

Dungeon Game Process Documentation

Orange Team

Members: Tiffany Yip, Charlie Mason, Sharon John,
Mohamed Nasrudeen Meeran Mohammed Sharifdeen,
Chaya Tungkaserawong, Marcus Raymond, Qibei Ge, Ashley Dawson

Link to code: <https://github.com/cmason2/FirstPersonSword>

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Introduction and Task Overview

Our team has been tasked to create a dungeon game for a client, which we will be meeting every week. The timeline for this task began on the 2nd of November and ends on the 20th of December, providing us with roughly 7 weeks. With such a short timeline, it is crucial that we plan and manage our time for tasks properly. As such, our team had proceeded with the project using Scrum as our software development framework.

As our client has unfinished requirements for the game, it is crucial that we are able to adapt to the client requirements throughout the product development process. As such, our team has structured each sprint to be a week long, beginning on the day of the client meeting, and ending the day before the next client meeting. This allows the team to plan backlog tasks for the next sprint based on any client needs that arise during the client meeting.

0.1. Meetings

Meeting 0.1 - 02-11-21

Members Present: Charlie, Meeran, Qibei, Tiffany, Marcus, Sharon, Chaya

Members Absent: Ashley

In this preliminary meeting prior to our first customer meeting we first conducted a skills audit of our team to help identify each member's strengths and weaknesses.

Our relative skills and experience discussed are as below:

- Charlie – Some limited programming experience (C, C++, Java), can use photoshop, made an app before using Java
- Chaya – No major programming experience
- Tiffany – Psychology – game development for dissertation – Unity/C\#, also knows some Python and Javascript, good at conducting interviews and studies.
- Marcus – Maths degree – Backend software development, algorithms, databases. Python and Java experience. Some art/design experience
- Meeran – Electrical engineering background – A lot of Java experience
- Qibei – Vehicle engineering/manufacturing - No related experience in Computer Science, some python coding, traditional project management skills.
- Sharon – Front end development experience mainly in HTML, CSS, Javascript and Angular

Following that, we discussed possible tools and languages that we could use for our development. 2 major tools popped out. First being Unity, which is a game engine which uses C\# as its programming language. Although no one apart from Tiffany had any prior experience with Unity, she suggested that it was straightforward with a drag and drop graphical user interface and thus may provide a simple learning curve. Furthermore, Meeran has extensive use of Jira and suggested that it would be useful for planning out the sprints for our product development process.

We also discussed possible game ideas to present to our client tomorrow such as:

- Meeran - Board game, map of level made up of grids, player object moves through level in four directions.
- Marcus – Zelda like dungeon game or platformer
- Charlie – Pokémon style 2D battle game – perhaps with meme characters stuck in a dungeon, they need to escape to become relevant memes again. Alternatively, 3D escape-room type dungeon type game, maybe FPS. Kill enemies, find keys etc.

These ideas are also followed up with multiple questions which we plan on asking our client in our meeting tomorrow:

- What platform do you want the game to be developed for – Windows/Mac Desktop apps, Mobile Apps (Android/iOS)?
- How often do you want to see a new iteration of the product?
- How long should the game be / take to complete?
- Does it need to be all original content? How many assets and designs can we reuse from others?

We plan to use these ideas to present to our client tomorrow and use these questions as a basis for gathering possible client needs to further develop user needs beginning the first sprint tomorrow.

Sprint 1: 03-11-21 - 09-11-21

Scrum Master: Meeran
Document Owner: Tiffany

1.1. Sprint Overview

From the customer meeting (see section 1.7) where we presented 3 initial game ideas to the client, it is evident that the most important thing the client wanted was for us to expand on each of the game ideas and develop feasibility plans to present (see section 1.8). This is to provide the client with a clearer idea on which is the most suitable game idea to move forward with. Furthermore, this would provide the client and the team a better idea on how to move forward with particular features that the client raised in the meeting such as game play length, the leader board, and graphics to be used.

As such, we decided to split our team into 3 subteams, with each developing more substantial plans and storyboarding based on the game idea presented in the client meetings. This corresponds to the backlog tasks for this sprint as seen in section 1.4.

These teams consist of:

- Zelda like game: Marcus, Ashley, Qibei
- 3D game: Charlie, Tiffany
- Board game: Meeran, Chaya, Sharon

We had a team meeting in the middle of the sprint and discussed the ideas developed and provided feedback to each other (section 1.3). Charlie also presented a mock-up of a first person game made in Unity and provided some ideas on proceeding the development with Unity. We also prepared how to present these ideas to the customer. We also discussed some of the issues regarding our workflow that had come up during the sprint (section 1.6), as such we set up Jira accounts and a table for role delegation to help us improve our workflow overall.

As seen from the meeting notes, it is evident that we had developed on our game ideas and feasibility plans, thus allowing us to complete all the backlog tasks (section 1.5).

1.2. Sprint Review

In our sprint retrospective, everyone in our team reflected on what went well and what could be improved.

- Sharon: learned a lot about games, enjoyed exploring games and coming up with ideas. Enjoyed working with the team and learning about other people's thought process. Feeling more confident this week
- Tiffany: happy with the development of ideas
- Marcus: happy to have had the meeting in person, felt that it improved team collaboration and spirit
- Meeran: suggests that could have followed the sprint process better such as the use of more stand-ups.

- Charlie: learned unity for a little bit, thinks both 2D and 3D games are feasible and roughly easy to use. Found setting up GitHub a bit tricky but developed understanding of how it works. Suggests the use of GitHub in the future.
- Chaya: feels like that there was some progression, happy that we have chosen unity/narrowed down scope of game ideas.
- Ash: happy that there were sharing of ideas in the last meeting. Though felt that the separation into few groups made the group feel split/insufficient teamwork.
- Qibei: thinks using unity is a good idea. Suggests that tasks should have clearer deadlines and description and outcomes. Suggests that there should be pre-meeting before client meeting.

Overall, it could be seen that the team felt positive regarding the progress made since the first client meeting. Furthermore, there was improved team spirit, but this could be further developed in the future. However, it should be noted that we could further improve our workflow by following the sprint process better as raised by Meeran. This would be implemented in future sprints.

1.3. Meetings

1.3.1. Meeting – 07-11-21

Members Present: Charlie, Tiffany, Marcus, Ahsley, Qibei, Sharon, Meeran, Chaya

Each sub team presented their storyboards and plans for each game idea.

3D Game: Charlie, Tiffany

Idea summary:

Similar to a first-person shooter format, however, the main weapon will be a sword. The player will go through different rooms in the dungeon to kill enemies for “experience points”. Each room has a specific theme and monster to kill. It may also have puzzles for the player to solve to advance to the next room. The goal of the game is to gain enough experience points to beat the boss at the end of the game. Some of the room ideas are detailed below:

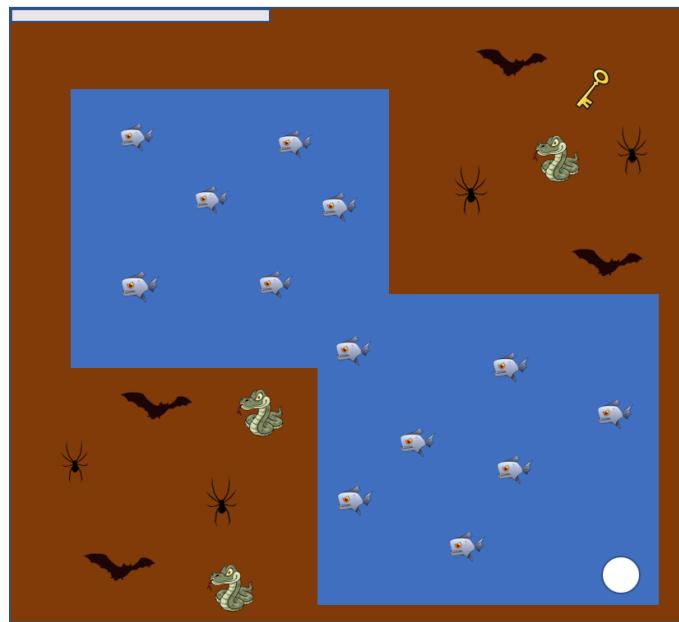


Figure 1 Water Room

Figure 1. is an overview of the water room. Here, the player (white circle) needs to swim through the room, killing piranhas, snakes, spiders etc. When this is finished, a key spawn and the player will need to pick that up to unlock the door (grey rectangle) to the next room.

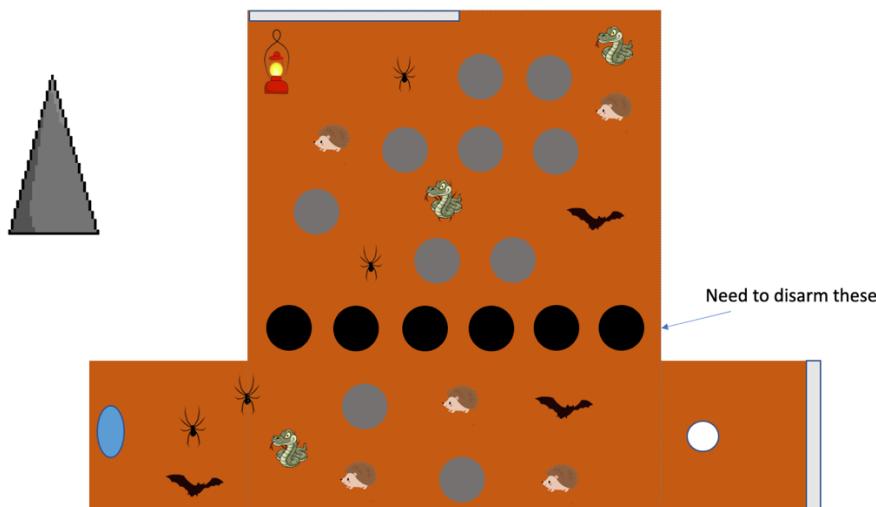


Figure 2 Spike Room

Figure 2 is the spike room. The grey circles represent spikes which come up and down and the black circles represent spikes which must be disabled by the player by pressing a button (blue circle). The player then must pick up a lamp at the end to advance to the next room.

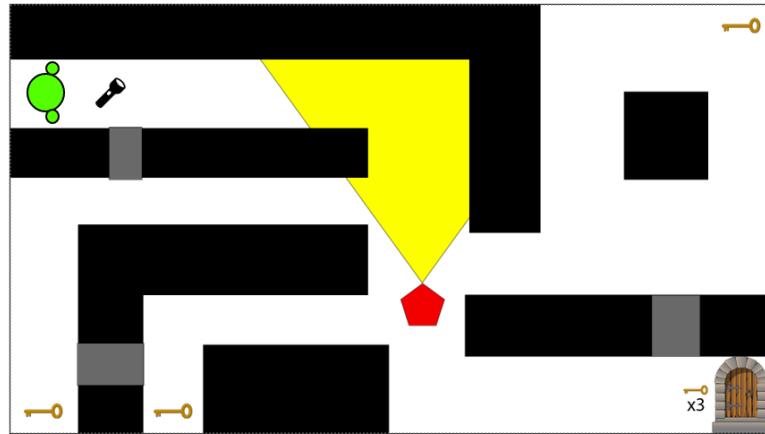


Figure 3 Maze Room

Figure 3 is an overview of the maze room. In this room the player has low vision as it is dim, and thus uses the lamp to help them navigate. In the room there is a shadow monster which follows the player closely, and the player has to outrun it, collect all the keys and use it to unlock the door at the end.

Feasibility evaluation:

Pros	Cons
More immersive as it is 3D	Difficulty in creating graphics
Looks realistic	Require more reuse of models
Potential to implement more complex detail	May require more time

Charlie also learned some unity and presented a simple 3D game mock-up (figure 4).



Figure 4 Dungeon Game Mock-up

Figure 4 demonstrates the player perspective. Furthermore, Charlie outlined that whilst he took some time to learn Unity, the overall process of creating this environment was fairly

simple. Suggesting that it could be a good game engine to develop the game on. Overall, the team felt increased confidence in developing games from gaining a bit of understanding of unity.

Board Game: Meeran, Sharon, Chaya

Idea summary: this is a two person game (or against a bot). The player has to choose a character to play as (the two players cannot choose the same character). Each character has a specific way in which it could move as detailed in figure 4. On the game map, there are special grids which has specific features (figure 5). The goal of the game is to get to the gate of the opposing player.

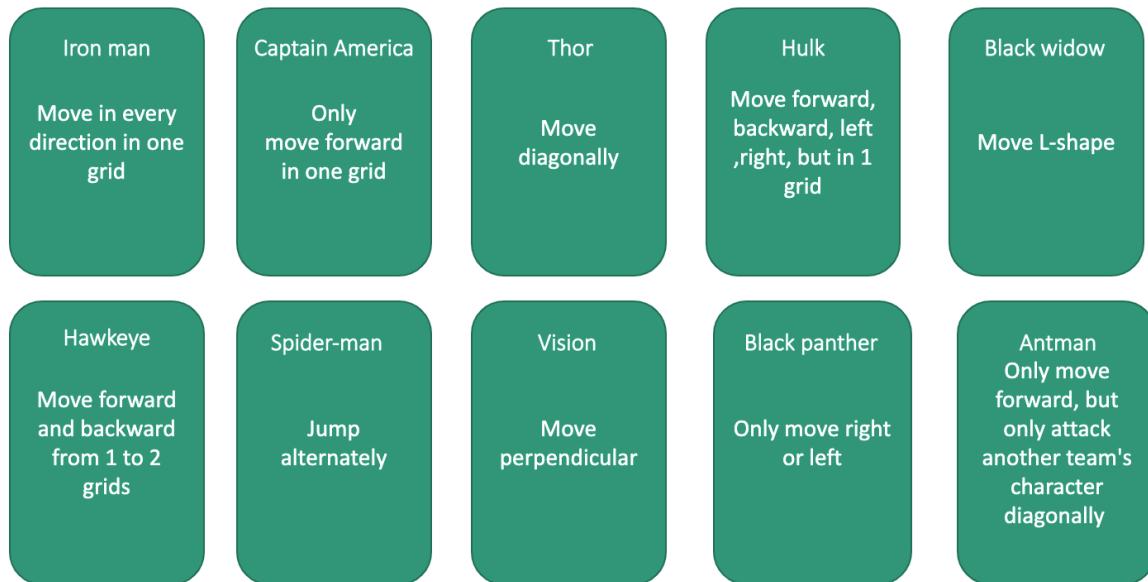


Figure 5 Character Features

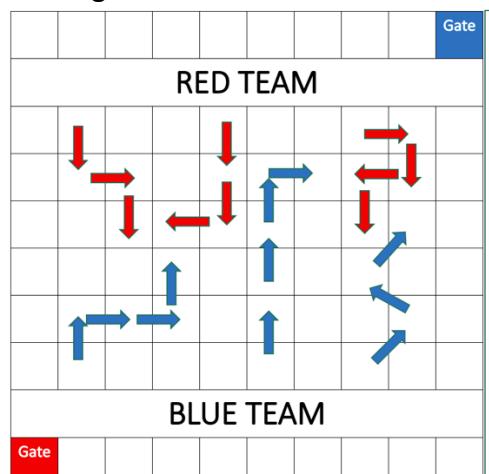


Figure 6 Game Map

								Gate
RED TEAM								
Orange		Gray						
			Black				Yellow	
	Green				Purple			
				Gray				
BLUE TEAM								
Gate								

FEATURES

Some grids in the map have a special feature:

Orange: hell pit

Gray: luck draw

Black: jail

Yellow: dragon

Green: safe zone

Purple: samurai

Not every grid in the map shows that it has a special feature, and it is placed randomly so that players cannot predict which grid has a hidden feature

Feasibility Evaluation:

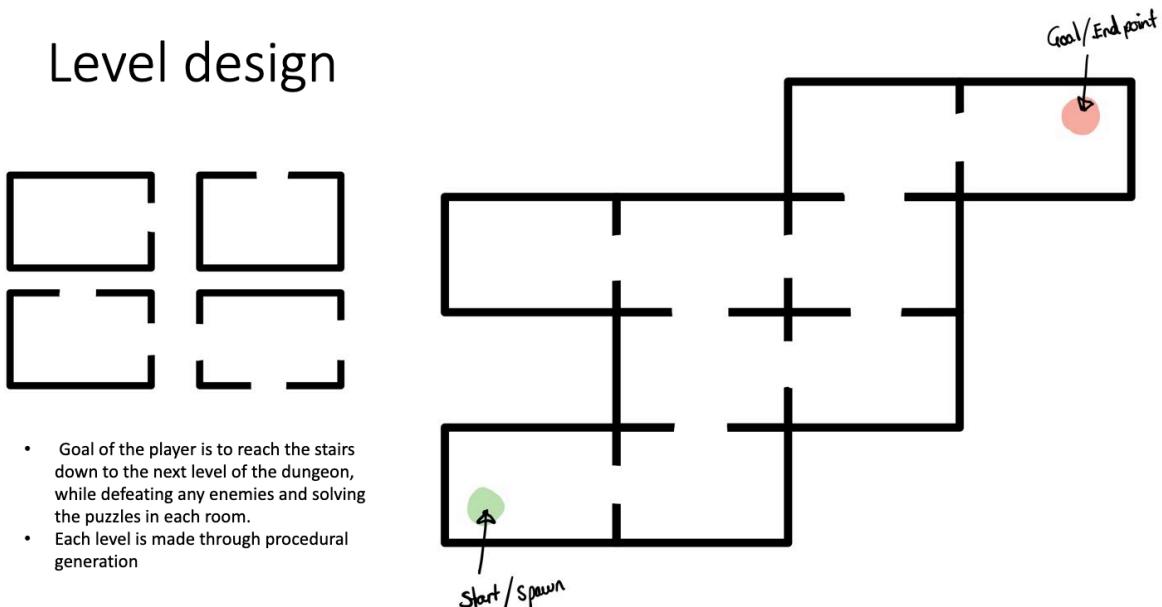
Pros	Cons
The game GUI/Design is not complicated	Limited scope in number of adventures to be implemented
It is suitable to all ages	Player may take time to familiarize themselves with the character moves
More luck based than strategy, so it will keep player interested	

Team felt that this idea was novel and unique, mirroring the sentiment of the customer in the meeting, however, there were some worries regarding programming the logic of the game as it involved a lot of puzzles.

Zelda Like Game: Marcus, Ashley, Qibei

Idea summary: this is a procedural generated game, meaning that there may be unlimited number of rooms. Goal of the game is to reach the stairs down to the next level of the dungeon whilst defeating enemies and solving puzzles in each room.

Level design



Feasibility Evaluation:

Pros	Cons
No need to worry about complicated features found in 3-D games (e.g., lighting & shadows, camera).	Puzzles / combat gameplay must be well-designed to keep game interesting.
Action and battles generally more simplistic in 2D setting.	Story is difficult to implement to a randomly generating game.
Can be replayed many times since generation of levels produces new gameplay.	Procedural generation algorithm could prove costly to set up initially.
Less difficult world to generate and design artistically.	

The team felt that there was a lot of potential to developing the game and providing a creative spin on it despite it being inspired by a Zelda format.

There were worries regarding producing the algorithm for procedural generation, this is particularly important as the team does not have significant game development experience and learning this may be a bit difficult given the short development timeline.

Group overall was happy with the finished progress and felt confident to bring these ideas to the customer meeting.

1.4. Backlog Overview

Backlog ID corresponds to the ID on JIRA.

Backlog ID	Backlog Description
SC-2	Create storyboards and plans for 3D game
SC-3	Create storyboards and plans for Zelda game
SC-4	Create storyboards and plans for board game

1.5. Completed Backlog

Story points are rough estimate on hours needed, with 1 point corresponding to 2 hours

Backlog ID	Story Points	Priority	Assignee(s)	Backlog Description	Technical Difficulty
SC-2	5	High	Charlie, Tiffany	Create storyboards and plans for 3D game	Low
SC-3	5	High	Marcus, Ashley, Qibei	Create storyboards and plans for Zelda game	Low
SC-4	5	High	Meeran, Chaya, Sharon	Create storyboards and plans for board game	Low

1.6. Exception Handling

During the sprint, we realised that we had a bit of uncertainty delegating roles for each sprint (i.e. scrum master, document owner, programmer etc.). This was an issue as it made the team structure vague, which impacts on collaboration. As such, Meeran had created a document outlining roles that members could take up in each sprint. We plan to use this to help us discuss and delegate the roles we could take up at the start of each sprint from now on.

We also found that there lacked structure when it came to setting up and documenting backlog items. For instance, whilst we were all tasked with developing storyboards and ideas for the game, these were mostly verbally agreed, but it could be easily forgotten, or it may not be clear. As such, we all set up Jira accounts and used it to create a shared backlog within the team. Using Jira also allowed us to log our progress with the backlog items across the sprint, and we have thus decided to continue using this throughout the game development process.

1.7. Customer Meeting and Analysis

Asked client what particular format of a game they wanted (i.e. desktop, mobile, browser) Client liked mobile development but acknowledges that this presents challenges to groups that don't have the expertise and tools (Same type of phone/ Mac needed for Xcode) to accommodate this development so he is happy with having a desktop product. He also suggests the idea of a browser based game that can then be played on all devices. However, client suggested that it is flexible, depending on the group expertise and abilities, suggested that group should conduct research to help gauge feasibility.

Proposed multiple ideas as seen in the preliminary meeting notes:

- Zelda like game: 2D adventure, exploring dungeon, find items to help you move to other rooms
- 3D game: similar to Zelda in goals, but just different in perspective and design
- Board game: with 3D graphic, players have particular goals and scene have walls. Player has to escape from walls to win. Could be 2 player (played using same computer) or play against computer.

Customer showed interest in the novelty of the board game idea. However, customer didn't want to give feedback on the specific ideas as they wanted further development of each idea.

Regarding artwork, customer suggested that stock items is a good initial starting point for increase development speed, although encourages development of own assets if required.

