# FINAL Project Report

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**Project Demo: https://youtu.be/tNICqGklR84**

## Section 1: REPORT SUMMARY

In our design proposal, we had intended to add accessibility features so that those with impaired vision or hearing could also enjoy our game. We also planned to add monsters, sound effects, equipment, and a battle system to make the game more engaging.

As a team, we suffered from a rough start. From technical errors in Git to frustrating merge conflicts, our team was struggling to get ourselves together to work on a consistent time frame and effectively manage our time during the earlier sprints.

However, because of our strong communication and determination to create an impactful final product, our team was able to bypass our original time management and Git struggles to enter a flow state during the final sprints. In particular, we found ourselves learning how to manage our merge conflicts, conduct more meaningful code reviews, and share more ideas to grow the product. Our creativity blossomed as a byproduct of our consistency in applying Git Flow principles to streamline our work as a team. This gave us a lot of extra time that we had been previously spending on grinding out errors and dependencies on one another to complete tasks.

As a result, because we all had a lot of passion for the project, we were able to take this extra time to add in more visuals and audio features beyond the constraints of the user stories we had originally drafted. We hope the final product and the process illustrated in this document reflects the hard work we all put into creating this project under the agile methodology during these past few weeks.

# Section 2: PROCESS DOCUMENTATION

## *2.1. SPRINT 1 OVERVIEW*

### 2.1.1.1 Sprint Overview:

Start date: November 15, 2023

End date: November 22, 2023

Our goal for this sprint is to finalize key gameplay and interface elements, enhancing player interaction and experience. The focus areas include updating player mechanics, refining the game's menu and settings, (which includes adding the text-to-speech feature and an adjustable font size), and improving troll interactions. We also will implement the escape mechanism to help a player exit from a tough troll interaction.

### 2.1.1.2 Stories Selected for this Sprint:

- 2.13 Player (Omar): Omar implemented the Player class using the Singleton design pattern, ensuring there's only one instance of the player throughout the game.
- 1.1 Menu (Kaison): Kaison developed a settings/menu view with accessibility features like text-to-speech, font size adjustment, and color theme changes, using the State design pattern. Originally there was supposed to be 4 different user stories for each feature, but were all combined into 1.
- 2.9 Troll (Laith): Laith added trolls as new combat opponents in the game, enhancing the gameplay by introducing a new fighting aspect.
- 2.5 Escape (Laith): Part of the Command design pattern, Laith worked on implementing an escape mechanism for players during combat situations.

### 2.1.1.3 Team Capacity:

We expect to complete these user stories by **November 22, 2023**. Our focus is on ensuring that the Singleton design pattern is fully implemented as per the UML diagram, along with getting a basic menu running and introducing basic trolls. We will verify that by conducting JUnit and GUI tests for each feature (where needed), conducting code reviews on each other’s work, and reaching out to each other for help.

#### 2.1.1.4 Participants:

- Omar: Focused on developing the Player class with a Singleton pattern and enhancing the visibility and functionality of the player health system.
- Kaison: Focused on refining the settings menu for enhanced accessibility, including features like text-to-speech and adjustable font size.
- Laith: Worked on code review as well as planning the Troll and Escape user stories.
- Dan: Reviewed the Menu user story ensuring it followed all requirements.

#### 2.1.1.5 Tasks Completed:

During this sprint, the team successfully implemented the Singleton pattern for the Player class, ensuring consistent and global player interactions throughout the game. The settings menu was refined for better accessibility and user experience, allowing the player to decide if they want text-to-speech on or off, as well as choosing whatever font size they find best.

### *2.1.2. SPRINT 1 PRODUCT BACKLOG*

- 2.13 Player (Omar): Omar implemented the Player class using the Singleton design pattern, ensuring there's only one instance of the player throughout the game.
- 1.1 Menu (Kaison): Kaison developed a settings/menu view with accessibility features like text-to-speech, font size adjustment, and color theme changes,

using the State design pattern. Originally there was supposed to be 4 different user stories for each feature, but were all combined into 1.

