |
| Description: Animates the player movement | Associated Use Cases: UC2.1 |
| Responsibilities: Animates the frames for player movement. | Collaborators: Detective |

| | |
|--|---|
| Class Name: TileMap | Version: 1 |
| Description: Design the game levels | Associated Use Cases: UC1.2, UC2.2 |
| Responsibilities: Game design display. Creating physical layers. | Collaborators: Detective |

2.5 UX/UI Design

We downloaded a simple pixel art asset pack from webpage, and it is for a private investigator and their office. Office accessories are also included such as chairs, walls, and bookshelves so we can add different accessories according to our own needs.

Background:



Fig. 17 The First Level Background ([KYPixel](#))

Office Accessories:

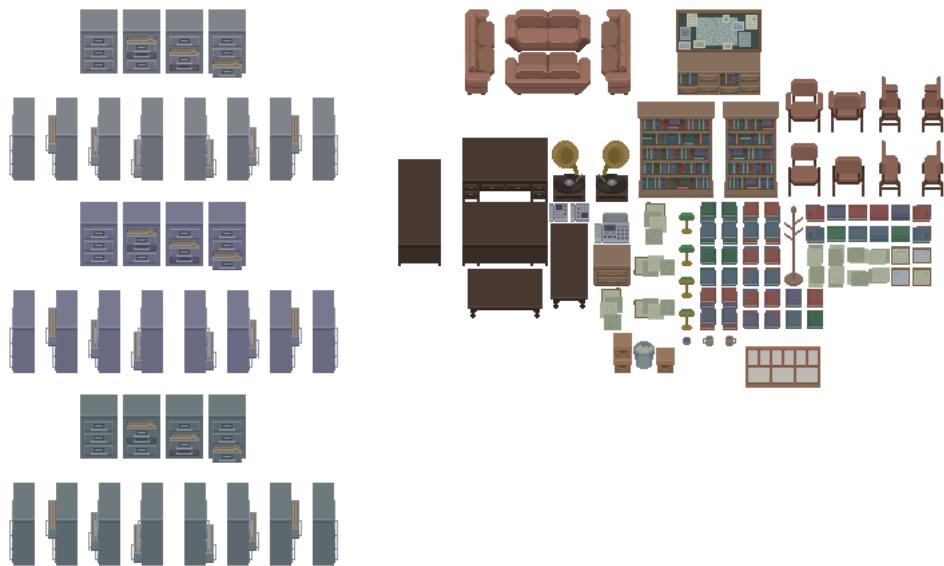


Fig. 18 Room Accessories

The pixel art asset pack also contains avatar's movements so we can add to games and make avatar moves like picture 4.

Avatar's movements:



Fig. 19 Avatar's Movements

Sprint 3 (9 November – 14 November)

Link: [Sprint 3 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

3.1 Customer Meeting - Wednesday, 15 November

Presentation of game demo:

Gameplay overview: we demonstrated the welcome screen with start and quit options. Highlighted the initial gameplay where the user appears in a room and can interact with a bookshelf, triggering a question dialogue.

Level progression mechanism: explained the choice mechanism, the player is presented with multiple options to answer. If the wrong answer is selected and the escape button is pressed, nothing happens. However, selecting the right answer opens the door to the next room, progressing the player to the next level.

Teaching mechanism discussion:

Educational integration: explored ideas for incorporating learning elements, such as providing fun facts and explanations for both correct and incorrect answers to reinforce learning.

Cultural aspects: plan to include various aspects of each country, like history, cinema, food, and clothes.

Customer suggestions and feedback:

Interactive learning: customer suggested incorporating interactive elements for learning about cultural artefacts. Agreed to include artefacts in the game environment, offering descriptions and fun facts upon interaction.

Bonus quiz concept: discussed adding bonus quiz based on the fun facts learned through interaction with extra items in the game (for example, different items in the room associated with a particular country, the user can interact with them and learn interesting and/or fun facts).

Interaction indicators: plans to include visual cues (like exclamation marks) to highlight interactable items in the room.

1. Oracle integration:

Current functionality: the Oracle currently is not implemented. The idea that we have is that the Oracle provides hints and answers to player queries within the game. For instance, if a player is stuck on a puzzle about a country's flag, the Oracle might offer a hint like, "This country's flag features a unique symbol representing its national animal."

Customer concerns and solutions:

Concerns about free-text input: the customer expressed concerns about the complexity and feasibility of implementing a free-text input system for the Oracle. For example, there were questions about how the Oracle would process and respond accurately to a wide range of open-ended player inputs.

Discussed interaction range: to address this, we explored limiting the Oracle's responses to predefined queries or using a multiple-choice format for player questions. For example, when faced with a historical question, player might be presented with a set of predefined questions to ask the Oracle, like "What was the major event in this country's history during the 20th century?"

Implementation strategies: considered implementing a dropdown menu or selection system where the Oracle's responses are tailored to the specific context of the room or level the player is currently in. This approach simplifies the input mechanism while still allowing for a range of interactions.

2. Action Items and Future Development:

Game expansion: focus on adding more content and possibly starting the development of the next level.

Oracle development: prioritise figuring out the integration and functionality of the Oracle in the game.

Database consideration: discussed the possibility of a database for dynamic content and replay ability, but confirmed it is not a requirement.

Save/pause menu: considered the customer's suggestion for a save/pause feature, especially if the game length warrants it.

3. Customer Encouragement:

The customer expressed satisfaction with the current progress and encouraged further development and exploration of the game mechanics and educational aspects.

3.2 User Stories, Use Cases

| User Story: | Requirements Use Case | UC 3.1 Flow of Events for the Start Game Use Case |
|--|--|---|
| <p>Acceptance criteria:</p> <ol style="list-style-type: none"> 1. The start screen should be visually appealing 2. The start screen should have a start button 3. The start screen should have the exit button | <p>Use Case: Start Game</p> <p>Scope: Game start</p> <p>Level: system goal</p> <p>Context: User can start the game by clicking on the start button on the start screen.</p> <p>Frequency of occurrence: Once per game session</p> <p>Open Issues: Should there be an option to reset the game from the saved progress?</p> | <p>Scope: Game Start</p> <p>Level: system goal</p> <p>Primary Actors: Player</p> <p>Description: Player clicks on the start button on the start screen to begin the game. Player progresses through the game by completing tasks in each room.</p> <p>Dependencies: None</p> <p>Assumptions: Player has a working device with an internet connection.</p> <p>Preconditions: Player has opened the game application.</p> <p>Main Flow: Player clicks on the start button on the start screen. The game begins and the player is taken to the first room.</p> |

| | | |
|---|---|--|
| | | <p>Sub Flows: None.</p> <p>Alternative Flows: The start button is not functional. The player is not taken to the first room after clicking on the start button.</p> <p>Post Conditions: The player is in the first room of the game.</p> <p>Frequency of Occurrence: Once per game session</p> <p>Open Issues: None</p> |
| <p>User Story: As a player, I want to interact with artefact in the game, so that I can learn about the culture of the country and gain a deeper understanding of the country's traditions, customs, and beliefs.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. There should be at least one interactive object in the room that provides information about the culture of the country. 2. When a player interacts with an object, they should be presented with a question or quiz about the country's culture. 3. The question or the quiz should be challenging but possible. 4. The player should receive feedback on their answers, | <p>Requirements Use Case</p> <p>Use Case: Interact with Cultural Object</p> <p>Scope: Game Interaction</p> <p>Level: User goal</p> <p>Context: User can interact with cultural objects in the game to learn about the country's culture. By clicking on an object, the user will be presented with a question or quiz that relates to the object and the country's culture.</p> <p>Frequency of occurrence: Every time the player interacts with a cultural object.</p> <p>Open Issues: What type of cultural objects will be included in the game? How will the questions and quizzes be designed? How will the player receive feedback on their answers?</p> | <p>UC 3.2 Flow of Events for the Interact with Cultural Object Use Case</p> <p>Scope: Game Interaction</p> <p>Level: User goal</p> <p>Primary Actors: Player</p> <p>Description: Player goes close to a cultural object in the game. Player is presented with a question or quiz about the country's culture. Player answers the question or quiz. Player receives feedback on their answers.</p> <p>Dependencies: U.C. 2.1 - Character Movement in Room and U.C. 2.2 - Basic Room Interaction</p> <p>Assumptions: Player has a working device with an internet connection.</p> <p>Preconditions: Player has entered a room in the game.</p> <p>Main Flow: Player clicks on a cultural object in the room. The object displays a question or quiz related to the country's culture. The player answers the question or quiz to the best of their ability. The object provides feedback to the player, including explanations for incorrect answers.</p> |

| | | |
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| <p>including explanations for incorrect answers.</p> | | <p>Subflows: None.</p> <p>Alternative Flows: The cultural object is not interactive. The object does not display a question or quiz. The object does not provide feedback to the player.</p> <p>Post Conditions: The player has learned something new about the country's culture.</p> <p>Frequency of Occurrence: Every time the player interacts with a cultural object</p> <p>Open Issues: What type of cultural objects will be included in the game? How will the questions and quizzes be designed? How will the player receive feedback on their answers?</p> |
| <p>User Story: As a player, I want to receive feedback for both correct and incorrect answers, to enhance my learning experience.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> Upon answering a question or completing a quiz, the player should receive immediate feedback indicating whether their answer is correct or incorrect. For correct answers, the feedback should provide reinforcement and affirmation, acknowledging the player's | <p>Requirements Use Case</p> <p>Use Case: Provide Informative Feedback</p> <p>Scope: Game Interaction</p> <p>Level: System goal</p> <p>Context: Upon answering a question or completing a quiz, the game system will provide informative feedback to the player, indicating whether their answer is correct or incorrect and offering explanations or reinforcement accordingly.</p> <p>Frequency of occurrence: Every time a player answers a question or completes a quiz</p> <p>Open Issues: What level of detail should the feedback provide? How will the feedback be presented visually? How will the feedback be tailored to</p> | <p>UC 3.3 Flow of Events for the Provide Informative Feedback Use Case</p> <p>Scope: Game Interaction</p> <p>Level: System goal</p> <p>Primary Actors: Player, Game System</p> <p>Description: Player answers a question or completes a quiz. Game system evaluates the player's answer and determines whether it is correct or incorrect. Game system provides feedback to the player based on the correctness of their answer. Feedback includes reinforcement for correct answers and explanations for incorrect answers.</p> <p>Dependencies: UC 1.1 - Engaging in Country-Specific Quiz and UC 3.2 - Interact with Cultural Object</p> <p>Assumptions: Player has a working device with an internet connection.</p> |

| | | |
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| <p>understanding of the concept.</p> <p>3. For incorrect answers, the feedback should provide clear explanations and guidance, helping the player identify their error and grasp the correct concept.</p> <p>4. The feedback should be tailored to the specific question or quiz, addressing the relevant knowledge gaps or misconceptions.</p> <p>5. The feedback should be presented in a clear, concise, and engaging manner to maintain the player's interest and motivation.</p> | <p>different types of questions and quizzes?</p> | <p>Preconditions: Player has entered a room in the game and interacted with a cultural object.</p> <p>Main Flow: Player answers a question or completes a quiz related to the country's culture. Game system evaluates the player's answer and determines whether it is correct or incorrect. If the answer is correct, the game system provides feedback that reinforces the player's understanding of the concept. If the answer is incorrect, the game system provides feedback that explains the correct concept and helps the player identify their error.</p> <p>Subflows: None.</p> <p>Alternative Flows: The game system does not provide feedback to the player. The feedback provided is not tailored to the specific question or quiz. The feedback is not clear, concise, or engaging.</p> <p>Post Conditions: The player has received informative feedback that enhances their learning experience.</p> <p>Frequency of Occurrence: Every time a player answers a question or completes a quiz</p> <p>Open Issues: What level of detail should the feedback provide? How will the feedback be presented visually? How will the feedback be tailored to different types of questions and quizzes?</p> |
|---|--|--|

3.3 Use Case Tests

| U.C. # | User Story | Preconditions / Data | Number | Steps To Execute | Expected Results | Pass/Fail | Defect/Comments |
|---------------------|---|---|--------|-------------------------------|---|-----------|-------------------------|
| 3.1 | As a player, I want to see a start screen to start the game so that I can begin | The game application is successfully loaded on the player's device. | 1 | Press the "Start Game" button | The game starts, the player is in the first room of Level 1 | PASS | Completed, as Expected. |

| | | | | | | | |
|-----|--|--|---|---|---|------|-------------------------|
| | my journey through the educational game about countries. | The start screen with necessary UI elements (like the start button) is operational. The player's device is compatible with the game, ensuring the start screen displays correctly. The player is at the start screen, ready to begin their journey through the game. | 2 | Press the "Quit" button | The game ends by exiting the start screen | PASS | Completed, as Expected. |
| 3.2 | As a player, I want to interact with artefact in the game, so that I can learn about the culture of the country and gain a deeper understanding of the country's traditions, customs, and beliefs. | The game level featuring the country is loaded. | 1 | Start the game and navigate to the artifact within the first room of Level 1. | The game starts successfully, and the player finds themselves in the first room of Level 1. | PASS | Completed, as Expected. |
| | | At least one cultural artifact that can be interacted with is present in the room. | 2 | Interact with the artifact by pressing the designated button or command. | A question or information panel related to the culture of the country is presented. | PASS | Completed, as Expected. |
| | | The player character is controllable and can navigate to the artifact. | | | | PASS | Completed, as Expected. |
| 3.3 | As a player, I want to receive feedback for both correct and incorrect answers, to enhance my learning experience. | The player is actively engaged in a quiz or question within the game. | 1 | Answer a question in the quiz correctly. | The player receives immediate positive feedback | PASS | Completed, as Expected. |
| | | The quiz/question system is functional, allowing for input and response. | 2 | Answer a question in the quiz incorrectly. | The feedback should indicate that the answer is wrong | PASS | Completed, as Expected. |

3.4 Software Design Documentation

| | |
|-----------------------|------------|
| Class Name: Detective | Version: 2 |
|-----------------------|------------|

| | |
|--|---|
| Description: The main player character that moves around the room | Associated Use Cases: UC2.1, UC2.2, UC3.1 |
| Responsibilities: Moves around the room. Interacts with objects. | Collaborators: AnimationPlayer, ActionableFinder, Sprite2D, CollisionShape |

| | |
|--|------------------------------------|
| Class Name: CollisionShape | Version: 1 |
| Description: The shape of the main player to detect collisions with other objects | Associated Use Cases: UC3.2 |
| Responsibilities: Detects collision. | Collaborators: Detective |

| | |
|--|--|
| Class Name: Actionable | Version: 1 |
| Description: Detects collisions and has | Associated Use Cases: UC3.2 |
| Responsibilities: Detects collision. | Collaborators: Detective, RigidBody, Dialogue |

| | |
|---|---|
| Class Name: DialogueManager | Version: 1 |
| Description: Handles branching dialogue for various interactions | Associated Use Cases: UC3.3 |
| Responsibilities: Gives feedback to player about whether the answer is correct or not. | Collaborators: Detective, Actionable, ActionableFinder |

3.5 UX/UI Design

We created the start screen with two buttons:

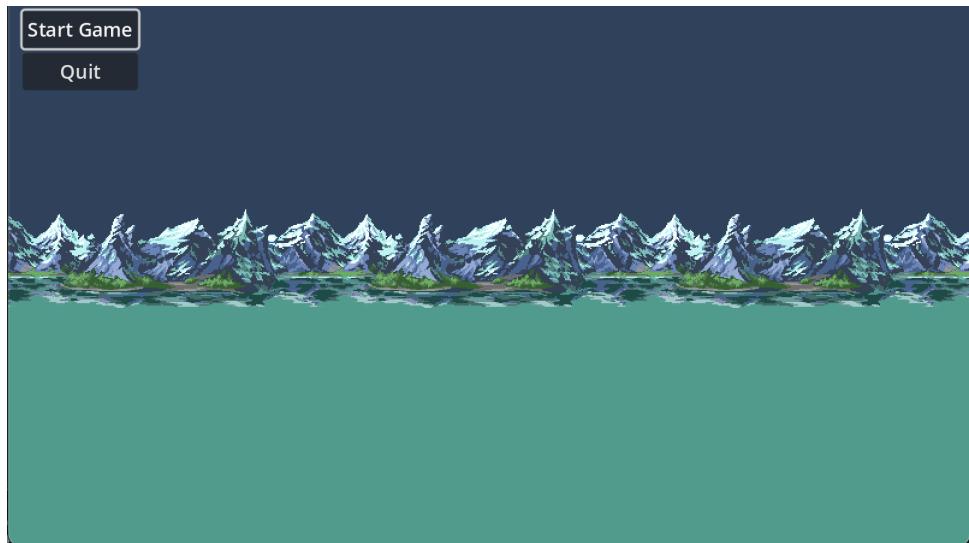


Fig. 20 The start screen

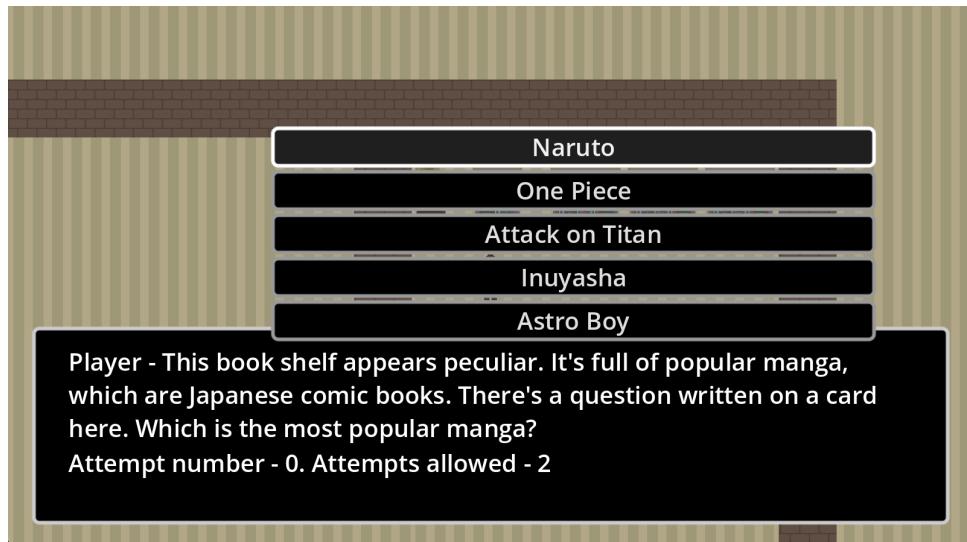


Fig. 21 Player interacts with a bookshelf and gets a quiz

If a player chooses the wrong answer, Fig. 22 will pop up. If the player chooses the correct answer, Fig. 22 will pop up.



Fig. 22 Player chose the wrong answer



Player - The room just turned a bit brighter. I think that's the correct answer.

Fig. 23 Player chose the right answer

Sprint 4 (15 November – 22 November)

4.1 Customer meeting - Wednesday, 22 November

During the customer meeting, we presented the current progress of our game development. The focus was on the improvements made since the last meeting, but it was evident that we fell short of expectations. The customer's feedback indicated a need for more substantial progress.

Key developments presented

1. Restricted the number of answer attempts: implemented a limit of three attempts per question to increase challenge and engagement.
2. Pause menu: introduced a pause menu with options to resume, contact Oracle, and quit.
3. Oracle integration: The Oracle now provides hints based on the number of attempts a user has made. However, it only gives a limited number of more specific hints.
4. Room expansion: increased the size of the game environment to enhance exploratory aspects.

Customer Feedback

The customer acknowledged the improvements, particularly the interactive elements and Oracle integration.

However, concerns were raised about the pace of development and the depth of content – the current stage was still focused on a single question. The customer urged the team to scale the game, adding more questions and considering the design for subsequent levels.

Challenges and Areas for Improvement:

1. **Limited progress:** the team only managed to implement basic functionalities and did not complete a full level or introduce significant interactive elements.
2. **Need for more content:** more questions and interactive features are required to make the first level engaging and complete.

3. **Game design for subsequent levels:** planning for additional levels, including a puzzle feature, was discussed but needs to be explored.
4. **Bug handling:** issues with the pause menu and movement after interacting with the Oracle were identified and need resolution.
5. **Narrative development:** a suggestion was made to implement a narrative explaining why the player is moving through levels, enhancing the game's context and engagement.

Customer's Suggestions:

- The customer advised focusing on essential elements and possibly reducing the scope to ensure completion (for example, reducing the number from five to two).
- Emphasis was placed on the importance of documentation and bug fixing.
- The team was encouraged to allocate more time and work collaboratively to meet the project's demands.

Conclusion and Next Steps:

The meeting was a wake-up call for the team to accelerate progress. Immediate actions include:

- Rapid development of more content for the first level.
- Starting design work for subsequent levels.
- Addressing identified bugs and enhancing the narrative aspect.
- Focusing on comprehensive documentation alongside development.

Reflection

This meeting highlighted the gap between our current progress and the project's requirements. A concerted effort is needed in the upcoming weeks to meet the project's goals and fulfil the customer's expectations. The team needs to prioritise efficiently and collaborate effectively to ensure the successful completion of the game.

4.2 User Stories, Use Cases

| User Story: | Requirements Use Case | Design Use Case: UC 4.1 Flow of Events for Interact with Exploratory Elements Use Case |
|---|--|---|
| <p>As a player, I want the environment to have certain artifacts that can make it resemble some specific country</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none"> 1. New interactive elements or objects are added to the game. 2. These elements contribute to the story, puzzles, or | <p>Use Case: Interact with Exploratory Elements</p> <p>Scope: In-game exploration</p> <p>Level: User goal</p> <p>Context: The player encounters and interacts with new exploratory elements added to the game environment.</p> <p>Frequency of Occurrence: As often as the player engages</p> | <p>Scope: In-game exploration</p> <p>Level: System Goal</p> <p>Primary Actors: Player</p> <p>Description: The player encounters and interacts with new exploratory elements added to the game.</p> <p>Dependencies: U.C. 3.2 - Interact with Cultural Object</p> |

| | | |
|--|--|---|
| <p>overall gameplay experience.</p> <p>3. Player is rewarded for exploration with in-game items, lore, or progress.</p> | <p>with new elements during exploration.</p> <p>Open Issues: Deciding the types of rewards for exploration and how they impact the overall game progression.</p> | <p>Assumptions: Interactive elements are placed in a way that encourages exploration.</p> <p>Preconditions: Player is actively exploring the game environment.</p> <p>Main Flow: The player discovers new interactive elements and engages with them, triggering various in-game responses.</p> <p>Sub Flows: None.</p> <p>Alternative Flows: Interactive elements do not function as intended or fail to enhance the gameplay experience.</p> <p>Post Conditions: The player has interacted with new elements and possibly received rewards for exploration.</p> <p>Frequency of Occurrence: As often as the player encounters new elements during exploration.</p> <p>Open Issues: Creating a balance between exploration and the main gameplay objectives.</p> |
| <p>User Story: As a player, I want to access the Oracle feature for assistance, so that the game remains challenging yet playable when I am stuck.</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none"> 1. The Oracle provides hints or assistance in a way that is helpful but does not give away the full solution. | <p>Requirements Use Case</p> <p>Use Case: Oracle Feature Usage</p> <p>Scope: In-game assistance system</p> <p>Level: User goal</p> <p>Context: The player uses the Oracle feature for hints or assistance within the game, with limited usage to keep the game challenging.</p> | <p>Design Use Case: UC 4.2 Flow of Events for Oracle Feature Usage Use Case</p> <p>Scope: In-game Assistance System</p> <p>Level: System Goal</p> <p>Primary Actors: Player</p> <p>Description: The player uses the Oracle feature for assistance during challenging parts of the game.</p> <p>Dependencies: U.C. 4.3 - Pause Game</p> |

| | | |
|--|--|---|
| <p>2. The use of the Oracle feature is integrated into the game narrative or mechanics.</p> | <p>Frequency of Occurrence: Limited number of times per level or per game session.</p> <p>Open Issues: Determining the optimal number of Oracle uses to balance help and challenge.</p> | <p>Assumptions: The Oracle feature is integrated as a part of the game mechanics.</p> <p>Preconditions: The player is in a situation within the game where they need assistance.</p> <p>Main Flow: The player activates the Oracle feature by selecting the “Contact Oracle” option in the pause menu, receives a hint or partial assistance, and the game deducts one use from the Oracle's allowed uses.</p> <p>Sub Flows: None.</p> <p>Alternative Flows: The Oracle feature does not provide helpful information.</p> <p>Post Conditions: The player has received assistance and continues gameplay.</p> <p>Frequency of Occurrence: Unlimited number of times per level or game session.</p> <p>Open Issues: Determining the optimal level of assistance to provide.</p> |
| <p>User Story: As a player, I want to be able to pause the game at any time, so that I can take breaks without losing my progress or exiting the game.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The game can be paused and resumed using a designated key or button. | <p>Requirements Use Case</p> <p>Use Case: Pause Game</p> <p>Scope: In-game functionality</p> <p>Level: User goal</p> <p>Context: The player wants to pause the game at any time for distinct reasons (e.g., take a break).</p> <p>Frequency of Occurrence: Potentially multiple times during a game session.</p> | <p>Design Use Case: UC 4.3 Flow of Events for Pause Game Use Case</p> <p>Scope: In-game Functionality</p> <p>Level: System Goal</p> <p>Primary Actors: Player</p> <p>Description: The player accesses the pause menu during gameplay to temporarily stop the game, adjust settings, or exit to the main menu.</p> <p>Dependencies: None</p> <p>Assumptions: Player understands the standard conventions for pausing a game.</p> |

| | | |
|---|---|--|
| <p>2. The pause menu displays options such as "Resume Game." Game state is preserved during the pause.</p> | <p>Open Issues: Deciding how the game should handle dynamic in-game events during pause (e.g. time-sensitive challenges).</p> | <p>Preconditions: The player is actively engaged in a game session.</p> <p>Main Flow: The player presses the designated pause button/key, activating the pause menu. The player can then select an option like 'Resume', 'Help', or 'Quit'.</p> <p>Sub Flows: The player adjusts settings within the pause menu.</p> <p>Alternative Flows: The pause functionality does not work as intended, or the game fails to resume correctly after unpausing.</p> <p>Post Conditions: The player resumes the game or selects another option from the pause menu.</p> <p>Frequency of Occurrence: Multiple times during a game session</p> <p>Open Issues: Handling pause functionality in multiplayer scenarios.</p> |
| <p>User Story:</p> <p>As a player, I want to know how many attempts I have left to answer a question correctly, so that I can strategize my gameplay and make informed decisions.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. Each question displays the number of remaining attempts. 2. The game provides feedback when the number of | <p>Requirements Use Case</p> <p>Use Case: Answering Game Questions</p> <p>Scope: In-game Question Mechanics</p> <p>Level: User Goal</p> <p>Context: When encountering a question in the game, the player wishes to see the number of remaining attempts they must answer correctly. This feature is intended to help player strategise their approach to gameplay and make informed decisions, particularly in scenarios</p> | <p>Design Use Case: UC 4.4 Flow of Events for Answering Game Questions Use Case</p> <p>Scope: Game Interaction Mechanics</p> <p>Level: System Goal</p> <p>Primary Actors: Player</p> <p>Description: The player is presented with a question in the game and has a limited number of attempts to answer it correctly.</p> <p>Dependencies: U.C. 3.2 - Interact with Cultural Object</p> <p>Assumptions: Each question has a set number of attempts allowed.</p> <p>Preconditions: Player encounters a question during the game.</p> |

| | | |
|---|--|--|
| <p>attempts decreases.</p> <p>3. The game logic changes based on the number of remaining attempts (e.g., hints, difficulty adjustment).</p> | <p>involving puzzle-solving or decision-making.</p> <p>Frequency of Occurrence: Each time a question is presented to the player within the game.</p> <p>Open Issues: Determining the optimal number of attempts for diverse types of questions to maintain a balance between challenge and player engagement. Designing an intuitive and non-intrusive way to display the number of attempts that does not disrupt the game experience. Deciding on the nature and extent of feedback provided as the number of remaining attempts changes. Establishing how the game logic should adapt with the decreasing number of attempts, including the type and level of hints or difficulty adjustments to be made.</p> | <p>Main Flow: The player views the question and the number of remaining attempts, submits an answer, and receives feedback based on their response.</p> <p>Sub Flows: None.</p> <p>Alternative Flows: The number of attempts does not display correctly, or the game does not provide appropriate feedback after each attempt.</p> <p>Post Conditions: The player successfully answers the question or exhausts all attempts.</p> <p>Frequency of Occurrence: Whenever a player encounters a question in the game.</p> <p>Open Issues: Balancing question difficulty and the number of attempts.</p> |
| <p>User Story: As a player, I want to explore a larger game environment, so that I can enjoy a more immersive and diverse gameplay experience.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The game level is expanded with new areas, challenges, or features. 2. The new areas are seamlessly integrated into the | <p>Requirements Use Case</p> <p>Use Case: Explore New Game Area</p> <p>Scope: Game World Expansion</p> <p>Level: User Goal</p> <p>Context: The player explores newly added areas in the game, enhancing the immersive and exploratory experience.</p> <p>Frequency of Occurrence: Occurs whenever the player</p> | <p>Design Use Case: UC 4.5 Flow of Events for Explore New Game Area Use Case</p> <p>Scope: Game World Expansion</p> <p>Level: System Goal</p> <p>Primary Actors: Player</p> <p>Description: The player explores newly added areas in the game, enhancing the gameplay experience.</p> <p>Dependencies: U.C. 2.1 - Character Movement in Room</p> |

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| <p>existing game world.</p> <p>3. The expanded environment provides varied and engaging content</p> | <p>reaches and explores new areas within the game.</p> <p>Open Issues: Ensuring seamless integration of new areas with the existing game environment and narrative.</p> | <p>Assumptions: New areas are accessible to the player at certain stages of the game.</p> <p>Preconditions: The player is actively exploring the game world.</p> <p>Main Flow: The player discovers and engages with new areas, interacting with various elements within these areas.</p> <p>Sub Flows: None.</p> <p>Alternative Flows: New areas are not accessible or do not integrate well with the existing game environment.</p> <p>Post Conditions: The player has explored new areas and engaged with new gameplay elements.</p> <p>Frequency of Occurrence: Occurs as the player progresses through the game.</p> <p>Open Issues: Ensuring coherence and seamless integration with existing game areas.</p> |
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4.3 Use Case Tests

| U.C. # | User Story | Preconditions / Data | Number | Steps To Execute | Expected Results | Pass/ Fail | Defect/Comments |
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| 4.1 | As a player, I want the environment to have certain artifacts that can make it resemble some specific country | The game level depicting Japan is loaded. | 1 | Navigate the game environment to locate a culturally significant artifact. | Japanese cultural artifacts are identifiable and interactable within the game environment. | PASS | Completed, as Expected. |
| | | Artifacts representing Japanese culture are designed | | Interact with the artifact to trigger any quizzes or puzzles. | Interacting initiates a puzzle or a quiz related to Japan | | Completed, as Expected. |