Regarding progress demonstration and expectations for each week, client suggests that progress documentation could be displayed in many different ways depending on what is discussed for the particular sprint (i.e. feature development, specific process documents, backlog changes).

Game length: client suggests that something over in 30 seconds is not a great deal of fun, although game length could depend on design of the game. Can either go down the set level design route and implement as many levels as feasible within the time frame or go down the procedural generation route of infinitely expanding map. Essentially, there is no set length.

Regarding particular features, client suggests the possibility of a leader board to garner some competitive spirit in players, though how to compare players is dependent on the design of the game.

1.8. User Stories

US-1-VER1		
Backlog ID: SC-2, SC-3, SC-4	Priority: High	Story Points: 12
AS A Customer I WANT Storyboards and feasibility plans for the game ideas SO THAT I can gauge the most suitable game idea to move forward with	Acceptance Criteria: creation of substantial storyboard and feasibility plans for game idea.	

US-2-VER1		
Backlog ID: SC-2, SC-3, SC-4	Priority: Medium	Story Points: 1
AS A Customer I WANT A leader board in the game SO THAT The player can be a bit competitive, but this needs to be suitable for the game	Acceptance Criteria: creation of substantial storyboard and feasibility plans for game idea and see if a leader board is feasible.	

US-3-VER1		
Backlog ID: SC-2, SC-3, SC-4	Priority: Medium	Story Points: 1
AS A Customer I WANT A game with a substantive length SO THAT It provides enough fun, but is feasible and suitable for the type of game developed	Acceptance Criteria: creation of substantial storyboard and feasibility plans for game idea and see what game length is feasible.	

US-4-VER1		
Backlog ID: SC-2, SC-3, SC-4	Priority: Medium	Story Points: 1
AS A Customer I WANT A game with good graphics, no preference if it is self-made or reused SO THAT The game looks good, but mostly, is feasible to develop within the timespan.	Acceptance Criteria: creation of substantial storyboard and feasibility plans for game idea and see how to proceed with graphics choice most appropriately.	

1.9. User Story Tests

User Story ID	Met acceptance criteria?	Description
US-1-VER1	Y	See game storyboard and ideas from meeting in section 1.3.1.
US-2-VER1	Y	See game storyboard and ideas from meeting in section 1.3.1.
US-3-VER1	Y	See game storyboard and ideas from meeting in section 1.3.1.
US-4-VER1	Y	See game storyboard and ideas from meeting in section 1.3.1.

1.10. Requirements Use Cases

As we have not progressed to the software development stage, use cases have not been developed.

1.11. Requirements Use Cases Tests

As we have not progressed to the software development stage, use cases testing have not been conducted.

1.12. Design Use Cases

As we have not progressed to the software development stage, use cases have not been developed.

[1.13. Design Use Cases Tests](#)

As we have not progressed to the software development stage, use cases testing have not been conducted.

[1.14. CRC Cards](#)

As we have not progressed to the software development stage, CRC cards have not been developed.

[1.15. User Interface Design](#)

As we have not progressed to the software development stage, there is not user interface design yet.

Sprint 2: 11-11-21 - 17-11-21

Scrum Master: Mohamed Nasrudeen Meeran

Document Owner: Sharon John

2.1. Sprint Overview

This sprint is broken down into 3 main agendas:

- Learning Unity
- Exploring games feasibility of each idea in Unity
- Finally, Choosing final game idea

Following the customer meeting (see section 2.7), we now know that the customer is happy with the boardgame and 3D game idea. As the team has chosen to use Unity as our development platform, it is important that we learn how to use Unity to ensure that the development process goes smoothly. Furthermore, understanding the learning curve to use Unity would help us better gauge the feasibility of developing either the boardgame or 3D game. So, we decided to take advantage of this sprint to learn Unity individually (see section 2.4 for backlog overview). The team explored the feasibility of the 3-D first person game and the board game and tried to implement specific features in Unity, then we had a meeting display and discuss our progress (see section 2.3.2). In this meeting, we also voted among ourselves to find the idea that fascinated most of the team members and decided to proceed with the 3-D First person sword game. Although we realized that we wanted to accomplish more learning activities in the middle of the sprint (see section 2.6) we reflected on this (see section 2.2) and planned to schedule this in a future sprint. Overall, all the initial backlog tasks ascribed were accomplished in this sprint (see section 2.5).

2.2. Sprint Review

Minutes of retrospective:

- Everyone on the team was happy with chosen game
- Assigning a week for Unity was a great idea as now everyone is more confident on beginning development.
- Knowledge transfer sessions could not be included in this sprint even we planned for it. Learning Unity and exploring game feasibility took up most of the time in this sprint. So, we could not conduct these sessions.
- Creating a solid plan on how to begin with game development was pending.
- We decided to create tasks for each sprint at the beginning of each sprint itself. By doing so, we will not miss any tasks.
- We also decided to have a 5min to 10min discussion among the team before client discussion. This will help us to more prepared with the customer meeting.

2.3. Meetings

2.3.1. Meeting – 11-11-21

Members Present: Ashley, Charlie, Chaya, Marcus, Meeran, Qibei, Sharon, Tiffany

Members Absent: N/A

This meeting was used for planning out the sprint. We created stories Jira and added tasks for each member individually (see section 2.4). While creating the stories, Meeran explained how to add story points appropriately and made sure tasks are equally split to avoid work load. We discussed how to learn unity and members of the team individually suggested the use of video tutorials, game development examples and other online materials. To facilitate collaboration during game development, we decided to use Github for version control and to ensure that all members have access to the code base. We also agreed to meet on teams for the next meeting to keep a track on the progress of the tasks and share each member's progress with learning unity.

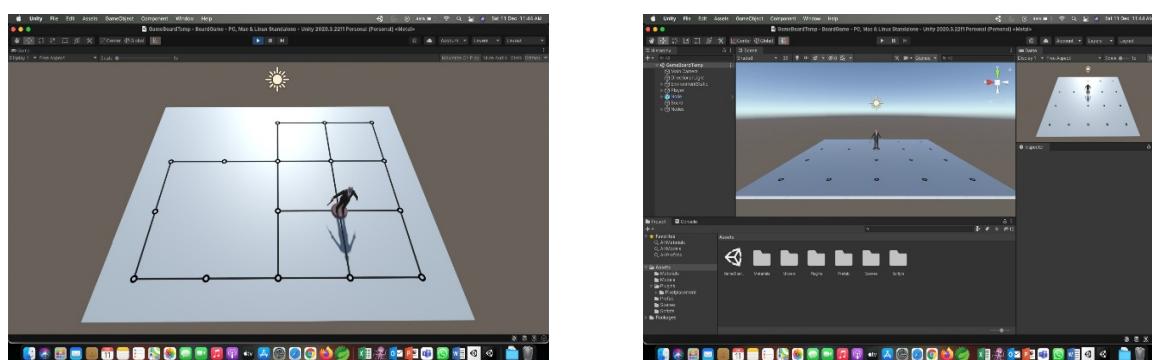
2.3.2. Meeting – 13-11-21

Members Present: Ashley, Charlie, Chaya, Marcus, Meeran, Qibei, Sharon, Tiffany

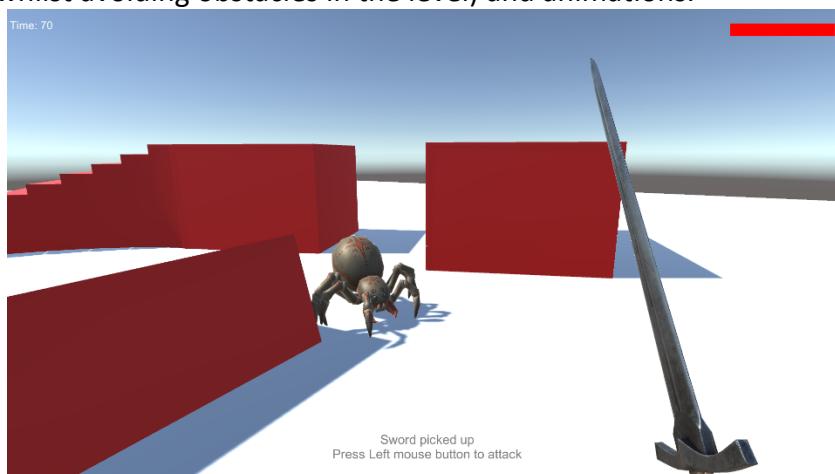
Members Absent: N/A

In this meeting we shared the progress of learning unity, most of the team members shared features that they were able to develop in unity. Efforts of different members are mentioned below.

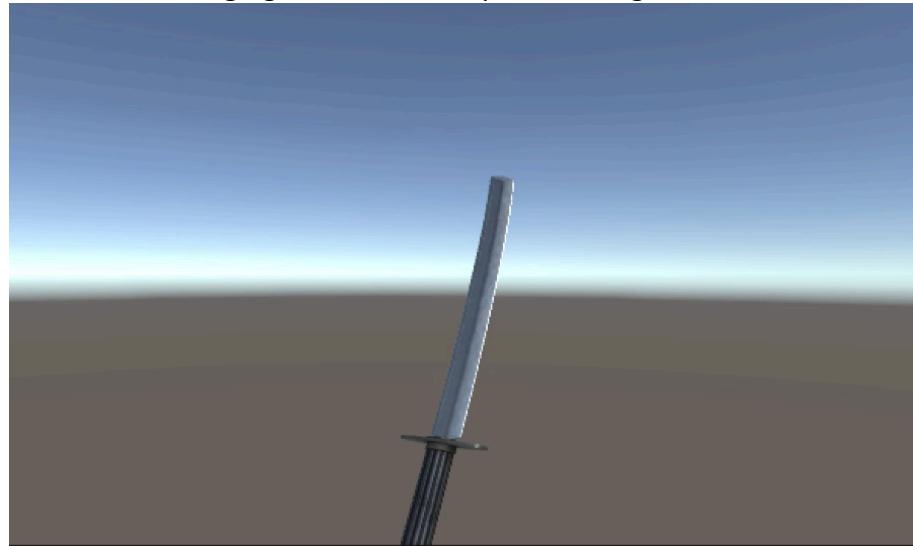
Meeran decided to learn Unity by creating sort of board game and implementing player movement from each spot.



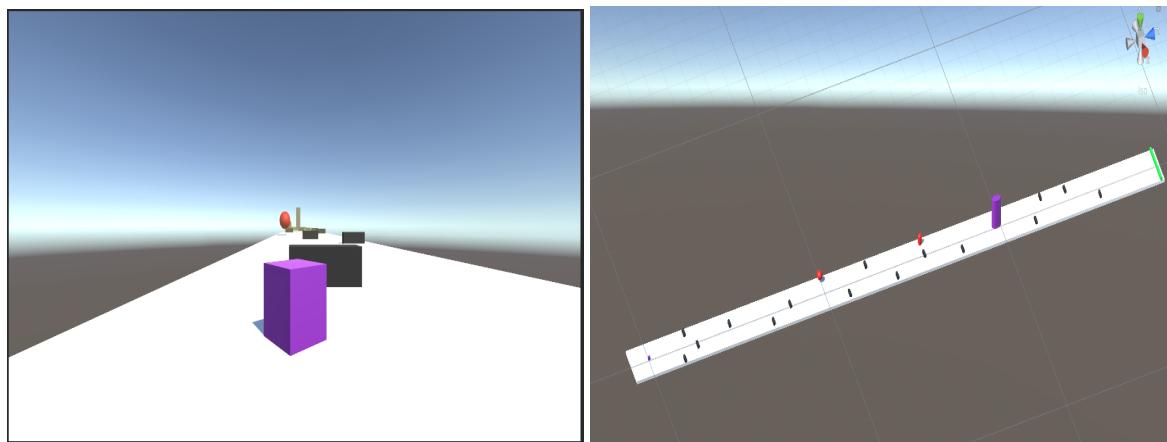
Charlie continued to work on the prototype of the game, 3-D First person game, that he started the week before. He was focused on looking at the enemy AI pathfinding (following the player whilst avoiding obstacles in the level) and animations.



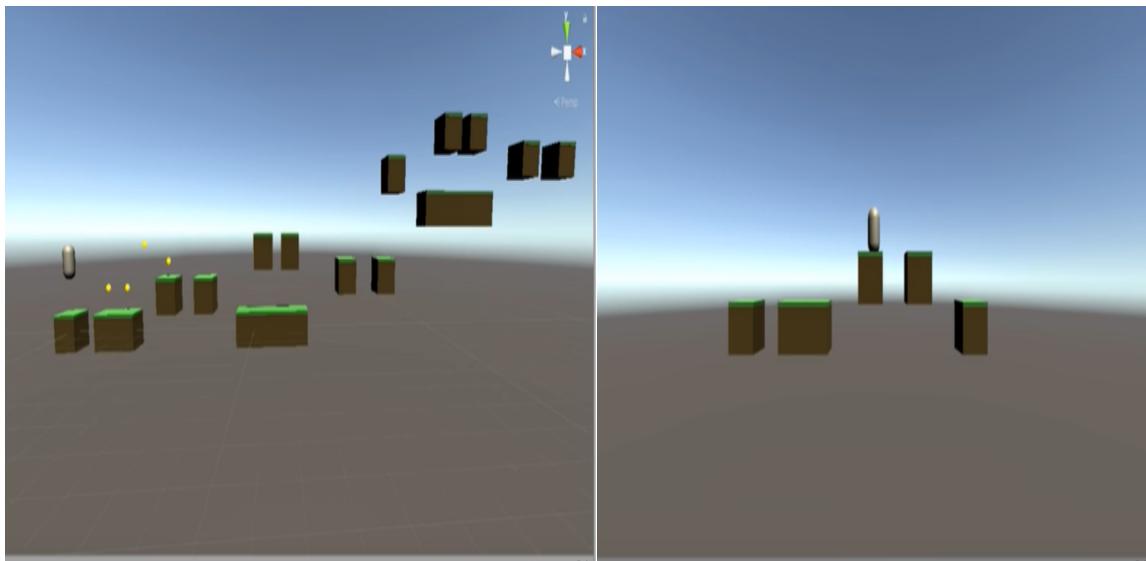
Tiffany explored sword swinging animation as a part of 3-D game.



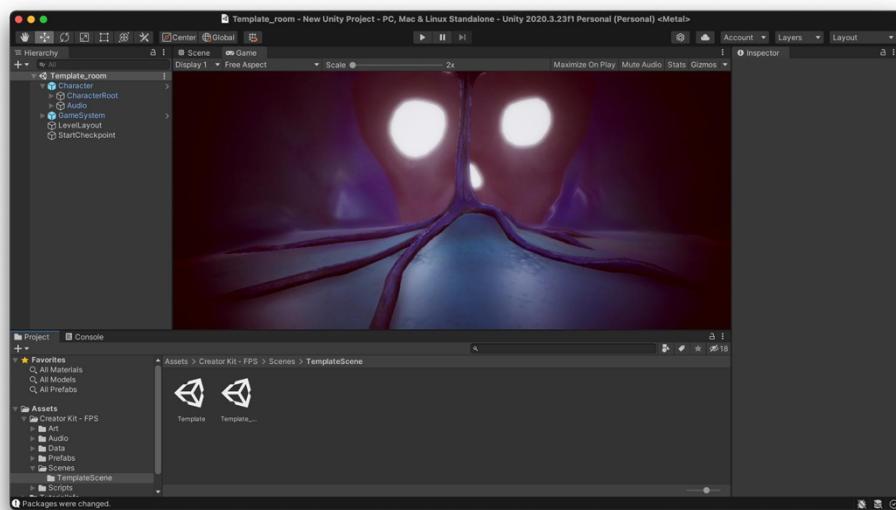
Sharon explored tutorials from YouTube and implemented some examples from that. The game is a block racing game, to reach the end by avoiding obstacles.



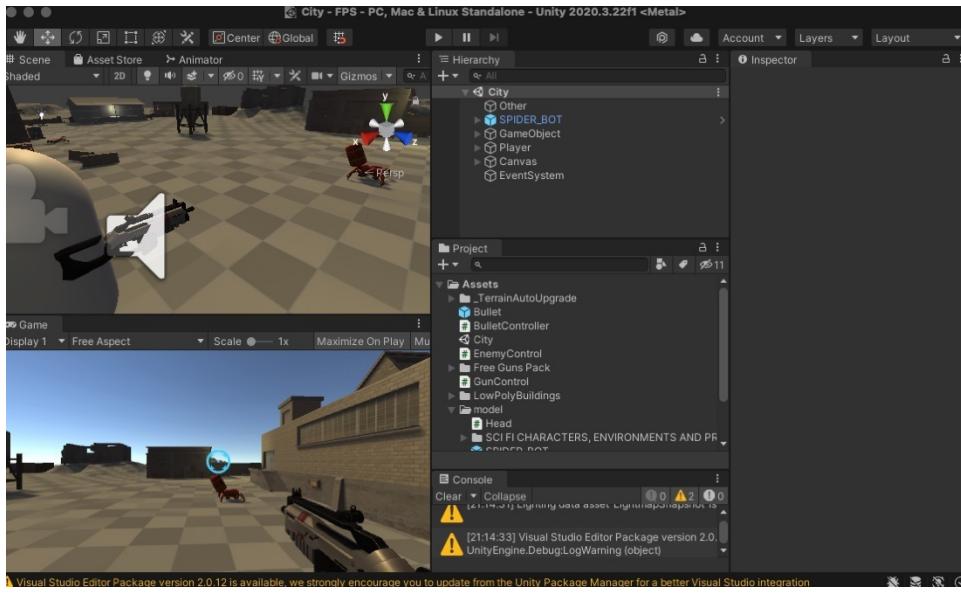
Chaya also created examples from tutorials to learn basic folder structure, how to write script, game object transformations and component



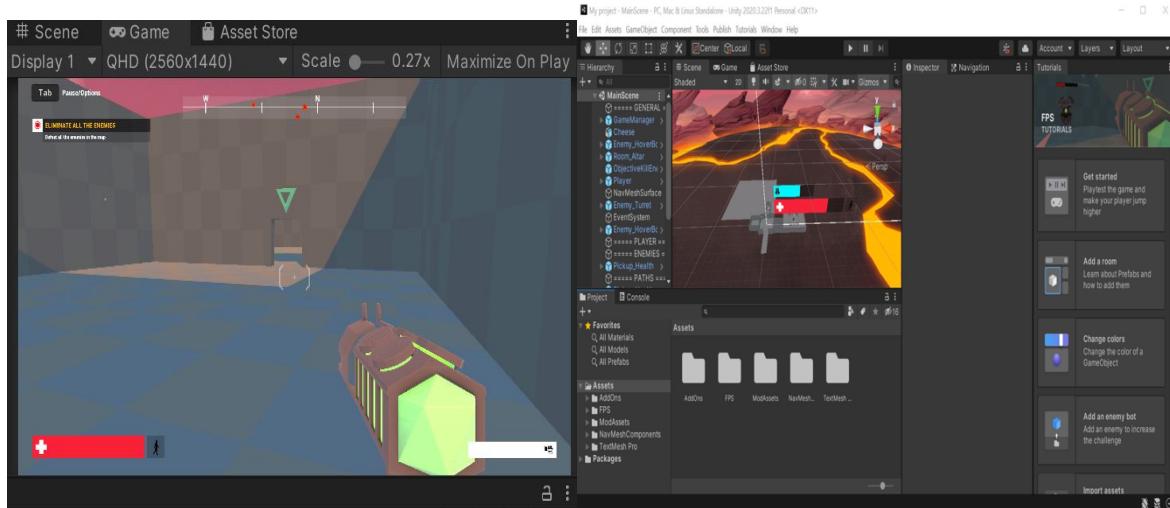
Marcus created a small example that thoroughly gives an idea about the Unity Editor interface. This example explores the enemy targets. He then Designed a level that could be played through and created an end point for the game.



Qibei made a demo of FPS game, he also added an animation to the gun and wrote some scripts that damages an enemy object.



During this sprint, Ashley completed a Unity tutorial on creating a 3D fps game. He learned how to add new rooms / meshes, insert an enemy that attacks and modify speed movement and in-game physics of the player.