- 2.9 Troll (Laith): Laith added trolls as new combat opponents in the game, enhancing the gameplay by introducing a new fighting aspect.
- 2.5 Escape (Laith): Part of the Command design pattern, Laith worked on implementing an escape mechanism for players during combat situations.
- 1.6 Memento (Kaison): Kaison implemented the Memento class for saving game states, allowing players to easily access details of their saved games.
- 2.2 Load/Save Command (Dan): Dan enhanced the game-saving functionality with accessible commands, simplifying the process of saving and loading games.
- 2.1 Saved Game File Details (Dan): Dan added a feature to display save file details in the menu, helping players understand their game's saved state.
- 2.7 Weapon (Omar): Omar focused on developing weapon objects and graphics, enhancing the visual and interactive aspects of combat.
- 2.12 Player Health (Omar): Omar introduced a health graphic that shows the player's health numerically and visually changes based on health percentage.
- 2.14 Parsing for Objects (Dan): Dan worked on parsing new text files related to trolls and weapons, improving the AdventureLoader's functionality.
- 2.6 Potion (Omar): Omar developed various potions as part of the game, each with different effects, enhancing the gameplay strategy.
- 1.4 Difficulty (Dan): Dan adjusted the game's difficulty levels, ensuring a balanced and enjoyable experience for players of all skill levels.
- 2.4 Attack (Laith): As part of the Command design pattern, Laith enhanced the attack mechanics, providing players with more combat options.
- 2.11 Combat Audio (Dan): Dan improved the audio experience in combat scenes, adding realism and depth to battles.
- 2.8 Keys (Omar): Omar created a keys feature for unlocking new areas or items, adding an element of exploration to the game.
- 2.3 Battle (Laith): Also part of the Command design pattern, Laith developed the overall battle system, focusing on dynamic and engaging combat.
- 2.10 Audio Enhancements (Omar): Omar worked on general audio

improvements, enhancing the game's overall auditory experience.

- 2.15 Final Boss Animation (Laith): Laith created the animation for the final boss, aiming for a memorable and challenging end-game encounter.

### *2.1.3. SPRINT 1 CODE REVIEWS*

| Story Reviewed | Name of Reviewer | Pull Request Link |
|---|---|---|
| [dev-elmalako-2.13]: Singleton | Laith, Kaison | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/1 |
| [dev-kaison-1.1]: Menu | Dan, Laith, Omar | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/2<br>https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/23 |

### *2.1.4 SPRINT 1 RETROSPECTIVE*

**Participants in the Meeting:**

- Omar
- Kaison
- Laith
- Dan

**Unfinished Tasks:**

- 2.9 Troll (Laith): Laith added trolls as new combat opponents in the game, enhancing the gameplay by introducing a new fighting aspect.
- 2.5 Escape (Laith): Part of the Command design pattern, Laith worked on implementing an escape mechanism for players during combat situations.

**Practices That Went Well:**

- We did a good job setting up the code base and getting everyone familiar with it

- Our communication is strong and we worked well as a unit during this sprint

**New or Revised Practices for Next Sprint:**

- We need to keep working on learning how to apply git flow practices as a team
- We need to be more thorough in our code reviews to avoid small mistakes getting pushed to the development branch as well as having multiple merge requests for the same user story
- We need to ensure that we are writing JUnit tests

**Practices to Discontinue:**

- Poor documentation of merge requests and commit messages
    - We should ensure that we are following a more consistent format

**Team’s Best Experience**

Getting all together in person to discuss what is going well and how we are going to plan for more productive future sprints despite the hurdles of other course loads.

**Team’s Worst Experience**

Accidentally working on the wrong branch and only realizing when it came time to push new commits.

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## *2.2 SPRINT 2 OVERVIEW*

### 2.2.1.1 Sprint Overview:

Start date: November 23, 2023

End date: December 1, 2023

Our goal for this sprint is to complete features related to the battle aspect of the game, which includes trolls, escaping from them, and weapons to fight them. Moreover, we implemented a system to save and load games using the Memento design pattern, while giving the user more visibility on their saved games states.

### 2.2.1.2 Stories Selected for this Sprint:

List the user stories selected for the sprints and the owners of these stories. Make note of any updates or changes to user stories that are made during this sprint.