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| | | and placed within the game environment. | | | | |
| | | The player is in control and can explore the game environment. | 3 | Interact with the artifact to trigger any information associated with the artifact | Interacting initiates a window with information related to the artifact | PASS Completed, as Expected. |
| 4.2 | As a player, I want to access the Oracle feature for assistance, so that the game remains challenging yet playable when I am stuck. | The game level where the Oracle feature is available is loaded. | 1 | Reach a challenging point in the game where assistance seems necessary. | The player successfully encounters a challenge that justifies the use of the Oracle feature. | PASS Completed, as Expected. |
| | | The player has reached a point in the game where assistance might be needed. | 2 | Access the Oracle feature within the game for assistance. | The Oracle is accessible, and the player can successfully interact with it. | PASS Completed, as Expected. |
| | | The Oracle feature is functional and ready to provide hints. | 3 | Evaluate the hint or assistance provided by the Oracle. | The Oracle provides a hint that is helpful but does not fully solve the challenge. | PASS Completed, as Expected. |
| | | | 4 | Attempt to use the Oracle's hint to progress in the game. | Using the hint, the player makes progress in the game or overcomes the challenge. | PASS |
| 4.3 | As a player, I want to be able to pause the game at any time, so that I can take breaks without losing my progress or exiting the game. | The game is actively running. | 1 | Press the designated key or button to pause the game during gameplay. | The game successfully pauses, and the pause menu appears with options like "Resume Game." | PASS Completed, as Expected. |
| | | The player is in control of the game character | 2 | Observe the pause menu and select the "Resume Game" option. | Selecting "Resume Game" resumes the game from the exact point | PASS Completed, as Expected. |

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| | | or in a game level. | | where it was paused. | | |
| 4.4 | As a player, I want to know how many attempts I have left to answer a question correctly, so that I can strategize my gameplay and make informed decisions. | The player is engaged in a game level where questions are presented. | 1 | Engage with a question within the game. | The question is presented with a clear indication of the number of attempts left. | PASS Completed, as Expected. |
| | | The system for tracking the number of attempts is active. | 2 | Observe the display showing the number of remaining attempts. | The display accurately shows the updated number of remaining attempts. | PASS Completed, as Expected. |
| | | | 3 | Use one attempt to answer the question (either correctly or incorrectly). | After using an attempt, the game provides feedback on the decrease in attempts. | PASS Completed, as Expected. |
| | | | 4 | Observe the change in the number of remaining attempts and any feedback provided. | The game updates the display and feedback after each attempt. | PASS Completed, as Expected. |
| | | | 5 | Continue to use attempts until they are exhausted | The game responds appropriately when attempts are low or exhausted (e.g., offering hints). | PASS Completed, as Expected. |
| 4.5 | As a player, I want to explore a larger game environment, so that I can enjoy a more immersive and diverse gameplay experience. | The game level with the new expanded areas is loaded. | 1 | Begin the game and navigate to the new expanded areas of the game level. | The player successfully accesses the new expanded areas of the game level. | PASS Completed, as Expected. |
| | | The player character can navigate and explore the game environment. | 2 | Explore various aspects of the new areas, such as interacting with any new features or challenges. | Interaction with new features or challenges in these areas' functions correctly. | PASS Completed, as Expected. |

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| | | | 3 | Observe the integration of these new areas with the existing game world. | The new areas appear to be seamlessly integrated into the existing game world without any inconsistencies or disruptions. | PASS | Completed, as Expected. |
| | | | 4 | Evaluate the content in the expanded environment for variety and engagement. | The expanded environment offers a diverse range of engaging content, enhancing the player's gameplay experience. | PASS | Completed, as Expected. |

4.4 Software Design Documentation

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| Class Name: DialogueManager | Version: 2 |
| Description: Handles branching dialogue for various interactions | Associated Use Cases: UC3.3, UC4.2 |
| Responsibilities: Gives feedback to player about whether the answer is correct or not. Implement the Oracle which provides help to the player. | Collaborators: Detective, Actionable, ActionableFinder |

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| Class Name: StartScreen | Version: 1 |
| Description: The main menu scene to start the game | Associated Use Cases: UC4.3 |
| Responsibilities: Start the game. Exit the game. | Collaborators: Level 1, StartStory_dialogue |

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| Class Name: PauseMenu | Version: 1 |
| Description: Pause menu which has options to resume or contact Oracle | Associated Use Cases: UC4.3 |
| Responsibilities: Pauses the game. Resumes the game. Allows user to get help from Oracle. Allows user to exit the game. | Collaborators: None |

4.5 UX/UI Design



Fig. 24 Some of the culturally significant artefacts in Geogame



Fig. 25 The Oracle, who can be contacted for help

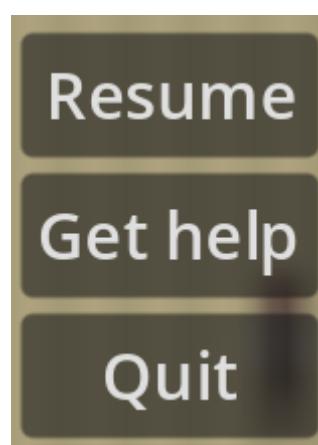


Fig. 26 The pause menu

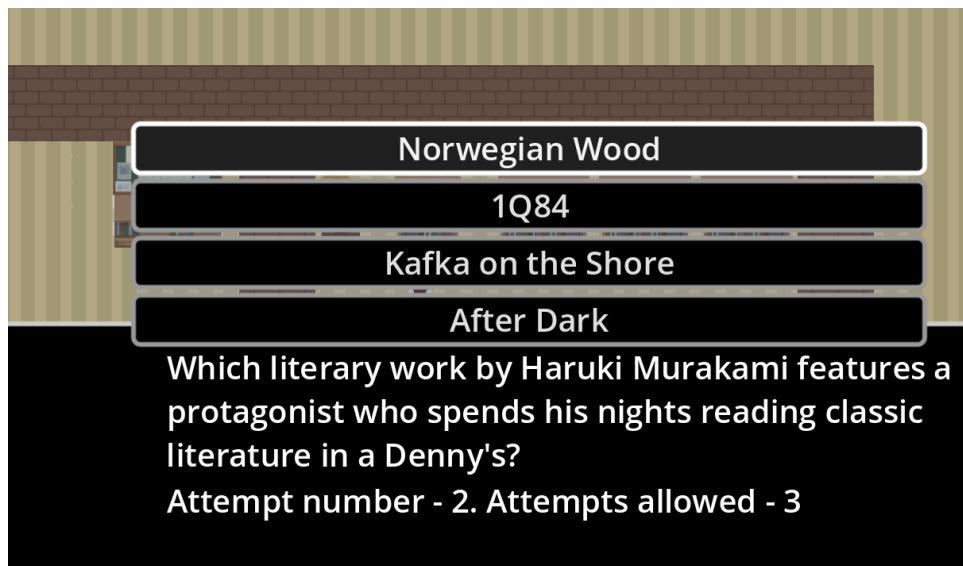


Fig. 27 The game lets the player know about how many attempts are allowed

Sprint 5 (23 November – 30 November)

Link: [Sprint 5 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

5.1 Customer Meeting - Wednesday, 29 November

During the customer meeting, we presented the full first level of our game, a Japan-themed room, where the player could pass five quizzes and finish the game.

Key Developments Presented:

1. Expanded Level 1: We highlighted the expanded version of the first level, which now includes multiple interactive elements. Some objects present questions for the player, while others provide cultural context, like the cherry blossom tree, which offers insights into its importance in Japanese culture.
2. Oracle Feature Improvement: Now the Oracle is designed to help only twice per level, and only with four questions, encouraging player to think carefully about when to seek assistance.

Customer Feedback and Recommendations:

1. Focus on Completing Levels: The customer inquired about the development of other levels. We confirmed our plans to complete the Egypt-themed room next, emphasizing our focus on expanding the game's content.
2. Narrative Integration: Discussed returning to the initial narrative idea centred around investigation. This narrative is intended to enhance the game's storyline and player engagement.
3. Game Mechanics and Asset Development: The customer highlighted the importance of having all game mechanics in place and finding suitable assets for each room. Emphasis was placed on the feasibility of developing multiple rooms within the given time – we should aim for three rooms ideally.

- Priority on Documentation and Bug Fixes: Emphasized the importance of prioritising documentation and resolving any bugs, especially with the submission deadline approaching.

5.2 User Stories and Use Cases

| User Story: | Requirements Use Case | Design Use Case: UC 5.1. Flow of events for transition scenes use case |
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| <p>User Story:</p> <p>As a player, I want to have engaging transition scenes so that I can immerse myself into the story of the game, understand the context of each level and be connected to the overall journey and purpose within the world of the game</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none"> Presence of transition scenes: Transition scenes are implemented between levels. These scenes should serve as narrative bridges, offering context, story progression, or character development. Integration with Game flow: The transition scenes should seamlessly integrate with the gameplay, ensuring a smooth shift from gameplay to narrative exposition and back. | <p>Requirements Use Case</p> <p>Use case: Transition Scenes</p> <p>Scope: Start of the game and between levels</p> <p>Level: System goal</p> <p>Context: The player desires transition scenes between levels to enhance the storytelling aspect of the game. These scenes provide narrative context, background information, and a smoother transition from one level to the next, contributing to a more immersive and cohesive game experience.</p> <p>Frequency of occurrence: At the end of each level before the start of the next one.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> Deciding the length and complexity of transition scenes to maintain player engagement without causing undue delay in gameplay. Balancing the informative aspect of these scenes with the need to keep them concise and interesting. | <p>Design Use Case: UC 5.1. Flow of events for transition scenes use case</p> <p>Scope: Storytelling and Level Transition</p> <p>Level: System Goal</p> <p>Primary Actors: Player</p> <p>Description: The player experiences a transition scene in the beginning of the game and at the end of each level, which provides narrative context and smoothly leads into the next level. These scenes enhance the storytelling element of the game, making the transition between levels more engaging and meaningful.</p> <p>Dependencies: U.C. 3.1 - Start Game</p> <p>Assumptions:</p> <ol style="list-style-type: none"> The game contains multiple levels with distinct narrative segments. The transition scenes are pre-designed and integrated into the game. <p>Preconditions: The player has completed a level in the game.</p> <p>Main Flow:</p> <ol style="list-style-type: none"> When the game starts, a window with a story pops up. The player gets to know the pre story. Upon completion of a level, the player is presented with a transition scene. The scene provides narrative content relevant to the story progression. After the scene concludes, the player is automatically taken to the next level. |

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| | <p>3. Quality and relevance: The scenes should be of high quality, both in terms of visual presentation and narrative content. They should be directly relevant to the game's story and the upcoming level.</p> | <p>3. Ensuring consistency in the art style and narrative tone between the transition scenes and the main game.</p> <p>Sub Flows: None.</p> <p>Alternative flows: If the transition scene fails to trigger or is skipped by the player, the game directly progresses to the next level without the narrative interlude.</p> <p>Post conditions: The player has been introduced to the context of the next level and is ready to continue the game.</p> <p>Frequency of occurrence: As the game starts and at the conclusion of each level, before starting the next.</p> <p>Open issues:</p> <ol style="list-style-type: none"> Ensuring that transition scenes are optimally timed and do not disrupt the flow of gameplay. Balancing the narrative content in the scenes to be engaging but not overly lengthy. |
| <p>User Story:</p> <p>As a player, I want to complete different kinds of quizzes and questions related to a specific country, so that I can progress to the next level.</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none"> Each quiz should be directly related to cultural, historical, or societal aspects of the country featured in the current level. Quizzes should be interactive, requiring active participation from | <p>Requirements Use Case</p> <p>Use case: Interactive quizzes for level advancement</p> <p>Scope: Each Game levels</p> <p>Level: System goal</p> <p>Context:</p> <ol style="list-style-type: none"> The player is immersed in a virtual room themed around a specific country, such as Japan for the first level. The room is designed with elements reflecting the culture, history, and traditions of that country. | <p>Design Use Case: UC 5.2 Flow of Events for the “Interactive quizzes for level advancement” use case</p> <p>Scope: Each Game levels</p> <p>Level: System goal</p> <p>Primary actors: Player</p> <p>Description: Player interacts with different elements in the room, triggering quizzes related to the country. The player progresses through the game by correctly answering these quizzes.</p> <p>Dependencies: U.C. 3.2 - Interact with Cultural Object</p> <p>Assumptions: Player has interest in learning about different countries.</p> |

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| <p>the player (e.g., selecting the right answer, solving puzzles related to cultural artifacts).</p> <p>3. Successful completion of these quizzes is necessary to progress to the next level, ensuring educational content is effectively communicated and understood.</p> <p>4. Quizzes should provide informative feedback for both correct and incorrect answers to enhance the learning experience.</p> | <p>2. As the player explores the room, they encounter various objects that are culturally significant to the country being featured. These objects are interactive and are the triggers for the quizzes.</p> <p>Frequency of occurrence: As soon as the player interacts with a relevant object in the game.</p> <p>Open issues: Balancing quiz difficulty to ensure player engagement and educational value.</p> | <p>Preconditions: Player is in a specific room dedicated to a country.</p> <p>Main flow: The player interacts with an element in the room, triggering a quiz. Answering correctly progresses the game.</p> <p>Sub Flows: Player interacts with various elements to unlock multiple quizzes.</p> <p>Alternative flows: Player struggles with quizzes (can contact Oracle).</p> <p>Post conditions: Successful completion of all quizzes leads to progression to the next room.</p> <p>Frequency of Occurrence: Once per game session</p> <p>Open Issues: None</p> |
| <p>User Story:</p> <p>As a player, I want to have background music so that it makes the game more engaging.</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none"> 1. The background music chosen or composed should resonate with the country or setting featured in the game. It should reflect that specific region's cultural and musical elements, contributing to the authenticity of the | <p>Requirements Use Case</p> <p>Use case: Background music integration</p> <p>Scope: Audio integration in the game environment</p> <p>Level: User goal</p> <p>Context: The player desires an engaging audio experience while playing the game. Background music enhances the game's atmosphere, making it more immersive and enjoyable. The music should complement the game's theme, i.e. country and pace, contributing positively to the</p> | <p>Design Use Case: UC 5.3 Flow of events for Background music integration use case</p> <p>Scope: Audio integration in the game environment</p> <p>Level: User goal</p> <p>Primary actors: Player</p> <p>Description: As the player progresses through the game, they experience culturally relevant background music corresponding to different countries or settings. This music enhances the overall immersive experience.</p> <p>Dependencies: None</p> |