We then conducted a vote to decide whether to go forward with the 3D or board game. The majority voted to continue with the 3D game as our final idea. In addition to preference, based on the progress the team made in learning unity, overall the team felt fairly confident regarding the feasibility of developing a 3D game as well. We also brainstormed few feasible levels for the game and added it on one note, aiming to present it to the customer in the next meeting:

- Maze room
 - Player navigates through a maze collecting keys
 - Room is dark, player collects a flashlight on entry to the room
 - Invincible enemy patrols around the maze, chases and attacks player when seen
 - Once all keys collected, exit door can be opened
- Exploration room

- Player explores the room and interacts with objects such as switches to disable traps in order to progress
 - Enemies attack the player when they get close
- Boss Room
 - Room with boss enemy in centre
 - Healing items around perimeter of room to restore player health
 - Defeating the boss ends the game
- Ocean Room (Achieve Mermaid mode)
 - Room with Water and all ocean set properties like some Coral, small fishes
 - The enemy is some wild sharks/whales
 - The enemy should be killed to collect the Keys
 - If possible, we can have some keys with letters like H—0, E—0, L—0, P—0
 - Upon collecting the keys, the player will move to the mermaid move, then we can bring up an underwater palace
 - Doors of the Palace will get open and then we can move to other rooms or we can bring in some idea of exploration in this palace room
- Volcano room:
 - color will be red and orange
 - hills with volcano pits and the volcanos can erupt unexpectedly(if possible)
 - the player should jump from hill to hill and avoid pits
- Crystal Cave:
 - Avoid crystals of certain colors – poisonous
 - Collect crystals of some other color to get to key
- Bat Cave:
 - Avoid flying bats
- Poisonous gas Cave:
 - Once the player enters this room, he will have some time to find a mask (I don't know the name of that big mask) or he will die
- We can also have a dummy room at times just to confuse the player:
 - Two doors will be there and the player can choose where to go to
 - One door will lead to the other rooms as discussed
 - The second door will immediately kill the player with something
- Mechanical room:
 - There are puzzles to solve in order to leave the room (escape room)
 - It gives the clue at start and every time that one puzzle is solved
 - Solve the puzzles>>>Find the key to open the door>>>Leave the room
 - A monster will come to the room at any time so player has hide behind the objects until it leave the room
 - If player can solve the puzzles and leave the room in time limit, player can end the game without fighting boss enemy

2.4. Backlog Overview

Backlog ID	Priority	Backlog Description
SC-16	Medium	Exploring the game feasibility in Unity
SC-15	High	Self-Study - Unity
SC-34	Medium	Recording the ideas on detailing the 3D FPS Game in Teams One Note

2.5. Completed Backlog

Backlog ID	Story Points	Assignee(s)	Backlog Description	Technical Difficulty
SC-16	16	Entire Team (2 points each)	Exploring the game feasibility in Unity	Medium
SC-15	16	Entire Team (2 points each)	Self-Study - Unity	High
SC-34	8	Entire Team (1 points each)	Recording the ideas on detailing the 3D FPS Game in Teams One Note	Medium

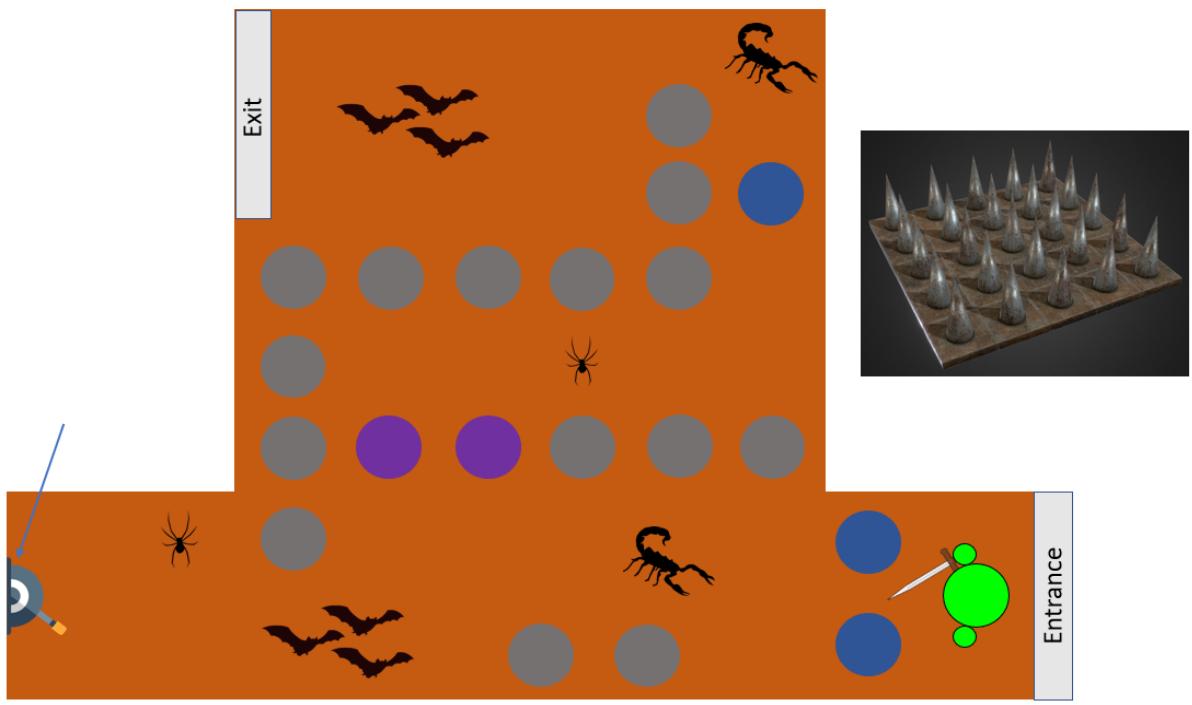
2.6. Exception Handling

In the middle of the sprint, we also realised that whilst we were going to move forward with using Unity, most of the team have very little experience and understanding of it with the exception of Tiffany and Charlie, who had come to self-learn many aspect of game development. Whilst we said that we should hold sessions so that the more knowledgeable team members share their knowledge to the rest of the team, this did not occur as it did not fit into the team's schedule in addition to the existing backlog tasks. However, we planned a date for it in the next sprint. Since we did not start development yet, we do not have other issues.

2.7. Customer Meeting and Analysis

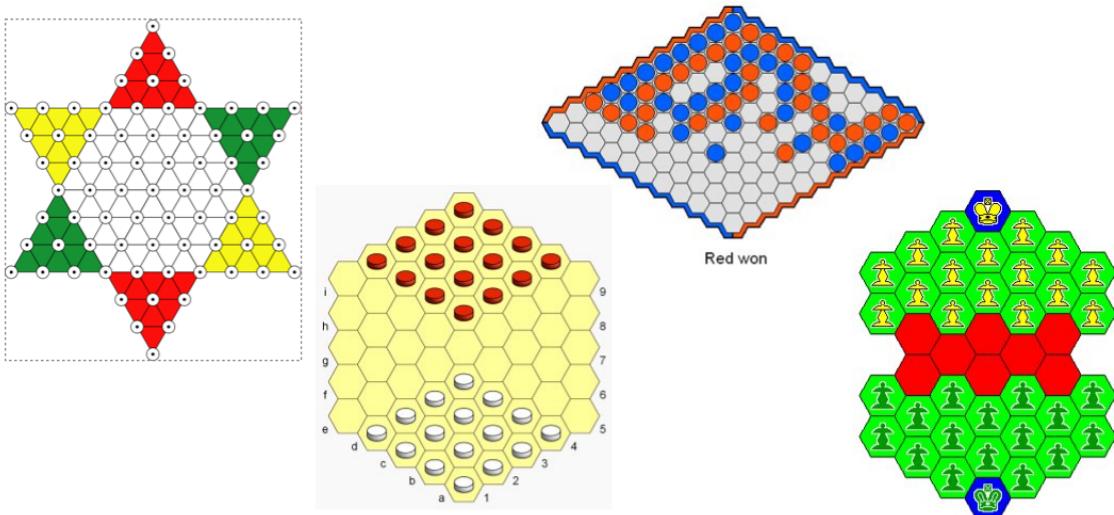
The customer meeting kicked off with the team elaborating on the three previous ideas (The 3-D First person game, Zelda themed game and 2-D Board game). Team was divided into three groups and each group created a presentation on each of the idea.

In the 3-D First person game, the player wakes up in a dungeon, must move through a series of various levels. It contains numerous levels in which the player must kill monsters, avoid traps, spikes etc and reach the final level to fight the "Boss" and win the game. The player can interact with objects in each environment like opening doors, picking up torches, swinging swords etc. Each level is in a different environment. A maze room, spike room, combat room etc. The monsters are bats, spiders and scary looking multifaced monster as the boss. Player has a health bar that depletes when they take damage from enemies/environment.



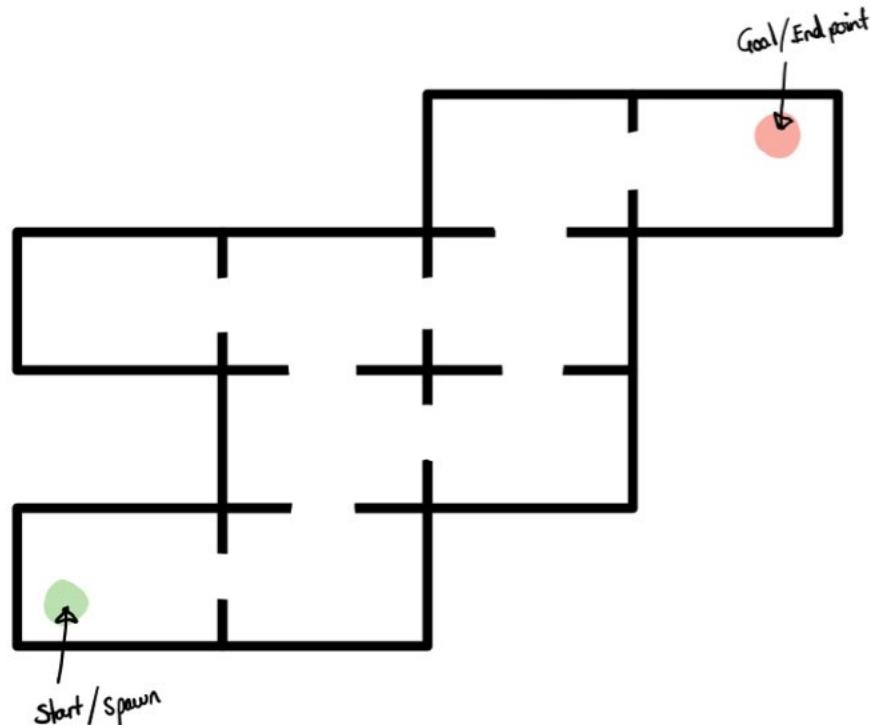
Example of spike level

The board game presented was a combination of luck and strategy. The board changes its layout in each level. Player(s) can choose which maps want to be played at the beginning of the game and it has a random choosing feature. Every map is a symmetric shape. The game is a competition between two teams. Each team is allowed to select a set of characters at the beginning of the game. These characters have specific powers and have restricted movement. For example, some characters can only move one or jump in L shape etc. The characters are exposed traps, sudden death, attacking dragons, samurai etc randomly to induce luck factor to the game. The aim is to reach the appropriate doors on either end of the board. The team with most of its character escaped in each time wins. Players can measure how well they played by looking at the ranking board. Who use the least amount of time to reach the gate has the highest rank in leader board.



Board layouts

The next idea is a classic Zelda themed game. The goal of the player is to reach the stairs down to the next level of the dungeon, while defeating any enemies and solving the puzzles in each room. Each level is made through procedural generation. This game has a lot of advantages like it is less difficult to generate and design artistically, it can be replayed many times since generation of levels produces new gameplay. It has a more simplistic game design than 3D. It also had some disadvantages like procedural generation algorithm could prove costly to set up initially, it is difficult to implement a story to a randomly generating game and because we decided to proceed with Unity, which is more designed for 3D games, than 2D (We will have to draw / paint features (2D) and characters instead of modelling (3D)).



Level Design of Zelda themed game

The customer liked the 3-D First person game and 2-D Board game. He gave us the option to proceed with any one of these ideas. We also confirmed that we will be implementing the game development with Unity. The customer did not have any different opinion regarding this. He also mentioned to produce concrete plans for various levels of the game.

2.8. User Stories

US-5-VER1		
BacklogID: SC-16	Priority: Medium	Story Points: 16
AS A Customer I WANT to fix the final idea from the two ideas SO THAT the development can be started as soon as possible	Acceptance Criteria: Finalize the selection of the game	

US-6-VER1		
BacklogID: SC-15	Priority: High	Story Points: 16
AS A Customer I WANT the team to familiarize with unity SO THAT development can be smooth	Acceptance Criteria: Familiarize with how unity works	

US-7-VER1		
BacklogID: SC-34	Priority: Medium	Story Points: 8
AS A Customer I WANT the team to fix the ideas for each level SO THAT development can be planned and the idea is clear	Acceptance Criteria: Produce ideas for game levels	

2.9. User Story Tests

User Story ID	Acceptance criteria met?	Description
US-5-VER1	Y	See meeting notes in section 2.3.2
US-6-VER1	Y	See meeting notes in section 2.3.2
US-7-VER1	Y	See meeting notes in section 2.3.2

2.10. Requirements Use Cases

Since we did not start development, we do not have any user cases.

2.11. Requirements Use Cases Tests

Since we did not start development, we do not have any user cases test.

2.12. Design Use Cases

Since we did not start development, we do not have any user cases.

2.13. Design Use Cases Tests

Since we did not start development, we do not have any user cases test.

2.14. CRC Cards

Since we did not start development, we do not have any CRC cards.

2.15. User Interface Design

Since we did not start development, we do not have any user interface design.

Sprint 3: 17-11-21 - 23-11-21

Scrum Master: Sharon John

Document Owner: Mohamed Nasrudeen Meeran

3.1. Sprint Overview

Sprint-3 is our first actual development sprint, so we planned to focus on the setting up the IDE and game development. Below are the user stories targeted.

- Create a Repository in GIT for the team game development code versioning
- Focus on to create a Layout for at least two levels of the game. Such as Maze and Boss level.
- Implementing the main player functionality for the game to play
- Implementing the action of the player to pick any objects
- Since we are behind on documentation, we also focussed to create a document template so that we can use the same format for all sprints
- Creating the sprint document for the sprints 1,2 and 3

For further details related to Priority, user story points, Assignee and technical competency, refer - Section-3.5-Completed Backlogs. In addition to these stories, we also targeted to create backlog tasks that were as detailed as possible (breaking down tasks into its smallest unit) and you can refer Section-3.4-Backlog Overview for more details.

In order to achieve and realise the target, we have come up with lot of plans like

- Resource management (split up of task equally) refer - Section-3.5-Completed Backlogs
- Making everyone in the team accountable for the activity, refer – Section-3.3.1. Also we planned to rotate this activity every sprint
- Detailed Sprint planning session, we have analysed the team capability and came up with the plan to make this sprint a successful one. For details refer – Section-3.3.1
- Frequent meetups to discuss about the team progress on their activity be it a game development or the documentation or setting up the IDE etc., Also we discussed about the impediments and we try to solve some during the meet itself and few outside of the stand up. For details, refer Section-3.3.3
- Knowledge transfer sessions, the purpose of the call is to educate the team to get familiarize with the unity and github. refer section-3.3.2
- We have handled few of the Exception i.e., the issue faced as part of game development, IDE setup and in the documentation. For details, refer Section 3.6

We also made sure to overcome the last sprint(sprint-2) retrospective improvement action items.

Finally, at the end of Sprint-3, we had a retrospective meeting and discussed about

- The items which went well in this sprint
- The items that didn't go well
- Action item for the improvement

For Further details, Refer Section 3.2.

3.2. Sprint Review

Below are the minutes of the Sprint-3 Retrospective:

What went well:

- Documentation – We could see the real progress in the documentation by creating the template in the overleaf and now every sprint has the sprint document,
- Development – we now end up creating two basic level in this sprint and developed some basic features like player movements and enemies.
- Knowledge Transfer – It's really good that we arranged a knowledge transfer session at 10w on Game development activity. The outcome of this session is good that we can able to play around with the unity independently.
- Document Template – The template is created in the overleaf and that we can use it for all the sprints.
- Team was happy that we made good process in the game development. We ended up developing a simple outline for 2 levels with a player and enemies.

What didn't go well:

- At the end of this sprint, The Backlog in the JIRA is almost empty and that is not good as a team for the progress.
- Jira stories and its sub-task created in this sprint may not have been detailed enough to identify the actual task. It should be more specific ex: it has maze development but not like building doors, keys etc.
- As per Agile process, we should have more standups, but unfortunately in this sprint, we didn't have a standup call except the one for the customer meeting preparation call.

Any action item for the improvement:

- User stories in the document template/document should be in the format as per the template shared by client like a table with actor, action, expectation etc.,
- sprint retrospective (or Review) is missing in the sprint document template and in the sprint 1,2,3 document. So all the created documents and the upcoming documents should be filled with this review details.

3.3. Meetings

3.3.1. Meeting – 16-11-21

Members Present: Ashley, Charlie, Chaya, Marcus, Meeran, Qibei, Sharon, Tiffany

Members Absent: Nil

This is the Sprint Planning Meeting:

As part of this, we have a very detailed discussion on the below Questions,

- What is the process which we need to adapt? Refer section- 3.3.1.1
 - What is the Agile methodologies and Roles of each team member?
 - How we are going to maintain the code and versioning of it?
 - What are all the backlogs which we need to create for this sprint?
- How we proceed to develop the game? Refer Section – 1.3.1.2
 - What is the technology and IDE for this project?
 - What are the features which we are planning to create?
- How we can progress to create documents? Refer Section – 1.3.1.3

- Are we going to create a document template?
- What are all the documents planned to create?

[3.3.1.1. Discussion related to Process](#)

As per Agile process, everyone in the team should be associated with the Roles and this role should be switched among themselves on a rotational basis.

After the discussion and on voluntary basis, we have come up with the below role assignment for the Sprint-3

Roles assigned to each team member:

Solution Owner: Sharon

MOM Organiser: Meeran

Documents Owner: Meeran

Documents: Tiffany, Sharon, Meeran and Chaya

Presenter: Ashley

Version Controller: Charlie

Developer: Entire Team

Tester: Entire Team will perform the unit testing

Release Manager: Charlie

Maintaining the code plays a vital role in all the projects and this ensure that

- The team can work on the same code without much issues
- This should come up with the code version on each commits/rollback(revert)
- It should help to review or go back to the old version if necessary

In order to fulfil this, we decided to go with GitHub for code maintaining and versioning.

We planned that, one of the team member(Charlie) will create a Repo in GITHUB and provide access to the entire team and then will educate the entire team to get themselves familiarize with GitHub and its usage.

At the end of the previous sprint, The Backlog items in the JIRA is empty such that we will create a backlog in the current sprint and then move it to sprint.

So, we planned to create as much as possible backlog items in this sprint (Refer Section – 3.4) so that we will get a better idea on the overall process and progress.

[3.3.1.2. Discussion related to Technical Aspects](#)

As part of earlier sprint, we took time to decide on the technology which we are going to adapt for this development activity and the result of it, our team decided to go with Unity for the game development.

In this sprint, in order to start with the development activity, all the developers (entire team) should

- Install Unity and Editor of correct version
- Install Github and clone the team repository
- Create a unity project from the GitHub repo

In addition to the basic software installation and creating the projects, we planned to create the below feature in the game.

- Main (First) Introduction UI Screen
- First level (Maze Level)
- Final Level (Boss Level)
- Player Movement
- Enabling Player to pick up objects

For further details on the feature that we planned to create, refer to Section 3.8.

3.3.1.3. Discussion related to Documentation

Documentation is the one predominant area where we are lacking, though we have all notes in Microsoft Teams but not well organised. So as part of this sprint, we should do a considerable improvement in terms of documentation.

- we will create a Sprint document template in overleaf
- Assign each sprint document activity to one team member (so that they can spend some Quality time in developing the document),
- We should realise the sprint-3 document as well at the end of this sprint.

3.3.2. Meeting – 19-11-21

Members Present: Ashley, Charlie, Chaya, Meeran, Qibei

Members Absent: Marcus, Sharon, Tiffany

This is the knowledge transfer session

Topic covered: Game development in Unity

Host: Charlie

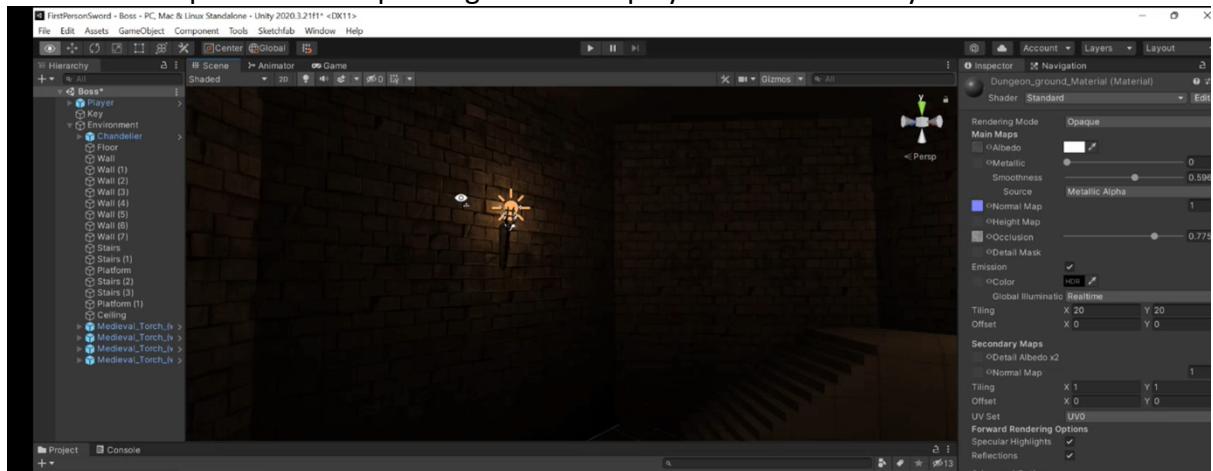
Place: 10W, University of Bath

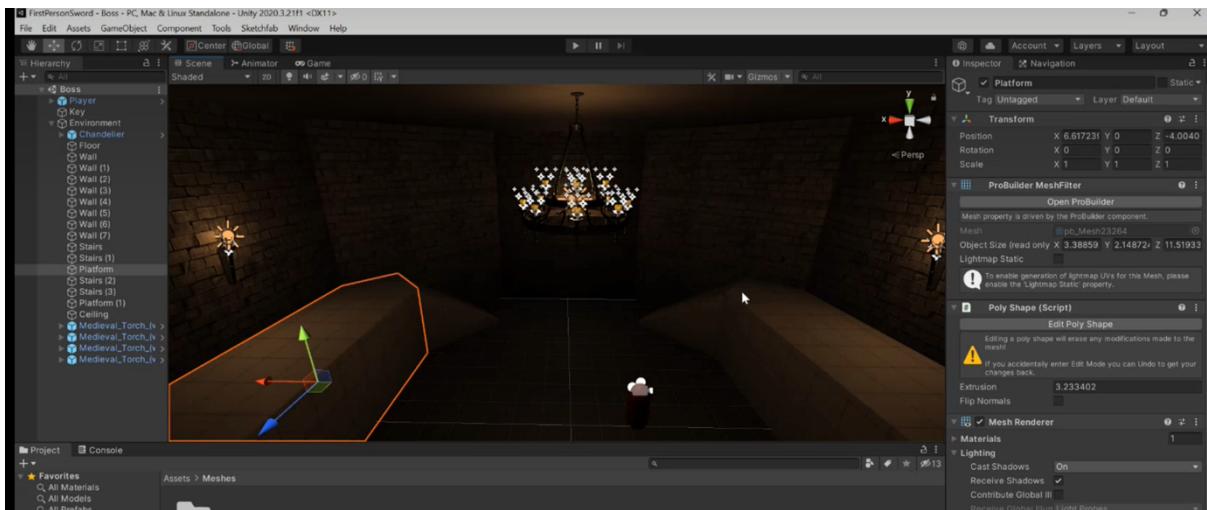
The purpose of the meeting is to

- Educate the team in Unity (Detailed enough on how to create a scene till object)
- Clarify all the doubts that raise while developing the game in unity.
- Enable the team to use sketchfab
- Make everyone familiar with the Boss Room Level