- 2.9 Troll (Laith): Laith added trolls as new combat opponents in the game, enhancing the gameplay by introducing a new fighting aspect.
- 2.5 Escape (Laith): Part of the Command design pattern, Laith worked on implementing an escape mechanism for players during combat situations.
- 1.6 Memento (Kaison): Kaison implemented the Memento class for saving game states, allowing players to easily access details of their saved games.
- 2.2 Load/Save Command (Dan): Dan enhanced the game-saving functionality with accessible commands, simplifying the process of saving and loading games.
- 2.1 Saved Game File Details (Dan): Dan added a feature to display save file details in the menu, helping players understand their game's saved state.
- 2.7 Weapon (Omar): Omar focused on developing weapon objects and graphics, enhancing the visual and interactive aspects of combat.

- 2.12 Player Health (Omar): Omar introduced a health graphic that shows the player's health numerically and visually changes based on health percentage.
- 2.14 Parsing for Objects (Dan): Dan worked on parsing new text files related to trolls and weapons, improving the AdventureLoader's functionality.

**2.2.1.3 Team Capacity:**

We expect to complete these user stories by **December 1, 2023**. Our main goal is to get a basic battle GUI working. This allows us to see the GUI and make decisions on how to resize or reposition the elements for a better user experience. It also allows us to test battle aspects such as escaping the troll, picking up weapons and saving the game while in battle, as well as displaying the game information before loading.

**2.2.1.4 Participants:**

- Laith: Responsible for the development of more engaging troll interactions and the implementation of the escape mechanism during troll encounters.
- Omar: Responsible for making more engaging battles by implementing the code for weapons and designing the graphics for items and player health.
- Kaison: Focused on implementing Mementos for easier access to saved data.
- Dan: Enhanced the accessibility of save and load features by implementing commands from which players could save or load the game. Also modified the load view to display the details of a save when selected. Simultaneously modified the AdventureLoader to work will troll.txt and weapons.txt.

**2.2.1.5 Tasks Completed:**

Though some features had minor bugs that were easily fixed later, all intended features were implemented. The save and load system was improved to store games as mementos instead of serialized files. Allowing developers to know which save was made earlier, and save details like hit points or current room. Commands were added so the player could easily save the game through the command label, and the load view was enhanced to include a preview of each save when selected.

### 2.2.2 SPRINT 2 PRODUCT BACKLOG

- 2.9 Troll (Laith): Laith added trolls as new combat opponents in the game, enhancing the gameplay by introducing a new fighting aspect.
- 2.5 Escape (Laith): Part of the Command design pattern, Laith worked on implementing an escape mechanism for players during combat situations.
- 1.6 Memento (Kaison): Kaison implemented the Memento class for saving game states, allowing players to easily access details of their saved games.
- 2.2 Load/Save Command (Dan): Dan enhanced the game-saving functionality with accessible commands, simplifying the process of saving and loading games.
- 2.1 Saved Game File Details (Dan): Dan added a feature to display save file details in the menu, helping players understand their game's saved state.
- 2.7 Weapon (Omar): Omar focused on developing weapon objects and graphics, enhancing the visual and interactive aspects of combat.
- 2.12 Player Health (Omar): Omar introduced a health graphic that shows the player's health numerically and visually changes based on health percentage.
- 2.14 Parsing for Objects (Dan): Dan worked on parsing new text files related to trolls and weapons, improving the AdventureLoader's functionality.
- 2.6 Potion (Omar): Omar developed various potions as part of the game, each with different effects, enhancing the gameplay strategy.
- 1.4 Difficulty (Dan): Dan adjusted the game's difficulty levels, ensuring a balanced and enjoyable experience for players of all skill levels.
- 2.4 Attack (Laith): As part of the Command design pattern, Laith enhanced the attack mechanics, providing players with more combat options.
- 2.11 Combat Audio (Dan): Dan improved the audio experience in combat scenes, adding realism and depth to battles.
- 2.8 Keys (Omar): Omar created a keys feature for unlocking new areas or items, adding an element of exploration to the game.

