

Project No.19

Multiplayer Online Boardgame

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A Project Submitted in Partial Fulfillment of the Requirements
for the Degree of Bachelor of Engineering
Department of Computer Engineering, Faculty of Engineering
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Abstract

Games have been used to relieve the stress from work, school or even play for fun. In early 2000s, the popular game genre is a 'Free For All' genre, which is the last man standing game that has a game mechanic that makes the players more likely to meet each other frequently. However, the people tend to forget the fun of playing board games, which is a turn-based game which let players take a turn to play.

Our group want to create a game that is the combination of last man standing game and the board game to be one game which the game needs to be online multiplayer and still give the feeling of the board game. The game will be created using Blender and Unity as base technologies.

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บทคัดย่อ

เกมเป็นสิ่งที่คลายความเครียดจากการทำงานจากที่โรงเรียนหรือที่ทำงานแม้กระทั่งใช้เล่นเพื่อความบันเทิงช่วงสัปดาห์ที่ผ่านมาเรามีแนวเกมที่เป็นกระแสนั้นคือเกมประเภทฟรีฟออลซึ่งเป็นเกมแนวเอาชีวิตรอดจากผู้เล่นคนอื่น โดยที่ผู้เล่นไม่มีเพื่อนร่วมทีมและทุกคนคือศัตรู ในเกมจนเหลือเป็นผู้เล่น คนสุดท้ายของเกม

อย่างไรก็ตามผู้คนอาจจะลืมความสนุกของเกมกระดาน(ภาษาอังกฤษ:Boardgame)ซึ่งเป็นเกมประเภทวางแผนผลัดกันเล่นเป็นรอบๆ(ภาษาอังกฤษ Turn-basedstrategy) กลุ่มของพวกเราต้องการสร้างเกมที่เกิดจากการผสมผสานระหว่างเกมทั้งสองประเภทเข้าด้วยกันซึ่งจะเป็นเกมสำหรับผู้เล่นหลายคนแต่ยังคงให้ความรู้สึกลับแบบเกมกระดานโดยในส่วนของเทคโนโลยีที่ใช้สร้างเกมจะประกอบไปด้วย Blender และ Unity เป็นเทคโนโลยีหลัก

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We couldn't complete this project without the help of our advisor, Asst. Prof. Jumpol Polvichai, Ph.D. He shared his time to guideline us for every week helping our project ran smoothly. We are very pleased to thank him very much here.

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Chapter 1

Introduction

1.1 Keywords

Board games, multiplayer, 2D, 2.5D, 3D, Unity, Blender,

1.2 Problem Statement and Approach

For many years, the advancing of technologies has been improving the quality of life to satisfy the need for human which games are one of them. Games have been used to relieve the stress from work, school or even play for fun. For the following year, there's one genre that was popular in the early 2000s; it's 'Free For All' game which you will have no alliance everyone is enemy. However, people tend to forget the fun of playing classic games like tabletop or board games due to the growth of digital games. Board game genre base on 'turn-based strategy' which is the game type that players take the turn to play.

Our group want to create a game that is the combination of last man standing game and the board game to be one game which the game needs to have a multiplayer mode on so every player can enjoy the game only on one device and still give the feeling of board game or tabletop game. This game can be introduced to a new generation of people to know about board game style while having fun. Our game will use as a commercial product.

Our product, which is a board game has many mechanisms. Players have different abilities in different characters. The game is base on turn-based strategy, so the player needs to think before doing the action. The major action is moving, attack, use item and healing yourself. The game difficulty is based on each player perspective because the view range of each player is not the same.

1.3 Project type

potential commercial product

1.4. Objectives

1. To create a unique style of a multiplayer board game which will help people understand and have fun while playing the game.
2. To study C# programming language.
3. To learn about 2D, 2.5D, and 3D computer graphics
4. To learn about games creating technologies.

1.4.1 Proposed method

1. Planning and researching that relate to our project and draft the prototype.
2. Study how to create, polish, and improve the game design by studying from various sources.
3. Discuss program to use in this project.
4. Study Unity and Blender for using to create a game in this project.
5. Editing prototype and build a graphics model using Blender.
6. Submit the first draft of the progress report and midterm examination.
7. List all features of the game, preparing for the implementation.
8. Using Unity, implement the game and finish stage design of the game.
9. Study how to make game playable online by Nodejs.
10. Check for the problems in the software and fix the problems.
11. Publish the game to get feedback from the customers.
12. Conclude the project and prepare materials for the presentation.

1.5. Scope of Project

This game will be a turn-based strategy and use medieval era free for all theme which created for the PC platform with a Multiplayer on a single machine and uses mouse and keyboard as a controller.

1.5.1 Game design scope

- This game use blender to design in-game object for example map and character
- Unity3d will be used to implement game flows and mechanics.
- The game can run on a moderate PC with smooth FPS

1.6 Original Engineering Content

The game will be created by using Unity software by using less asset to help as possible. The 3D and 2D models will be created by using Blender by which the models will be original without importing existing models.

1.7 Task breakdown and draft schedule

1.7.1 Task breakdown

1.7.1.1 Planning and researching project and draft the prototype.

Research about the game design and how to make one by reading from blog, paper and books. Then draft the prototype of the game. Next, we need to plan the length of the project and plan each task how long it should be.

1.7.1.2 Study how to create, polish, and improve the game design

This phrase is improving the game design and how to implement the design to be real game via technologies.

1.7.1.3 Discuss program to use in this project.

This part, we discuss what program to use for the project because due to there is much software to create games in the market. The software that was selected is Unity to developing games and Blender to create the 3D models.

1.7.1.4 Study Unity and Blender for using to create a game

After choosing the software, we are studying how each software work and learn the basic to intermediate level tutorial from various sources.

1.7.1.5 Editing prototype and build a graphics model using Blender.

After knowing enough knowledge about software, then we start creating the model by using Blender. The model that will be created is the map and objects of the game design. Then update the prototype due to the high complexity of object when creating in blender.

1.7.1.6 List all features of the game, prepare for the implementation.

List all the objects, features of game, items, game mechanics and the models. We need the list to make sure that we do everything according to the design

1.7.1.7 Using Unity implement the game & finish stage design

Finish the stage design and then implement the game using Unity.

1.7.1.8 Research how to make the game multiplayer and work efficiency.

After finishing the game with major game mechanisms, then start research on how to make it multiplayer and make it efficiency.