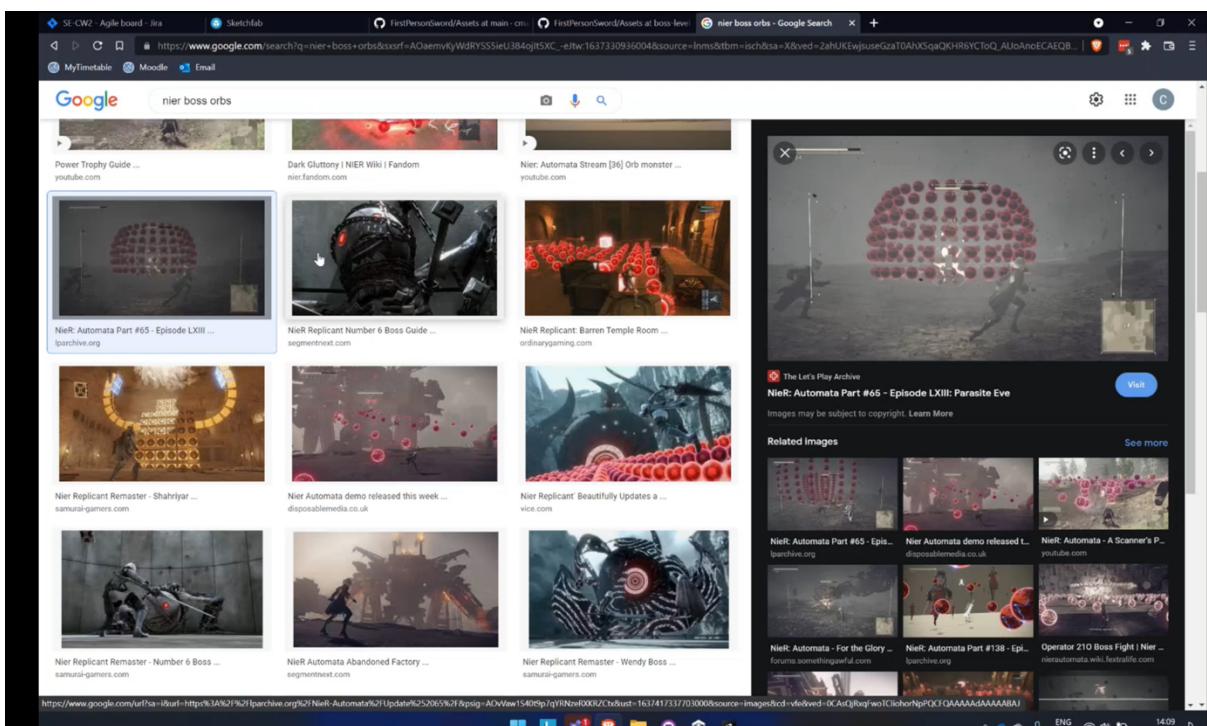
Charlie host the entire session and explained the above items in detail.

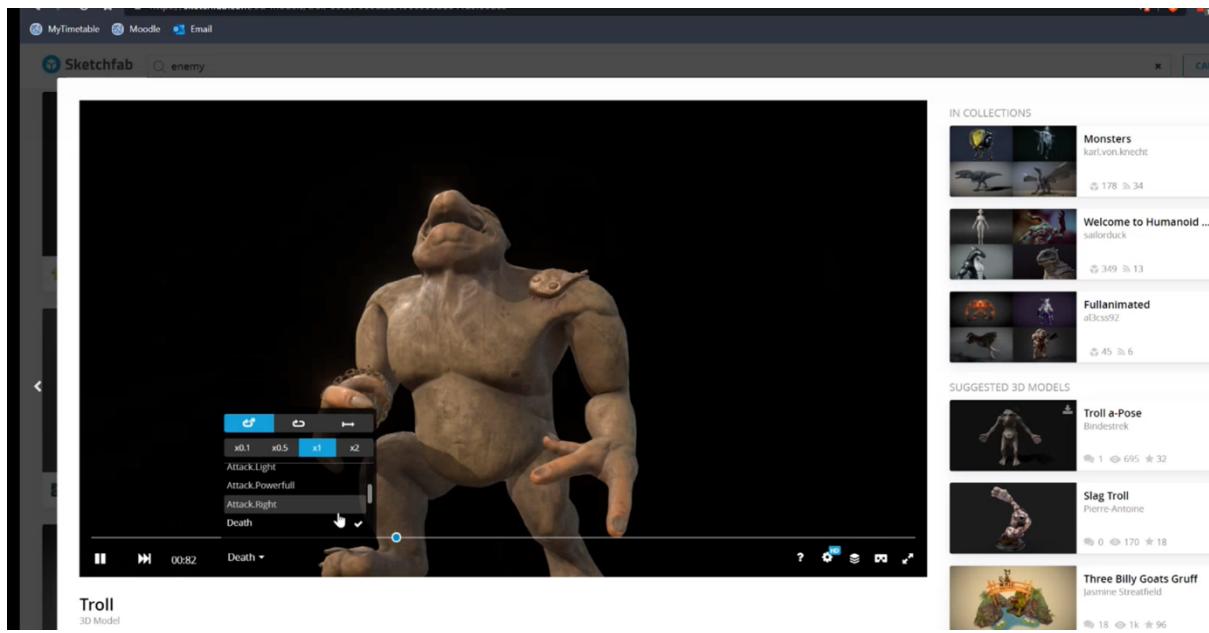
This is the snapshot while explaining on how to play around with unity.





This is the snapshot while explaining on how to use sketchfab.





At the end of this meeting, almost all participants are happy about the session and felt very confident in using the unity and developing the prefabs using sketchfab.

3.3.3. Meeting – 23-11-21

Members Present: Ashley, Charlie, Chaya, Marcus, Meeran, Qibei, Sharon, Tiffany

Members Absent: Nil

This is the pre-preparation for customer meeting:

Slide Preparation and Presenter: Ashley

Inputs from the team members:

Charlie:

- Explained in detail about the development carry out in Boss level
- Gave a short demo as well
- Also, he changed the maze level and shown a short demo as well
- He also explained that how he built the maze level with the use of pre-build assets

Ashley:

- Charlie and Ashley worked on the boss game level like detailing the design of different phases of the boss
- Worked on the slides and will add more screenshots to it
- In the slides, will talk about the documentation, programmers and management
- Will add some more points for the maze level
- Will also talk about the UI and Menu
- Asked Charlie to give some demo of the game with the customer

Meeran:

- Explained about the maze level and its development activity
- Shown a short demo

- Also confirmed that, Charlie's Maze level looks fantastic and we should definitely go with it.
- Finished the Sprint-3 documentation as per the template

Chaya:

- Worked on the Documentation and planned to complete by EOD
- Tried two models for bosses but it's quite complicated
- Also worked on the pressure pan development

Marcus:

- Charlie's maze scene is fantastic, he thought to add the torch is Meeran's maze scene but now Charlie's maze looks awesome so we can go with it
- Also asked Charlie's code to push it to GIT, so that everyone can use it

Qiebi:

- Worked on the enhancing the enemy feature by generating the enemies automatically and to aid the player with a weapon
- He is in midway in writing the scripts for damaging the enemy

3.4. Backlog Overview

Backlog ID	Priority	Backlog Description
SC-68	MEDIUM	Sprint-3 Documentation
SC-44	MEDIUM	Implement the main player and its movements
SC-45	MEDIUM	Implement the action of the player to pick up objects
SC-46	HIGH	Creating repository and setting up GitHub
SC-47	MEDIUM	Designing and creating the main UI
SC-52	HIGH	Designing the game layout for maze level
SC-53	HIGH	Designing the game layout for boss level
SC-54	LOW	Designing the game layout for spike room
SC-55	LOW	Creating puzzles
SC-65	HIGH	Common Template for Documentation
SC-66	MEDIUM	Sprint 1 Documentation
SC-67	MEDIUM	Sprint 2 Documentation
SC-68	MEDIUM	Sprint 3 Documentation

3.5. Completed Backlog

Backlog ID	Story Points	Priority	Assignee(s)	Backlog Description	Technical Difficulty
SC-68	2	MEDIUM	Meeran Chaya	Sprint-3 Documentation	NA
SC-44	1	MEDIUM	Charlie	Implement the main player and its movements	MEDIUM
SC-45	1	MEDIUM	Charlie	Implement the action of the player to pick up objects	MEDIUM

SC-46	4	HIGH	Entire Team	Creating repository and setting up GitHub	NA
SC-47	3.5	MEDIUM	Tiffany	Designing and creating the main UI	MEDIUM
SC-52	11.5	HIGH	Meeran Sharon Marcus	Designing the game layout for maze level	HIGH
SC-53	15	HIGH	Charlie Chaya Qeibei Ashley	Designing the game layout for boss level	HIGH
SC-65	0.5	HIGH	Tiffany	Common Template for Documentation	NA
SC-66	0.5	MEDIUM	Tiffany	Sprint 1 Documentation	NA
SC-67	1	MEDIUM	Sharon	Sprint 2 Documentation	NA
SC-68	2	MEDIUM	Meeran Chaya	Sprint 3 Documentation	NA

3.6. Exception Handling

Below are the issues which we faced during this sprint,

1. While creating the document template in overleaf, there found an alignment issue in the user story table – Temporarily addressed with the manual intervention, planned to fix it in next sprint with the use of long table or any other.
2. In the Maze level, the walls made it to different sizes (by dragging) and that result in alignment issue- it is fixed with creating a wall with some fixed size and use it all along.
3. In JIRA, we didn't split the task with respect to the actual feature detailing, instead with respect to feature as a whole and it creates lot of dependency, so we planned to create a task in detail from next sprint

3.7. Customer Meeting and Analysis

During the customer meeting held on 10-11-21(Sprint 2 Customer Meeting), Customer asked to finalise the game idea between the 3D FPS(First Person Sword) and Board Game.

During this meeting, we presented the below to the customer:

- Shared that we have decided to go with 3D FPS game
- Showed him the player's Movement and control
- Also showed him the Weapon and how we are going to use it
- We also discussed about the difficulty adjustment of the game
- Showed customer, the enemies in detail, shared the real images of it
- Talked in detail about the Maze level,
 - Player (green) wakes up in a maze and picks up a torch
 - Navigates around dark maze attempting to find keys to unlock the exit door
 - Enemy (red) patrols the maze and chases player if they enter its cone of vision.
- Talked in detail about the Spike level

- Brown Spike - Move up when player is close (act like walls)
 - Blue Spike - Move up and down on timer Player must dash past them
 - Purple Spike - Must be disabled by activating the switch
 - Button to disable spike
- Have given some insights about the poisonous game level and Escape room
- Poisonous gas room
 - Door shuts and locks behind the player on entry to the room.
 - Player must solve a puzzle within a certain time limit before they succumb to the poison gas and die.
 - Escape Room
 - Need to collect various items in the room that can be combined/interact with each other to solve puzzles.
 - Once all puzzles are completed, player obtains a key to leave the room.
 - Player is given hints through the game UI as to how they should proceed.
- Very detailed explanation on the Boss Level,
- Boss enemy needs to be defeated before the dungeon exit opens up
 - Weak point located on boss that must be hit to do damage
 - Health recovery items distributed around the boss arena

Also showed him some demo about the boss level

Overall after the presentation, Customer is happy about the gaming idea that we presented in detail. Customer suggested to implement stamina feature first person also added that we can implement this if time permits, so hence customer asked us to have that story in the Backlog list.

Stamina feature:

Stamina feature is as when the game progress or attack from the enemy then the stamina will reduce and if its empty then player will lose the game.

3.7.1. Discussion with Tutor

Further to the Customer Meeting, our team had a meeting with tutors to discuss about the results of last sprint and the plan for the upcoming sprint.

- We shared the details such as the way how we created the Epic, Story, sub-task on jira and on what basis it is assigned and how we progressed it.
- Shared the plan for the upcoming sprint in terms of its process and the game development idea and strategy,
- Shared about the technology we are using and how we are progressing.
- We explained about how we are following Agile methodologies, techniques and tools.
- Showed them the Plan sheet and the role sheet and explained them on how we are switching the roles per sprint and showed them the roles for the sprint 3.
- Shared the Sprint-2 retrospective minutes and explained them on how we overcome it.

The tutors expressed that they are happy about the process but asked to give more importance to the documentation. Tutors also asked to keep update the documentation instead of having everything in an unorganised way like in Teams Notes, JIRA etc.,

3.8. User Stories

US-8-VER1		
Backlog ID: SC-44	Priority: Medium	Story Points: 1
AS A Customer I WANT a player of the game with the predefined movements SO THAT it will enable the users to play a first-person game	Acceptance Criteria: The player behaviour should be like a player in the general first-person games	

US-9-VER1		
Backlog ID: SC-45	Priority: Medium	Story Points: 1
AS A Customer I WANT a player of the game to pick up any objects SO THAT it will enable the player to pick up sword or any weapon	Acceptance Criteria: The player should be capable to pick up the sword	

US-10-VER1		
Backlog ID: SC-46	Priority: High	Story Points: 4
AS A Customer and Tutor I WANT the team to create a GITHUB repository and setup in their local machine SO THAT It will create a better track on the Code versioning	Acceptance Criteria: Every team member local development environment should be configured from the team's GITHUB repository	

US-11-VER1		
Backlog ID: SC-47	Priority: Medium	Story Points: 3.5
AS A Customer I WANT a GUI for a main menu SO THAT Once when player open up the game they now know what they can do	Acceptance Criteria: The Main Menu should be created with the basic items such as difficulties, Leader board	

US-12-VER1		
Backlog ID: SC-52	Priority: High	Story Points: 11.5
AS A Customer I WANT a game room of type Maze SO THAT The player can explore this new Maze level and play in the maze level	Acceptance Criteria: The Maze level layout should be created with the player implemented as part of it	

US-13-VER1		
Backlog ID: SC-53	Priority: High	Story Points: 15
AS A Customer I WANT a game room of type Boss, a Final Level of the game SO THAT The player can explore this new Final boss level and play in the boss level	Acceptance Criteria: The Boss level layout should be created with the player implemented as part of it	

US-14-VER1		
Backlog ID: SC-65	Priority: Medium	Story Points: 0.5
AS A Customer and Tutor I WANT a team to come up with the template for the sprint documentation SO THAT it can maintain the similar format for each sprint	Acceptance Criteria: The template should full fill all the needs of the customer as per the sample	

US-15-VER1		
Backlog ID: SC-66, SC-67, SC-68	Priority: Medium	Story Points: 3.5
AS A Customer and Tutor I WANT a document each for each sprint (say Sprint-1,2, and 3) SO THAT I can refer and review the happenings of that sprint	Acceptance Criteria: The Sprint document should full fill all the needs of the customer as per the sample	

3.9. User Story Tests

User Story ID	Acceptance criteria met?	Description
US-1-VER1	Y	First person player is created and behaved as a first person
US-9-VER-1	Y	First person player is now able to pick up the objects
US-10-VER-1	Y	Every team member installed unity, Git hub and cloned the common repo and created a project from the common repo
US-11-VER1	Y	The Main Menu is created with the basic items such as difficulties, Leader board
US-12-VER1	Y	Maze level is created with basic functionalities
US-13-VER1	Y	Boss level is created with the basic functionalities
US-14-VER1	Y	Document template is created in overleaf
US-15-VER1	Y	Sprint document is created for the sprints - 1,2 and 3

3.10. Requirements Use Cases

RUS-1-VER1	User Story: US-9-VER1
Actor	Player
Scope	Player Class
Level	User Goal
Context	Player can pick up a sword
Frequency of Occurrence	Every time – Key object of the game
Open Issues	Player stamina is yet to implement

RUS-2 –VER2	User Story: US-8-VER1
Actor	Player
Scope	Maze Level
Level	User Goal
Context	Create a Maze level and enable the player to move around
Frequency of Occurrence	Whenever the game begins, this is the first level
Open Issues	Setting the Timer, Stamina Bar, Level transition (Once after this level is done, it should navigate to next level) is yet to achieve

RUS-3-VER3	User Story: US-12-VER1
Actor	Player
Scope	Boss Level

Level	User Goal
Context	Create a Boss level and enable the player to move around
Frequency of Occurrence	Every time – Key object of the game
Open Issues	Setting the Timer, Stamina Bar, Level transition (Once after this level is done, it should navigate to next level) is yet to achieve

RUS-4-VER1	US-11-VER1
Actor	Player
Scope	Menu
Level	User Goal
Context	Starting the game
Frequency of Occurrence	Once, when the player accesses the menu
Open Issues	Some buttons have issues with it being clickable, yet to have button to access leader board

3.11. Requirements Use Cases Tests

Use Case ID	Test status	Description
RUS-1-VER1	Y	Refer the backlog id SC-45 and SC-46
RUS-2-VER1	Y	Refer the backlog id SC-52
RUS-3-VER3	Y	Refer the backlog id SC-53
RUS-4-VER1	N	Refer to backlog id SC-47, whilst the UI is designed, there are some issues and underlying functionalities is yet to be implemented

3.12. Design Use Cases

DUS-1-VER1	User Story: US-8-VER1, US-9-VER1
Actor	Player
Scope	Player and its movement is the starting point of the game
Level	User goal
Pre-conditions	There needs to be a sword in place, and the player needs to be able to move NESW.
Description	Implement a level and enable a player to play the game
Overall Flow	Player enters the first level, moves around with the WASD keys and finds sword, alternatively picks up sword.
Alternative Flow (number)	Player unable to find sword. Therefore, continues moving around.
Post Conditions	It should move around in all level of the game

Frequency of Occurrence	Every time the game starts
Open Issues	Killing the enemies

DUS-2-VER1	User Story: US-8-VER1, US-9-VER1
Actor	Player
Scope	This is the first level of the Game
Level	User goal
Pre-conditions	There needs to be a sword in place, and the player needs to be able to move NESW.
Description	Implement a level and enable a player to play the game
Overall Flow	Player enters the first level, moves around with the WASD keys and finds sword, alternatively picks up sword.
Alternative Flow (number)	Player unable to find sword. Therefore, continues moving around.
Post Conditions	It should move to the next level
Frequency of Occurrence	Every time the game starts
Open Issues	Setting the Timer, Stamina Bar, Level transition (Once after this level is done, it should navigate to next level) is yet to achieve

DUS-3-VER1	User Story: US-13-VER1
Actor	Player
Scope	This is the Last level of the Game
Level	User goal
Pre-conditions	There needs to be a sword in place, and the player needs to be able to move NESW.
Description	Implement a Boss level and enable a player to play the game
Overall Flow	Player enters the last level, moves around with the WASD keys and finds sword, alternatively picks up sword.
Alternative Flow 1	Player unable to find sword. Therefore, continues moving around.
Post Conditions	If successfully killing the enemies leads to a win
Frequency of Occurrence	Every time the player enters the last level of the game
Open Issues	Setting the Timer, Stamina Bar, Level transition (Once after this level is done, it should navigate to next level) is yet to achieve

DUS-4-VER1	
Actor	Player
Scope	Menu
Level	Use Goal
Pre-conditions	Buttons for starting the game, difficulty and quit should be in place
Description	Starting the game from the menu
Overall Flow	Player press start and the game begins.
Alternative Flow 1	Player presses the difficulty option and selects their preferred difficulty, before going back and starting the game
Alternative Flow 2	Player presses quit and exits the game
Post Conditions	The game starts
Frequency of Occurrence	Once, at the menu screen
Open Issues	Some buttons have issues with it being clickable, yet to have button to access leader board

3.13. Design Use Cases Tests

Use Case ID	Test status	Description
DUS-1-VER1	Y	Refer the backlog id SC-45 and SC-46
DUS-2-VER1	Y	Refer the backlog id SC-52
DUS-3-VER1	Y	Refer the backlog id SC-53
DUS-4-VER1	N	Refer to backlog id SC-47, whilst the UI is designed, there are some issues and underlying functionalities is yet to be implemented

3.14. CRC Cards

3.14.1. Player Classes - DUS-1-VER1, DUS-2-VER1, DUS-3-VER1

Class: Player	
<p>Responsibility:</p> <ul style="list-style-type: none"> • Adjust camera position • Interact with objects (keys etc.) • Pick up objects • Equip items • Turn torch on/off (if equipped) • Zoom camera • Set the interaction and information text UI elements 	<p>Collaboration:</p> <ul style="list-style-type: none"> • Objects <ul style="list-style-type: none"> ◦ Door • UI Elements <ul style="list-style-type: none"> ◦ TextFadeInOut

Class: PlayerMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Move player forward, backward, left and right using keyboard keys Apply gravity force Jump using spacebar 	

3.14.2. Enemy Classes - DUS-1-VER1, DUS-2-VER1, DUS-3-VER1

Class: Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Check Enemy health “Die” when health <= 0 	

Class: BossMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Rotate to always look at player Shoot projectiles at player 	<ul style="list-style-type: none"> Player

Class: Projectile	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Move in direction of the player after being spawned by the boss enemy Can be set to be “homing” (follow player continuously) On collision with the player, damage the player On collision with other environment objects, destroy the projectile 	<ul style="list-style-type: none"> Player

3.14.3. UI Classes - DUS-4-VER1

Class: TextFadeInOut	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Display text in the information text UI object with fade in and fade out effects 	

Class: MenuUI	
<p>Responsibility:</p> <ul style="list-style-type: none"> Handle user selection of game difficulty Move to the Maze scene when the “Start” button is pressed Quit the game when the “Quit” button is pressed 	<p>Collaboration:</p> <ul style="list-style-type: none"> SceneManager

3.14.4. Object Classes - DUS-1-VER1, DUS-2-VER1, DUS-3-VER1

Class: Door	
<p>Responsibility:</p> <ul style="list-style-type: none"> Rotate the door open Rotate the door closed 	<p>Collaboration:</p>

Class: Flicker	
<p>Responsibility:</p> <ul style="list-style-type: none"> Continuously modify the intensity of the Light attached to the same GameObject as this script to simulate a flickering effect 	<p>Collaboration:</p>

3.15. User Interface Design

Below are the UI created as part of this Sprint,

- Main Menu
- Maze Level
- Boss Level

3.15.1. Main Menu

Main Menu is the first screen, player will see once open the game application, This UI should have few buttons such as Start, Quit and option to select the difficulty.