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| <p>game's environment.</p> <p>2. The background music should be set at an audible but not overpowering volume level. It should complement the gameplay without disturbing the player's focus, particularly during moments that require intense concentration or strategic thinking.</p> | <p>player's experience.</p> <p>Frequency of occurrence: Continuous presence throughout the game, varying according to different game scenarios, levels, or environments.</p> <p>Open issues:</p> <ol style="list-style-type: none"> 1. Selecting or composing music that aligns well with the game's genre, theme, and mood. 2. Implementing an audio system that can handle dynamic changes in music based on game events or player actions. 3. Ensuring the music is not distracting or overwhelming, maintaining a balance between enhancing gameplay and allowing player to focus. 4. Deciding on the option for player to adjust music volume or toggle the background music on/off according to their preference. | <p>Assumptions: The player's device can produce sound and is set to a moderate volume.</p> <p>The game has been designed with different environments representing various countries.</p> <p>Preconditions: The player has opened the game application and is actively engaged in gameplay.</p> <p>Main flow:</p> <ol style="list-style-type: none"> 1. Upon starting the game and entering different game environments, the player hears background music reflecting the current environment's cultural setting. 2. The background music changes as the player moves through different areas or levels to match the new setting. <p>Sub Flows: Dynamic adjustment of music based on game events or player actions (e.g., entering a new area).</p> <p>Alternative flows: If the background music fails to play, the game continues without audio enhancement, but the gameplay remains unaffected.</p> <p>Postconditions: The player has experienced an enhanced game environment through culturally relevant background music.</p> <p>Frequency of occurrence: Continuously throughout the game, with variations according to the player's progress and changes in-game environments.</p> <p>Open Issues: Ensuring the cultural accuracy and appropriateness of the music for each country or setting. Balancing the volume and presence of music to avoid overpowering game dialogue or essential sound effects.</p> |
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| <p>User Story:</p> <p>As a player, I want the background to blur when the pause menu comes up to enhance focus and reduce distractions.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. When the pause menu is activated, the game background should automatically blur. 2. The blurring effect should adequately reduce background detail to minimize distractions while the pause menu is open. 3. Resuming the game should return the background to its normal state. | <p>Requirements Use Case</p> <p>Use Case: Enhanced Pause Menu Focus</p> <p>Scope: User Interface Improvement</p> <p>Level: User Goal</p> <p>Context: Player needs a clean, distraction-free environment when accessing the pause menu, which is achieved by blurring the background.</p> <p>Frequency of Occurrence: Every time the pause menu is accessed during gameplay.</p> <p>Open Issues: Determining the optimal blur level to reduce distractions without impacting the game's aesthetic appeal.</p> | <p>Design Use Case: UC 5.4 Flow of Enhanced Pause Menu Focus Use Case</p> <p>Scope: User Interface Improvement</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 4.3 - Pause Game</p> <p>Assumptions: Player prefers a less cluttered screen when navigating menu options.</p> <p>Preconditions: The player initiates the pause menu during gameplay.</p> <p>Main Flow: Upon activating the pause menu, the background of the game screen automatically blurs, focusing attention on the menu.</p> <p>Sub Flows: N/A.</p> <p>Alternative Flows: If the blur effect does not activate, the pause menu still functions without the enhanced focus feature.</p> <p>Post Conditions: The player navigates the pause menu with reduced visual distractions from the game background.</p> <p>Frequency of Occurrence: Consistently whenever the pause menu is accessed.</p> <p>Open Issues: Balancing the blur effect for different game environments and lighting conditions.</p> |
| <p>User Story:</p> <p>As a player, I want to solve a rearranging puzzle so that I can enjoy a variation in gameplay and test my knowledge of the</p> | <p>Requirements Use Case</p> <p>Use Case: Puzzle Interaction for Diverse Gameplay</p> | <p>Design Use Case: U.C. 5.5. Flow of Puzzle Interaction for Diverse Gameplay Use Case</p> <p>Scope: Game Level Interaction</p> |

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| <p>country's culture, history, or landmarks in an engaging way.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The puzzle should be clearly related to an aspect of the country featured in the current level. 2. Upon successful completion, the puzzle should provide a fact or snippet about the subject of the puzzle, contributing to the educational value of the game. 3. The puzzle should be of moderate difficulty, offering a challenge but not discouraging the player. | <p>Scope: Game Level Interaction</p> <p>Level: User Goal</p> <p>Context: The player encounters a rearranging puzzle as a part of the game's interactive elements, offering a fun and educational break from traditional quiz formats.</p> <p>Frequency of Occurrence: Puzzles are a recurring interactive feature in each level, though each puzzle is unique to its respective country theme.</p> <p>Open Issues: Fine-tuning the difficulty of puzzles and integrating a hint system that encourages learning without giving away the answers too easily.</p> | <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 1.1 - Engaging in Country-Specific Quiz</p> <p>Assumptions: The player has basic problem-solving skills and is motivated by game-based learning.</p> <p>Preconditions: The player has reached the point in the game where the puzzle is presented as a challenge.</p> <p>Main Flow: The player engages with the puzzle, rearranges pieces to complete the image, and receives educational content upon completion.</p> <p>Sub Flows: If the player chooses to receive hints, the game may reveal portions of the puzzle or provide guidance on piece placement.</p> <p>Alternative Flows: If the player cannot solve the puzzle, they may skip after a certain number of attempts but miss learning content associated with the puzzle.</p> <p>Post Conditions: The player has gained new knowledge about the country and is more prepared for future quizzes and challenges in the game.</p> <p>Frequency of Occurrence: Puzzles are a recurring interactive feature in each level, though each puzzle is unique to its respective country theme.</p> <p>Open Issues: Fine-tuning the difficulty of puzzles and integrating a hint system that encourages learning without giving away the answers too easily.</p> |
| User Story: | Requirements Use Case | Design Use Case: UC 5.6 Flow of Events for Limited Oracle |

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| <p>As a player, I want the Oracle feature to have limited uses (two per level) instead of unlimited access to maintain the game's challenge and engagement.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The Oracle can be accessed only twice per level by the player. 2. The Oracle provides helpful hints or assistance but only partially solves puzzles or challenges. 3. Limiting Oracle's uses enhances the gameplay challenge, encouraging player to rely more on their skills and knowledge. | <p>Use Case: Limited Oracle Assistance for Enhanced Gameplay</p> <p>Scope: In-game Assistance Mechanism</p> <p>Level: User Goal</p> <p>Context: The player can access the Oracle for assistance, but this feature is limited to two uses per level, balancing help with the gameplay challenge.</p> <p>Frequency of Occurrence: The Oracle can be used twice in each level, aligning with the game's progression and difficulty.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> 1. Ensure the Oracle's hints are helpful without making the game too easy. 2. Decide on the type of assistance provided by Oracle for different challenges. | <p>Assistance for Enhanced Gameplay Area Use Case</p> <p>Scope: In-game Assistance Mechanism</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 4.2 - Oracle Feature Usage</p> <p>Assumptions: Player seek occasional assistance but enjoy solving challenges independently.</p> <p>Preconditions: The player is actively engaged in a game level and encounters a challenge they find difficult to solve.</p> <p>Main Flow:</p> <ol style="list-style-type: none"> 1. The player encounters a challenge within the level. 2. The player decides to use the Oracle feature for assistance. 3. The Oracle provides a hint or clue towards solving the challenge. 4. The player uses this information to attempt to overcome the challenge. <p>Sub Flows: N/A</p> <p>Alternative Flows: If the Oracle cannot provide sufficient assistance, or if the player chooses not to use the Oracle, the player continues to attempt to solve the challenge independently.</p> <p>Post Conditions:</p> <ol style="list-style-type: none"> 1. The player has either overcome the challenge using Oracle's assistance or has |
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| | | <p>continued to engage with the challenge independently.</p> <p>2. The Oracle's usage count for the level decreases, reflecting the limited number of uses.</p> <p>Frequency of Occurrence: The Oracle can be used twice per level, with each use counted against the limit.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> 1. Balancing the Oracle's hints to be helpful without completely solving puzzles or challenges for the player. 2. Monitoring player engagement to ensure the limited-use feature enhances the game's challenge and enjoyment. |
| <p>User Story:</p> <p>As a player, I want the narrative sections of the game to include engaging pictures to enhance the storytelling and make the experience more immersive.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. Each narrative section should be accompanied by relevant and visually appealing images that complement the story. 2. The pictures should be thematically consistent with the narrative, enhancing the | <p>Requirements Use Case</p> <p>Use Case: Enhanced Narrative with Visuals</p> <p>Scope: Narrative Enhancement</p> <p>Level: User Goal</p> <p>Context: The player experiences the game's narrative, now enriched with visual storytelling elements to deepen immersion.</p> <p>Frequency of Occurrence: Each narrative section in the game is accompanied by images.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> 1. Selection of images that accurately reflect the narrative content | <p>Design Use Case: UC 5.7 Flow of Events for Enhanced Narrative with Visuals Use Case</p> <p>Scope: Narrative and Visual Integration</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 5.1 - Transition Scenes</p> <p>Assumptions: Players appreciate visual aids that complement and enhance the story.</p> <p>Preconditions: The player is engaging with a narrative section of the game.</p> <p>Main Flow:</p> <ol style="list-style-type: none"> 1. The player reaches a narrative section of the game. |

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| | <p>understanding and engagement of the player.</p> <p>3. The integration of images should maintain the game flow but add depth to the storytelling.</p> | <p>and the cultural context of the game.</p> <p>2. Balancing the visual and textual elements to maintain player engagement without overwhelming them.</p> <p>Alternative Flows: If an image fails to load, the narrative text continues to display, ensuring the storyline remains uninterrupted.</p> <p>Post Conditions: The player gains a richer understanding of the story through combining textual and visual elements.</p> <p>Frequency of Occurrence: Consistently whenever narrative sections are encountered in the game.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> Ensuring that the images are culturally appropriate and add value to the narrative. Technical implementation of image loading synchronously with text display. |
| <p>User Story:</p> <p>As a player, I want to complete the first level of the game by interacting with all necessary objects and passing the required quizzes, then progress to the next level and continue my adventure.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> The player must interact with all designated objects within the first level. Successfully answer a set number of quizzes | <p>Requirements Use Case</p> <p>Use Case: Completing the First Level</p> <p>Scope: Level Completion</p> <p>Level: User Goal</p> <p>Context: The player engages with the first level, aiming to complete all required interactions and quizzes to progress.</p> <p>Frequency of Occurrence: This occurs every time a player attempts to complete the first level.</p> | <p>Design Use Case: UC 5.8 Flow of Events for Completing the First Level Use Case</p> <p>Scope: Level Completion and Progression</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 5.2 - Interactive quizzes for level advancement</p> <p>Assumptions: Players enjoy a clear sense of progression and achievement.</p> <p>Preconditions: The player starts the first level of the game.</p> |

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| <p>related to the level's theme.</p> <p>3. Upon completion, receive a clear indication of success and transition to the second level.</p> | <p>Open Issues:</p> <ol style="list-style-type: none"> 1. Ensuring clarity in what objects need interaction and the number of quizzes to pass. 2. Balancing quiz difficulty to maintain engagement and provide a sense of achievement. | <p>Main Flow:</p> <ol style="list-style-type: none"> 1. The player begins the first level, interacting with specified objects. 2. Completes the required quizzes, testing their understanding of the level's theme. 3. Upon successful completion, receives notification and transitions to the second level. <p>Alternative Flows: If a quiz is failed, the player can retry or seek help through in-game hints.</p> <p>Post Conditions: The player feels accomplished and is ready to tackle the next level.</p> <p>Frequency of Occurrence: Consistently whenever a player engages with the first level.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> 1. Adjusting the level's difficulty to suit a wide range of players. 2. Ensuring a smooth transition to the next level. |
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5.3 Use Case Tests

| User Story Test Cases Sprint 5 | | | | | | | |
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| U.C. # | User Story | Preconditions / Data | Number | Steps To Execute | Expected Results | Pass/Fail | Defect/Comments |
| 5.1 | As a player, I want to have engaging transition scenes so that I can immerse myself into the story of the game, understand the context of each level and be | The game includes implemented transition scenes in the beginning | 1 | Start the game and observe the initial narrative scene introducing the level. | The game starts with a narrative scene that sets the context for the level. | PASS | Completed, as Expected. |
| | | | | Play through the level, | | | |

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| | connected to the overall journey and purpose within the world of the game | | | engaging with its elements. | player engaging in the level's activities. | | |
| | | 3 | Upon completing the level, observe the transition scene. | At the end of the level, a transition scene unfolds | PASS | Completed, as Expected. | |
| 5.2 | As a player, I want to complete different kinds of quizzes and questions related to a specific country, so that I can progress to the next level. | The player is in a level featuring a specific country. | 1 | Player engages with quizzes that test knowledge on the country's cultural aspects. | Quizzes should be directly relevant and accurate to the country's theme. | PASS | Completed, as Expected. |
| | | Quizzes relevant to that country's culture, history, or society are available. | 2 | Player answers questions related to the country's history. | Successful completion should be required to progress to the next level. | PASS | Completed, as Expected. |
| | | | 3 | Player solves puzzles or answers questions on societal aspects of the country. | Informative feedback should be provided for both correct and incorrect answers. | PASS | Completed, as Expected. |
| 5.3 | As a player, I want to have background music so that it makes the game more engaging. | Background music is integrated into the game, reflecting the current level's country or setting. | 1 | Evaluate if the music resonates with the specific cultural and musical elements of the country featured in the level. | The music should authentically represent the cultural setting of the level. | PASS | Completed, as Expected. |
| | | | 2 | Check the music volume during various gameplay scenarios for balance. | It should be audible but not overpowering, enhancing the gameplay experience without being distracting. | PASS | Completed, as Expected. |
| 5.4 | As a player, I want the background to | The game is actively running. | 1 | During gameplay, | The pause menu opens successfully upon activation. | PASS | Completed, as Expected. |

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| | blur when the pause menu comes up to enhance focus and reduce distractions. | | activate the pause menu. | | |
| | The player is in a game level where the pause menu can be accessed. | 2 | Observe the background's behaviour when the pause menu appears. | The game background blurs effectively when the pause menu is active, reducing detail and minimizing distractions. | PASS Completed, as Expected. |
| | | 3 | Resume the game by exiting the pause menu. | Upon resuming the game, the background returns to its normal, unblurred state. | PASS Completed, as Expected. |
| | | 4 | Observe the background's behaviour when returning to gameplay. | The transition between the blurred and unblurred background states is smooth and does not disrupt gameplay. | PASS Completed, as Expected. |
| <u>5.6</u> | As a player, I want the Oracle feature to have limited uses (two per level) instead of unlimited access to maintain the game's challenge and engagement. | The Oracle feature is integrated into the game level with a limit of two uses per level. | 1 | Access the Oracle feature for the first time in a level and use it for assistance. | The Oracle is accessible and provides a hint or assistance during the first use. |
| | | The game level where the Oracle is usable is loaded. | 2 | Observe the type of hint or assistance provided by the Oracle. | The assistance offered is helpful but does not completely solve the puzzle or challenge. |
| | | | 3 | Access the Oracle feature for the second time in the same level and use it again. | The Oracle is again accessible for the second use and provides another hint. |
| | | | 4 | Attempt to access the Oracle feature a third time in the same level. | On the third attempt, the Oracle feature should not be accessible or should indicate that it has reached its use limit for the level. |

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| | | The game's narrative sections are designed to include images. | 1 | Access a narrative section of the game. | Narrative sections successfully display with accompanying images. | PASS | Completed, as Expected. |
| <u>5.7</u> | As a player, I want the narrative sections of the game to include engaging pictures to enhance the storytelling and make the experience more immersive. | These images are relevant and thematically consistent with the story. | 2 | Observe the images accompanying the narrative text. | The images are visually appealing and complement the narrative text. | PASS | Completed, as Expected. |
| | | | 3 | Assess the relevance, appeal, and thematic consistency of the images with the narrative. | Images are thematically consistent and enhance the understanding of the story. | PASS | Completed, as Expected. |
| | | | 4 | Evaluate the integration of images and their impact on the game flow. | Integration of images adds depth to storytelling without disrupting the game flow. | PASS | Completed, as Expected. |
| <u>5.8</u> | As a player, I want to complete the first level of the game by interacting with all necessary objects and passing the required quizzes, to progress to the next level and continue my adventure. | The player is actively playing the first level of the game. | 1 | The player navigates through the level and interacts with all specified objects. | Each interaction should provide contextually relevant information or gameplay progression. | PASS | Completed, as Expected. |
| | | All interactive objects and quizzes for the level are correctly implemented and functional. | 2 | Attempt and answer all the quizzes related to the level's theme. | Correct answers result in positive reinforcement and additional thematic information. Incorrect answers provide constructive feedback, guiding the player towards the | PASS | Completed, as Expected. |

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| | | | | correct understanding. | | |
| | 3 | Observe the game's response upon completing the last quiz. | | Upon successful completion of all tasks, the player receives a clear indication of success and is seamlessly transitioned to the next level. | PASS | Completed, as Expected. |

5.4 Software Design Documentation

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| Class Name: DialogueManager | Version: 1 |
| Description: Handles branching dialogue for various interactions | Associated Use Cases: UC1.1, UC3.5, UC4.2, UC5.2 |
| Responsibilities: Handles branching dialogue. Changes game state variables to control game flow. | Collaborators: Detective, Actionable, ActionableFinder |

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| Class Name: PauseMenu | Version: 2 |
| Description: Pause menu which has options to resume or contact Oracle | Associated Use Cases: UC4.3, UC5.4 |
| Responsibilities: Pauses the game. Resumes the game. Allows user to get help from Oracle. Allows user to exit the game. Blurs the background when paused. | Collaborators: None |

5.5 UX/UI Design

We added appropriate pictures and text to the transition scenes to make players more immersed.