1.7.1.9 Make the game playable in multiplayer.

We are going to use one of a packet in Nodejs called socket.io which work like a server by using Javascript and after we will use C# language to send object of our game to server then server broadcast to another client these flow will happen exactly real time because we want to make every client get updated of any player behaviour, so every user will feel like play on the same device

1.7.1.10 Check for the problems in the software and fix the problems.

After all component in our game finished, we will run the whole game and trying to find any bug as possible and fix it because we want everyone to play our game smoothly.

1.7.1.11 Publish the game to get feedback from the customers

After finalising the game then publish it for friends and people who want to try it to get the feedback.

1.7.1.12 Conclude the project and prepare for the presentation.

1.7.2 Task breakdown

Table 1.1 Schedule of time and plan for term 1

Task	Aug	Sep	Oct	Nov	Dec
Plan, Research, and Draft					
Study game design theory					
Choose program to use in project					
Study Unity and Blender to create a game					
Create the game model by using Blender					
Submit first draft of progress report and midterm examination					
List all features of the game, preparing for the implementation					
Using Unity implement the game and finish stage design of the game.					

Table 1.2 Schedule of time and plan for term 2

Task	Jan	Feb	Mar	April	May
Research more how to make the game online and work efficiency					
Make the game playable in multiplayer					
Check for the problems in the software and fix the problems					
Publish the game to get feedback from the customers					
Conclude the project and prepare materials for presentation					

Chapter 2

Literature Review and Related Theory

2.1. Background definition

2.1.1 Online game[1]

Video games allow the player to play with other people through the internet through any platform including PC, consoles and mobile devices and have a variety of genres including FPS(First person shooting), MMORPG (massively multiplayer online role-playing games) and Strategy games.

2.1.2 Free For All[2]

Free For All mean player have no alliance; everyone is enemy. You can eliminate most of the enemy as you can and be the winner to become the last survivor.

2.1.3 Turn-based strategy[3]

Turn-based strategy is a subgenre of strategy game which every player will have their turn. Every turn player must complete their action after that player will have to wait for all player in the same game complete their action one by one. Most turn-based strategy games are card game. In figure 2.3 “Chess” is an example of turn-based strategy game which let the player take a turn to play.



Figure 2.1 Example of a turn-based strategy game
[<https://www.rei.com/product/871860/outside-inside-magnetic-chess-game>]

2.1.4 Medieval period[4]

The Medieval period happens in the middle age between 5th to 15th century started with the fall of the Western Roman Empire and merged into the Renaissance and the Age of discovery. Knight is one of the components in the political structure and it's a great symbol of the word Medieval as shown in figure 2.4.



Figure.2.2 Example of Medieval period

[<https://pl.ruarrijoseph.com/obrazovanie/81036-odezhda-rycarya-srednevekovya-foto-i-istoriya.html>]

2.2. Game Design

2.2.1. MDA framework[7]

MDA framework stands for Mechanic, Dynamic and Aesthetics. These three things are the core of the game design. In figure 2.5 and figure 2.6 will show the concept of MDA shortly.

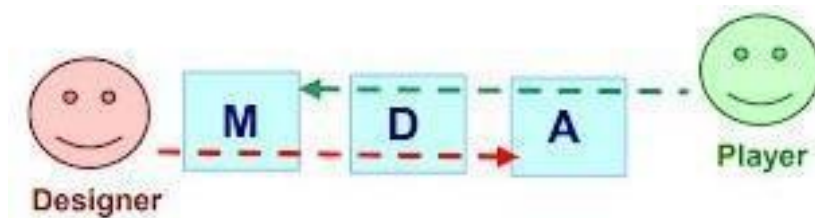
The MDA framework can break into three components.

- Mechanics describes the components of the game and data.
- Dynamics describes the game mechanisms and input and output of the mechanic.
- Aesthetics describes the emotional responses from the players when they interact with the game system.



Figure 2.3 Flow of MDA framework[7]

The perspective of the player and designer are different from each other. With the different from the two sides, it can improve the game design by following the MDA framework.



The figure2.4 perspective of player and designer[7]

2.3. Tool in Game Development

2.3.1 Blender[5]

Blender is the open source software to creating a 3D model suite. It supports of the 3D pipeline-modelling, rigging, animation, simulation, rendering, compositing and motion tracking even video editing and game creation in this part we will use in term of game creation to build 3D character, map, etc.

From figure 2.5, the figure shows the interface of the blender and the prototype design of the map of our group.

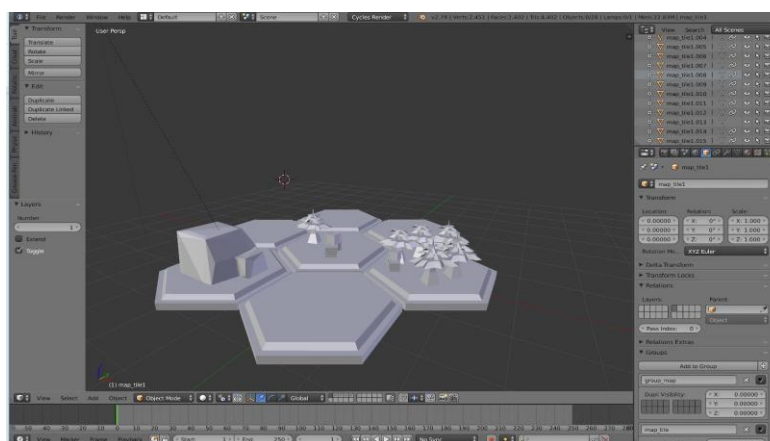


Figure 2.5 Interface of blender software

The figure 2.6 showing the finish of the prototype design of the objects that will be used in our project.



Figure 2.6 An Example of in-game object design

2.3.2 Unity 3D[6]

Unity is an open source game engine to creating 2D and 3D games that provides game creators with the necessary set of features to build games quickly and efficiently. For using Unity, you must have C# and JavaScript programming skill to implement the script. From figure

2.7 after finish created in-game building objects. Objects will be imported to unity3d and implemented with C# and JavaScript programming. An important component for this game allows player access online[1].