Below is the sample UI of the Main Menu.



3.15.2. Maze Level

Maze level constitute with lot of walls and objects in the maze structure in a way to confuse the player.

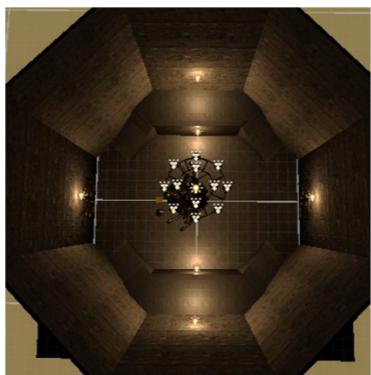
Below is the sample UI of the Maze level.



3.15.3. Boss Level

Boss level is the final level of the game and it like a hollow room with a boss in the middle and attack the player.

Below is the sample UI of the Boss level.



Sprint 4: 24-11-21 - 30-11-21

Scrum Master: Charlie

Document Owner: Marcus

4.1. Sprint Overview

In this week's sprint the focus is on a continuation of the previous weeks work towards a polished fully functioning game, this is a result of no major changes to direction of the project being raised in the client meeting (See section 4.7).

The most prominent tasks that were added to the backlog this week were implementing combat animations and function along with enemies Ai. Additional tasks for planning future levels were also added in the event of the time allowing completion of the existing levels (see section 4.4).

Charlie was assigned with the tasks relating to the enemy attack Ai and animations as he had the most experience in this area having worked on the proof of concepts earlier on in the development stages. Chaya, Meeran and Sharon had a focus on working together to design the layout and implement the functionality of the traps within the spike level.

The remaining team members focused on smaller tasks that would improve the flow and functionality of the game.

Within the sprint we had two team meetings on the 26th and 30th of November which were treated as stand-ups to give transparency to the whole team about the progress of individual tasks, and raise any problems or blockers that might have occurred (section 4.3.1 and 4.3.1). Additionally, the second meeting on the 30th allowed for planning and collating the work ready for the meeting with the client on the 1st of December.

4.2. Sprint Review

All team members were present for the retrospective meeting.

- There were concerns regarding merge conflicts, but the team was happy with the future workflow as discussed in section 4.6. to hopefully reduce these issues
- Meeran, Sharon and Chaya felt confident in continuing with the spike level
- Charlie raised that refactoring of the code made it easier to manage
- Tiffany raised felt concerns regarding finish the documentation in the beginning of the sprint, however, felt increased ease after finalizing the template.

4.3. Meetings

4.3.1. Meeting - 26-11-21

Members Present: All team members were present

Members Absent: Nil

Aim of the meeting was to update the team on individual task progress and to raise any issues that might have occurred on these tasks.

First Charlie presented his progress, he had been working on enemy AI movement, applying animations to the spider enemy and implementing basic combat mechanics within the game. In his own testing of these features he had found that the damage was dealt correctly

to enemies but minor polish was needed before the task is completed. This included ensuring that animations are happening at the correct times and the spider does not move after the death. Therefore, he plans to continue working on it until the end of the sprint. Charlie also raised that the code he had been writing had started to become unmanageable so as a result he planned to do some refactoring.

The team working on the layout for the spike room, Meeran, Sharon and Chaya, have started on the initial stages of building the scene for the level and plan to have a meeting the following day to distribute the work between them. Additionally, Chaya had been working on finding model/creating a model for the spikes within this level which was still in progress.

Qibei had worked on the animation for combat with the sword, he was unsure if his current work was suitable for a final product, but the team was happy with the animation so thus the task was moved to completed.

Marcus presented the implementation of the scene changing mechanic it had been tested in closed environments but needs further testing in combination with the health mechanics and requires the existing scenes to be modified slightly to allow smooth transitions between the scenes, these tasks will be added to the backlog and the current task marked complete.

Tiffany had been working on building templates for the documentation given the rotating roles the team needed the consistent structure to follow to meet the requirements needed in the documentation.

Ash had done the initial designs for the poison/gas room, these were to be used provided there was sufficient time for to complete the other levels.

4.3.2. Meeting - 30-11-21

Members Present: All team members were present

Members Absent: None

Aim of the meeting was to again update the team on individual task progress and to raise any issues that might have occurred on these tasks. As well as finalise the finished features ready for demo and presentation in the client interview the next day.

The following progress had been made on the tasks:

Qibei and Ash had completed a layout designed scene for poison level. Sharon and Meeran had created the scene layout for the spike level. For this level Chaya had also implemented the spikes with animations but the task of adding the damage mechanics to them will be put into the backlog.

Ash had also implemented a timer UI and mechanics to be used in the leader board feature identified in the user stories. This had functionality but needed work before it could be used in the final build due to some minor bugs and needing to be combined with the scene changing mechanic.

Charlie being the version controller raised initial issues with merge conflicts (discussed in section 4.6). So he was going to spend extra time resolving these conflicts. Charlie had also

fine tuned his enemy interactions and AI so that this task was now marked as complete and ready for the main branch.

Marcus had been updating documentation writing up the meetings and preparing the sprint 4 documentation.

Tiffany had been working on finalising the menu scene.

4.4. Backlog Overview

Backlog ID is the ID on Jira

Backlog ID	Priority	Backlog Description
SC-104	Low	Create Layout for Poison Room - Ash
SC-103	Low	Create Layout for Poisonous Room - Qibei
SC-102	Low	Create Layout for Poisonous room
SC-101	High	Design layout of Spike Room
SC-99	Low	Duplicate doors (trap)
SC-98	High	Create controller to move between game scenes
SC-97	High	Create Pressure pads for boss level
SC-96	High	Write template for user stories and general template
SC-95	Low	Update Sprint 3 Documentation
SC-94	Low	Update Sprint 2 Documentation
SC-93	Low	Update Sprint 1 Documentation
SC-92	Medium	Prepare slides for presentation
SC-91	Medium	Prepare for presentation
SC-90	Medium	Create leader board to be shown at end of game (timer)
SC-89	High	Create main game UI (health bar, interaction text, information text, objectives)
SC-88	Medium	Create Switch that controls the spikes, with on/off animation
SC-87	High	Make spike prefabs for Spike Level (distance based, switch controlled and random timed)
SC-84	Low	Prepare Sprint 4 Documentation
SC-82	High	Implement player attack animations
SC-81	High	Implement enemy attacks and damage to player
SC-80	High	Apply animations to enemies
SC-79	High	Create enemy movement AI
SC-78	Medium	Finalise Menu UI

4.5. Completed Backlog

Backlog ID	Story Points	Assignee(s)	Backlog Description	Technical Difficulty
SC-104	3	Ash	Create scene for Poison Room - Ash	Low
SC-103	3	Qibei	Create scene for Poisonous Room - Qibei	Low
SC-102	3	Ash	Create design for Poisonous room	N/A
SC-101	4	Sharon, Meeran	Design layout of Spike Room	Low
SC-98	3	Marcus	Create controller to move between game scenes	Medium
SC-97	1	Chaya	Create Pressure pads for boss level	Medium
SC-96	2	Tiffany	Write template for user stories and general template	N/A
SC-95	1	Meeran	Update Sprint 3 Documentation	N/A
SC-94	1	Sharon	Update Sprint 2 Documentation	N/A
SC-93	1	Tiffany	Update Sprint 1 Documentation	N/A
SC-92	0.5	Chaya	Prepare slides for presentation	N/A

SC-91	0.5	Marcus	Prepare for presentation	N/A
SC-89	1	Charlie	Create main game UI (health bar, interaction text, information text, objectives)	High
SC-88	1	Chaya	Create Switch that controls the spikes, with on/off animation	High
SC-87	3	Chaya	Make spike prefabs for Spike Level (distance based, switch controlled and random timed)	High
SC-84	2	Marcus	Prepare Sprint 4 Documentation	N/A
SC-82	2	Qibei	Implement player attack animations	High
SC-81	2	Charlie	Implement enemy attacks and damage to player	High
SC-80	1	Charlie	Apply animations to enemies	High
SC-79	1	Charlie	Create enemy movement AI	High
SC-78	2	Tiffany	Finalise Menu UI	Medium

4.6. Exception Handling

Throughout the sprint each team member had been working on separate branches of the GitHub repository which had worked well in the earlier sprints. However as we started remotely working on the same levels the branch management started to become increasingly complex with merge conflicts that were proving to be increasingly difficult to resolve taking time away from the original tasks. These conflicts were handled on an individual basis manually seeing where the merges were conflicting and deciding which parts to keep. Planning was set for the future to try avoiding any unresolvable conflicts, this including making sure things were pushed to GitHub in smaller stages so things were updated more regularly. Trying when possible to work in the same place together when working on the same level to limit the clashes when bringing work together.

The second problem that was occurring was on the documentation side. Up until now we had been using overleaf with latex to write up the documentation, using our own built template for each of the sprints. However when we were reviewing the submission requirements we found that our existing work did not fully cover all the required information, thus we concluded on reorganising the template to cover the requirements. Furthermore we decided as a team in the next sprints we would move to using word over overleaf due to the problems with handling tables within latex and formatting we wanted for the CRC cards and User story cards. The process of moving the existing documentation into word from latex will be put onto the backlog for the next sprint.

4.7. Customer Meeting and Analysis

This meeting took place on the 24th of November and all team members were present.

In this meeting with the client, we were discussing our progress and any new directions that the client or the team wanted to take for the next sprint. We started by presenting a demo of how the game has progressed since the previous meeting. The team have now created multiple different scenes for the game, the menu set up that has various buttons to change the difficulty and start the game, the functionality for this menu has yet to be implemented but the aesthetics was well received by the customer. Next we presented the maze level the layout, torch mechanics and interactive doors have all been added again well received by

the customer who discussed our aims for going for the visual experience within our game and making it as immersive as possible while not sacrificing on making the game interesting and challenging in response to this we discussed our plans to implement the difficulty settings and enemies which will make the game challenging, closer to the final product we can decide on more elements such as stamina bars and effects caused by enemies to further make it a challenge.

Finally, we presented the boss level stage, we have decided on the boss model as well as functionality for the boss's basic attack of projectiles targeting the player. Feedback for this was positive. We discussed further with the customer about the boss's attacks over the course of the battle, the customer was keen to have different phases to make it more engaging for the player but showed no preference to our three ideas for how the phases would work thus we will decide as a team.

The customer discussed our timeline for completing the project, once we have implemented the enemies, we have a core functioning game so further additions to the game would be improvements to make the game better rather than essential functionality hence we are confident that we will be able to meet the time frame required by the customer.

4.8. User Stories

US-2-VER2		
BacklogID: SC-78 and 90	Priority: Medium	Story Points:
AS A Player I WANT To be able to see my friend's score SO THAT I can compare and compete against them	Acceptance Criteria: Produce a leader board that stores previous times and is accessible through the menu for every player to see.	

US-16-VER1		
BacklogID: SC-79, 80 and 81	Priority: High	Story Points: 5
AS A Player I WANT The enemies to attack me SO THAT The game is more exciting and scarier	Acceptance Criteria: Producing a good Ai for the enemies so that they follow and attack the player while	

4.9. User Story Tests

User Story ID	Acceptance criteria met?	Description
US-2-VER2	N	The foundations for how the scoring has been implemented in this sprint but the leader board UI has yet to be added to the game.
US-16-VER1	Y	The spider enemies have been added these are fully animated with attack phases, death phase and path finding AI.

4.10. Requirements Use Cases

RUS-5-VER1	User Story: US-2-VER2
Actor	Player
Scope	Menu Scene
Level	Player Goal
Context	Player accessing the leader board and registering their name on the leader board.
Frequency of Occurrence	At the end of the game if the player registers a high score.
Open Issues	Leader board design pending.

RUS-6-VER1	User Story: US-16-VER1
Actor	Player
Scope	Enemy Class
Level	Summary
Context	Enemies moves towards the player when near, either attacks or looms.
Frequency of Occurrence	Throughout the game
Open Issues	N/A

4.11. Requirements Use Cases Tests

Use Case ID	Test status	Description
RUS-5-VER1	N	The backend of this use case has been developed but the front end is yet to be fully created.
RUS-6-VER1	Y	This has been fully implemented see SC-79, 80 and 81 in the backlog

4.12. Design Use Cases

DSU-5-VER1	User Story: US-2-VER2
Actor	Player
Scope	Menu Scene
Level	Player Goal
Pre-conditions	Once multiple different players have run through the game their scores need to be stored in some form of memory.
Description	Player accessing the leader board and registering their name on the leader board.
Overall Flow	When the player is on the menu screen they can press the leader board button which takes them to a page showing the names and each of that players best score. For the player to register a new score they first need to work their way through the game and kill the boss. Once they have finished they can enter their name, then

	repeat the first step to see their score against the other players.
Alternative Flow 1	When the player dies before defeating the boss the score is not recorded within the leader board and the player does not need to enter their name.
Alternative Flow 2	When no players have played the game before the leader board will be blank.
Post Conditions	Player gets registered on the leader board and can see their score by accessing it from the menu screen.
Frequency of Occurrence	At the end of the game if the player registers a high score.
Open Issues	Leader board design pending.

DSU-6-VER1	User Story: US-16-VER1
Actor	Player
Scope	Enemy classes
Level	Summary
Pre-conditions	The player should have progressed through the menu selected a difficulty and started the game, made it through to the spike game into the maze or boss level.
Description	Enemies moves towards the player when near, either attacks or looms.
Overall Flow	Once the player is at either the maze or boss level the player will reach enemies in our game, the first enemy within the maze the player is unable to attack producing a much more threatening enemy. The later enemies will be able to be attack timing and accuracy when hitting the enemy will be critical otherwise the player will die before the enemy is killed.
Alternative Flow 1	Player dies and has to respawn before further interactions with the enemy
Post Conditions	Player successfully kills or dodge the enemy and finishes the game
Frequency of Occurrence	Throughout the game
Open Issues	N/A

4.13. Design Use Cases Tests

Use Case ID	Test status	Description
DSU-5-VER1	N	The back end of this use case has been developed but the front end is yet to be fully created.
DSU-6-VER1	Y	This has been fully implemented see SC-79, 80 and 81 in the backlog

4.14. CRC Cards

Black text indicates functionality that has not been changed since the previous sprint.

Green text indicates functionality that has been added since the previous sprint.

Red text indicates functionality that has been removed or moved to another class where it is better situated.

4.14.1. Player Classes - DSU-6-VER1

Class: Player	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Adjust camera position • Interact with objects (keys etc.) • Pick up objects • Equip items • Turn torch on/off (if equipped) • Zoom camera • Set the interaction and information text UI elements • Drop objects • Take damage when attacked • Check player health • Equip items at start of level • Attack Enemies • Update player healthbar UI • Set the Keys UI elements depending on how many keys the player has collected 	<ul style="list-style-type: none"> • Enemies <ul style="list-style-type: none"> ◦ Enemy • Objects <ul style="list-style-type: none"> ◦ Door ◦ Switch • UI Elements <ul style="list-style-type: none"> ◦ TextFadeInOut ◦ HealthBar ◦ Keys

Class: PlayerMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Move player forward, backward, left and right using keyboard keys • Apply gravity force • Jump using spacebar 	

Class: swing	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Animate the sword swing when player clicks the attack button 	

4.14.2. Enemy Classes - DSU-6-VER1

Class: Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Check Enemy health • “Die” when health ≤ 0 • Take damage when attacked by player • Visually indicate damage taken • When health ≤ 0, become an object that can be picked up by player 	

Class: MoveEnemyToPlayer	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Play idle animation when not in range of player • Move towards player when they enter detection radius • Return to original position when player leaves detection radius • Attack player when in range 	<ul style="list-style-type: none"> • Player

Class: BossMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Rotate to always look at player • Shoot projectiles at player 	<ul style="list-style-type: none"> • Player

Class: Projectile	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Move in direction of the player after being spawned by the boss enemy • Can be set to be “homing” (follow player continuously) 	<ul style="list-style-type: none"> • Player

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <ul style="list-style-type: none"> • On collision with the player, damage the player • On collision with other environment objects, destroy the projectile | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

4.14.3. UI Classes - DSU-5-VER1

Class: TextFadeInOut	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Display text in the information text UI object with fade in and fade out effects 	

Class: MenuUI	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Handle user selection of game difficulty • Move to the Maze scene when the “Start” button is pressed • Quit the game when the “Quit” button is pressed • Move to the Leaderboard scene when the “Leaderboard” button is pressed 	<ul style="list-style-type: none"> • SceneManager

Class: HealthBar	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Update the max value of the player health bar slider • Set the value of the boss health bar slider 	

4.14.4. Object Classes - DSU-6-VER1

Class: Door	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Rotate the door open • Rotate the door closed 	

Class: Flicker	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Continuously modify the intensity of the Light attached to the same GameObject as this script to simulate a flickering effect 	

Class: Bridge	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Move the bridge object forward when both pressure pads are activated Move the bridge backwards when neither or only one of the pressure pads are activated 	<ul style="list-style-type: none"> Pad

Class: Pad	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> “Activate” the pressure pad when a dead spider object is placed on it “De-activate” the pressure pad when the dead spider object is removed 	<ul style="list-style-type: none"> Bridge

Class: Damage_smallspike	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When collision occurs with player, reduce player HP by 4. 	<ul style="list-style-type: none"> Player

Class: Damage_traproom	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When collision occurs with player, reduce player HP by 5. 	<ul style="list-style-type: none"> Player

Class: Switch	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Animate switch being activated by the player • Lower the spikes in front of the exit door 	<ul style="list-style-type: none"> • Spike GameObjects

4.15. User Interface Design

description of the user interface of the game. Justify why we designed it like that, refer back to user stories if appropriate. Include screenshots if appropriate.

As part of this sprint the UI for

- The health bar
- Timer
- Spike levels
- Boss room pressure pad
- Gas room
- Boss' health bar



The picture above shows the newly added UI in the boss level in the top left is the health bar which reduces in size and changes in colour from green to yellow to red depending on how much damage the player has taken. In the bottom right corner is the UI for the boss health this again reduces in size depending on the remaining health of the boss. The corners have been used as the bars need high visibility and to the player while not distracting the player from the immersive game play.

In the picture below is the initial implementation of the timer UI running in the in the bottom right. might have to be adjusted in later sprints as both the boss health and timer are both located in the bottom left.



Sprint 5: 01-12-21 - 07-12-21

Scrum Master: Chaya

Document Owner: Qibei

5.1. Sprint Overview:

In this sprint we had no customer meeting but we still met together to discuss about our current progress, what to do in next sprint and documentation. We believe the customer would like to see a more complete game so we decided to focus on two levels: boss level and maze level. So Charlie gave his suggestions about what feature to finish in these two levels and based on this we assigned work to every team member (see section 5.5).

About documentation, we decided to use another template in order to make it meet the requirements more closely, like using user story, user case ,CRC etc.

Regarding to the process, we encountered some issues(especially the deadline of another difficult coursework), members had limited progress before the customer meeting(see section 5.3.2). However, this meant that members had to prioritize specific backlog tasks and some tasks had to be moved to the next sprint (see section 5.5).

Considering the current situation and coming deadline, we made a decision that the whole team was split to two groups, one focused on documentation, including User Manual, Maintenance Report, Installation Guide etc. One group focused on development work to make the game complete.

5.2. Sprint Review:

What went well:

- Organization: the scrum master organized team members to do coding together to make it more efficient.
- Cooperation: we gave technical suggestions to each other when developing, everyone was willing to help other members
- Assignment: tasks were clear and explicit, everyone was happy with the assigned work

What didn't go well:

- Progress: in this sprint, some members didn't finish tasks on time because of the deadline of other coursework, this indicated that we didn't think about the external effects when we assigned tasks.
- Documentation: although we had a documentation template, we didn't completely finish every sprint documentation well, it could be left to be done in the last 2 sprints and lead to some risks.

Improvement needed:

1. we need an objective analysis of our current progress and use the only two sprints to finish the game efficiently with more detailed assignment and strict time requirement. We need to give up something and focus on the key task.
2. More attention should be put on the documentation, teachers mark on it! Everyone documentation owner should discuss together and have the same criteria(structure, details), finish corresponding documents.