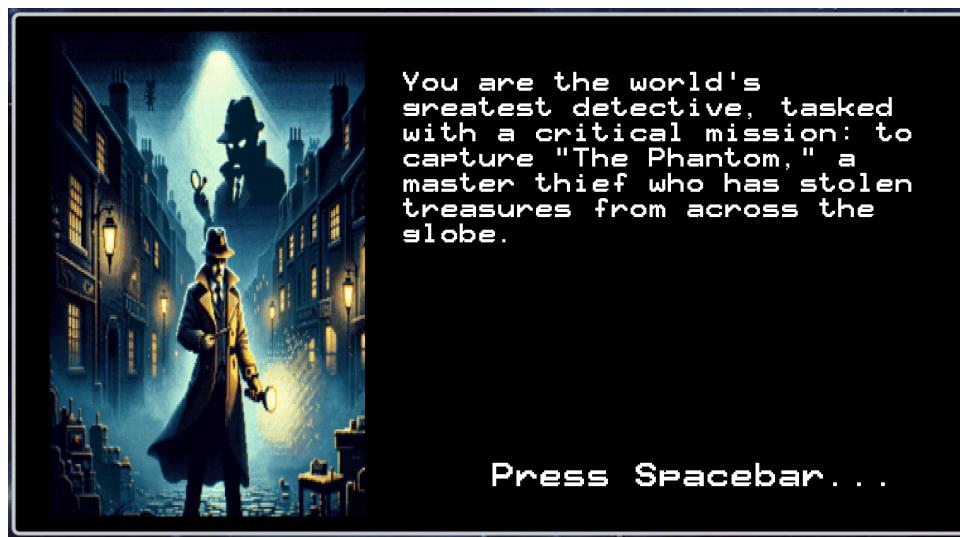


Fig. 29 The transition scenes set the narrative of the game (OpenAI. (2023). [[Image 1 of opening dialogue](#)])

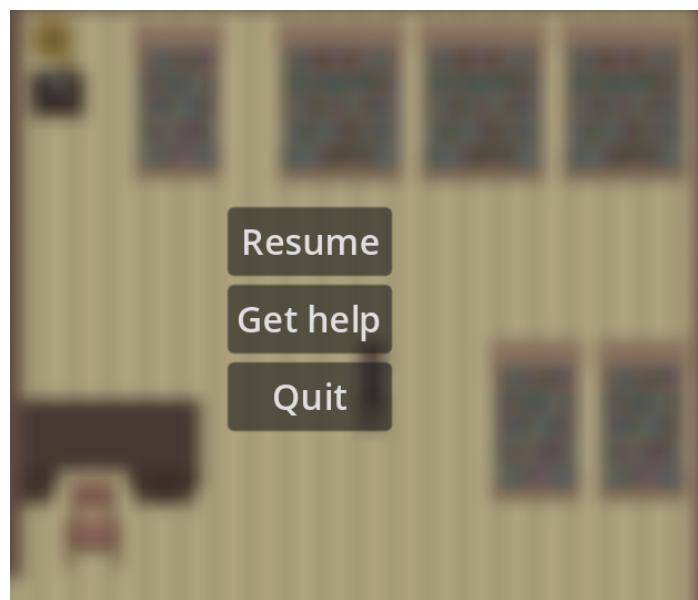


Fig. 30 The pause menu blurs the background

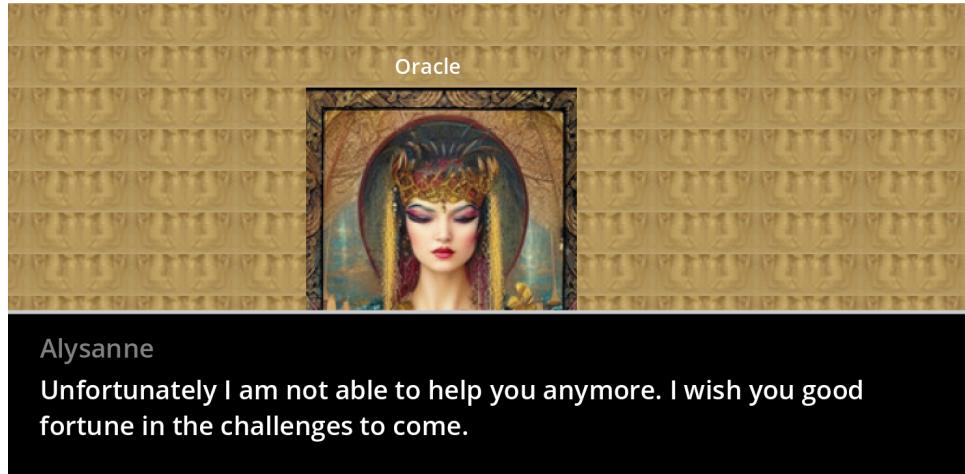


Fig. 31 The Oracle can provide help only a limited number of times per level (Oracle image - OpenAI. (2023). [[Oracle](#)])

Sprint 6 (30 November – 6 December)

Link: [Sprint 6 - Sprint taskboard - Software Engineering CW-2 : Serious Game \(taiga.io\)](#)

6.1 Customer Meeting - Wednesday, 6 December

New Level Development: We introduced a new level themed around Egypt, filled with evocative questions and a central pyramid puzzle. Completing this puzzle unlocks narrative elements that enrich the game's story, providing players with a satisfying sense of progression.

Oracle Feature Implementation: Discussed the implementation of the Oracle feature for the new Egypt level, highlighting its role in enhancing gameplay and aiding player progression.

Interactive Gameplay: We brainstormed on how to set player expectations right from the start. Ideas included integrating introductory dialogue pop-ups to guide players through their objectives and interactive elements in the game.

Elevating the Challenge: Addressed the escalation of question difficulty from level one to two. We plan playtesting sessions to gauge and adjust the difficulty levels appropriately, ensuring a balanced and engaging player experience.

Replay ability and Knowledge Expansion: Explored the idea of associating multiple questions with each interactable object in the game. This approach aims to enhance replay value and broaden the educational content, offering players a richer learning experience.

Bug Fixing and Preparing for Closure: The team is currently focusing on debugging and making final adjustments to the game. We discussed the possibility of a final customer meeting or a meeting with TAs the following week to wrap up the project.

Plans for the Next Sprint:

Setting Player Expectations: In response to the customer's query about setting player expectations, we plan to introduce a clear and informative dialogue system as soon as the game starts. This dialogue will pop up when the player spawns in the first level, guiding them on the required actions.

In response to the customer's query on guiding players, we plan a practical addition to our game interface. We are considering adding a straightforward yet practical feature to the game's user interface – a progress bar or a simple counter at the top of the screen. This is not just any ordinary addition; it will show the players exactly where they stand in the game. It will count the questions they have and indicate how many more they need to crack to move up to the next level. It is like giving players a glance at their journey so far and a hint of what is just around the corner. We are excited because it will make the game interactive and keep our players looped into their progress.

Implementing Transition Scenes: We will introduce narrative transition scenes between levels to provide context and enhance the storytelling aspect of the game.

Final Testing and Polishing: Our focus will be on conducting comprehensive testing of both levels, addressing bugs, and refining gameplay elements for a seamless experience.

Feedback Integration: We will incorporate feedback from playtesting and customer suggestions to fine-tune the game mechanics and narrative elements.

Preparation for Final Presentation: We will start preparations for our final presentation or meeting, ensuring that all aspects of the game are polished and effectively demonstrate our project's achievements and learning outcomes.

6.2 User Stories and Use Cases

| User Story: | Requirements Use Case | Design Use Case: UC 6.1 Flow of Clarity in Pause Menu Options Use Case |
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| <p>User Story:</p> <p>As a player, I want the text options in the pause menu to be clear and understandable so I can easily navigate the game without confusion. Instead of abstract and mystical terms like “Contact Oracle,” which might be unclear, I would like to see a more universally comprehensible label such as “Get Help.”</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The pause menu text should be simple, direct, and free of jargon or ambiguous terms. 2. Changing “Contact Oracle” to “Get Help” should make the | <p>Requirements Use Case</p> <p>Use Case: Clarity in Pause Menu Options</p> <p>Scope: User Interface</p> <p>Level: User Goal</p> <p>Context: The player seeks assistance through the pause menu and requires clear labelling to understand the available support options.</p> <p>Frequency of Occurrence: The updated text will be displayed every time the pause menu is accessed, providing consistent clarity throughout the game.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> 1. How to effectively communicate the type | <p>Design Use Case: UC 6.1 Flow of Clarity in Pause Menu Options Use Case</p> <p>Scope: User Interface Text</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 4.3 - Pause Game</p> <p>Assumptions: Player prefers straightforward, easily understandable instructions when seeking in-game assistance.</p> <p>Preconditions: The player has initiated the pause menu and is looking for help within the game.</p> <p>Main Flow: Upon accessing the pause menu, the player selects the “Get Help” option to receive Oracle’s assistance to help the player progress in the game.</p> |

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| <p>button function immediately apparent to all players.</p> <p>3. The updated text should align with the overall design and tone of the pause menu while enhancing user comprehension.</p> | <p>of help the “Get Help” feature provides.</p> <ol style="list-style-type: none"> 2. Ensuring the text change integrates seamlessly with other language localizations within the game. 3. Consider if additional explanations or tooltips are necessary for the “Get Help” feature. | <p>Sub Flows: The “Get Help” feature may offer different types of assistance, such as hints for the current challenge or navigation aid within the game (seeing the list of interactive objects makes it easier for the player to understand where to go next).</p> <p>Alternative Flows: If the “Get Help” feature cannot assist (the player has used two</p> <p>The player feels supported and can continue gameplay with a clearer understanding of the available assistance options.</p> <p>Frequency of Occurrence: Whenever the player accesses the pause menu during gameplay.</p> <p>Open Issues: Determining the scope and depth of assistance provided by the "Get Help" feature to ensure it meets player needs without over-simplifying game challenges</p> |
| <p>User Story:</p> <p>As a player, I want to advance to the second level and enter a new room to continue my journey and learn about a different country, enhancing my cultural understanding and enjoyment of the game.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The game allows progression to the second level upon completing the first level's tasks or quizzes. 1. The second level introduces a new room representing | <p>Requirements Use Case</p> <p>Use Case: Advancing to the Second Level of Cultural Exploration</p> <p>Scope: Game Level Progression</p> <p>Level: User Goal</p> <p>Context: The player, having completed the first level, progresses to the second level, where they encounter a new room themed around a different country.</p> <p>Frequency of Occurrence: Occurs after the player completes the first level.</p> <p>Open Issues: Ensuring the content and design of the</p> | <p>Design Use Case: UC 6.2. Flow of Events for Advancing to the Second Level of Cultural Exploration Use Case</p> <p>Scope: Game Level Progression</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 5.2 - Interactive quizzes for level advancement</p> <p>Assumptions: The player is interested in exploring diverse cultures through the game.</p> <p>Preconditions: The player has completed the first level's requirements.</p> |

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| <p>a different country with unique cultural elements.</p> <p>2. The transition to the second level should be seamless and maintain player engagement.</p> | <p>second level are distinct and culturally accurate for the new country.</p> | <p>Main Flow: The player transitions from the first to the second level, encountering an unfamiliar environment that immersivity represents a different country.</p> <p>Subflows: Introducing new cultural elements and educational content specific to the second level's country.</p> <p>Alternative Flows: If the player struggles to complete the first level, they must resolve challenges or seek hints to progress.</p> <p>Post Conditions: The player actively explores the second level's cultural theme.</p> <p>Frequency of Occurrence: The transition occurs once per game cycle, following the completion of the first level.</p> <p>Open Issues: Balancing educational content and gameplay to maintain engagement in the second level.</p> |
| <p>User Story:</p> <p>As a player, I want to see distinctive, recognisable artifacts representing each new country I explore in the game, enhancing my cultural and geographical experience and immersion.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. Cultural Accuracy and Distinctiveness: Each country in the game should feature culturally and historically | <p>Requirements Use Case</p> <p>Use Case: Incorporation of Culturally Specific Artifacts</p> <p>Scope: Game Level Design and Interaction</p> <p>Level: User Goal</p> <p>Context: Players experience an enriched cultural environment at each game level, with artifacts emblematic of each featured country's heritage.</p> <p>Frequency of Occurrence: This feature is standard in each country-themed level, with</p> | <p>Design Use Case: UC 6.3. Flow of Events for Incorporation of Culturally Specific Artifacts Use Case</p> <p>Scope: Game Level Design and Interaction</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 6.2 - Advancing to the Second Level of Cultural Exploration</p> <p>Assumptions: Players are interested in learning about diverse cultures and appreciate the inclusion of authentic cultural elements in the game.</p> |

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| <p>accurate artifacts, distinguishing one country from another.</p> <p>3. Visual Representation: Artifacts should be visually striking and easily recognizable, with high-quality graphics and detail.</p> <p>4. Educational Aspect: Each artifact should come with a brief description or backstory, providing educational value and context about its significance to the country.</p> <p>5. Integration with Gameplay: The discovery or interaction with these artifacts should be seamlessly integrated into the gameplay, contributing to the overall narrative or objectives.</p> <p>6. Diversity of Artifacts: Various artifacts should be included, representing various aspects of a country's culture, such as art, architecture, historical items,</p> | <p>particular emphasis on newly introduced rooms like Egypt.</p> <p>Open Issues: Ensuring the authenticity and accuracy of the artifacts and their descriptions to provide an educational yet engaging experience.</p> | <p>Preconditions: The player navigates a new game level, such as the Egypt-themed room.</p> <p>Main Flow: As the player explores the room, they encounter various artifacts that are not only visually appealing but also have cultural and historical significance. Interaction with these artifacts may trigger questions or provide educational content related to their origin and importance.</p> <p>Sub Flows: The game may offer additional narrative or contextual information about the artifacts, deepening the player's understanding and engagement.</p> <p>Alternative Flows: If a player skips certain artifacts, they might miss out on bonus content or additional game insights but can still progress through the main storyline.</p> <p>Post Conditions: Players gain a richer understanding of various cultures and feel more connected to the game's world.</p> <p>Frequency of Occurrence: Interaction with artifacts occurs in each country-themed level, with each artifact tailored to its specific cultural context.</p> <p>Open Issues: Continually updating and enhancing artifact representation to maintain cultural relevance and educational value.</p> |
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| or everyday objects. | | |
| <p>User Story:</p> <p>As a player, I want an ending stage in the game that I can complete, providing a sense of achievement and closure to my gaming experience. This ending stage should effectively wrap up the game's narrative and challenges.</p> <p>Acceptance Criteria:</p> <p>Definable Ending Stage: The game should have a clearly defined final stage or level that signifies the end of the game.</p> <ol style="list-style-type: none"> 1. The ending stage should provide a conclusion to the game's story, resolving any ongoing narratives or character arcs. 2. The difficulty of the ending stage should be appropriately challenging, reflecting the culmination of the skills and knowledge gained throughout the game. 3. Completing the ending stage should offer a reward or recognition, such as a special | <p>Requirements Use Case</p> <p>Use Case: Implementing an Ending Stage for Game Completion</p> <p>Scope: Game Completion and Player Satisfaction</p> <p>Level: User Goal</p> <p>Context: The game is designed to offer players a complete and satisfying experience, culminating in an ending stage. This final stage serves as the climax of the game, bringing together the narrative threads and skills developed throughout the gameplay. It aims to provide players with a sense of accomplishment and closure, marking a definitive end to their journey within the game's world.</p> <p>Frequency of Occurrence: Occurs once per gameplay, at the culmination of the game's main content.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> 1. Balancing the difficulty of the ending stage to provide a challenge without being overly frustrating. 2. Ensuring the narrative conclusion is fulfilling and resonates with players. | <p>Design Use Case: UC 6.4. Flow of Events for Enhanced Narrative with Visuals Use Case</p> <p>Scope: Finalising Game Experience and Narrative</p> <p>Level: User Goal</p> <p>Primary Actor: Player</p> <p>Dependencies: U.C. 6.2 - Advancing to the Second Level of Cultural Exploration</p> <p>Assumptions: Players seek a fulfilling and conclusive end to their gaming experience, encompassing both narrative and gameplay elements.</p> <p>Preconditions: The player has progressed through the primary levels of the game, approaching the final stage.</p> <p>Main Flow:</p> <ol style="list-style-type: none"> 1. The player enters the ending stage, which encompasses the ultimate challenges and narrative conclusion of the game. 2. The stage design reflects the culmination of the game's story and the skills required throughout the game. 3. Upon completing the stage, the player is presented with a rewarding conclusion, such as a cinematic cutscene, credits, or a unique achievement. 4. Options for replay ability or exploration of additional |