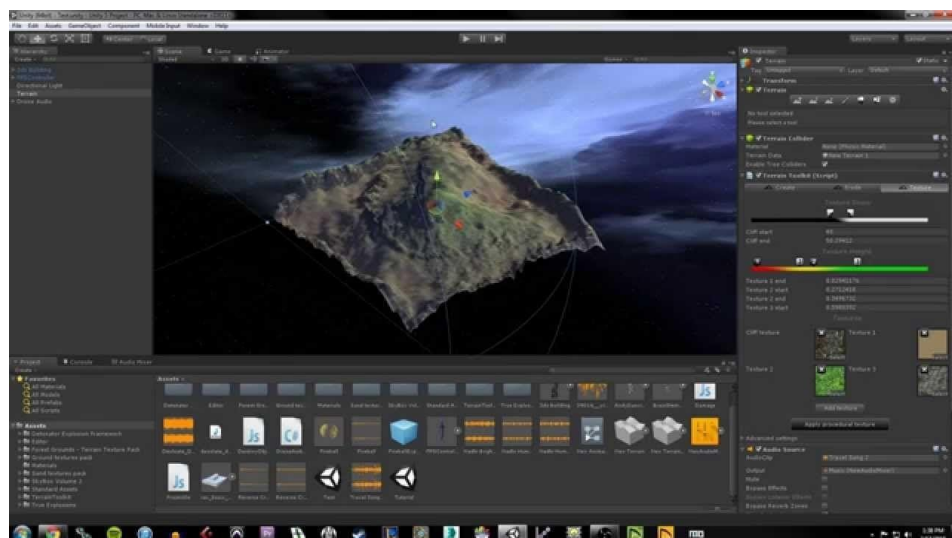


Figure.2.7 Game implementation in unity3d

[https://www.youtube.com/watch?v=pbOGY5G_kZ4]

2.3.3 Socket.io (NodeJs)[11]

Node.js is an open-source, cross-platform JavaScript run-time environment that executes JavaScript code outside of a browser.

Socket.io is one of the packages in NodeJs which helped the host's device act as a server. In Unity, we have to download socket.io from the asset store and attached it to GameObject. This process will let the client send the data to the server by converted from C# object to a JSON object.

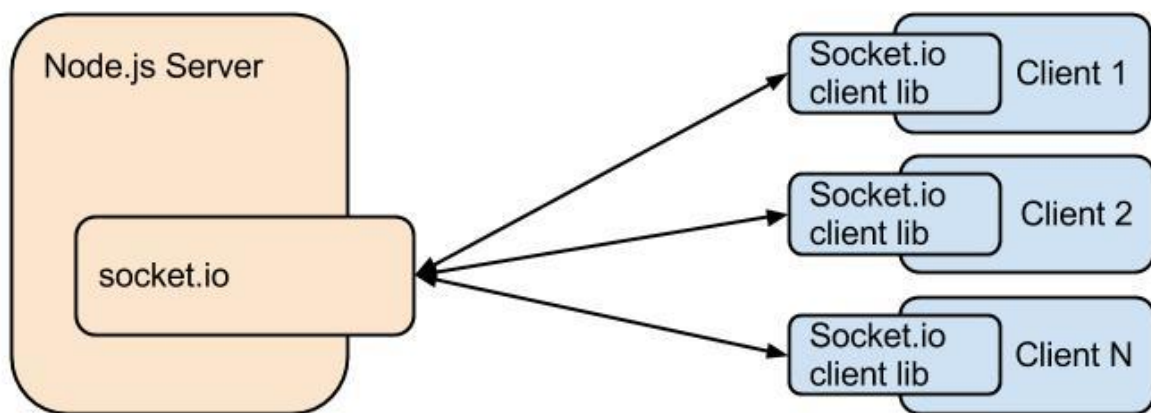


Figure2.8 How Socket.io Works

[https://www.fiverr.com/suhail_amir/socketio-based-real-time-chat-system]

Chapter 3

Design and Methodology

3.1 Game Design

3.1.1 Game Overview

This game will be a local multiplayer game which the theme of the game will be fantasy and middle-age theme. The game will have a style of a board game. Every single action has to think carefully because in one turn player has a limit move. Moreover, the game allows players to get different play style each round by using the random map feature which let players have different map each game. The game will end when there is only one player alive.

3.1.1.1 Game Concept

This is a 3D local Multiplayer turn-based strategy game. This game can be played between 2-4 players. The objective of this game is to be the last survivor team by killing another player the game will start with the player can deploy 4 unit which will have many types of character with also different ability and skill so the player can make their strategy and unique play style. In the game, the player has to manage skill and move patiently like you are playing chess if you make a mistake another player can kill your unit and if your last unit has been taken down, you will be lost.

3.1.1.2 Genre

Turn-based strategy and local Multiplayer games.

3.1.1.3 Target Audience

This game contains some violence content and may not appropriate for young kids, so this game will focus on player age 15 and beyond

3.1.1.4 Look and Feel

This game is a 2.5D looking game which allows players to move in 6 direction like a hexagon. Since this is turn-based strategy game player can take some actions per one round then the round is finished until the next round comes.

3.1.2 Applying theory to game development

The game will be created relating to the rule of game design research. 'Maslow Hierarchy of Human needs in Game' game design research was used to create the structure of the game. Moreover, the game will be following the rule of 'Natural Funativity in Game' which use to determine what game can interact with people who play it.

3.1.2.1 Natural Funativity in Game

Our game is a local multiplayer game which contains Physical Fun, Social Fun and Mental Fun

1. Physical Fun

Players feel fun to press mouse and hotkeys in the game after they plan what action do they want to make. That's the only physical fun which happens in our game. Since the game is a turn-based strategy game, it will not contain much of physical fun but will focus on the rest fun.

2. Social Fun

Our game can be played up to any players in one game. The key concept is to let player guess what strategies other player have and try to kill another player, but on the other hand, you can group up with another player to make temporary teamwork by using communication.

3. Mental Fun

Player must manage skill which has limit use and cooldown time also moving around to siege an enemy and kill them. Moreover, each character has different skill and different attack range; it tells that player need to think carefully before making every decision in player turn.

3.1.2.2 Maslow Hierarchy of Human needs in Game

Maslow's hierarchy of human needs is a theory in psychology that motivates human being shown in the tier model or pyramid. The game will adopt the rule of hierarchical levels, which contain human needs.

1. Physiological Needs

The physiological need is about the basic need for human being, which in our game player must collect the medic from healing themselves so they can cure the damage that they take.

2. Safety Needs

Player need to keep their healing unit alive to keep the whole units alive. If the player lost units, they can't come back again.