5.3. Meetings:

5.3.1. Meeting - 01-12-21

Members Present: Charlie, Tiffany, Marcus, Ahsley, Qibei, Sharon, Meeran, Chaya

Members Absent:

This is the Sprint Planning Meeting:

The principle of role switching still goes, after discussion, we come up with the role assignment for Sprint 5 as follows:

Role assignment :

Scrum master: Chaya

MOM organizer: Meeran

Documentation owner: Qibei

Documents: Tiffany, Sharon, Marcus, Meeran

Presenter: Marcus, Chaya

Version controller: Charlie

Programmer: Entire team

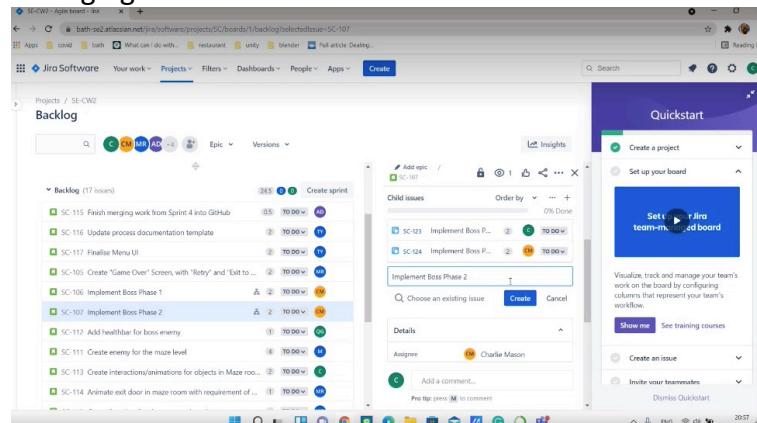
Tester: Entire team

Release manager: Charlie

Minutes:

Chaya, as the Scrum Master, organized a discussion about work assignment. Everyone agreed with Charlie's suggestion on what features to do in this sprint.

Chaya created 16 Jira tasks and assigned them to team members. All the tasks were for making our current game completer and more detailed (shown in the Backlog Overview). Merging work was left to Ash to finish, and everyone needed to create a new branch from main branch after merging.



5.3.2. Meeting-07-12-21

Members Present: Charlie, Tiffany, Marcus, Ahsley, Qibei, Chaya

Members Absent: Sharon, Meeran

Minutes:

This is a pre-meeting before the customer meeting.

Charlie: finished bat enemy, which follows you around and attacks you from a certain distance. Not decided on the second phase, kept working on it the rest of the day.

Ash: spent much time on the other coursework, would spend rest of today on his task.

Qibei: finished Boss health bar, might have some error, would figure it out if it would affect merging.

Chaya: worked on maze room, finished the animation of doors, not started with spike room because of coursework, would do it tonight; asked about the presentation tomorrow-if new things need to be added to it, Charlie suggested yes.

Marcus: made the game over scene, not sure if the retry button let player start from the same level or the beginning, at the moment made it start from the beginning; worked on the double doors and the scene change with carrying health, not understand the player script well, Charlie would help with that.

Tiffany: finished the menu scene, difficulty button worked, finished documentation template and sprint one documentation.

At the end, Chaya would send a message to the chat to decide on the time of customer meeting.

We had a progress issue because we need to submit a big coursework of another unit. Team members would try to make it up before the customer meeting.

5.4. Backlog Overview

Backlog ID	Backlog Description
SC-86	Update sprint documentation
SC-90	Create leader board at the game end
SC-116	New documentation template
SC-117	Finalise Menu UI
SC-106	Boss Phase 1
SC-115	Merging work from sprint4 into Github
SC-105	Game over Screen, Retry and Exit to Menu
SC-127	Spike room
SC-107	Boss Phase2
SC-111	Create enemy for maze level
SC-112	Health bar for boss
SC-113	Interactions/animations for objects in Maze room
SC-114	Exit door animation in Maze room
SC-133	Documentation for sprint 5
SC-118	Functionality that moves player between scenes, maintaining health etc.
SC-119	Create additional basic enemy

5.5. Completed Backlog

Backlog ID	Story Points	Priority	Assignee(s)	Backlog Description	Technical Difficulty
SC-86	7	High	Tiffany,Sharon,Meeran,Marcus	Update sprint documentation	NA
SC-116	2	High	Tiffany	New documentation template	NA

SC-117	2	High	Tiffany	Finalise Menu UI	Medium
SC-115	0.5	High	Ash	Merging work from sprint4 into Github	NA
SC-105	2	High	Marcus	Game over Screen, Retry and Exit to Menu	Medium
SC-111	4	High	Meeran	Create enemy for maze level	High
SC-112	1	High	Qibei	Health bar for boss	Medium
SC-113	1	High	Chaya	Interactions/animations for objects in Maze room	High
SC-114	1	High	Marcus	Exit door animation in Maze room	Medium
SC-133	1	Medium	Qibei	Documentation for sprint 5	NA
SC-118	1	High	Marcus	Functionality that moves player between scenes, maintaining health etc.	High
SC-119	1	Medium	Charlie	Create additional basic enemy	Medium

5.6. Exception Handling

In this sprint, we ran into two issues:

1. Due to the coming deadline of another big coursework, some tasks were not finished on time, as such the team had to prioritize finishing important tasks and bring the unfinished tasks to the next sprint
2. Understanding of documentation was not unified as such, the documentation owners had a discussion about the template and finalised it, every documentation should act in accordance with this template

5.7. Customer Meeting and Analysis

There was no customer meeting in this Sprint.

5.8. User Stories

US-2-VER3		
BacklogID: SC-90	Priority: High	Story Points: 2
AS A Player I WANT To have game timer SO THAT It will motivate my desire to play	Acceptance Criteria: Create a leader board to shown at the end of the game and in the menu	

US-17-VER1		
BacklogID: SC-117	Priority: High	Story Points: 2
AS A Player I WANT To configure the game	Acceptance Criteria: A finalized Menu UI	

SO THAT I can choose the difficulty level	
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US-18-VER2		
BacklogID: SC-106	Priority: High	Story Points: 2
AS A Player I WANT To play at different difficulties in Boss level SO THAT It can be more playable	Acceptance Criteria: Implement Boss Phase 1	

US-19-VER1		
BacklogID: SC-105	Priority: High	Story Points: 2
AS A Player I WANT To have an option to start again when dead SO THAT I can keep playing	Acceptance Criteria: Create “Game Over” screen, with “Retry” and “Exit to Menu” buttons	

US-20-VER1		
BacklogID: SC-127	Priority: High	Story Points: 4
AS A Player I WANT To see a complete Spike level SO THAT I can play in a new level	Acceptance Criteria: Finish Spike room	

US-21-VER1		
BacklogID: SC-107	Priority: High	Story Points: 2
AS A Player I WANT To play at different difficulties in Boss level SO THAT It can be more playable	Acceptance Criteria: Implement Boss Phase 2	

US-22-VER1		
BacklogID: SC-111	Priority: High	Story Points: 4
AS A Player I WANT To have different enemies in Maze SO THAT	Acceptance Criteria: Create enemy for Maze Level	

It can be more playable	
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US-23-VER1		
BacklogID: SC-112	Priority: High	Story Points: 1
AS A Player I WANT To know the health info of Boss SO THAT I can know if i succeed to do damage to it	Acceptance Criteria: Add a health bar for Boss	

US-24-VER1		
BacklogID: SC-113	Priority: High	Story Points: 1
AS A Player I WANT These objects that hold keys to be interactable SO THAT I can open it like in a real life	Acceptance Criteria: Create interactions to those objects	

US-25-VER1		
BacklogID: SC-114	Priority: High	Story Points: 1
AS A Player I WANT to open the exit door in Maze with keys SO THAT I can move to next level	Acceptance Criteria: Animate exit door in maze room (player should have 3 keys)	

US-26-VER1		
BacklogID: SC-118	Priority: High	Story Points: 1
AS A Player I WANT To maintain my states between scenes SO THAT It can be a consistent process	Acceptance Criteria: Create functionality to maintain health and time taken.	

US-27-VER1		
BacklogID: SC-119	Priority: High	Story Points: 1
AS A Player I WANT To have different enemies in Boss level SO THAT	Acceptance Criteria: Create additional basic enemy (bats)	

It can be more playable	
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5.9. User Story Tests

User Story ID	Acceptance criteria met?	Description
US-2-VER3	N	Create leader board at the game end, continues in next sprint
US-17-VER1	Y	Refer to section Meeting-07-12-21
US-18-VER2	Y	Refer to section Meeting-07-12-21
US-19-VER1	Y	Refer to section Meeting-07-12-21
US-20-VER1	N	Finish Spike room, continues in next sprint
US-21-VER1	N	Implement Boss Phase 2, continues in next sprint
US-22-VER1	N	Create enemy for Maze Level, continues in next sprint
US-23-VER1	Y	Refer to section Meeting-07-12-21
US-24-VER1	Y	Refer to section Meeting-07-12-21
US-25-VER1	Y	Refer to section Meeting-07-12-21
US-26-VER1	Y	Refer to section Meeting-07-12-21
US-27-VER1	Y	Refer to section Meeting-07-12-21

5.10. Requirements Use Cases

RUS-7 -VER1	User Story: US-2-VER3, US-17-VER1, US-19-VER1
Actor	Player
Scope	Menu
Level	Summary
Context	Player can navigate the menu: starting the game, configuring difficulty, viewing the leaderboard or quitting the game.
Frequency of Occurrence	Once in the start of the game.
Open Issues	Leaderboard backend needs refining

RUS-8-VER1	User Story: US-21-VER1, US-23-VER1, US-27-VER1, US-2-VER3
Actor	Player
Scope	Boss Level
Level	Summary
Context	Player should be able to kill the boss and or respawn / exist the game.
Frequency of Occurrence	Once in the boss level
Open Issues	Boss functionality at phase 2 unfinished. Leader board implementation unfinished.

RUS-9-VER1	User Story: US-20-VER1, US-24-VER1
Actor	Player

Scope	Spike Level
Level	Summary
Context	Player should be able to navigate the spike level to disable the spikes and escape the level
Frequency of Occurrence	Once in the spike level
Open Issues	Spike room unfinished

DSU-10-VER1	User Story: US-25-VER1, US-24-VER1, US-22-VER1
Actor	Player
Scope	Maze Level
Level	Summary
Context	Player should be able to navigate the maze level to find keys and unlock the door to the next level
Frequency of Occurrence	Once in the maze room
Open Issues	Maze room unfinished.

DSU-11-VER1	User Story: US-26-VER1
Actor	Player
Scope	Throughout all levels
Level	Subfunction
Context	Player should be able to see their health and time taken (for the leader board) across all levels
Frequency of Occurrence	Continuously throughout the game
Open Issues	N/A

5.11. Requirements Use Cases Tests

Use Case ID	Test status	Description
RSU-7-VER1	N	Leaderboard unfinished and continues on the next sprint
RSU-8-VER1	N	Boss level phase 2 is unfinished and continues on the next sprint
RSU-9-VER1	N	Spike level is unfinished and continues on the next sprint
RSU-10-VER1	N	Maze room is unfinished and continues on the next sprint
DSU-11-VER1	Y	Player health and timer has been implemented and carries over across levels

5.12. Design Use Cases

DSU-7-VER1	User Story: US-2-VER3, US-17-VER1, US-19-VER1
Actor	Player
Scope	Menu
Level	Summary

Pre-conditions	Player opens the executable file of the game
Description	Player navigating the menu: starting the game, configuring difficulty, viewing the leaderboard or quitting the game.
Overall Flow	Player can press “start” to begin the game, alternatively, they can configure the difficulty (alternative flow 1) or view the leaderboard (alternative flow 2) or quit the game (alternative flow 3). For alternative flow 1 and 2, the player can return back to the main menu to start or quit the game (alternative flow 3).
Alternative Flow 1	Player clicks the difficulty button, and chooses easy, medium and hard for difficulty. Press back to return to main menu.
Alternative Flow 2	Player clicks the leaderboard button to see the leaderboard. Press back to return to main menu.
Alternative Flow 3	Player presses quit to exit the game.
Post Conditions	Player starts the game in their configured difficulty.
Frequency of occurrence	Once in the start of the game.
Open Issues	Leaderboard backend needs refining

DSU-8-VER1	User Story: US-21-VER1, US-23-VER1, US-27-VER1, US-2-VER3
Actor	Player
Scope	Boss Level
Level	Summary
Pre-conditions	Player enters Boss level
Description	Player should be able to kill the boss and or respawn / exist the game.
Overall Flow	Boss is in phase 1, it drops to ground to spawn enemies and keeps doing damage to player with projectile orbs , during spawn time, player attacks it, after several times of attacking, it enters to phase 2 and player continues attacking the boss. The boss health bar is shown on the screen and decreases as player does damage.
Alternative Flow 1	Player is killed by enemies and sees game over screen, allowing them to restart game or exit to menu to choose difficulty again.

Alternative Flow 2	Player kills boss and reaches a new high score, allowing player to register score on leader board at the end
Post Conditions	The boss is killed and the game finishes.
Frequency of Occurrence	Once in the boss level
Open Issues	Boss functionality at phase 2 unfinished. Leader board implementation unfinished.

DSU-9-VER1	User Story: US-20-VER1, US-24-VER1
Actor	Player
Scope	Spike Level
Level	Summary
Pre-conditions	Player can interact with objects and has entered the spike level.
Description	Player navigates the spike level to disable the spikes and attempts to escape the level
Overall Flow	Player walks around, avoids damage from spike, looks for keys to turn off spike and escapes room
Alternative Flow 1	Player is killed by spike, goes to game over scene
Alternative Flow 2	Player unable to find keys and continue moving around
Post Conditions	Player successfully diffuses spike and finishes spike level
Frequency of Occurrence	Once in the spike level
Open Issues	Spike room unfinished

DSU-10-VER1	User Story: US-25-VER1, US-24-VER1, US-22-VER1
Actor	Player
Scope	Maze Room
Level	Summary
Pre-conditions	Player enters Maze room and can interact with objects
Description	Player navigates the maze level to find keys and unlock the door to the next level
Overall Flow	Player is chased by enemies and look for the way to the exit by finding and collecting keys to unlock the door at the end.
Alternative Flow 1	Player is killed by enemies and is directed to the game over room
Alternative Flow 2	Player is unable to find the keys to escape and therefore continues navigating the room

Alternative Flow 3	Player unable to find the exit and continues navigating the room
Post Conditions	Player exits the room
Frequency of occurrence	Once in the maze room
Open Issues	Maze room unfinished.

DSU-11-VER1	User Story: US-26-VER1
Actor	Player
Scope	Throughout all levels
Level	Subfunction
Pre-conditions	There is a variable that stores health and time taken
Description	Player should be able to see their health and time taken (for the leader board)
Overall Flow	Player goes through the levels, viewing their health and time taken on the screen.
Alternative Flow	N/A
Post Conditions	Player health and time taken carries across scenes.
Frequency of Occurrence	Continuously throughout the game
Open Issues	N/A

5.13. Design Use Cases Tests

Use Case ID	Test status	Description
DSU-7-VER1	N	Leaderboard unfinished and continues on the next sprint
DSU-8-VER1	N	Boss level phase 2 is unfinished and continues on the next sprint
DSU-9-VER1	N	Spike level is unfinished and continues on the next sprint
DSU-10-VER1	N	Maze room is unfinished and continues on the next sprint
DSU-11-VER1	Y	Player health and timer has been implemented and carries over across levels

5.14. CRC Cards

Black text indicates functionality that has not been changed since the previous sprint.

Green text indicates functionality that has been added since the previous sprint.

Red text indicates functionality that has been removed or moved to another class where it is better situated.

5.14.1. Player Classes - DSU-8-VER1, DSU-9-VER1, DSU-10-VER1, DSU-11-VER1

Class: Player	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Adjust camera position • Interact with objects (keys etc.) 	<ul style="list-style-type: none"> • Enemies <ul style="list-style-type: none"> o Enemy o SpiderEnemy

<ul style="list-style-type: none"> • Pick up objects • Equip items • Turn torch on/off (if equipped) • Zoom camera • Set the interaction and information text UI elements • Drop objects • Take damage when attacked • Check player health • Equip items at start of level • Attack Enemies • Update player healthbar UI • Set the Keys UI elements depending on how many keys the player has collected <ul style="list-style-type: none"> • Animate the sword swing when player clicks the attack button 	<ul style="list-style-type: none"> o BatEnemy o DeflectEnemy o BossEnemy • Objects <ul style="list-style-type: none"> o Door o Switch • UI Elements <ul style="list-style-type: none"> o TextFadeInOut o HealthBar o Keys
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Class: PlayerMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Move player forward, backward, left and right using keyboard keys • Apply gravity force • Jump using spacebar 	

Class: swing -> Functionality moved to Player class	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Animate the sword swing when player clicks the attack button (moved to Player class) 	

5.14.2. Enemy Classes- DSU-8-VER1, DSU-10-VER1

The “Enemy” class was repurposed to be the base class for all enemies in the game. Each individual type of enemy was then created as a class derived from Enemy, which overrides some of the functions of the base class to perform enemy-specific functionality.

Class: Enemy	
Responsibility:	Collaboration:
<p>• Check Enemy health</p> <p>• Take damage when attacked by player</p> <p>• Visually indicate damage taken</p> <p>• When health ≤ 0, become an object that can be picked up by player (moved to SpiderEnemy class)</p> <p>• “Die” when health ≤ 0</p>	

Class: SpiderEnemy inherits from Enemy	
Responsibility:	Collaboration:
<p>• Base responsibilities of Enemy class</p> <p>• Overridden damage method to visually indicate taking damage</p> <p>• When health ≤ 0, become an object that can be picked up by player</p>	

Class: BatEnemy inherits from Enemy	
Responsibility:	Collaboration:
<p>• Base responsibilities of Enemy class</p> <p>• Overridden damage method to visually indicate taking damage</p>	

Class: DeflectEnemy inherits from Enemy	
Responsibility:	Collaboration:
<p>• Base responsibilities of Enemy class</p> <p>• Overridden damage method to toggle object colour between green and red when damage is taken</p>	

Class: BossEnemy inherits from Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Base responsibilities of Enemy class • Overridden damage method to visually indicate taking damage • Update the boss health bar UI when damage is taken • When health ≤ 0, play death animation and fade out scene 	<ul style="list-style-type: none"> • BossHealthBar

Class: SpiderMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Play idle animation when not in range of player • Move towards player when they enter detection radius • Return to original position when player leaves detection radius • Attack player when in range 	<ul style="list-style-type: none"> • Player

Class: BatMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Play idle animation when not in range of player • Move towards player when they enter detection radius • Return to original position when player leaves detection radius • Attack player when in range 	<ul style="list-style-type: none"> • Player

Class: DeflectProjectile	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Move in direction of the player after being spawned by the boss enemy Damage the player when collision occurs Get deflected by the player in the direction they are looking when attacked Get deflected by the boss enemy back to the player when collision occurs with the boss enemy Increase movement speed after each collision If the projectile has been deflected enough times by the player, damage the boss enemy when they next collide 	<ul style="list-style-type: none"> Player BossEnemy

Class: BossMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Rotate to always look at player Shoot projectiles at player Phase 1: <ul style="list-style-type: none"> Shoot projectiles at player Spawn spider enemies Phase 2: <ul style="list-style-type: none"> Remove all other enemies from the level Deactivate pressure pads and retract bridge Shoot deflectable projectiles at the player 	<ul style="list-style-type: none"> Player BossEnemy Bridge Pad

Class: Projectile	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Move in direction of the player after being spawned by the boss enemy • Can be set to be “homing” (follow player continuously) • On collision with the player, damage the player • On collision with other environment objects, destroy the projectile 	<ul style="list-style-type: none"> • Player

Class: MoveEnemyToPlayer (replaced by specialised enemy Movement classes)	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Play idle animation when not in range of player • Move towards player when they enter detection radius • Return to original position when player leaves detection radius • Attack player when in range 	<ul style="list-style-type: none"> • Player

5.14.3. UI Classes - DSU-7-VER1

Class: TextFadeInOut	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Display text in the information text UI object with fade in and fade out effects 	

Class: MenuUI	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Handle user selection of game difficulty • Move to the Maze scene when the “Start” button is pressed 	<ul style="list-style-type: none"> • SceneManager

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <ul style="list-style-type: none"> • Quit the game when the “Quit” button is pressed • Move to the Leaderboard scene when the “Leaderboard” button is pressed | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

Class: UITesting

Responsibility:

- Disable inactive buttons on the menu canvas

Collaboration:

Class: HealthBar

Responsibility:

- Update the max value of the player health bar slider
- Set the value of the boss health bar slider

Collaboration:

Class: BossHealthBar

Responsibility:

- Display boss health bar UI if current scene is the boss level
- Update the max value of the boss health bar slider
- Set the value of the boss health bar slider
- Destroy the boss health bar when boss health reaches 0.