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| <p>cutscene, credits, or a congratulations message.</p> | | <p>content are provided post-completion.</p> <p>Sub Flows: The player may access hints or support if the ending stage proves particularly challenging.</p> <p>Alternative Flows: Players seeking a unique experience may replay the game from the beginning or from specific checkpoints.</p> <p>Post Conditions: The player feels a sense of accomplishment and closure, having fully completed the game.</p> <p>Frequency of Occurrence: Occurs once per playthrough at the end of the game.</p> <p>Open Issues:</p> <ol style="list-style-type: none"> Ensuring the ending stage is challenging yet accessible to a broad range of players. Crafting a narrative conclusion that is both satisfying and resonates with the game's themes. |
| <p>User Story:</p> <p>As a player, I want to see the name of the country each room represents at the beginning of each level to understand the cultural context and setting of my current challenge immediately.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> When a new level starts, the name of the country the room represents (like 'Japan' or 'Egypt') should be | <p>Requirements Use Case</p> <p>Use Case: Country Name Reveal at Level Start</p> <p>Scope: Level Introduction and Setting</p> <p>Level: User Goal</p> <p>Context: Players are introduced to each new level with a clear display of the country's name, setting the theme and context for the challenges ahead.</p> <p>Frequency of Occurrence: Occurs at the start of each new level in the game.</p> | <p>Design Use Case: UC 6.5. Flow of Events for Country Name Reveal at Level Start Use Case</p> <p>Scope: Level Introduction and Setting</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 3.1 - Start Game</p> <p>Assumptions: Players appreciate a clear introduction to each level's cultural setting.</p> <p>Preconditions: The player is transitioning to a new level in the game.</p> |

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| <p>prominently displayed.</p> <ol style="list-style-type: none"> 2. This display should be brief yet noticeable, giving players an immediate sense of place before it disappears. 3. The country name should add to the excitement and anticipation of discovering what the level offers. | <p>Open Issues: Designing the display visually appealing and harmonious with the game's overall aesthetic.</p> | <p>Main Flow: As the player enters a new level, the country name associated with that level is briefly and prominently displayed on the screen. This introduction sets the stage for the level's theme and challenges.</p> <p>Sub Flows: The display of the country name is designed to be engaging and fit the level's overall design, enhancing the player's immersion in the game's world.</p> <p>Alternative Flows: If the player misses the initial display, the country's theme will still be evident through the level's design and artifacts.</p> <p>Post Conditions: The player is aware of the cultural context of the level and is prepared to engage with the challenges and learning experiences it offers.</p> <p>Frequency of Occurrence: This feature is standard at the beginning of each new level throughout the game.</p> <p>Open Issues: Ensuring the country name display is integrated seamlessly into the game's progression and narrative flow.</p> |
| <p>User Story:</p> <p>As a player, I want the game's question dialogue boxes to feature engaging pictures so that my learning experience is visually stimulating and more memorable.</p> <p>Acceptance Criteria:</p> | <p>Requirements Use Case</p> <p>Use Case: Visual Improvement of Question Dialog Boxes</p> <p>Scope: In-Game Question Interaction</p> <p>Level: User Goal</p> <p>Context: Players receive questions in dialogue boxes</p> | <p>Design Use Case: UC 6.6. Flow of Events for Visual Improvement of Question Dialog Boxes Use Case</p> <p>Scope: In-Game Question Interaction</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 3.2 - Interact with Cultural Object</p> |

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| <ol style="list-style-type: none"> 1. Each question dialogue box should include a relevant and visually appealing picture of the question's content. 2. The pictures should be high quality and add contextual depth to the questions, making them more engaging. 3. The integration of images should complement the learning experience without distracting from the question itself. | <p>enhanced with engaging and relevant pictures, enriching the visual and educational experience.</p> <p>Frequency of Occurrence: This feature is present in every instance where a question is posed to the player in a dialogue box.</p> <p>Open Issues: Select appropriate and culturally representative images for each question while ensuring they align with the game's visual style.</p> | <p>Assumptions: Players appreciate visual elements that complement their learning and enhance engagement.</p> <p>Preconditions: The player encounters a question dialogue box as part of their game progression.</p> <p>Main Flow: When a player is presented with a question in a dialogue box, it includes an engaging picture related to the question's theme or content. The image visually represents the question's context, making the interaction more immersive and informative.</p> <p>Sub Flows: The player can view the image while considering their response to the question, providing a visual cue that aids in understanding and recalling information.</p> <p>Alternative Flows: If the image fails to load or is unavailable, the question still appears, but the visual enhancement is absent.</p> <p>Post Conditions: The player has interacted with a visually enriched question dialogue box, potentially leading to a deeper understanding and retention of the information presented.</p> <p>Frequency of Occurrence: Consistently occurs with every question presented in a dialogue box throughout the game.</p> <p>Open Issues: Ensuring the consistency and relevance of images across various questions and maintaining the balance between visual appeal and educational value.</p> |
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6.3 Use Case Tests

| U.C.# | User Story | Preconditions / Data | Number | Steps To Execute | Expected Results | Pass/Fail | Defect/Comments |
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| | | The game is in a state where the pause menu can be accessed. | 1 | Start the game and access the pause menu. | The pause menu opens successfully upon the player's request. | PASS | Completed, as Expected. |
| 6.1 | As a player, I want the text options in the pause menu to be clear and understandable so I can easily navigate the game without confusion. | Original text options, including terms like "Contact Oracle," are present in the game's code. | 2 | Observe the text options available in the pause menu. | All text options in the pause menu, including "Get Help," are displayed clearly and are easy to read. | PASS | Completed, as Expected. |
| | | | 3 | Verify that the option previously labelled as "Contact Oracle" is now labelled as "Get Help." | The option labelled as "Get Help" replaces the abstract term "Contact Oracle," making it more comprehensible. | PASS | Completed, as Expected. |
| | | | 4 | Select the "Get Help" option to see if it functions as intended. | Upon selecting "Get Help," the game provides the appropriate help or hints as per its design. | PASS | Completed, as Expected. |
| | | | 5 | Review other menu options for clarity and understandability. | Other menu options are also clear, with no ambiguity in their descriptions or functionalities. | PASS | Completed, as Expected. |
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| 6.2 | As a player, I want to advance to the second level and enter a new room to continue my journey and learn about a different country, enhancing my cultural | The game is designed with multiple levels, each representing a different country. | 1 | Start the game and engage with the first level, completing the necessary tasks or challenges. | Completion of the first level's tasks triggers progression to the second level. | PASS | Completed, as Expected. |

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| | understanding and enjoyment of the game. | The player must complete specific tasks or challenges in the first level to unlock the second level. | 2 | Observe the game's response upon completing these tasks, particularly how it transitions to the second level. | The transition to the second level is clear and seamless, indicating a change in the country being represented. | PASS | Completed, as Expected. |
| | | | 3 | In the second level, assess if the environment, design, and cultural elements correspond to a different country than the first level. | The second level accurately depicts a new country, different from the first, in its design and cultural elements. | PASS | Completed, as Expected. |
| | | | 4 | Interact with elements in the second level to determine if they offer new and relevant cultural information about the featured country. | The player can learn about the new country through engaging tasks and interactions within the second level. | PASS | Completed, as Expected. |
| | | | 5 | Verify if the game provides clear indications that the player has successfully progressed to the second level. | The game confirms the player's successful advancement to the second level, enhancing their understanding and enjoyment of exploring diverse cultures. | PASS | Completed, as Expected. |

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| | | The game contains multiple levels, each representing a different country. | 1 | Start the game and progress to a level representing a specific country. | Each level in the game distinctly represents a different country with appropriate environmental design and artifacts. | PASS | Completed, as Expected. |
| 6.3 | As a player, I want to see distinctive, recognisable artifacts representing each new country I explore in the game, enhancing my cultural and geographical experience and immersion. | Artifacts representing each country are designed and integrated into their respective levels. | 2 | Observe the artifacts present in the level to determine if they are recognizable and culturally relevant to the country represented. | Artifacts in each level are easily recognizable and culturally relevant, enhancing the player's geographical and cultural experience. | PASS | Completed, as Expected. |
| | | | 3 | Interact with one of the artifacts to see if it triggers any educational content or quizzes related to the country. | Interaction with artifacts provides educational content or quizzes, offering insights into the culture and history of the represented country. | PASS | Completed, as Expected. |
| | | | 4 | Complete the level and move to the next one, repeating the observation and interaction with new artifacts. | As the player progresses through various levels, they encounter a diverse range of artifacts, each aligning with the country's theme. | PASS | Completed, as Expected. |
| | | | 5 | Evaluate the variety and cultural accuracy of the artifacts across various levels. | The variety and cultural accuracy of the artifacts across levels contribute to an immersive and educational gaming experience. | PASS | Completed, as Expected. |
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| | | The game has a structured narrative with multiple stages leading to a final ending stage. | 1 | Start the game and progress through all the stages to reach the ending stage. | The player can progress through the game and reach the ending stage without any hindrances. | PASS | Completed, as Expected. |
| 6.4 | Start the game and access the level or room themed around the specific country (e.g., Egypt). | The ending stage is designed to provide closure to the game's narrative and challenges. | 2 | Observe and evaluate how the ending stage effectively wraps up the game's narrative. | The ending stage provides a clear and effective conclusion to the game's narrative, tying up any loose ends. | PASS | Completed, as Expected. |
| | | | 3 | Complete the challenges or tasks in the ending stage to test their appropriateness as final challenges of the game. | Challenges or tasks in the ending stage are appropriately scaled as final tests of the player's skills and knowledge gained throughout the game. | PASS | Completed, as Expected. |
| | | | 4 | Review feedback or concluding messages presented at the end of the game to ensure they align with the overall narrative and player's journey. | Any concluding messages or feedback reinforce the overall theme and learning objectives of the game, leaving the player with a memorable end to their journey. | PASS | Completed, as Expected. |
| | | As a player, I want to see the name of the country each room represents at the beginning of each level to understand the cultural context | Each level in the game is designed to represent a specific country, such as Japan or | 1 | Launch the game and start a new level. | As each new level begins, the name of the country it represents is clearly and prominently displayed on the screen. | PASS |

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| | and setting of my current challenge immediately. | Egypt. | | | | | |
| | The feature to display the country's name at the start of each level is integrated into the game. | 2 | Observe the initial screen as the level loads to check if the country's name (e.g., 'Japan' or 'Egypt') is prominently displayed. | The display of the country name is of appropriate duration, making it noticeable but not overly prolonged. | PASS | Completed, as Expected. | |
| | | 3 | Note the duration and visibility of the country name display to ensure it is brief yet noticeable. | The presentation of the country name enhances the player's anticipation and excitement for the level. | PASS | Completed, as Expected. | |
| | | 4 | Assess whether the display of the country name effectively sets the cultural context and adds to the player's excitement. | The display is consistent in style and duration across various levels, providing a uniform experience. | PASS | Completed, as Expected. | |
| | | 5 | Proceed to another level and repeat the process to ensure consistency across various levels. | The immediate revelation of the country name effectively sets the stage for the cultural and thematic context of each level. | PASS | Completed, as Expected. | |
| <u>6.6</u> | As a player, I want the game's question dialogue boxes to feature engaging pictures so that my learning experience is | The game features dialogue boxes for questions related to diverse topics | 1 | Play the game to encounter a question dialogue box. | Every question dialogue box in the game includes a relevant picture that corresponds to the question's topic. | PASS | Completed, as Expected. |

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| | visually stimulating and more memorable. | within the game. | | | | |
| | Each dialogue box is designed to include a picture relevant to the question's content. | 2 | Observe the dialogue box to confirm the presence of a picture that is relevant to the question. | The pictures are of high quality, visually appealing, and effectively add context to the questions. | PASS | Completed, as Expected. |
| | | 3 | Evaluate the quality and visual appeal of the picture to ensure it adds depth and engagement to the question. | The integration of images enhances the engagement and memorability of the learning experience. | PASS | Completed, as Expected. |
| | | 4 | Assess how the picture complements the learning experience without overshadowing the question's content. | The presence of pictures does not distract from understanding or answering the question but rather supports it. | PASS | Completed, as Expected. |
| | | 5 | Repeat the process with multiple dialogue boxes across various levels or questions to check for consistency in the integration of images. | Across various levels and questions, the standard of image quality and relevance is consistently maintained, contributing positively to the game's educational value. | PASS | Completed, as Expected. |

6.4 Software Design Documentation

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|---|------------------------------------|
| Class Name: CountryNameDisplay | Version: 1 |
| Description: Displays the country name | Associated Use Cases: UC6.4 |

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| Responsibilities: Displays the country name when level starts. | Collaborators: None |
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| Class Name: EscapeButton | Version: 1 |
| Description: Button to escape the room | Associated Use Cases: UC6.4 |
| Responsibilities: Detective, TilemapAllows the user to escape the room on answering the required number of questions. In level 2, pressing this button, upon answering all the questions allows the user to reach the ending scene. | Collaborators: Detective, Tilemap |

6.5 UX/UI Design

We've added text prompts to let players know which level they are in.