3. Self Esteem Needs

We will have a Ranking system in our game. The rank of the player survivor will calculate the ranking system for Example Player 1 Got 1st rank and get 25 ranking point and decrease 5 points until the last player. In future, we have a plan about the tier in the ranking system which will generate the people who have a different ranking point so the player who got high rank will not match with the lower rank player

4. Cognitive Needs

Because of the different environment, in-game map player must study about how to manage item and plan how to walk in the map to make a better opportunity like can see other player or can hide from another player in the safe zone.

5. Aesthetic Needs

Our game will have a different character to let player prefer ability which our character will come from the history and tale from the medieval period and also we will have the story of the game to make the game more interesting.

6. Self Actualization Needs

After the player has played our game the thing that player get is the experience for example player have done mistake in this round with the bad plan so in next game player will adapt it and will make less mistake, and another factor player will get more understand about the game mechanic.

7. Transcendence Needs:

In high-rank, a player can share the mindset to lower rank player to adapt it and improve to a higher rank, and another thing is we will make the mechanic game to have a temporary teamwork system which player can also share the mindset by co-op another player in the same match.

3.1.3 Gameplay and Game Mechanics Design

For the gameplay, the game will adapt some feature from typical board game which is taking a turn to play for each player. First, we start which each player choose classes to play then start walking by toss the dice and the outcome of the dice will be used to move. In the game, the players have to gather the resource to craft potion and weapons. The game ends when only one player left alive.

3.1.3.1 Goals

Eliminate other players to be the last player alive.

3.1.3.2 User skills

- Strategy planning

- Reaction / Interaction
- Decision-making skill
- Unit ability decision

3.1.3.3 Mechanics

Characteristics of the game:

- The players need to think very carefully for every action.
- The player's character health and damage depend on the character they choose
- The game has many characters and different abilities to make a different play style.

3.1.3.4 Game Control

The game is a turn-based strategy genre so that the control will be focusing on mouse cursor and in-game buttons. The player must plan their turn first by checking the skill of character and checking line of sight that how many enemies in line of sight. Then check the block that you want to move and click on the block that you want to move or click on the enemy to attack another opponent.

3.1.3.5 Game Elements

The game base on the middle-age era, so the detail of the game such as weapon or item will be middle-age style. For example, axe, bow, and sword will be the weapons for the game. Moreover, we also want the game to be fantasy theme too, so we add the item that can make some supernatural things such as create a mountain that comes out of nowhere so the player cannot walk through. Lastly, we add hero mythology so the game can be used to relate to some legend in history.





1. Back story

In middle age, many people lost their lives in war, but the war still goes on. One day the dungeon suddenly appear out of nowhere. The dungeon has supernatural things in it. The magicians come with the dungeon and have the ability to use strange power from the mythology hero. The news of this strange power has spread like a plague to every place. Many people start coming to this place to get this power. The war to be the strongest one has begun.

2. Character class

Before the player starts the game, the player needs to choose a class to begin the game. Each class will have different skill and different stat of character. As you can see from table 3.1.









Table 3.1 Class details

Class	Icon (4 teams)	Unit Status	skill
Knight		line of sight: 2 blocks movement: 2 blocks Hp: 200 Armor : 75 Dodge: 10% Atk damage: 30-50 Crit chance: 25% Crit dmg: x1.5 Atk Range: 1 block	Charge attack Hit and Stun
Mage		line of sight: 2 blocks movement: 2 blocks Hp: 100 Armor : 50 Dodge: 20% Atk damage: 30-70 Atk Range : 3 blocks	Super shot Poison
Priest		line of sight: 2 blocks movement: 2 blocks Hp: 75 Armor : 50 Dodge: 20% Atk damage: 15-30 Crit chace: 5% Crit dmg: x3 Atk Range: 1 block	Teleport Heal
Thief		line of sight: 4 blocks movement: 3 blocks Hp: 50 Armor: 50 Dodge: 30% Atk 30-50 Atk Range : 3 blocks Crit chance 30% Crit dmg: x2 Atk Range: 3 blocks	Bombard Buff dodge & armour

3. Class skills

In the game, Every unit has there own skills to use, which can use on friendly or hostile units depend on the skills.

Table 3.2 Skill details

Skill name	Effect	Cooldown	Class
Charge attack 	Charge attack enemy and stun for 4 turns	5 turns	Knight
Hit and Stun 	Deal 20-30 Dmg to the enemy and have 50% chance to stun enemy for 4 turns.	5 turns	Knight
Super shot 	Shoot thru enemy in a straight line which can be piercing every enemy in skill line. Deal 20-40 dmg.	6 turns	Mage
Poison 	Poisoned to get damage per turn which will disappear after 3 turn	4 turns	Mage
Teleport 	Move to another block in a range of 4 from the user	5 turns	Priest
Heal 	Increase teammate hp to	4 turns	Priest
Bombard 	Rain AOE arrows that will attack every enemy in range of 3. Deal 15-35 dmg.	5 turns	Thief
Buff dodge & armour 	Increase 50% dodge chance and armour	5 turns	Thief

4. Collectable items

In the game, items will randomly spawn on the map which player can move and land on it. Then the effect of items will be activated. The list and effect can be seen in table 3.3.

Table 3.3 Item detail

Item name	Item effect
Heal	Heal for 10-20
Buff ATK	Increase attack damage by 30% for 5 turns
Buff DEF	Increase armour by 30% for 5 turns
Scan	Scan the target area with a range of 4.

5. Level design

The design will use a low polygon style as a base. For the level design, we will have one main playable level because the game will be random each block, so every time you play, it won't be the same. The game will also have the start screen, and the tutorial screen. The game has less screen because we don't want to diverge too much from the board game style. Some board games have many levels, but most of have only one level to play.

6. Obstacle

The game will have two types of obstacles whole block obstacles and wall obstacles. For the whole block, the players can't move through that block. For the wall, the players can only move through the side that not been blocked.

3.2 Software Architecture

Unity supports both UI implementation such as Blender and game physics. The process is performed on the Unity engine. However, the Node.js is connected to the system for the Multiplayer system.