Collaboration:

- SceneManager

5.14.4. Object Classes - DSU-9-VER1, DSU-10-VER1

Class: Door

Responsibility:

- Rotate the door open
- Rotate the door closed

Collaboration:

Class: Flicker	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Continuously modify the intensity of the Light attached to the same GameObject as this script to simulate a flickering effect 	

Class: Bridge	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Move the bridge object forward when both pressure pads are activated Move the bridge backwards when neither or only one of the pressure pads are activated 	<ul style="list-style-type: none"> Pad

Class: Pad	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> “Activate” the pressure pad when a dead spider object is placed on it “De-activate” the pressure pad when the dead spider object is removed 	<ul style="list-style-type: none"> Bridge

Class: Damage_smallspike	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When collision occurs with player, reduce player HP by 4. 	<ul style="list-style-type: none"> Player

Class: Damage_traproom	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When collision occurs with player, reduce player HP by 5. 	<ul style="list-style-type: none"> Player

Class: Switch	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Animate switch being activated by the player • Lower the spikes in front of the exit door 	<ul style="list-style-type: none"> • Spike GameObjects

Class: Spike_switch	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • When player enters the trigger volume, raise the spikes in front of the exit door and display text prompting user to find the switch to disable the spikes 	<ul style="list-style-type: none"> • Spike GameObjects • TextFadeInOut

Class: Spike_traproom	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • When player enters the trigger volume, activate all spikes in the traproom 	<ul style="list-style-type: none"> • Spike GameObjects

5.15. User Interface Design

- Health bar for boss, refer to US-23-VER1; additional basic enemy(bat), refer to US-27 VER1



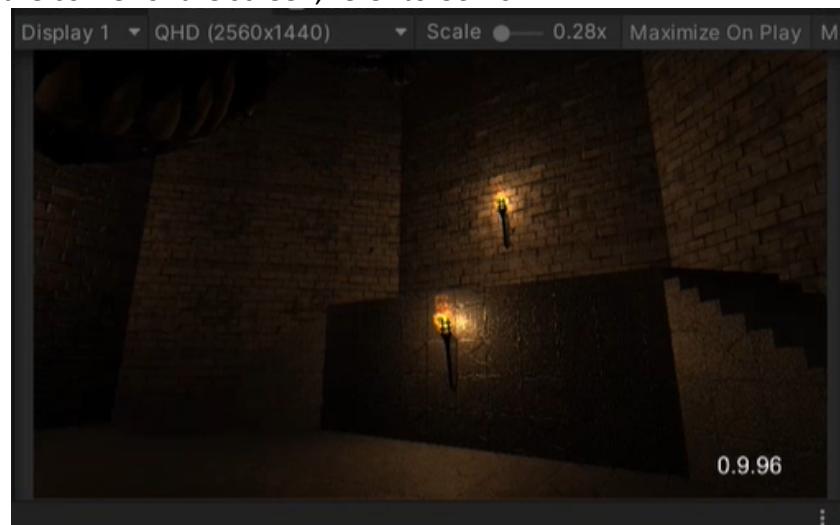
- “Game over” screen, refer to US-19-VER1



- finalized Menu UI, refer to US-17-VER1



- timer at the corner of the screen, refer to US-26-VER1



Sprint Number 6: 08-12-21 - 14-12-21

Scrum Master: Meeran

Document Owner: Chaya

6.1. Sprint Overview

In Sprint 6, most of the team members solely worked on documentation task which is the highest priority. While anyone works only one document tasks, Charlie, Marcus, Qibei and Ashley must work on game features that have not been developed yet as well (refer to section 6.4). In customer meeting, the customer gives the suggestion about how we should work on User manual and Maintenance documents, which we plan to do it after the meeting (refer to section 6.7). In this Sprint, we hold two meetings. The first meeting is held on 10 December and the second meeting is held on 13 December. The aim of these meetings is to report the individual progression and impediment (refer to section 6.3). In the end of this Sprint, almost documentation tasks are completed except the Maintenance document that will be continuing in the next Sprint. Also, there are only two game features that will be continuing in the next Sprint (refer to section 6.5).

6.2. Sprint Review

What went well:

- All features in spike level and boss level were almost completed
- The main menu was clickable and could interact with the user
- The most documentations were almost completed

What did not go well:

- The difficulty was not implemented into the game yet
- The leaderboard was still not working
- The enemy in maze level was not put into the game yet

Improvement:

- Assign the tasks that relate to game features that have not developed yet to people who can work on Unity. Also, they should work together in person in order not to create the conflict when merging the files on GitHub.

6.3. Meetings

6.3.1. Meeting – 10-12-21

Members Present: Meeran, Qibei, Charlie, Chaya, Tiffany, Marcus

Members Absent: Sharon, Ashley

Aim of the meeting was to update the team on individual task progress and to raise any issues that might have occurred on these tasks.

Overall, most of the team were working on documentations.

Meeran had been working on Sprint 3 documentation, which he had finished the Sprint Overview section. Sprint review and Exception handled sections in the document were in progress, while other sections in the document had been pending.

Qibei had been working on Sprint 5 documentation. Most sections of the document were completed or in progress, except Retrospective and Exception Handling sections. This was because he was not certain that both sections were about the current Sprint or the previous one. Later, Meeran and Tiffany explained to him that Retrospective section was about the reflection of what went well and what could have been better in this sprint, yet Exception handled section was something which described the issues which faced in the current sprint and the action if any like how we resolved it, or planned to push it to next sprint

Charlie added screen fade function to each level of the game. The player' view would fade in when the player started the game and moved to next level. He also fixed UI and made change to the spike level to make the enemies worked, changed lighting setup, and fixed some object alignment issues. CRC cards for Sprint 3 to Sprint 5 were in progress.

Chaya added some enemies and script to spikes in the spike level so that player HP would drop when touching them. He also changed animation and location of spikes, switch that disable the spike wall. While the Maintenance document had been pending, and Sprint 6 was in progress.

Tiffany had done Sprint 1 documentation, while the User manual was in progress. Also, the User manual that was decided to be video at first changed to document instead.

Marcus had been working on Sprint 4 documentation and two features of the game (SC-114 and SC-118, refer to section 6.4). Also, the "Game Over" scene would be push on GitHub late.

6.3.2. Meeting – 13-12-21

Members Present: Meeran, Charlie, Marcus, Sharon

Members Absent: Chaya, Tiffany, Qibei, Ashley.

Aim of the meeting was to update the team on individual task progress and to raise any issues that might have occurred on these tasks.

In general, everyone that did present in this meeting almost completed their tasks that they were assigned.

Meeran had done Sprint 3 documentation and Installation guide, which he also covered the installation guide section for Maintenance document.

Charlie had been working on CRC cards for Sprint 3 to Sprint 5, while he had done SC-150 (refer to section 6.4). In addition, he asked everyone who had been working on game should push the updated version of each level to the main branch on GitHub as soon as possible to finalise the game.

Marcus completed the Sprint 4 documentation but having a problem with SC-118 (refer to section 6.4). Thus, Charlie suggested that health bar of the player could be reset to full health every time the player move the next levels.

Sharon had almost completed Sprint 2 documentation. She also still needed some screenshot of what team did during the Unity learning week. Lastly, Sharon and Chaya had meeting yesterday regarding the maintenance document which they split the remaining tasks between themselves.

6.4. Backlog Overview

Backlog ID	Priority	Backlog Description
SC-90	MEDIUM	Create leaderboard to be shown at the end of game
SC-111	MEDIUM	Create enemy for the maze level
SC-114	MEDIUM	Animate exit door in maze room with requirement of player having three keys
SC-118	MEDIUM	Create functionality that moves player between scenes, maintaining health etc
SC-140	HIGH	Sprint 1 document
SC-141	HIGH	User Manual
SC-142	HIGH	Maintenance Document
SC-143	HIGH	Installation Guide
SC-144	HIGH	Sprint 2 Document
SC-145	HIGH	Sprint 3 Document
SC-146	HIGH	Sprint 4 Document
SC-147	HIGH	Sprint 5 Document
SC-148	HIGH	Sprint 6 Document
SC-150	HIGH	Boss Room-Fade the room up on killing the BOSS
SC-151	HIGH	CRC Cards for Sprint 3
SC-152	HIGH	CRC Cards for Sprint 4
SC-153	HIGH	CRC Cards for Sprint 5
SC-154	MEDIUM	Menu Screen Button Click

6.5. Completed Backlog

Backlog ID	Story Points	Assignee(s)	Backlog Description	Technical Difficulty
SC-114	1	Marcus	Animate exit door in maze room with requirement of player having three keys	MEDIUM
SC-118	2	Marcus	Create functionality that moves player between scenes, maintaining health etc	HIGH
SC-140	2	Tiffany	Sprint 1 document	NA
SC-141	3	Tiffany	User Manual	NA
SC-143	3	Meeran	Installation Guide	NA
SC-144	2	Sharon	Sprint 2 Document	NA
SC-145	2	Meeran	Sprint 3 Document	NA
SC-147	2	Qibei	Sprint 5 Document	NA
SC-148	3	Chaya	Sprint 6 Document	NA

SC-150	1	Charlie	Boss Room-Fade the room up on killing the BOSS	MEDIUM
SC-151	1	Charlie	CRC Cards for Sprint 3	NA
SC-152	1	Charlie	CRC Cards for Sprint 4	NA
SC-153	2	Charlie	CRC Cards for Sprint 5	NA
SC-154	3	Qibei	Menu Screen Button Click	HIGH

6.6. Exception Handling:

In Sprint 6, most of us completed the documentation tasks (refer to section 6.5), however we still got many features in game that we needed to finish it to complete the game. This caused the delay to other tasks such as maintenance document that required all codes and functions that used in the game. Therefore, we should divide the tasks equally and focus on game tasks more in the next Sprint. On the other hand, we could drop some game features that we have not develop it yet, which is not important in order to complete the game and finish all documents before the deadline.

6.7. Customer Meeting and Analysis

The meeting was hold on 8th December 2021. We started the meeting by presenting the two weeks progression because there was a strike, which cancelled the customer meeting that should be hold last week. The presentation began with the main menu of the game which the buttons were not clickable in last meeting. In this meeting, it was clickable, and the player can choose the difficulty of the game (easy→medium→hard). We also presented the “Game Over” scene, which the player can choose two options: exit to main menu or retry. After presenting these two progressions, the customer gave the good respond even though the main menu and the “Game Over” scene did not link to main parts of the game yet.

Next, we presented the spike level. In the spike level, there is many spikes and traps that player need to avoid them. The customer then would like to understand that could player avoid the spikes, or it was impossible to avoid. We explained that the player could avoid them and some of them could be disable by using a switch which satisfied the customer.

Later, we discussed and demonstrated the boss level. There are two phases in this level. In the first phase, the player needs to kill the spider enemies that are respawned by boss enemy. After killing spider enemies, the player can pick the death body of spider enemies and put them on two pressure pads to activate the bridge which player can approach the boss enemies to attack with sword. For the second phase, it will be starting after boss enemy' HP drops at certain point. In this phase, the player can kill the boss enemy by reflecting the projectile attack from boss enemy three times which ends the game. We also presented the health bar feature of player and boss enemy, and the timer that is used on leader board to compare the previous run. At first, we decided that the boss level should have three phases and poison level would be developed if we had time, but the timeframe was limited. Then, the customer suggested that we already had many functions and features in the game, thus we should focus on what was work rather than what was not work.

Before we finished presenting the two weeks progression, the customer would like to know that how could we connect between levels since there was gap of transition between levels.

We then replied that we were going to add the loading scene to make the game run smoother which the customer agreed with the solution. The customer also guided that we should ask other people to check the quality of the game since we might set the quality of the game higher than it was necessary.

In the last few minutes of the meeting, the customer questioned about the document because the document was expected to better with the time. Moreover, the customer mentioned about manual and maintenance documents. The customer recommended that we should try to think about the view of people who never seen the game and what the player should know to start the game before working on manual document, which can be presented in form of document, slide, video etc. For maintenance document, we should describe about the code and the function which people can use it to change or modify the game

In brief, the customer mostly satisfied with the progression and gave positive feedback about time management for working on game and documents.

6.8. User Stories

US-28-VER1		
BacklogID: SC-118	Priority: HIGH	Story Points: 2
AS A customer I WANT the loading scene when the player moves between levels SO THAT The game run smoother without a gap of transition between levels which seems discontinuous.	Acceptance Criteria: Creating the functionality that moves player between scenes while maintaining health	

US-29-VER1		
BacklogID: SC-141	Priority: HIGH	Story Points: 3
AS A customer I WANT us to understand the view of people who never seen the game before SO THAT people who play the first time know how to play it without giving too much information (game spoiler)	Acceptance Criteria: Creating the User manual that new users can easily follow it while don't give much information about the game	

US-30-VER1		
BacklogID: SC-142	Priority: HIGH	Story Points: 3
AS A customer I WANT us to describe about the code and where the functions in each scene SO THAT people who would like to change the game can understand what code and function are created for.		Acceptance Criteria: Creating the Maintenance document that contains all important detailed of codes and functions that people can use it to improve or change the game without struggling

6.9. User Story Tests

User Story ID	Acceptance criteria met?	Description
US-28-VER1	y	Refer to section 6.5
US-29-VER1	y	Refer to section 6.5
US-30-VER1	n	Maintenance Document will be continuing in next Sprint

6.10. Requirements Use Cases

RUS-12-VER1	User Story: US-28-VER1
Actor	Player
Scope	Maze level, Spike level, Boss level
Level	User goal
Context	Player' view fades in when starting the game and moving the next level
Frequency of Occurrence	Every time that player starts to play each level of the game
Open Issues	-

RUS-13-VER1	User Story: US-28-VER1
Actor	Player
Scope	Maze level, Spike level, Boss level
Level	User goal
Context	The dark screen will appear as the loading screen, which create transition between level
Frequency of Occurrence	Every time that player moves to next level of the game
Open Issues	-

6.11. Requirements Use Cases Tests

Use Case ID	Test status	Description
RUS-12-VER1	Y	Refer to section 6.5
RUS-13-VER1	Y	Refer to section 6.5

6.12. Design Use Cases

DUS-12-VER1	User Story: US-28-VER1
Actor	Player
Scope	Maze level, Spike level, Boss level
Level	User goal
Pre-conditions	<ul style="list-style-type: none"> - Click the start button at main menu - Enter the exit door of each level
Description	Player' view fades in when starting the game and moving the next level
Overall Flow	The player clicks the start button at main menu. Then the player' s view will fade in with the scene of the first level. In case that player is already inside the game, after the player enter exit door of each level, the screen will turn to black screen. Then the player's view will fade in with the scene of next level.
Alternative Flow (number)	-
Post Conditions	Player is at the next level or the first level
Frequency of Occurrence	Every time that player starts to play each level of the game
Open Issues	-

DUS-13-VER1	User Story: US-28-VER1
Actor	Player
Scope	Maze level, Spike level, Boss level
Level	User goal
Pre-conditions	Enter exit door of each level
Description	The dark screen will appear as the loading screen, which create transition between level
Overall Flow	The player enters the exit door, and the dark screen will appear later. Then, the player is at next level
Alternative Flow (number)	-
Post Conditions	Player is at next level
Frequency of Occurrence	Every time that player moves to next level of the game
Open Issues	-

6.13. Design Use Cases Tests

Use Case ID	Test status	Description
DUS-12-VER1	Y	Refer to section 6.5
DUS-13-VER1	Y	Refer to section 6.5

6.14. CRC Cards

Black text indicates functionality that has not been changed since the previous sprint.

Green text indicates functionality that has been added since the previous sprint.

Red text indicates functionality that has been removed or moved to another class where it is better situated.

6.14.1. Player Classes - DUS-12-VER1, DUS-13-VER1

Class: Player	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Adjust camera position • Interact with objects (keys etc.) • Pick up objects • Equip items • Turn torch on/off (if equipped) • Zoom camera • Set the interaction and information text UI elements • Drop objects • Take damage when attacked • Check player health • Equip items at start of level • Attack Enemies • Update player healthbar UI • Set the Keys UI elements depending on how many keys the player has collected • Animate the sword swing when player clicks the attack button • Fade in the screen at the start of each scene • Move to GameOver scene when player dies • Adjust objective text on UI depending on which level is loaded 	<ul style="list-style-type: none"> • Enemies <ul style="list-style-type: none"> ◦ Enemy ◦ SpiderEnemy ◦ BatEnemy ◦ DeflectEnemy ◦ BossEnemy • Objects <ul style="list-style-type: none"> ◦ Door ◦ Switch ◦ Door1 • UI Elements <ul style="list-style-type: none"> ◦ TextFadeInOut ◦ HealthBar ◦ Keys ◦ SceneFade ◦ SceneManager

Class: PlayerMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Move player forward, backward, left and right using keyboard keys Apply gravity force Jump using spacebar 	

6.14.2. Enemy Classes - DUS-12-VER1, DUS-13-VER1

Class: Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Check Enemy health Take damage when attacked by player Visually indicate damage taken “Die” when health <= 0 	

Class: SpiderEnemy inherits from Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Base responsibilities of enemy class Overridden damage method to visually indicate taking damage When health <= 0, become an object that can be picked up by player 	

Class: BatEnemy inherits from Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Base responsibilities of Enemy class Overridden damage method to visually indicate taking damage 	

Class: DeflectEnemy inherits from Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Base responsibilities of Enemy class Overridden damage method to toggle object colour between 	

green and red when damage is taken

Class: BossEnemy inherits from Enemy

Responsibility:	Collaboration:
<ul style="list-style-type: none"> Base responsibilities of Enemy class Overridden damage method to visually indicate taking damage Update the boss health bar UI when damage is taken When health ≤ 0, play death animation and fade out scene 	<ul style="list-style-type: none"> BossHealthBar SceneFade SceneManager

Class: SpiderMovement

Responsibility:	Collaboration:
<ul style="list-style-type: none"> Play idle animation when not in range of player Move towards player when they enter detection radius Return to original position when player leaves detection radius Attack player when in range 	<ul style="list-style-type: none"> Player

Class: BatMovement

Responsibility:	Collaboration:
<ul style="list-style-type: none"> Play idle animation when not in range of player Move towards player when they enter detection radius Return to original position when player leaves detection radius Attack player when in range 	<ul style="list-style-type: none"> Player

Class: DeflectProjectile

Responsibility:	Collaboration:
<ul style="list-style-type: none"> Move in direction of the player after being spawned by the boss enemy Damage the player when collision occurs 	<ul style="list-style-type: none"> Player BossEnemy

- Get deflected by the player in the direction they are looking when attacked
- Get deflected by the boss enemy back to the player when collision occurs with the boss enemy
- Increase movement speed after each collision
- If the projectile has been deflected enough times by the player, damage the boss enemy when they next collide

Class: BossMovement

Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Rotate to always look at player • Phase 1: <ul style="list-style-type: none"> • Shoot projectiles at player • Spawn spider enemies • Phase 2: <ul style="list-style-type: none"> • Remove all other enemies from the level • Deactivate pressure pads and retract bridge • Shoot deflectable projectiles at the player 	<ul style="list-style-type: none"> • Player • BossEnemy • Bridge • Pad

Class: Projectile

Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Move in direction of the player after being spawned by the boss enemy • Can be set to be “homing” (follow player continuously) • On collision with the player, damage the player • On collision with other environment objects, destroy the projectile 	<ul style="list-style-type: none"> • Player

6.14.3. UI Classes - DUS-12-VER1, DUS-13-VER1

Class: TextFadeInOut	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Display text in the information text UI object with fade in and fade out effects 	
Class: MenuUI	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Handle user selection of game difficulty Move to the Maze scene when the “Start” button is pressed Quit the game when the “Quit” button is pressed Move to the Leaderboard scene when the “Leaderboard” button is pressed 	<ul style="list-style-type: none"> SceneManager
Class: UITesting	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Disable inactive buttons on the menu canvas 	
Class: HealthBar	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Update the max value of the player health bar slider Set the value of the boss health bar slider 	
Class: BossHealthBar	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Display boss health bar UI if current scene is the boss level Update the max value of the boss health bar slider Set the value of the boss health bar slider 	<ul style="list-style-type: none"> SceneManager

- | |
|-------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Destroy the boss health bar when boss health reaches 0. |
|-------------------------------------------------------------------------------------------------------------|

Class: GameoverUI

Responsibility:

- Change scenes to the Maze level when the “Retry” button is pressed
- Return to the main menu when the exit button is pressed

Collaboration:

- SceneManager

Class: SceneFade

Responsibility:

- Provide a public function to fade in the screen from black
- Provide a public function to fade out the screen to black

Collaboration:

6.14.4. Object Classes - DUS-12-VER1, DUS-13-VER1

Class: Door

Responsibility:

- Rotate the door open
- Rotate the door closed

Collaboration:

Class: Door1

Responsibility:

- Open both doors

Collaboration:

Class: Exit_door

Responsibility:

- Play door opening animation when the player enters the trigger volume

Collaboration:

- Player

Class: Flicker

Responsibility:

- Continuously modify the intensity of the Light attached to the same GameObject as this

Collaboration:

script to simulate a flickering effect

Class: Bridge

Responsibility:

- Move the bridge object forward when both pressure pads are activated
- Move the bridge backwards when neither or only one of the pressure pads are activated

Collaboration:

- Pad

Class: Pad

Responsibility:

- “Activate” the pressure pad when a dead spider object is placed on it
- “De-activate” the pressure pad when the dead spider object is removed

Collaboration:

- Bridge

Class: Damage_smallspike

Responsibility:

- When collision occurs with player, reduce player HP by 4.

Collaboration:

- Player

Class: Damage_traproom

Responsibility:

- When collision occurs with player, reduce player HP by 5.

Collaboration:

- Player

Class: Switch

Responsibility:

- Animate switch being activated by the player
- Lower the spikes in front of the exit door

Collaboration:

- Spike GameObjects

Class: Spike_switch	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When player enters the trigger volume, raise the spikes in front of the exit door and display text prompting user to find the switch to disable the spikes 	<ul style="list-style-type: none"> Spike GameObjects TextFadeInOut

Class: Spike_traproom	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When player enters the trigger volume, activate all spikes in the traproom 	<ul style="list-style-type: none"> Spike GameObjects

6.15. User Interface Design

In Sprint 6, there were no additional UI elements implemented into the game.

Sprint 7: 15-12-21 - 20-12-21

Scrum Master: Mohamed Nasrudeen Meeran
Document Owner: Ashley Dawson

7.1. Sprint Overview

The main focus of this sprint was to:

- Finalise documentation.
- Complete the final user stories before the end of the final sprint.

There was no customer meeting after the completion of sprint 6. The previous customer meeting concluded with the customer stating he is happy with the current state of the game and with the remaining user stories that would bring the game to a finalised state (see section 6.7). We therefore commence sprint 7 with the planning meeting, the central focus on which user stories are remaining (see section 7.3.1). For the game development, the creation of a ‘game won’ screen where the final time is shown and the integration of the leaderboard screen with this screen (SC-90). An enemy to implemented into the maze level (SC-111) and death animations to be added to player’s and enemy bodies (SC-138, 139, 158). The documentation to be completed being the sprint 3,4, and 7 documents, the review of all documents (SC-159), the read me file for the game (SC-160) and maintenance document (SC-142). See section 7.4 for backlog details. We held one final meeting to conclude the final sprint and the project as a whole (see section 7.2).

7.2. Sprint Review

In this sprint, we continued with having two separate sub-teams, software development and documentation. However, since the majority of the game had already been completed, we were able to transfer more members onto the documentation team. On reflection, this was definitely advantageous to making sure that the documentation was completed on time and to a good level of quality.