- 2.3 Battle (Laith): Also part of the Command design pattern, Laith developed the overall battle system, focusing on dynamic and engaging combat.
- 2.10 Audio Enhancements (Omar): Omar worked on general audio improvements, enhancing the game's overall auditory experience.
- 2.15 Final Boss Animation (Laith): Laith created the animation for the final boss, aiming for a memorable and challenging end-game encounter.

### 2.2.3 SPRINT 2 CODE REVIEWS

| Story Reviewed | Name of Reviewer | Pull Request Link |
|---|---|---|
| [dev-alzoubi-2.9]: Troll | Omar | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/3 |
| [dev-alzoubi-2.5]: Escape | Dan | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/9 |
| [dev-kaison-1.6]: Memento | Laith | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/11 |
| [dev-nguy3283-2.2]: Load/Save Command | Laith | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/14 |
| [dev-nguy3283-2.1]: Saved Game File Details | Kaison | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/15 |

### 2.2.4 SPRINT 2 RETROSPECTIVE

**Participants in the Meeting:**

- Omar
- Kaison
- Laith

- Dan

**Unfinished Tasks:**

- 2.7 Weapon (Omar)
- 2.12 Player Health (Omar)
- 2.14 Parsing for Objects (Dan)

**Practices That Went Well:**

- Implementing unit tests on each merge request was done well and more consistently
- Leaving more comments on each merge request review to ensure no errors were pushed

**New or Revised Practices for Next Sprint:**

- Pushed IDE configuration and text-to-speech files to avoid needing to reconfigure IntelliJ whenever a new branch is pulled
- We still need to put in some work streamlining commit message and merge request formats

**Practices to Discontinue:**

- Making very large commits all at once, rather than multiple smaller commits
    - We lost a lot of code and had to restart as a result of this poor practice!
    - Leaving too many user stories to complete all at once
- Not letting one sprint have a lot of user stories
    - A lot of user stories had to get pushed to the next sprint as they were in the process of getting completed, but we realized some of us had dependencies on other stories
        - As a result, some of us had to pivot to a different user story so that all of us could be working at the same time
            - This caused a few stories to be shelved for the next sprint

**Team's Best Experience**

Working together to solve issues related to merge conflicts was our best experience as it allowed us to exercise resiliency and teamwork. Merge conflicts were a huge issue during this sprint, so we took a lot of time working them out in person together. These were especially frustrating on big conflicts on the AdventureGameView.java file as there were a lot of missing closing brackets as a result. It was rewarding to get these resolved together.

### Team’s Worst Experience

Gitlab included 300+ files in a commit because of a glitch, which forced us to delete and remake a few merge requests.

## *2.3 SPRINT 3 OVERVIEW*

### 2.3.1.1 Sprint Overview:

**Start date:** December 1, 2023

**End date:** December 5, 2023

Our sprint goal is to elevate the game by focusing on combat and exploration enhancements. Omar is adding depth with the 'Potion' and 'Keys' features, enriching gameplay and puzzle elements. Dan is adjusting the 'Difficulty' settings for all player levels and improving battle immersion with better 'Combat Audio'. Laith is refining 'Attack' mechanics and the overall 'Battle' system for smoother fights, and he's crafting an exciting 'Final Boss Animation' for a memorable end-game. Omar's also enhancing the overall game audio for a more immersive experience. These updates aim to make the game more engaging, challenging, and enjoyable for players.

### 2.3.1.2 Stories Selected for this Sprint:

- 2.6 Potion (Omar): Omar developed various potions as part of the game, each with different effects, enhancing the gameplay strategy.
- 1.4 Difficulty (Dan): Dan adjusted the game's difficulty levels, ensuring a balanced and enjoyable experience for players of all skill levels.
- 2.4 Attack (Laith): As part of the Command design pattern, Laith enhanced the attack mechanics, providing players with more combat options.
- 2.11 Combat Audio (Dan): Dan improved the audio experience in combat scenes, adding realism and depth to battles.
- 2.8 Keys (Omar): Omar created a keys feature for unlocking new areas or items, adding an element of exploration to the game.
- 2.3 Battle (Laith): Also part of the Command design pattern, Laith developed the overall battle system, focusing on dynamic and engaging combat.
- 2.10 Audio Enhancements (Omar): Omar worked on general audio improvements, enhancing the game's overall auditory experience.
- 2.15 Final Boss Animation (Laith): Laith created the animation for the final

boss, aiming for a memorable and challenging end-game encounter.