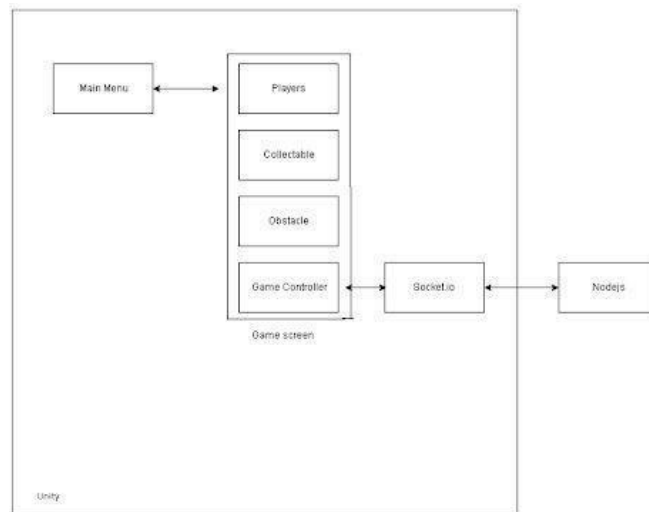


Figure 3.1 Software Architecture

3.3 Workflow diagram

In this section game's flow can be separated into two parts. First one is when a player takes a turn and become the winner. The second one is when the player is becoming the loser.

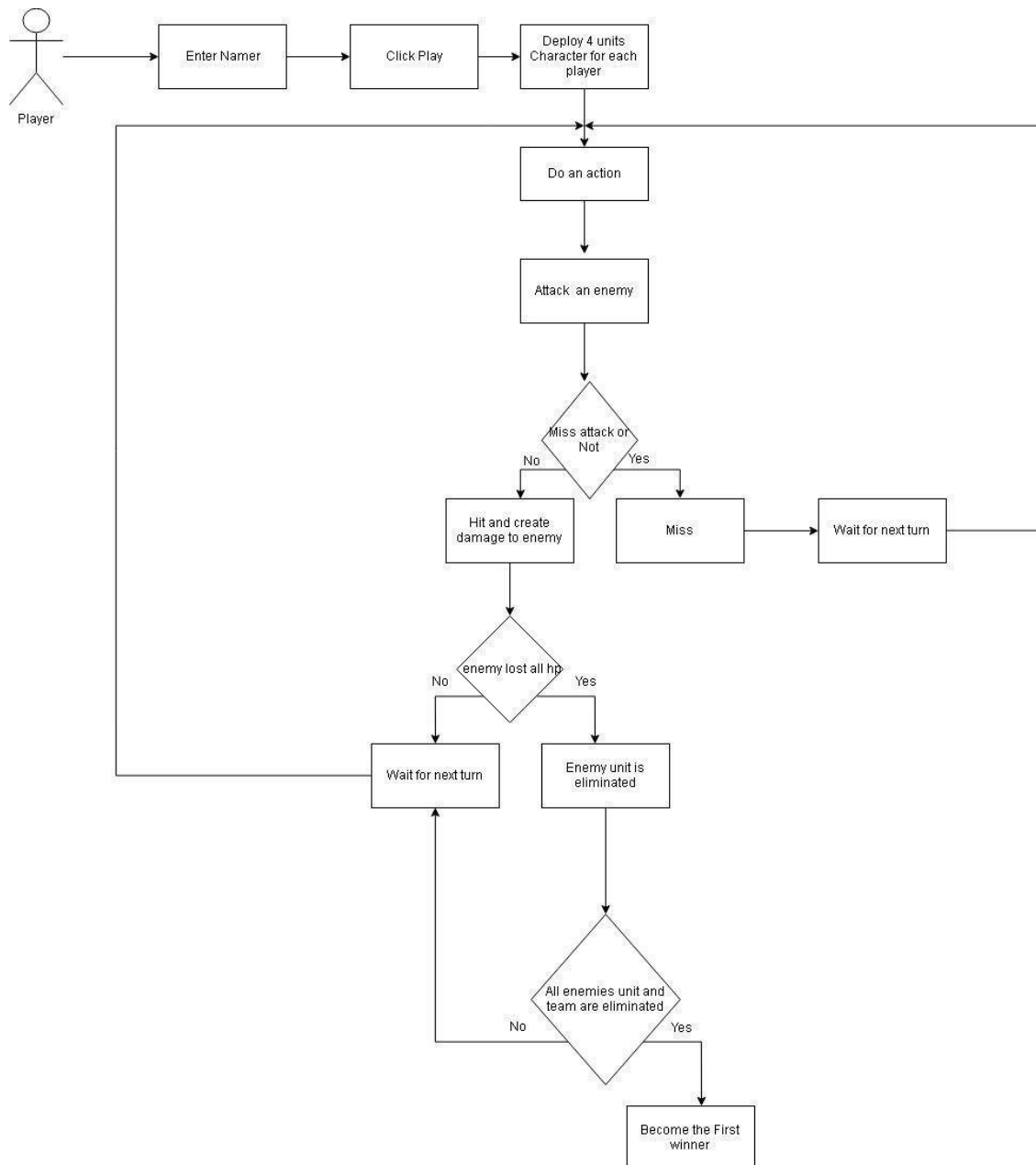


Figure 3.2 Overall game's flow of winner condition.