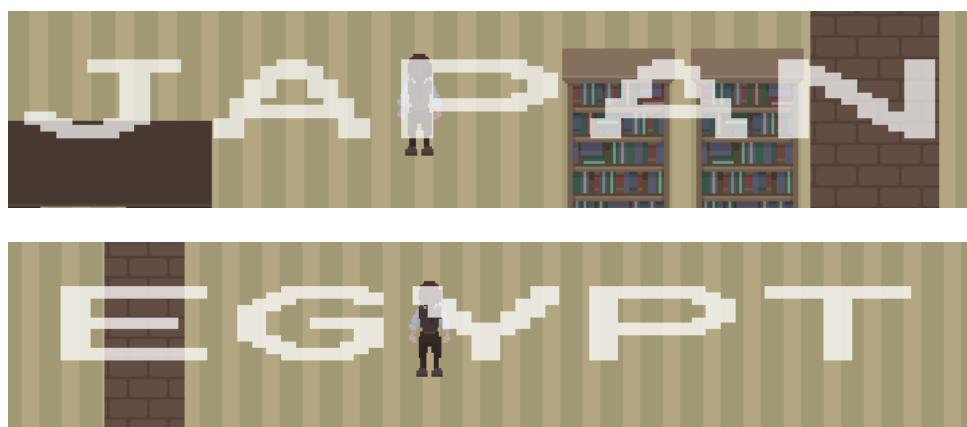


Fig. 32-33 – The names of the countries appear at the beginning of the levels

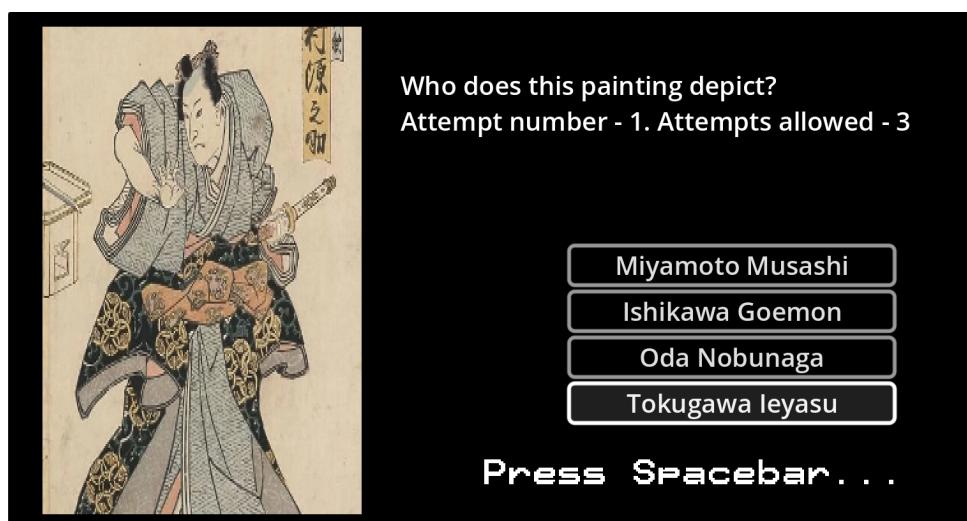


Fig. 34 The dialogue box for the questions contains images to make them more engaging (image - [\(Utagawa, circa 1827\)](#))

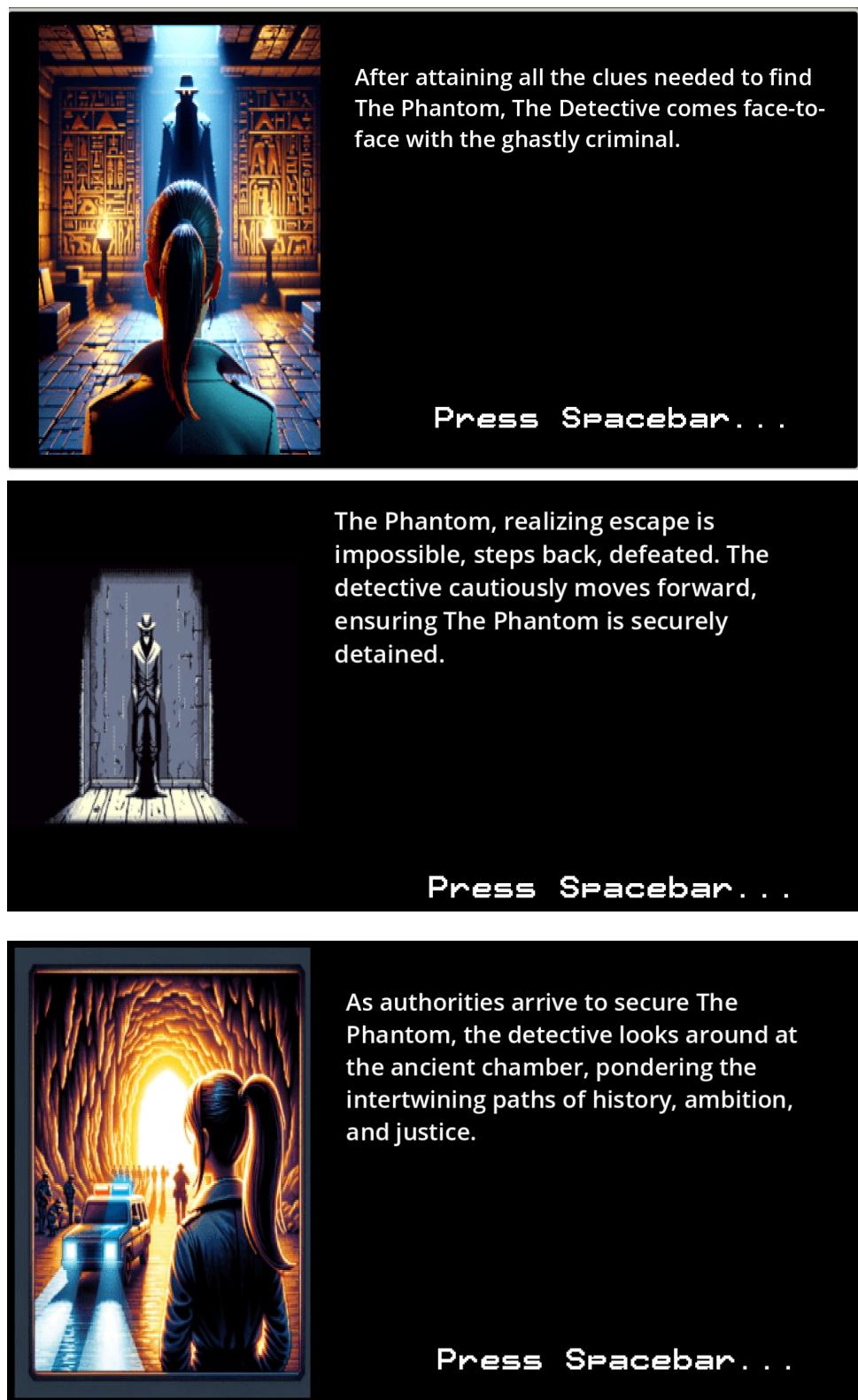


Fig. 35-37 The ending scenes conclude the narrative of the game (OpenAI. (2023). [[Image 1 of ending dialogue](#)], [[Image 2 of ending dialogue](#)], [[Image 3 of ending dialogue](#)])

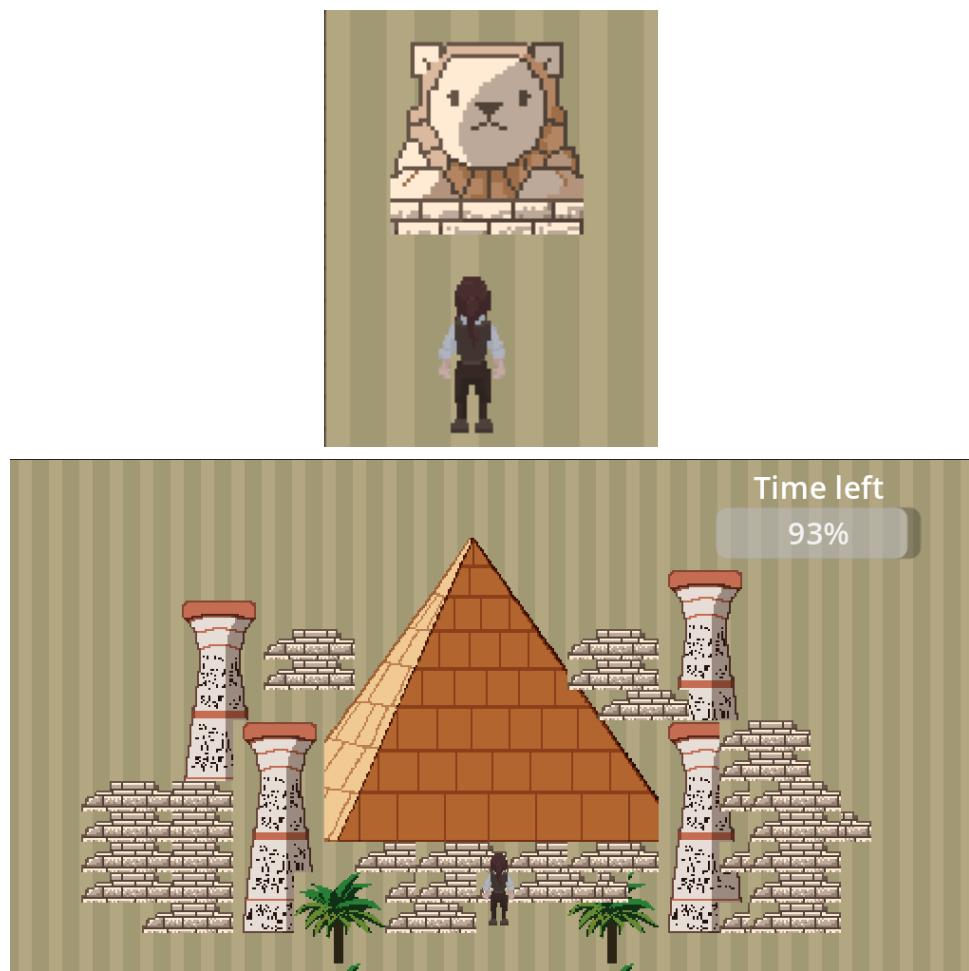


Fig. 38-39 Some of the cultural artefacts of the Egypt level

Sprint 7 (7 December – 15 December)

7.1. User Stories and Use Cases

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| User Story: As a player, I want to see an alternative ending scene if I lose the game. | Requirements Use Case Use Case: Alternative Ending for Incorrect Attempts Scope: Game Conclusion Interaction Level: User Goal Context: Players who exceed the maximum number of | Design Use Case: UC 7.1 Flow of Alternative Ending for Incorrect Attempts Use Case Scope: Game Conclusion Interaction Level: User Goal Primary Actors: Player |
| Acceptance Criteria: 1. The game should have a distinct ending scene for players who lose the game after | | |

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| <p>exceeding the allowed number of incorrect attempts.</p> <p>2. This ending scene should differ from the winning ending, indicating that the game has concluded due to the player's unsuccessful attempts.</p> <p>3. The alternative ending should be engaging and offer encouragement or improvement tips if the player decides to replay the game.</p> | <p>incorrect attempts encounter a unique ending scene, concluding their game session with a different narrative outcome.</p> <p>Frequency of Occurrence: Occurs when a player reaches the limit of incorrect attempts.</p> <p>Open Issues: Developing a scene that is engaging and motivating, rather than discouraging, for players who fail.</p> | <p>Dependencies: U.C. 6.4 - Implementing an Ending Stage for Game Completion</p> <p>Assumptions: The player understands the rules and consequences of exceeding incorrect attempt limits.</p> <p>Preconditions: The player has reached the maximum number of incorrect attempts allowed in the game.</p> <p>Main Flow: Upon reaching the limit of incorrect attempts, the player is presented with an alternative ending scene that concludes their game session and provides narrative feedback on their performance.</p> <p>Sub Flows: The ending scene might offer the player encouragement, highlight their achievements despite the loss, and suggest strategies or areas to focus on for improvement.</p> <p>Alternative Flows: The player may choose to replay the game from the start or a specific checkpoint if available.</p> <p>Post Conditions: The player clearly understands why they lost the game and is motivated to try again or improve their skills.</p> <p>Frequency of Occurrence: This scenario occurs each time a player fails to meet the game's success criteria.</p> <p>Open Issues: Balancing the tone of the alternative ending to ensure it is constructive and motivating</p> |
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| <p>User Story:</p> <p>As a player, I want to receive clear instructions on what to do once the game begins so that I can understand my objectives and how to interact with the game environment right from the start.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The player should be presented with clear, concise instructions or a tutorial on the game objectives and mechanics as soon as the game starts. 2. The instructions should guide the player on interacting with the game environment, including any unique features or controls. 3. The initial guidance should be engaging and not overwhelming, providing a smooth introduction to the game. | <p>Requirements Use Case</p> <p>Use Case: Initial Game Guidance</p> <p>Scope: Game Start Interaction</p> <p>Level: User Goal</p> <p>Context: Player receives immediate guidance upon starting the game, setting a clear understanding of the gameplay and objectives.</p> <p>Frequency of Occurrence occurs at the beginning of every new game session.</p> <p>Open Issues: Determining the optimal balance of information - enough to guide but not too much to overwhelm the player.</p> | <p>Design Use Case: UC 7.2 Flow of Initial Game Guidance Use Case</p> <p>Scope: Game Start Interaction</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 3.1 - Start Game</p> <p>Assumptions: The player may need to familiarize themselves with the game's mechanics.</p> <p>Preconditions: The player has initiated a new game session.</p> <p>Main Flow: Upon starting the game, the player is presented with an introduction or tutorial that outlines the primary objectives, mechanics, and controls of the game.</p> <p>Sub Flows: Interactive elements in the tutorial help the player practice and understand key gameplay mechanics.</p> <p>Alternative Flows: If the player skips the tutorial, brief on-screen prompts during early gameplay provide necessary guidance.</p> <p>Post Conditions: The player is equipped with the knowledge needed to begin their journey in the game.</p> <p>Frequency of Occurrence: This guidance is presented at the start of each new game session.</p> <p>Open Issues: Creating an introductory experience that is both informative and engaging</p> |
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| | | for players with varying levels of gaming experience. |
| <p>User Story: As a player, I want to have a timer in the game to increase the difficulty, providing a more challenging and engaging gameplay experience.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. A timer should be integrated into the game levels to create time-bound challenges. 2. The presence of the timer should add a sense of urgency, challenging player to think and act quickly. 3. The time limit should be balanced to provide a challenge without being excessively difficult or frustrating for the player. | <p>Requirements Use Case</p> <p>Use Case: Timer for Increased Challenge</p> <p>Scope: Game Level Interaction</p> <p>Level: User Goal</p> <p>Context: Players encounter time-bound challenges within the game, adding an element of urgency and difficulty to the gameplay.</p> <p>Frequency of Occurrence: Timed challenges occur in specific levels or segments of the game where increased difficulty is desired.</p> <p>Open Issues: Determining the optimal duration for the timer to ensure it enhances the game experience without overwhelming the player.</p> | <p>Design Use Case: UC 7.3 Flow of Timer for Increased Challenge Use Case</p> <p>Scope: Game Level Interaction</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: None</p> <p>Assumptions: The player has basic time-management skills and enjoys time-bound challenges.</p> <p>Preconditions: The player is engaged in a game level where timed challenges are integral to the gameplay.</p> <p>Main Flow: Upon entering a timed challenge, the player must complete specific objectives within the set time limit. The timer is prominently displayed, and the player knows the time constraints.</p> <p>Sub Flows: If the player fails to complete the challenge within the time limit, there may be consequences, such as losing a life or needing to restart the challenge.</p> <p>Alternative Flows: If the player completes the challenge within the time limit, they progress further in the game, with additional rewards.</p> <p>Post Conditions: The player either successfully overcomes the timed challenge and progresses or faces the</p> |

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| | | <p>consequences of not meeting the time limit.</p> <p>Frequency of Occurrence: This feature is incorporated in selected levels to vary gameplay and challenge levels.</p> <p>Open Issues: Adjusting the timer for different difficulty levels and ensuring it aligns with the game design and player experience.</p> |
| <p>User Story:</p> <p>As a player, I want to have a clear indication of when I have answered all the required questions so that I know when I can proceed to the next stage of the game.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> 1. The game should display a visible progress indicator showing the number of questions answered and the total number of questions required to move to the next stage. 7. This indicator should update in real time as the player answers each question. 8. Once all required questions are answered, the indicator should notify the player that they can move on to the next stage. | <p>Requirements Use Case</p> <p>Use Case: Progress Tracking for Question Completion</p> <p>Scope: Game Level Interaction</p> <p>Level: User Goal</p> <p>Context: Players receive continuous feedback on their progress in answering the required number of questions to advance in the game.</p> <p>Frequency of Occurrence: This feature is active during any game stage where answering a set number of questions is required to progress.</p> <p>Open Issues: Ensuring the progress indicator is intuitive and seamlessly integrated into the game interface without disrupting the gameplay experience.</p> | <p>Design Use Case: UC 7.4 Flow of Progress Tracking for Question Completion Use Case</p> <p>Scope: Game Level Interaction</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: U.C. 3.2 - Interact with Cultural Object</p> <p>Assumptions: The player seeks to understand their progress in the game and values real-time feedback.</p> <p>Preconditions: The player is in a game stage where completing a certain number of questions is necessary to advance.</p> <p>Main Flow: As the player answers questions, a progress indicator on the screen updates to reflect the number of questions answered versus the total number required.</p> <p>Sub Flows: Once the player has answered the required questions, the indicator confirms their eligibility to</p> |