#### 2.3.1.3 Team Capacity:

We expect to complete these user stories by **December 5, 2023**. This includes Omar finalizing the strategic 'Potion' and 'Keys' features, enhancing the gameplay depth and exploration. Dan will be finishing the adjustments to the 'Difficulty' settings to suit a wide range of players and perfecting the 'Combat Audio' for a more immersive battle experience. Laith is set to complete the refinement of 'Attack' mechanics and the overall 'Battle' system, ensuring fluid and engaging combat. Additionally, he will be wrapping up the 'Final Boss Animation', creating a thrilling climax for the game. Omar will also have completed the broad 'Audio Enhancements', elevating the game's auditory immersion. These updates are geared towards making our game more captivating, challenging, and enjoyable for our players.

#### 2.3.1.4 Participants:

- Omar
- Kaison
- Dan
- Laith

#### 2.3.1.5 Tasks Completed:

All tasks were fully implemented and tested.

### 2.3.2 SPRINT 3 PRODUCT BACKLOG

- 2.7 Weapon (Omar): Omar focused on developing weapon objects and graphics, enhancing the visual and interactive aspects of combat.
- 2.12 Player Health (Omar): Omar introduced a health graphic that shows the player's health numerically and visually changes based on health percentage.
- 2.14 Parsing for Objects (Dan): Dan worked on parsing new text files

related to trolls and weapons, improving the AdventureLoader's functionality.

- 2.6 Potion (Omar): Omar developed various potions as part of the game, each with different effects, enhancing the gameplay strategy.
- 1.4 Difficulty (Dan): Dan adjusted the game's difficulty levels, ensuring a balanced and enjoyable experience for players of all skill levels.
- 2.4 Attack (Laith): As part of the Command design pattern, Laith enhanced the attack mechanics, providing players with more combat options.
- 2.11 Combat Audio (Dan): Dan improved the audio experience in combat scenes, adding realism and depth to battles.
- 2.8 Keys (Omar): Omar created a keys feature for unlocking new areas or items, adding an element of exploration to the game.
- 2.3 Battle (Laith): Also part of the Command design pattern, Laith developed the overall battle system, focusing on dynamic and engaging combat.
- 2.10 Audio Enhancements (Omar): Omar worked on general audio improvements, enhancing the game's overall auditory experience.
- 2.15 Final Boss Animation (Laith): Laith created the animation for the final boss, aiming for a memorable and challenging end-game encounter.

### 2.3.3 SPRINT 3 CODE REVIEWS

| Story Reviewed | Name of Reviewer | Pull Request Link |
|---|---|---|
| [dev-elmalako-2.7]: Weapon | Laith | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/17 |
| [dev-nguy3283-2.14]: Parsing for Weapons, Potions and Trolls | Kaison, Omar | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/19 |

| | | |
|---|---|---|
| [dev-elmalako-2.6]: Potion | Laith | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/21<br>https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/24 |
| [dev-nguy3283-1.4]: Difficulty | Kaison | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/20 |
| [dev-alzoubi2-2.4]: Attack | Dan | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/22 |
| [dev-nguy3283-2.11]: Combat Audio | Kaison | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/27 |
| [dev-elmalako-2.8]: Keys | Kaison | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/29 |
| [dev-alzoubi2-2.3]: Battle | Omar | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/30 |
| [dev-elmalako-2.10]: Audio Enhancements | Laith | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/32 |
| [dev-alzoubi2-2.15]: Final Boss Animation | Omar | https://mcsscm.utm.utoronto.ca/csc207_20239/group_28/-/merge_requests/36 |

### 2.3.4 SPRINT 3 RETROSPECTIVE

**Participants in the Meeting:**

- Omar
- Kaison
- Laith
- Dan

**Unfinished Tasks:**

- All tasks were completed as planned to finally submit a strong, functioning product!