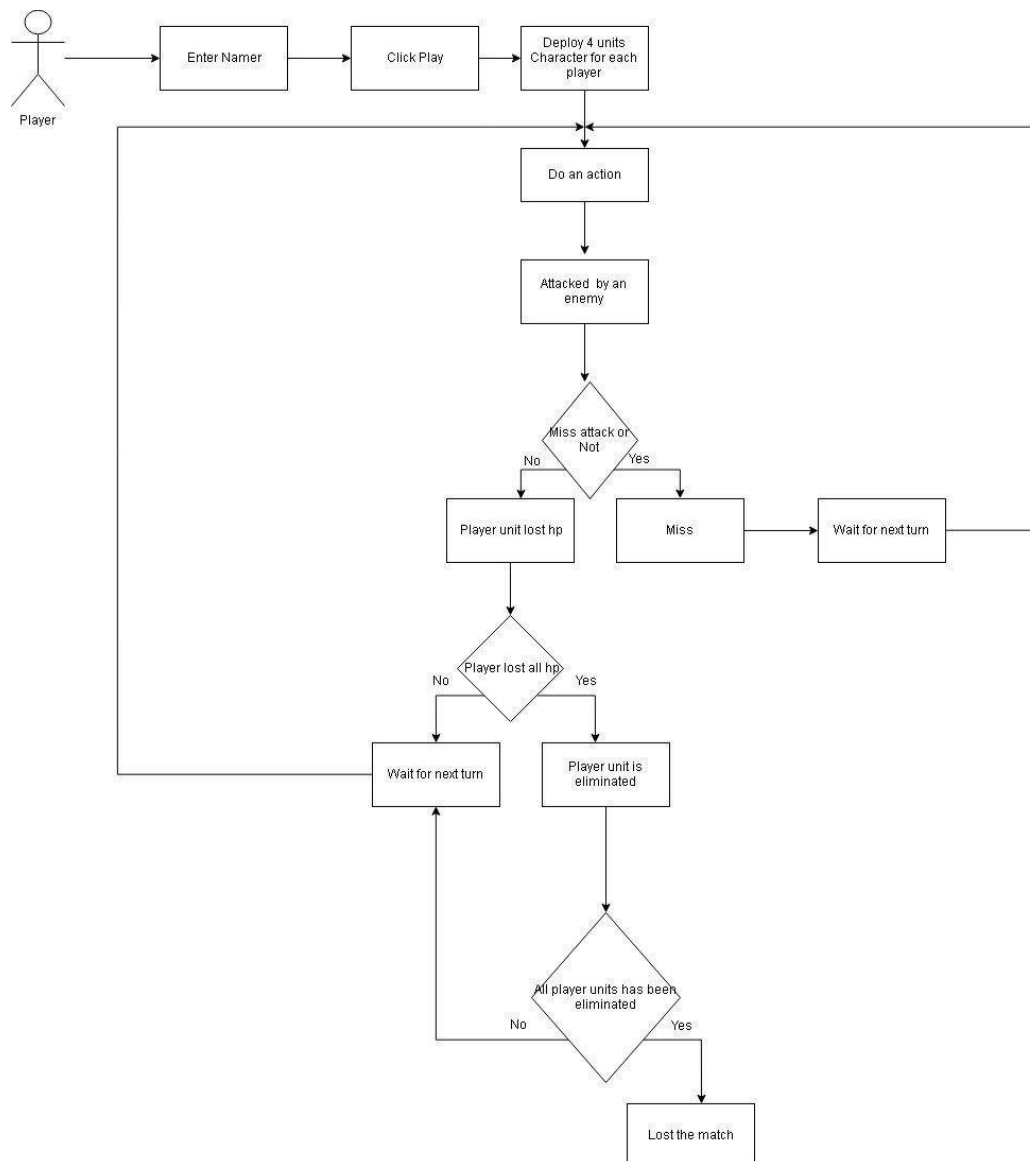


Figure 3.3 Overall game's flow of loser condition

Chapter 4

Results and Discussion

The result of this project we will be measured by the game function, mechanic, and design. First, game development and design will explain the process and progress of the game product, including the game design model and prototype.

4.1 Game development and design

The game development will focus on make the game working first by using Unity to create and develop the prototype of the game. Blender program was used to create the models that will be implemented to the game after the prototype.

4.1.1 The game models

The result in this part is the model products that have been created and finish in the Blender program.

4.1.1.1 Obstacle models

There are three obstacles which conclude of forest, river and mountain which river and forest allow a player to see through a different block, but when you want to attack the enemy, you missing chance will be increased up to 30%. In mountain obstacle, it will block your sight so you won't be able to see your opposite block in this obstacle.



Figure 4.1 Tree obstacle **Figure 4.2** Mountain obstacle **Figure 4.3** Water obstacle

4.1.1.2 Wall models

Another obstacle is the wall shown in figure 4.4. There are two types of walls. First one full wall which is on the left, this wall will make player unpassable and effects to reduce hit chance by 30%. Another one called half wall which is on the right work the same but no effect. The wall function is used to block the player from moving through the wall directly, but the player still can land on those blocks which you can see in figure 4.5.



Figure 4.4 The walls model



Figure 4.5 Unit block by the walls

4.1.1.3 Animation

Figure 4.6[8] shows the flow of unit animation. Which contain idle, move, take damage, death, and attack range/melee animation.

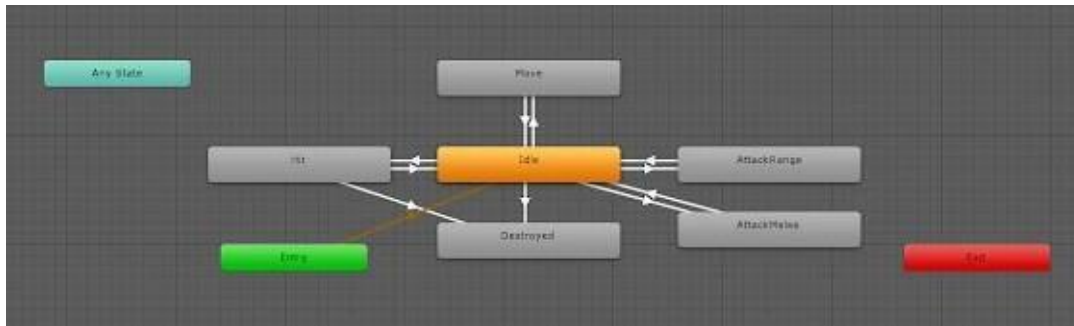


Figure 4.6 Animation flow

4.1.1.4 Multiplayer Network using socket.io[11]

One of our goal in this project is we want to make games can be playable on multi devices because in our game player must have to hide information and position which can be easily caught out when you play on the same device.

4.1.1.5 Game screens

a. Start screen

Figure 4.7 is the start menu of the game. Player will enter their username and click play to the game scene. Then will connect to one of the sockets which one room got four players

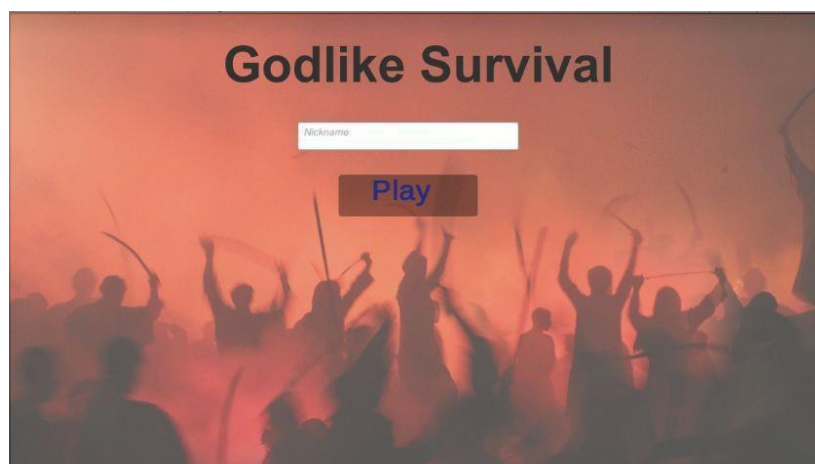


Figure 4.7 Menu screen

B. Deploy unit screen

This screen uses to let players decide where they will put their units on the board. The screen is shown in Figure 4.8. The bottom left side show which unit you can deploy and the green check mark show which unit you selected. The deploy zone is the blue highlight on the middle right of the figure. After you finish, deploy every unit press done button on the right to start.