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| | | <p>advance, through a visual cue or message.</p> <p>Alternative Flows: If the player has not answered enough questions, the indicator motivates them to continue exploring and interacting with the game to find and answer more questions.</p> <p>Post Conditions: The player is either ready to move to the next stage or aware of the remaining questions needed to progress.</p> <p>Frequency of Occurrence: Continuously active during stages of the game that involve answering a set number of questions.</p> <p>Open Issues: Balancing the visibility and informativeness of the progress indicator with the overall aesthetic and immersion of the game.</p> |
| <p>User Story:</p> <p>As a player, I want to encounter multiple questions linked to the same object within the game to increase the depth and functionality of the gameplay experience.</p> <p>Acceptance Criteria:</p> <ol style="list-style-type: none"> Objects within the game should be linked to more than one question, providing a deeper exploration of each object's significance and relevance. This feature should add layers to the gameplay, making each | <p>Requirements Use Case</p> <p>Use Case: Improved Object Interaction with Multiple Questions</p> <p>Scope: Game Level Interaction</p> <p>Level: User Goal</p> <p>Context: Players encounter objects within the game that offer multiple questions, enriching the gameplay with varied and in-depth learning opportunities.</p> <p>Frequency of Occurrence: Regularly throughout the game, especially in levels where deeper exploration and learning are encouraged.</p> | <p>Design Use Case: UC 7.5 Flow of Improved Object Interaction with Multiple Questions Use Case</p> <p>Scope: Game Level Interaction</p> <p>Level: User Goal</p> <p>Primary Actors: Player</p> <p>Dependencies: UC 3.2 - Interact with Cultural Object</p> <p>Assumptions: The player is interested in engaging deeply with the game's content and enjoys discovering multiple facets of a single object.</p> <p>Preconditions: The player is engaged in a game level where</p> |

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| <p>interaction with an object more engaging and informative.</p> <p>3. The design should ensure that the player is not overwhelmed by too many questions at once, maintaining a balance in the gameplay.</p> | <p>Open Issues: Ensuring the multiple questions are relevant, engaging, and not overly complex or repetitive.</p> | <p>objects present multiple questions for interaction.</p> <p>Main Flow: When a player interacts with an object, they are presented with a series of questions related to that object. Each question explores various aspects of the object's significance in the game's context.</p> <p>Sub Flows: The player's responses to these questions may unlock additional information, clues, or game progress, depending on their accuracy and depth of engagement.</p> <p>Alternative Flows: If a player chooses not to engage deeply with an object, they may miss out on specific information or bonus content but can still progress in the game.</p> <p>Post Conditions: The player has gained a richer understanding of the game's content and context through multiple interactions with the same object.</p> <p>Frequency of Occurrence: This feature is a recurring element in the game, designed to enhance the educational and interactive experience.</p> <p>Open Issues: Balancing the number and difficulty of questions linked to each object to maintain player interest and prevent information overload.</p> |
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7.2. Use Case Tests

| U.C. # | User Story | Preconditions / Data | Number | Steps To Execute | Expected Results | Pass/Fail | Defect/Comments |
|--------|--|--|--------|--|--|-----------|-------------------------|
| 7.1 | As a player, I want to see an alternative ending scene if I lose the game. | The game includes alternative ending scenes based on the player's performance. | 1 | Play the game and deliberately exceed the allowed number of incorrect attempts. | Upon exceeding the allowed number of incorrect attempts, the game transitions smoothly to the alternative ending scene. | PASS | Completed, as Expected. |
| | | A specific number of incorrect attempts are allowed before triggering the losing ending scene. | 2 | Observe the transition to the alternative ending scene once the limit of incorrect attempts is reached. | The alternative ending scene is clearly distinct from the winning ending, appropriately indicating that the game has concluded due to unsuccessful attempts. | PASS | Completed, as Expected. |
| | | | 3 | Assess the distinctiveness of the losing ending scene compared to the winning ending. | The content of the losing ending scene is engaging, offering encouragement and constructive tips for players to improve in future attempts. | PASS | Completed, as Expected. |
| | | | 4 | Evaluate the content of the alternative ending scene for its engagement quality and the presence of encouragement or tips for improvement. | The alternative ending provides a meaningful conclusion to the game, even in the event of a loss, maintaining player interest and motivation. | PASS | Completed, as Expected. |
| | | | 5 | Replay the game to confirm the consistency and triggers of the alternative ending scene. | The triggers for the alternative ending scene are consistent, reliably activating whenever the player fails to meet the success criteria of the game. | PASS | Completed, as Expected. |

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| | | The game includes an introductory segment or tutorial at the start. | 1 | Start a new game and observe the initial screen for the presence of instructions or a tutorial. | Clear and concise instructions or a tutorial appears as soon as the game starts. | PASS | Completed, as Expected. |
| 7.2 | As a player, I want to receive clear instructions on what to do once the game begins so that I can understand my objectives and how to interact with the game environment right from the start. | This segment is designed to provide clear instructions on game objectives and mechanics. | 2 | Review the content of the instructions or tutorial to ensure clarity and conciseness regarding game objectives and mechanics. | The instructions effectively guide the player on the game's objectives, mechanics, and how to interact with the game environment. | PASS | Completed, as Expected. |
| | | | 3 | Test the guidance provided for interacting with the game environment, including any specific features or controls unique to the game. | The guidance provided is user-friendly and covers essential aspects of gameplay, including unique features or controls. | PASS | Completed, as Expected. |
| | | | 4 | Evaluate the engagement level of the instructions or tutorial, ensuring it is informative but not overwhelming. | The tutorial or instructions are engaging and provide a smooth introduction to the game, helping inexperienced players acclimate without feeling overwhelmed. | PASS | Completed, as Expected. |
| | | | 5 | Restart the game to check the consistency and reliability of the introductory instructions appearing at the game's start. | The consistency of the introductory segment is maintained, ensuring every new game start provides the same level of guidance and information. | PASS | Completed, as Expected. |
| 7.3 | As a player, I want to have a timer in the game to | The game includes levels with integrated timers for | 1 | Start a level in the game where the timer is known to be active. | As the level starts, the timer begins counting down, prominently | PASS | Completed, as Expected. |

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| | increase the difficulty, providing a more challenging and engaging gameplay experience. | time-bound challenges. | | | displayed on the game screen. | | |
| | | The timer is set to challenge the player to complete tasks within a specific timeframe. | 2 | Observe the initiation of the timer as soon as the level starts, or the challenge begins. | The timer is easily visible and understandable, allowing players to keep track of the remaining time. | PASS | Completed, as Expected. |
| | | | 3 | Assess the visibility and clarity of the timer on the screen. | The time limit set for the level strikes a balance between being challenging and achievable, adding a layer of difficulty to the gameplay. | PASS | Completed, as Expected. |
| | | | 4 | Monitor the time limit to ensure it provides a reasonable challenge without being excessively difficult. | The presence of the timer successfully adds urgency, encouraging quicker thinking and decision-making from the player. | PASS | Completed, as Expected. |
| | | | 5 | Attempt to complete the level within the given time frame, noting the sense of urgency and its effect on gameplay. | If the player fails to complete the level within the time limit, the game responds appropriately, such as restarting the level or providing the option to try again. | PASS | Completed, as Expected. |
| | | | 6 | Evaluate the player's experience and reaction if the time limit expires before completing the level. | The integration of the timer enhances the overall gameplay experience, making it more engaging and challenging. | PASS | Completed, as Expected. |
| 7.4 | As a player, I want to have a clear indication of when I have answered | The game features a progress indicator that tracks and displays the number of | 1 | Start a level in the game where answering a set number of questions is required to progress. | Upon entering a relevant level, the progress indicator is visible, clearly showing the number of questions answered | PASS | Completed, as Expected. |

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| | all the required questions so that I know when I can proceed to the next stage of the game. | questions answered out of the total required to proceed to the next stage. | | | and the total required. | | |
| | | The indicator is designed to update in real time. | 2 | Observe the presence and visibility of the progress indicator showing the count of answered questions versus the total required. | The indicator updates immediately and accurately each time a question is answered. | PASS | Completed, as Expected. |
| | | | 3 | Answer a question and verify that the progress indicator updates in real time to reflect this. | The player can easily track their progress in real time, knowing how many questions remain. | PASS | Completed, as Expected. |
| | | | 4 | Continue answering questions, checking the indicator after each response. | Upon answering all required questions, the indicator clearly notifies the player, indicating that they are now eligible to move on to the next stage. | PASS | Completed, as Expected. |
| | | | 5 | After answering the final required question, observe how the indicator notifies the player that they can proceed to the next stage. | The feature enhances the player's experience by providing a clear sense of progression and achievement within the game. | PASS | Completed, as Expected. |
| 7.5 | As a player, I want to encounter multiple questions linked to the same object within the game to increase the | The game includes interactive objects that are linked to multiple questions. | 1 | Begin playing the game and locate an interactive object known to be linked with multiple questions. | Upon interacting with the object, the first question is presented, and the player responds accordingly. | PASS | Completed, as Expected. |
| | | The design ensures a balanced | 2 | Interact with the object and answer the first | After answering the initial question, additional related | PASS | Completed, as Expected. |

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| | depth and functionality of the gameplay experience. | approach to the number and complexity of questions per object. | question presented. | questions are presented, exploring various aspects of the object. | | |
| | | 3 | Observe if additional questions are triggered related to the same object after answering the initial question. | The subsequent questions are relevant and add depth to the player's understanding of the object's significance in the game. | PASS | Completed, as Expected. |
| | | 4 | Engage with these subsequent questions to assess their relevance and depth related to the object. | The interaction remains engaging and informative, with each question contributing to the overall gameplay experience. | PASS | Completed, as Expected. |
| | | 5 | Evaluate the overall experience of interacting with the object, focusing on the engagement level and the balance in the number of questions. | The number of questions linked to each object is balanced, providing depth without overwhelming the player. | PASS | Completed, as Expected. |
| | | 6 | Repeat this process with different objects in the game to ensure consistency in the implementation of this feature. | This multi-question feature is consistently implemented across various objects in the game, enhancing the depth and functionality of the gameplay. | PASS | Completed, as Expected. |

7.3. Software Design Documentation

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|--|------------------------------------|
| Class Name: Counter | Version: 1 |
| Description: Displays the number of questions answered and total answers needed to progress | Associated Use Cases: UC7.4 |
| Responsibilities: Displays the progress. | Collaborators: None |

| | |
|---|--|
| Updates the progress as the player answers the questions. | |
|---|--|

| | |
|---|------------------------------------|
| Class Name: TimerProgressBar | Version: 1 |
| Description: Displays the timer | Associated Use Cases: UC7.3 |
| Responsibilities: Displays the time remaining. | Collaborators: None |

7.4. UI/UX Design



Fig. 40 The game provides context to the player in the beginning

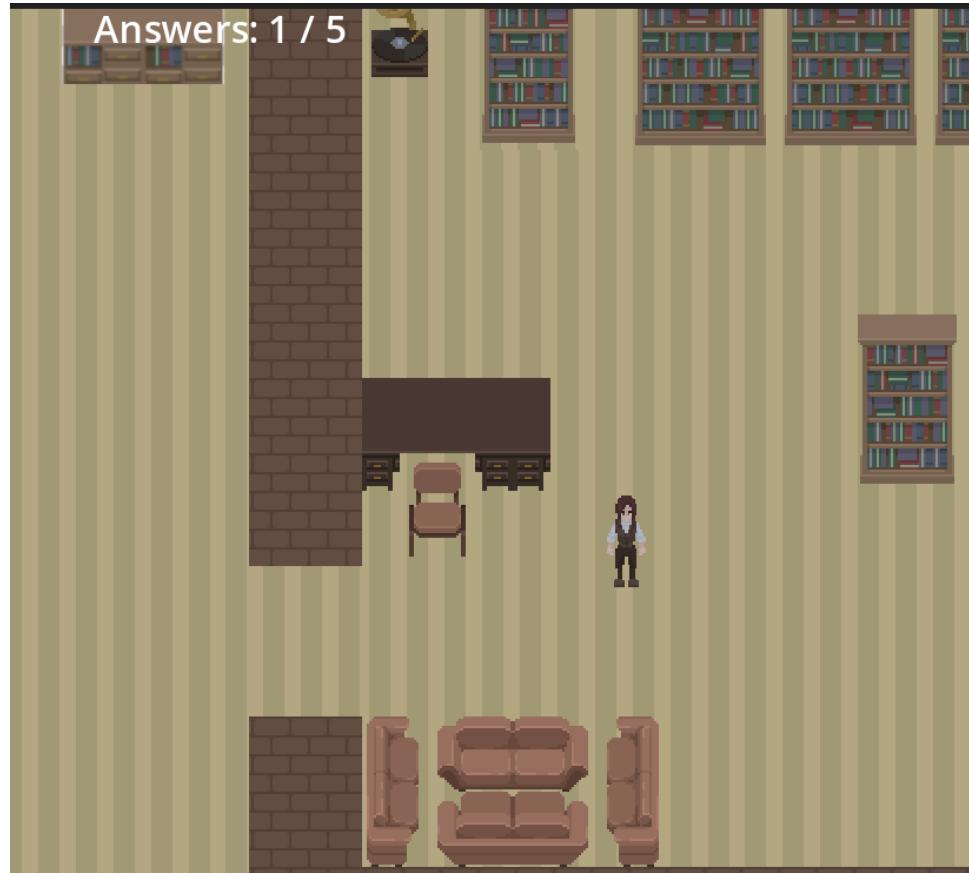


Fig. 41 The counter helps the player to track the progress



Fig. 42 The timer lets the user know how much time is left

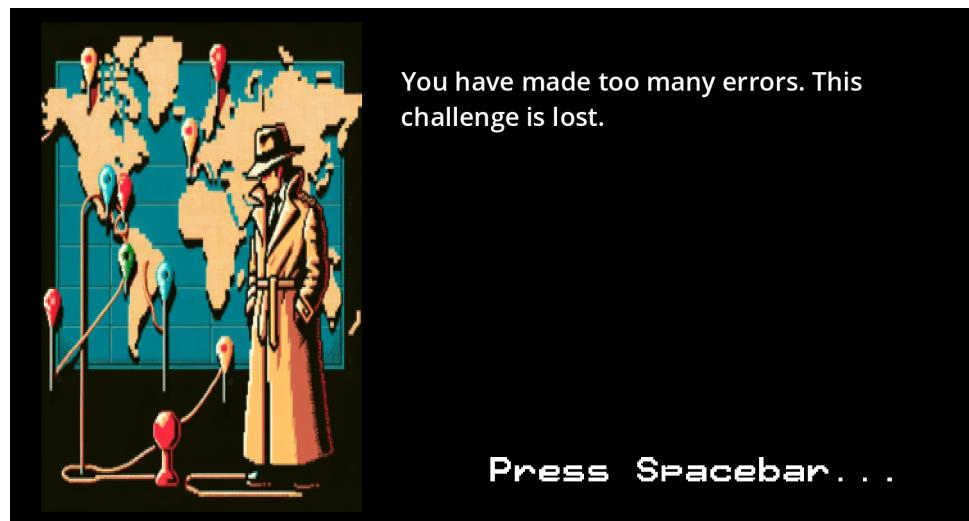


Fig. 43 The ending scene if the user loses the game (

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