**Practices That Went Well:**

- Keeping merge requests and commit messages consistent in terms of format
  - This was something we struggled with and worked on throughout our three sprints, and we finally got a good rhythm in the last sprint
- Our communication in getting everything done was strong near the end and we discussed all our ideas and navigated the troubles of Git under the pressure of getting a final product ready for the deadline

**New or Revised Practices for Next Sprint:**

- There is no next sprint, but if we had one, we should ensure that we are taking more time for code reviews as some mistakes slipped through the cracks to the development branch at times
- We got a lot better at this and this did not happen very often in the last sprint, but this is still something for us to think about moving forward

**Practices to Discontinue:**

- Mixing user stories together into one was something we did a little too often as we did not want to set up a full merge request for only a few lines of code
  - This was bad practice and caused us to be unsure where and when some lines were changed

**Team's Best Experience**

Our best experience was getting the final boss animation to work (User Story 2.15 specifically). This took a lot of effort from the whole team to come up with an idea and execute it in creative ways using JavaFX. This was the last user story we wanted to complete and came about as a result of our passion for the project and our will to create something we are proud of. When it finally came together after a lot of frustration, we were ecstatic.

**Team's Worst Experience**

Waiting for Gitlab to load was very troublesome and took a lot of time.

# Section 3: SUMMARY

One of our biggest accomplishments is implementing all the design patterns we intended to implement. For the most part, we were able to stick to our original UML diagrams to help support our implementation of all classes. For instance, we leveraged the Command design pattern to implement battles (User Story 2.3) between players and trolls. This made it significantly easier for a player to click the attack button and have an exchange of blows with a troll take place as a result. This also required the support of Weapon and Potion objects to dictate the dynamics of the battle. We then connected these backend components to the view to display the changes in the troll's HP, as we had originally intended to in our Phase 1 Proposal. We also implemented the Memento design pattern (User Story 1.6) as we had drawn out via the UML diagrams to save and load games efficiently. We were successful in implementing different difficulty levels (User Story 1.4) and maintaining the state of such using the State design pattern. We noticed it would be easier to implement color themes without using this design pattern, and proceeded with a different route to accomplish this. Finally, we observed that the Singleton design pattern would, in fact, be of use for the Player class (User Story 2.13). We were proud to have this done during our first official sprint, as it was essential in aiding the development of our future features. This is the reason that we decided to designate a user story tailored to this as it would be of great use for development on our end. Setting aside new User Stories such as User Story 2.13, 2.14, and 2.15, toward the developer end proved to be of great use to us as game developers. Effectively, the design patterns we illustrated in the Phase 1 Proposal were key in helping us carry out our user stories with direction and intent, along with helping us open the door as a foundation for more creative ideas.

Additionally, we are proud to have placed heavy emphasis on accessibility at the forefront of our development cycles. We accomplished multiple user stories such as the implementation of color themes (User Story 1.2), text-to-speech (User Story 1.5), and audio enhancements (User Stories 2.10, 2.11, 2.12, and 2.15). All of these user stories took a significant portion of our development time in order to help deliver a product that can be accessible to all. Our game features a variety of visual information as well as audible information for players who have accessibility needs for visual or hearing impairment to help further immerse them into the game.

During the process of working on some of these ideas, we noticed some unexpected changes had to be made. Some were for the better and some had to be taken to avoid significant overhead for a feature we deemed was insignificant to be taken up on a sprint within the project time frame. An example of the former is the implementation of a responsive visual display for the player's health (User Story 2.12). This user story was not originally intended to be completed, but with the development of the trolls (User Story 2.9) came the need to implement a new widget for the user to see their own health with the touch of a dynamically changing heart. This new user story adds more depth to the display and provides the user with greater information visually rather than purely numerically.

However, a situation in which we realized a limitation was during the development of extra color themes. We had originally anticipated creating multiple contrasts, but soon came to realize that this would be costly in terms of time. Instead, we settled for light and dark, as these striking contrasts would suffice in achieving our goal of greater accessibility for visually impaired players of our game. Decisions like these—to steer away from our original plans—did not come easy, but we learned their value and accepted them as part of the process of agile software development. Contrary to what we had originally believed before putting our sprints into practice, we recognize that switching gears is actually a benefit of software development via the agile methodology and we learned to pivot accordingly.