Figure 4.8 Deploy unit screen

c. Play screen

Gameplay Screen is shown in Figure 4.9. This figure is the game played by four players. The top-right corner has two columns of text. The first column shows exit functions, which shown in figure 4.10. The second column is the perk menu, which will tell the effect of the items and can use to buy the skill in a future version. In the bottom right of the screen show the 'end turn' button which use to end the player turn. Lastly when there is only one player left the game will show the text 'You Win' then go back to start menu



Figure 4.9 Play screen



Figure 4.10 Play screen pause menu

4.2 Experimental Result and Discussion

Figure 4.11 shows the experimental result of the survey for rating questions we had gathering from 20 people. We asked users to rate the following aspects of our game using a scale of 1 = Very low to 5 = Very High



Figure 4.11 Testing game with users

4.2.1 Experimental Result Overall

In figure 4.12 represent the score evaluate by 20 users. The red bar stands for graphic, which has an average rating of 3.55. The yellow bar stands for the game concept, which has an average score of 3.85. The yellow bar stands for the game concept, which has an average rating of 3.85. The green bar stands for game performance, which has an average score of 3.75. The blue bar stands for enjoyable, which has an average rating of 3.05. The purple bar stands for the game's variety, which has an average score of 3.30. From the result shown, Concept is the highest average score, and Enjoyable has the least rating. According to the experimental result users kind of like the game's theme but the reason they didn't enjoy much because they said the game is not balanced yet, some damage output is overpowered. Moreover, we will focus on variety and performance to increase more players and make the game run as smooth as possible.

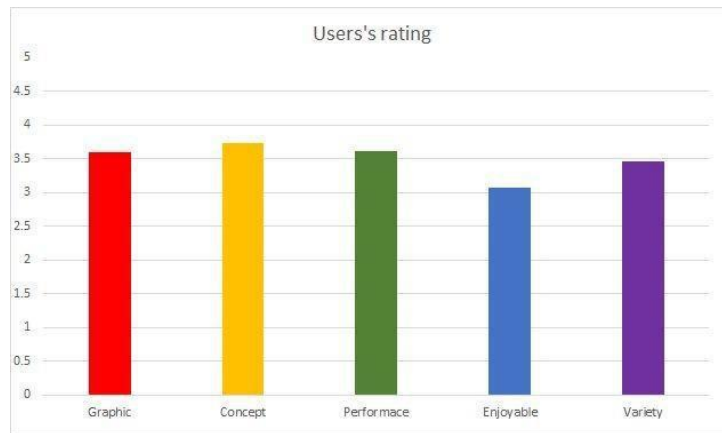


Figure 4.12 Experimental result of the survey for rating questions

Next, there is two open-ended questions in the survey, which are What do users like in this game? And What do we need to improve this game? In Figure 4.13 and Figure 4.14.

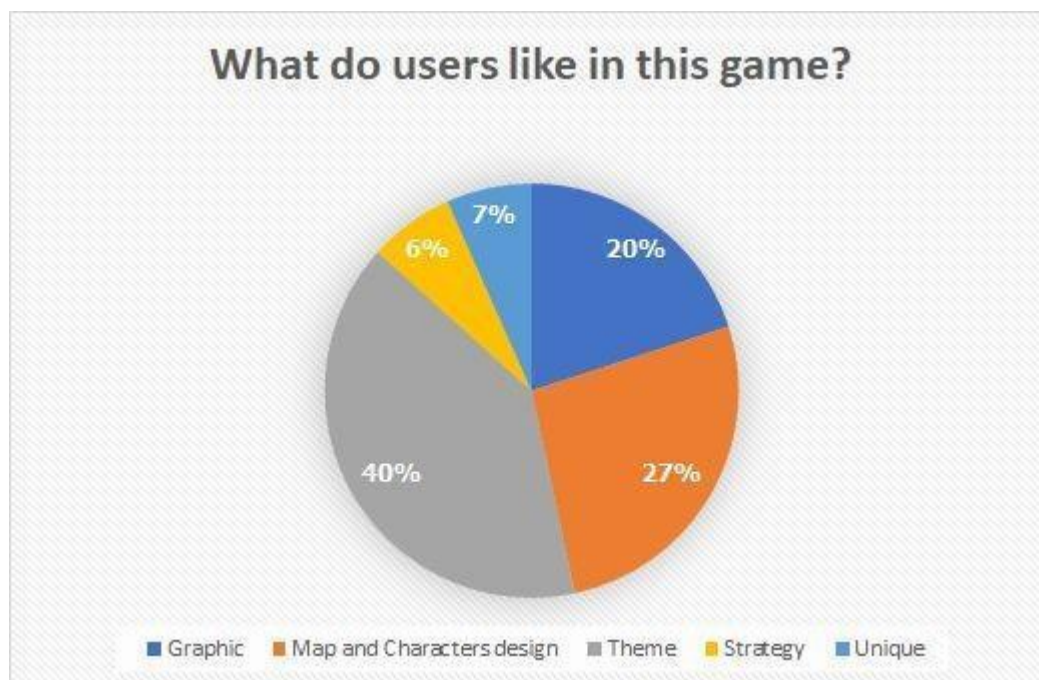


Figure 4.13 Experimental result for an open-ended question “What do users like in this game?”

From figure 4.13, users comment about the game theme the most which relate to the game’s concept in figure 4.12, Users also like Map and Characters design and Graphic. It shows that backstory of the game, and most model design is very important to attract users to play video games.