7.3. Meetings

7.3.1. Meeting - 15-12-21

Members Present: Ashley, Charlie, Chaya, Marcus, Meeran, Qibei, Sharon, Tiffany

Members Absent: None

This meeting was used for planning of the sprint. We carried over any incomplete user stories from sprint 6. How to complete the final software development user stories and the story points to assign to each task was also discussed. Next, we considered the current stage of the documentation and to what needed to be finished before submission. Finally, members were assigned to the final user stories to be completed for the final sprint. Some old user stories were assigned to other members of the team to even out workload through the team.

Role assignment :

Scrum master: Meeran

Documentation owner: Tiffany

Documents: Ashley, Qibei, Sharon, Marcus, Meeran, Chaya

Presenter: -

Version controller: Charlie

Programmer: Charlie, Ashley

Tester: Entire team

Release manager: Charlie

7.4. Backlog Overview

Backlog ID	Priority	Backlog Description
SC-90	High	Leaderboard to be shown at the end of game
SC-111	High	Create enemy for the maze level
SC-142	High	Maintenance document
SC-146	High	Sprint 4 documentation
SC-157	High	Customer meeting preparation
SC-159	High	Review and feedback on the existing sprint docs
SC-160	High	Read me file
SC-161	High	Sprint 3 document update
SC-162	High	Sprint 7 documentation
SC-158	High	Bat Death Documentation
SC-139	Medium	Boss Death Animation
SC-138	Medium	Add Player Death Animation

7.5. Completed Backlog

Backlog ID	Story Points	Assignee(s)	Backlog Description	Technical Difficulty
SC-90	2	Ashley	Leaderboard to be shown at the end of game	Medium
SC-111	4	Charlie	Create enemy for the maze level	High
SC-142	1	Chaya	Maintenance document	N/A
SC-146	2	Marcus	Sprint 4 documentation	N/A
SC-157	2	Sharon	Customer meeting preparation	N/A
SC-159	1	Tiffany	Review and feedback on the existing sprint docs	N/A
SC-160	2	Meeran	Read me file	N/A
SC-161	1	Meeran	Sprint 3 document update	N/A
SC-162	2	Ashley	Sprint 7 documentation	N/A
SC-158	2	Charlie	Bat Death Documentation	High
SC-139	2	Charlie	Boss Death Animation	High
SC-138	2	Charlie	Add Player Death Animation	Medium

7.6. Exception Handling

Due to the high volume of work from other modules the members of the group have had to complete this week, the backlog tasks were completed close to the deadline. Therefore, it was made more difficult for any issues with completing tasks to be discussed and overcome. However, the issues that did arise were not very problematic and easy to resolve with beneficial communication with other members of the team.

7.7. Customer Meeting and Analysis

There was no customer meeting before this sprint so no analysis can be done. Only for us to keep in line with the customer's wishes from the previous customer meeting (see section 6.7).

7.8. User Stories

US-30-VER1		
BacklogID: SC-142	Priority: HIGH	Story Points: 3
AS A Customer I WANT Us to describe about the code and where the functions in each scene SO THAT People who would like to change the game can understand what code and function are created for.		Acceptance Criteria: Creating the Maintenance document that contains all important detailed of codes and functions that people can use it to improve or change the game without struggling

7.9. User Story Tests

User Story ID	Acceptance criteria met?	Description
US-30-VER1	Yes	Create the maintenance document, see Section 7.5

7.10. Requirements Use Cases

RUS-14-VER1	User Story: US-25-VER1, US-24-VER1, US-22-VER1
Actor	Player
Scope	Maze level
Level	User goal
Context	User has to navigate through the maze level without being killed by the enemy
Frequency of Occurrence	Throughout the whole maze level
Open Issues	-

RUS-15-VER1	User Story: US-27-VER1, US-20-VER1
Actor	Player
Scope	Spike and Boss scene
Level	User goal

Context	User kills a bat enemy, the bat dies and its on-death animation is played
Frequency of Occurrence	Whenever the player kills a bat enemy
Open Issues	A bat enemy may bug or glitch on death

RUS-16-VER1	User Story: US-21-VER1
Actor	Player
Scope	Boss scene
Level	User goal
Context	User kills the boss enemy, the boss dies and its on-death animation is played
Frequency of Occurrence	When the player kills the boss enemy
Open Issues	-

RUS-17-VER1	User Story: US-2-VER3
Actor	Player
Scope	End of game and leaderboard screens
Level	User goal
Context	User finishes the game, their time is shown and placed on the leaderboard if fast enough.
Frequency of Occurrence	When the player kills the boss enemy and completes the game.
Open Issues	-

7.11. Requirements Use Cases Tests

Use Case ID	Test status	Description
RUS-14-VER1	Y	Multiple completions of the maze scene, and purposeful player death from the maze enemy to test enemy can attack successfully without bugs.
RUS-15-VER1	Y	Killing multiple bat enemies in both the spike and boss room, when player is attacking normally, jumping and moving. Testing for no glitches if bat dies onto another enemy
RUS-16-VER1	Y	Killing the boss, making sure that the boss body does not glitch on death if it falls onto the player
RUS-17-VER1	Y	Completion of the game with and without a time that is fast enough to feature on the leaderboard.

7.12. Design Use Cases

DUS-14-VER1	User Story: US-25-VER1, US-24-VER1, US-22-VER1
Actor	Player
Scope	Maze level
Level	User goal

Pre-conditions	Player needs to load up the maze level
Description	User has to navigate through the maze level without being killed by the enemy
Overall Flow	Player must pick up a torch at the beginning of the level. They then navigate their way through the maze level with the torch light on to pick up keys to unlock the exit door. They must avoid attacks from the maze enemy in order to survive and escape.
Alternative Flow	Player is killed by the maze enemy
Post Conditions	If player escapes, player progresses to the spike level. If player dies, they are sent to the game over screen before returning to the menu screen
Frequency of Occurrence	Once per playthrough
Open Issues	-

DUS-15-VER1	User Story: US-27-VER1, US-20-VER1
Actor	Player
Scope	Spike and Boss scene
Level	User goal
Pre-conditions	Bat is in the vicinity of the player, the bat will attempt to attack the player.
Description	User kills a bat enemy, the bat dies and its on-death animation is played
Overall Flow	Player loads into the spike level, there are multiple bat enemies within. The player may choose to attack the bat enemies as they progress through the level. If the player is successful on killing the bat enemy, its on-death animation is played. The same is true for the bats in the boss level.
Alternative Flow	The bat does not die
Post Conditions	The bats death animation plays before the bat body despawns.
Frequency of Occurrence	Whenever player kills an enemy bat.
Open Issues	A bat enemy may bug or glitch on death

DUS-16-VER1	User Story: US-21-VER1
Actor	Player
Scope	Boss scene
Level	User goal

Pre-conditions	The player enters the boss scene and commences the boss fight.
Description	User kills the boss enemy, the boss dies and its on-death animation is played
Overall Flow	Player loads into the boss level, it deals enough damage in its first phase. The boss progresses to its second phase. If the player is successful on killing the boss enemy in this phase, its on-death animation is played.
Alternative Flow	The player is killed before killing the boss
Post Conditions	The boss on-death animation plays before the player is sent to the game over screen with their time of completion. If the player dies, they are sent to the game over screen before returning to the menu screen
Frequency of Occurrence	Whenever player kills the boss.
Open Issues	-

DUS-17-VER1	User Story: US-2-VER3
Actor	Player
Scope	End game screen and leaderboard screen
Level	User goal
Pre-conditions	The player kills the boss enemy
Description	User finishes the game, their time is shown and placed on the leaderboard if fast enough.
Overall Flow	Player kills the boss enemy, the timer is stopped and the boss' on-death animation plays. The screen fades to black before loading the end game Screen with their time showing. The player then navigates to the leaderboard screen where their time has been added to the leaderboard if it is fast enough.
Alternative Flow	The player's time is not fast enough to appear on the leaderboard so is not shown again after the end game screen
Post Conditions	The player's time is saved such that it is shown whenever the player accesses the leaderboard screen
Frequency of Occurrence	On every completion of the game
Open Issues	-

7.13. Design Use Cases Tests

Use Case ID	Test status	Description
DUS-14-VER1	Y	Multiple completions of the maze scene, and purposeful player death from the maze enemy to test enemy can attack successfully without bugs.
DUS-15-VER1	Y	Killing multiple bat enemies in both the spike and boss room, when player is attacking normally, jumping and moving. Testing for no glitches if bat dies onto another enemy
DUS-16-VER1	Y	Killing the boss, making sure that the boss body does not glitch on death if it falls onto the player
DUS-17-VER1	Y	Completion of the game with and without a time that is fast enough to feature on the leaderboard.

7.14. CRC Cards

Black text indicates functionality that has not been changed since the previous sprint.

Green text indicates functionality that has been added since the previous sprint.

Red text indicates functionality that has been removed or moved to another class where it is better situated.

7.14.1. Player Classes - DUS-14-VER1, DUS-15-VER1, DUS-16-VER1

Class: Player	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Adjust camera position • Interact with objects (keys etc.) • Pick up objects • Equip items • Turn torch on/off (if equipped) • Zoom camera • Set the interaction and information text UI elements • Drop objects • Take damage when attacked • Check player health • Equip items at start of level • Attack Enemies • Update player healthbar UI • Set the Keys UI elements depending on how many keys the player has collected • Animate the sword swing when player clicks the attack button • Fade in the screen at the start of each scene 	<ul style="list-style-type: none"> • Enemies <ul style="list-style-type: none"> ◦ Enemy ◦ SpiderEnemy ◦ BatEnemy ◦ DeflectEnemy ◦ BossEnemy • Objects <ul style="list-style-type: none"> ◦ Door ◦ Switch ◦ Door1 • UI Elements <ul style="list-style-type: none"> ◦ TextFadeInOut ◦ HealthBar ◦ Keys ◦ SceneFade ◦ SceneManager

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| <ul style="list-style-type: none"> • Move to GameOver scene when player dies • Adjust objective text on UI depending on which level is loaded | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

Class: PlayerMovement

Responsibility:

- Move player forward, backward, left and right using keyboard keys
- Apply gravity force
- Jump using spacebar

Collaboration:

7.14.2. Enemy Classes - DUS-14-VER1, DUS-15-VER1, DUS-16-VER1

Class: Enemy

Responsibility:

- Check Enemy health
- Take damage when attacked by player
- Visually indicate damage taken
- “Die” when health <= 0

Collaboration:

Class: SpiderEnemy inherits from Enemy

Responsibility:

- Base responsibilities of enemy class
- Overridden damage method to visually indicate taking damage
- When health <= 0, become an object that can be picked up by player

Collaboration:

Class: BatEnemy inherits from Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Base responsibilities of Enemy class • Overridden damage method to visually indicate taking damage • Apply physics to fall to the ground when killed 	

Class: DeflectEnemy inherits from Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Base responsibilities of Enemy class • Overridden damage method to toggle object colour between green and red when damage is taken 	

Class: BossEnemy inherits from Enemy	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Base responsibilities of Enemy class • Overridden damage method to visually indicate taking damage • Update the boss health bar UI when damage is taken • When health ≤ 0, play death animation and fade out scene 	<ul style="list-style-type: none"> • BossHealthBar • SceneFade • SceneManager

Class: SpiderMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Play idle animation when not in range of player • Move towards player when they enter detection radius • Return to original position when player leaves detection radius • Attack player when in range 	<ul style="list-style-type: none"> • Player

Class: BatMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Play idle animation when not in range of player • Move towards player when they enter detection radius • Return to original position when player leaves detection radius • Attack player when in range 	<ul style="list-style-type: none"> • Player

Class: DeflectProjectile	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Move in direction of the player after being spawned by the boss enemy • Damage the player when collision occurs • Get deflected by the player in the direction they are looking when attacked • Get deflected by the boss enemy back to the player when collision occurs with the boss enemy • Increase movement speed after each collision • If the projectile has been deflected enough times by the player, damage the boss enemy when they next collide 	<ul style="list-style-type: none"> • Player • BossEnemy

Class: BossMovement	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Rotate to always look at player • Phase 1: <ul style="list-style-type: none"> • Shoot projectiles at player • Spawn spider enemies • Phase 2: <ul style="list-style-type: none"> • Remove all other enemies from the level • Deactivate pressure pads and retract bridge 	<ul style="list-style-type: none"> • Player • BossEnemy • Bridge • Pad

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| <ul style="list-style-type: none"> • Shoot deflectable projectiles at the player |
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Class: Projectile	
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Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Move in direction of the player after being spawned by the boss enemy • Can be set to be “homing” (follow player continuously) • On collision with the player, damage the player • On collision with other environment objects, destroy the projectile 	<ul style="list-style-type: none"> • Player

Class: MonsterMovement	
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Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Play idle animation when not in range of player • Move towards player when they enter detection radius • Return to original position when player leaves detection radius or enters an area that the enemy can't reach (behind doors) • Attack player when in range 	<ul style="list-style-type: none"> • Player

7.14.3. UI Classes - DUS-17-VER1

Class: TextFadeInOut	
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Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Display text in the information text UI object with fade in and fade out effects 	

Class: MenuUI	
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Responsibility:	Collaboration:
<ul style="list-style-type: none"> • Handle user selection of game difficulty 	<ul style="list-style-type: none"> • SceneManager

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| <ul style="list-style-type: none"> Move to the Maze scene when the “Start” button is pressed Quit the game when the “Quit” button is pressed Move to the Leaderboard scene when the “Leaderboard” button is pressed | |
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Class: UITesting

Responsibility:

- Disable inactive buttons on the menu canvas

Collaboration:

Class: HealthBar

Responsibility:

- Update the max value of the player health bar slider
- Set the value of the boss health bar slider

Collaboration:

Class: BossHealthBar

Responsibility:

- Display boss health bar UI if current scene is the boss level
- Update the max value of the boss health bar slider
- Set the value of the boss health bar slider
- Destroy the boss health bar when boss health reaches 0.

Collaboration:

- SceneManager

Class: GameoverUI

Responsibility:

- Change scenes to the Maze level when the “Retry” button is pressed
- Return to the main menu when the exit button is pressed

Collaboration:

- SceneManager

Class: SceneFade	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Provide a public function to fade in the screen from black Provide a public function to fade out the screen to black 	

Class: create_Leaderboard	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Create a list of all game completion times Retrieve the most recent completion time from the Timer script when the game is beaten Replace slower times in the list with faster times 	<ul style="list-style-type: none"> Timer

7.14.4. Object Classes - DUS-14-VER1, DUS-15-VER1, DUS-16-VER1

Class: Door	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Rotate the door open Rotate the door closed 	

Class: Door1	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Open both doors 	

Class: Exit_door	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Play door opening animation when the player enters the trigger volume 	<ul style="list-style-type: none"> Player

Class: Flicker	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> Continuously modify the intensity of the Light attached to the same GameObject as this 	

script to simulate a flickering effect

Class: Bridge

Responsibility:

- Move the bridge object forward when both pressure pads are activated
- Move the bridge backwards when neither or only one of the pressure pads are activated

Collaboration:

- Pad

Class: Pad

Responsibility:

- “Activate” the pressure pad when a dead spider object is placed on it
- “De-activate” the pressure pad when the dead spider object is removed

Collaboration:

- Bridge

Class: Damage_smallspike

Responsibility:

- When collision occurs with player, reduce player HP by 4.

Collaboration:

- Player

Class: Damage_traproom

Responsibility:

- When collision occurs with player, reduce player HP by 5.

Collaboration:

- Player

Class: Switch

Responsibility:

- Animate switch being activated by the player
- Lower the spikes in front of the exit door

Collaboration:

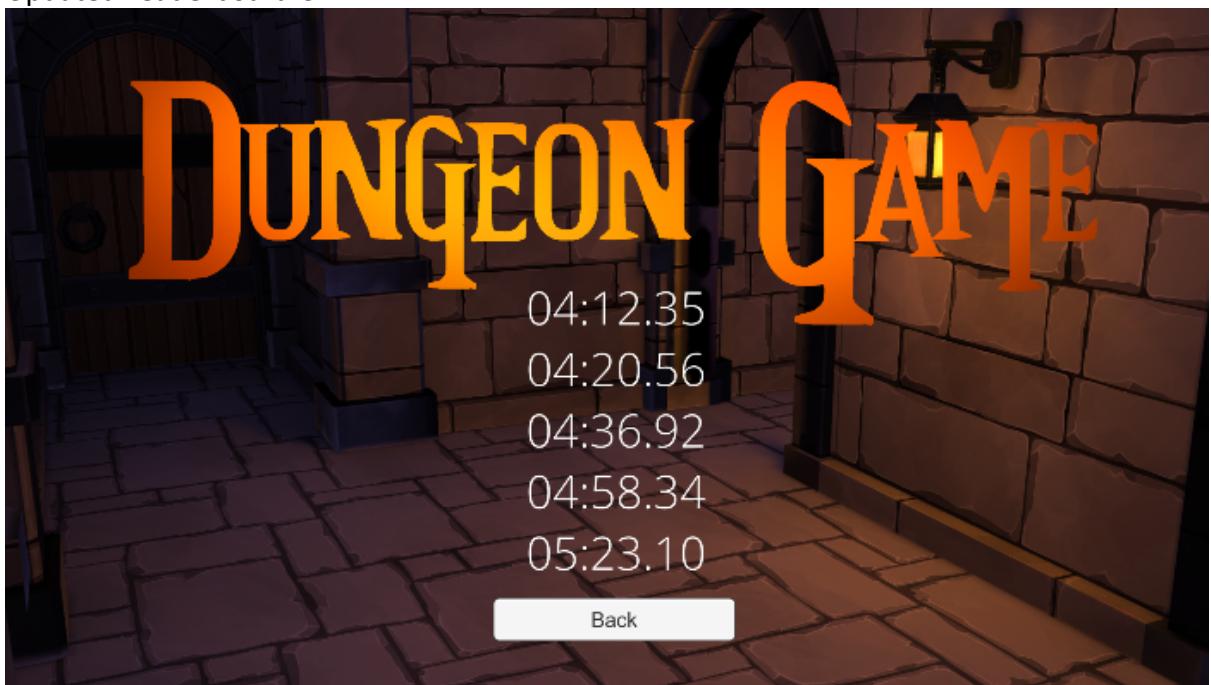
- Spike GameObjects

Class: Spike_switch	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When player enters the trigger volume, raise the spikes in front of the exit door and display text prompting user to find the switch to disable the spikes 	<ul style="list-style-type: none"> Spike GameObjects TextFadeInOut

Class: Spike_traproom	
Responsibility:	Collaboration:
<ul style="list-style-type: none"> When player enters the trigger volume, activate all spikes in the traproom 	<ul style="list-style-type: none"> Spike GameObjects

7.15. User Interface Design

Updated Leaderboard UI:



Closing

At the end of the 7 week development period, the team was able to finish and create version of the game. However, there were further backlog items that the team had originally wanted to complete such as:

Backlog ID	Backlog Description
SC-136	Add screen overlay effect when player takes damage
SC-134	Add enemy and player knockbacks when taking damage
SC-110	Add battery functionality to the Torch (need to collect batteries around the level to recharge)
SC-109	Implement sprinting and player stamina (sprinting and attacking reduces stamina, can't attack/run when depleted)
SC-137	Add sounds to the game
SC-55	Creating Puzzles
SC-99	Duplicate doors
SC-135	Add health item that players can collect to regain HP
SC-162	Add pause menu to game, with "Exit" and "Return to Menu" buttons and user can change mouse sensitivity

However, due to the short timeline, and also due to the other occurring commitments of the members, the team had to prioritize on the most important features of the game to complete nearing the end of the development period. As such, these backlog items are logged as future work. This, along with how to maintain the game is discussed in the maintenance guide.

8.1. Final Meeting

At the end of sprint 7, in addition to the sprint review, the team had a meeting to reflect over the whole project.

Members present: All

Members absent: Nil

- Charlie: felt that there was a mismatch between the actual state of tasks and state of tasks marked on Jira. I.e. sometimes tasks that were logged done on jira needed further refinements in later sprints. There were also issues with committing changes – e.g. tasks marked as done did not make it to the main branch on git until the start of the next sprint, this was an issue as it led to limited demos to the customer during the weekly meetings. Suggests that perhaps tasks could be broken down into smaller sections on jira, so it was as detailed as possible. Suggests that there could also have been a firmer deadline with committing changes, allowing sufficient time to solve merge conflicts before the customer meetings.
- Qibei: thought that there was a good culture of mutual help, everyone is willing to help other members. With role switching, members also got a better understanding

of agile development. Qibei also mimicked the Charlie's sentiment in regard to updating tasks on Jira and the state of completion.

- Sharon: suggests that there could have been better planning and task division.
- Meeran: was happy that we were able to follow agile practices and techniques that helped us finish most of the high priority requirements (for instance the use of intense sprint planning and retrospective to help us improve the process).
- Tiffany: expressed that the documentation template could have been finished earlier to facilitate the documentation process better.
- Chaya: felt happy with the group dynamic in that everyone was willing to help each other. However, suggested that perhaps sprint planning could have been improved to ensure that tasks for that sprint is finished in that sprint (i.e. less underestimation of time needed for tasks).
- Ashley: felt that the retrospectives held every week were especially useful for having a clear idea of where abouts in the project we were. The more regular the meetings, the more up to date the team members were and it was easier to organise remaining work before the end of the sprint. Similar to Chaya, Ashley suggested that we could have been more disciplined in finishing the tasks before each sprint.
- Marcus: was similarly happy with the team dynamic and the ability for the team make decisions together without any major disagreements. In person meetings always went well too. However, whilst he thought Jira was good, it was suggested that maybe the team did not use it to its full potential such as breaking down tasks even more and updating statuses appropriately. He also expressed that it was a shame that there could not have been more in person meetings with all the conflicting schedules between team members.

Overall, the team expressed that this project was an immense learning process. For instance, most of the members learned a lot of about Unity, the use of git to manage projects as well as the use of Jira to facilitate the agile process. For many members it was the first time using these technologies and applying the agile process. Although there were problems in each sprint and that there were unfinished backlog items by the end, the team learned a lot regarding the process of developing a piece of software, which could be applied to future development projects.