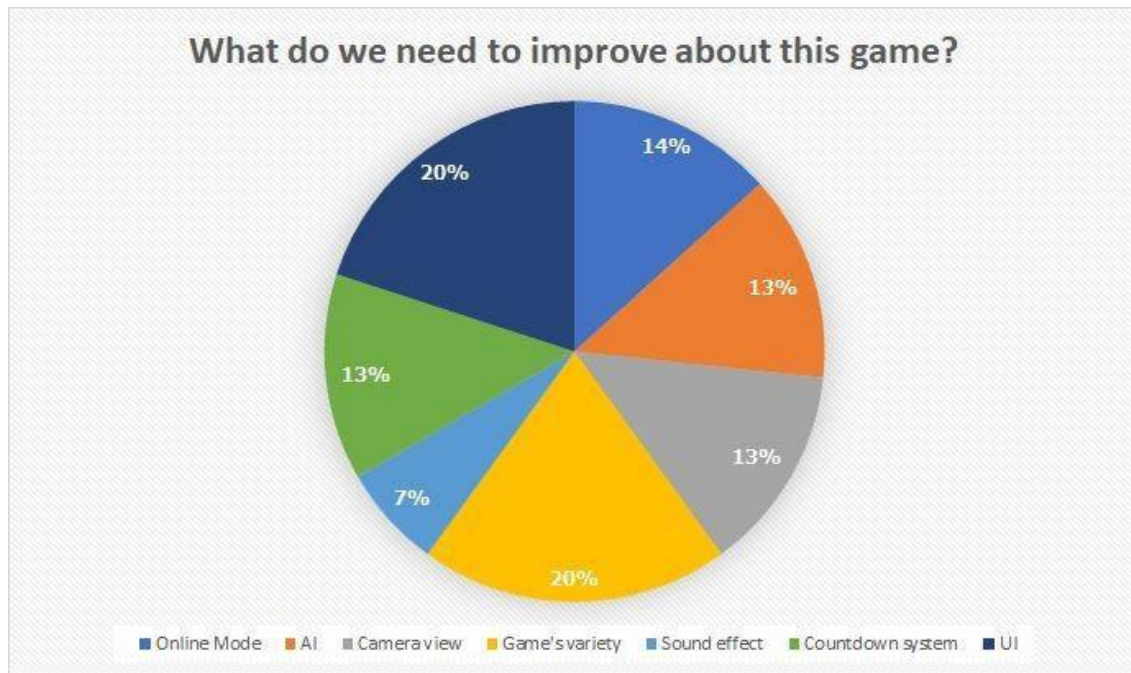


Figure 4.14 Experimental result for an open-ended question “What do we need to improve this game?”

In figure 4.14, users suggest about what do our game need to improve. There are many things that users mark as in-game trouble, for example, Game’s variety and UI which have the most percentage in this open-ended question. Now we have only four characters and only one map, but we have a plan in future to add more variety into this game. For the UI, we didn’t include some interface such as setting and tutorial, and it might be a problem for many users.

Moreover, some users request for online mode and AI in the game. Start with the online mode currently users can play this game only on a single machine, and they look forward to playing this game with friends on different location at the same time, and we’re on the process of making that happen. Then they think about AI mode to practice in case they are new players.

Chapter 5

Conclusions

5.1 Accomplished Tasks

Table 5.1 Accomplished Tasks

Component	Task	Description
Gameplay Mechanic (Player)	Health system	Each hero have different health
	Attack system	Attack system for any weapon and character
	Movement Mechanic character	Our movement will be like characters moving from point to point on our board map.
	Character's Ability	Any character in our game will have different ability and status
System Mechanic (Collectable system)	Picking up item	When a player step in a block with item box effect suddenly appears up to the player, for example, rise hp, attack or defend or even get an extra walk
Gameplay Design (Art and model)	Import environment models from Blender to Unity	We use Blender to build our environment model
Gameplay Design (Art and model)	Import Character models	We will use the open source model to implement character in our game.
Game Development (Game UX)	Add sound effect for character and background music.	Game Development (Game UX)

In summary:

For the accomplished task we separate our project into 3 part which concludes of gameplay mechanic, system mechanic and game design right now gameplay and system mechanic are done which after this we will stay on update an additional content to the game and also game design we have a tiny thing to fix but for most of the content is done.

5.2 Future tasks (Deliverable plan)

Table 5.3 Future tasks

Component	Task	Description
Game Development (Characters)	Make game balanced	Balanced all character create new rule and fix the old rule to make it more interesting

In summary:

In future, if our games have been launch out to any platform we hope that every player enjoys our competition with our rule and condition and we want a player to create their unique strategy with creative style, so we have a passion for making a game have all balance.

5.3 Problems Encounters and Resolves

5.3.1 Multiplayer problem

There's an unexpected update from Unity on 11th April 2019 that UNet[10] has been deprecated. That's mean no more support of UNet and that accidentally stop the online process. So, we think of an alternative way for this problem it is using Socket.io package from Nodejs. Godlike Survivor can create one host and have other clients with the same IP join the room but the animation synchronization is not ready yet.

5.3.2 Character Animation problem

When we start creating the animation for the models, there was no problem at first. But after we try to put it in the game, there was a lot of issues, so we spent quite a lot of time to fix it.

5.4.2 Asset problem

Due to our game use some assets to help to create the game. But there are some assets that when your import to the project and make project error.

5.4 Project's benefit

5.4.1 Game Development

This cover entire skills that we use in game development start from game design, UI design, game implement and multiplayer feature. Most of this part is gathering many ideas and solve a problem when a thing doesn't work.

5.4.2 Time Management

We learned to work by schedule. Sometimes it doesn't go along with the schedule, so we try to rush everything up and think about what is not important then remove it. Now we can move on to the game's main point. After we reach the main point, we will come back again on optional detail and move on it.

5.4.3 Teamworking

This Project taught us about team working. Most of the thing we did can't be done on one person. We shared our idea and workload. When there's an unexpected problem, we group up together and find a possible solution to fix it.

5.5 Future extending suggestion

5.5.1 AI Mode

Sometimes we think of new player may afraid to play against other players. AI Mode is going to help them to teach them how to play properly, and they feel more comfortable when they lose to AI.

5.5.2 Variety of Character

For now, we have only 4 characters that the player can play. It would be good if there's plenty of character to choose. For old players, they can try new things, and for new players, this can attract them to play this game.

5.5.3 Portable Platform

Most people have a smartphone more than a personal computer, and they can play more often. This is a good chance to port this game into a mobile platform.

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