Software Requirements Specification

Hex Army

Prepared by Wizard Monkeys

University of North Texas - CSCE 5430

Table of Contents

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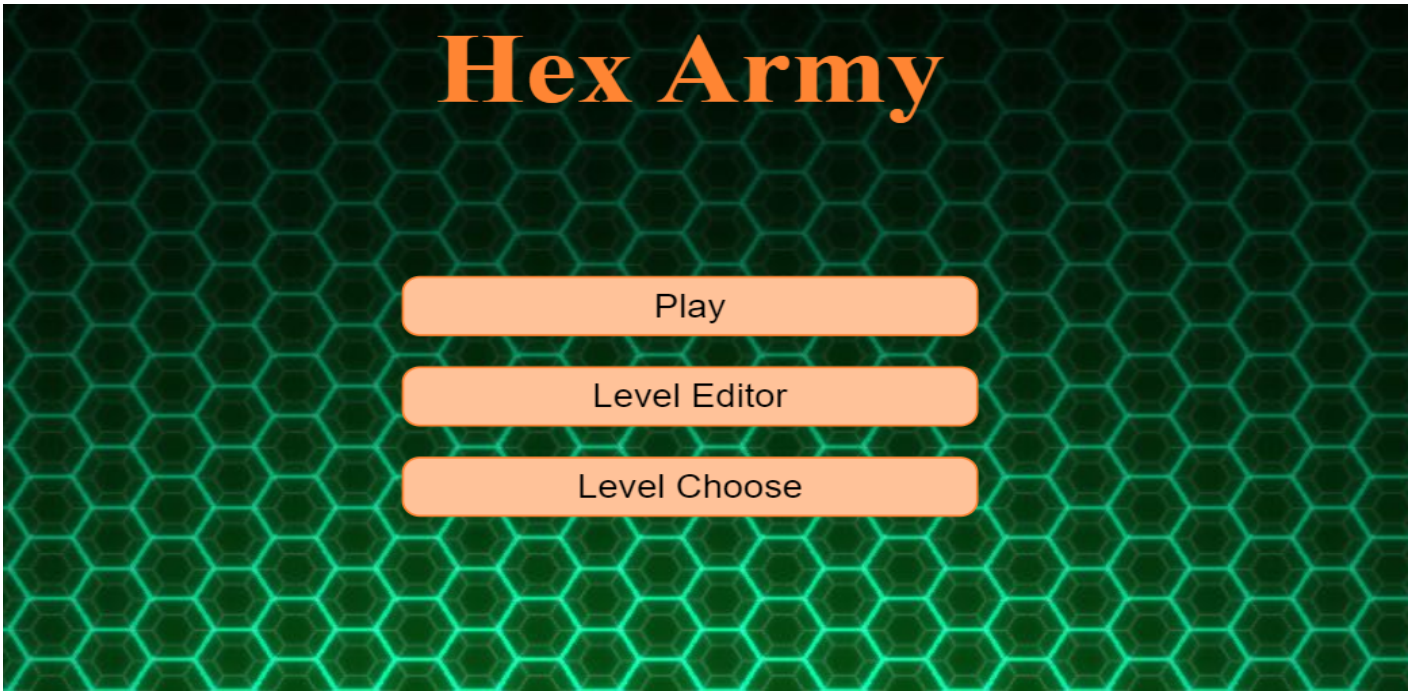
Document History

Version	Date	Author	Comments
2.0	29th Oct, 2021	Wizard Monkeys	Deliverable 4

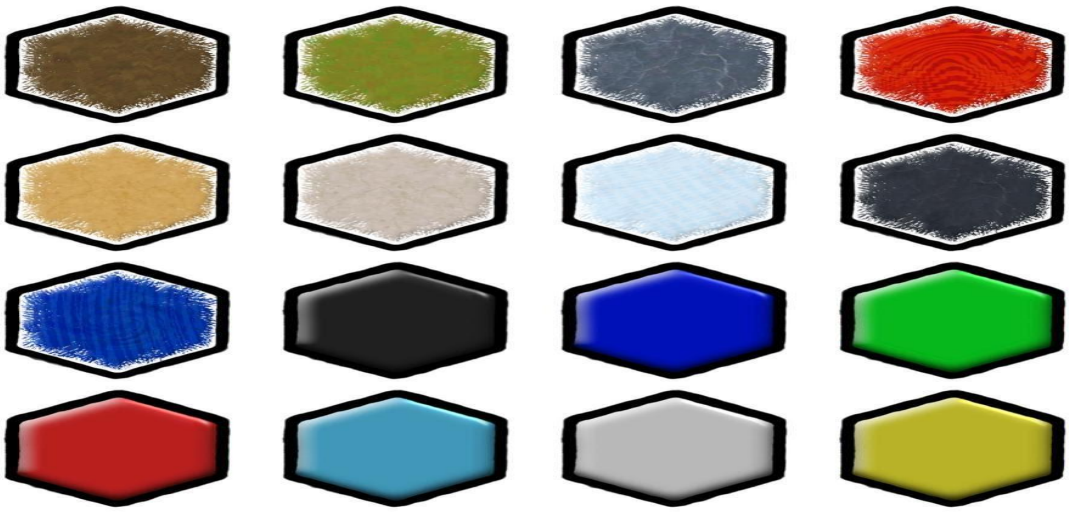
1. **General Diagram:**

Main page

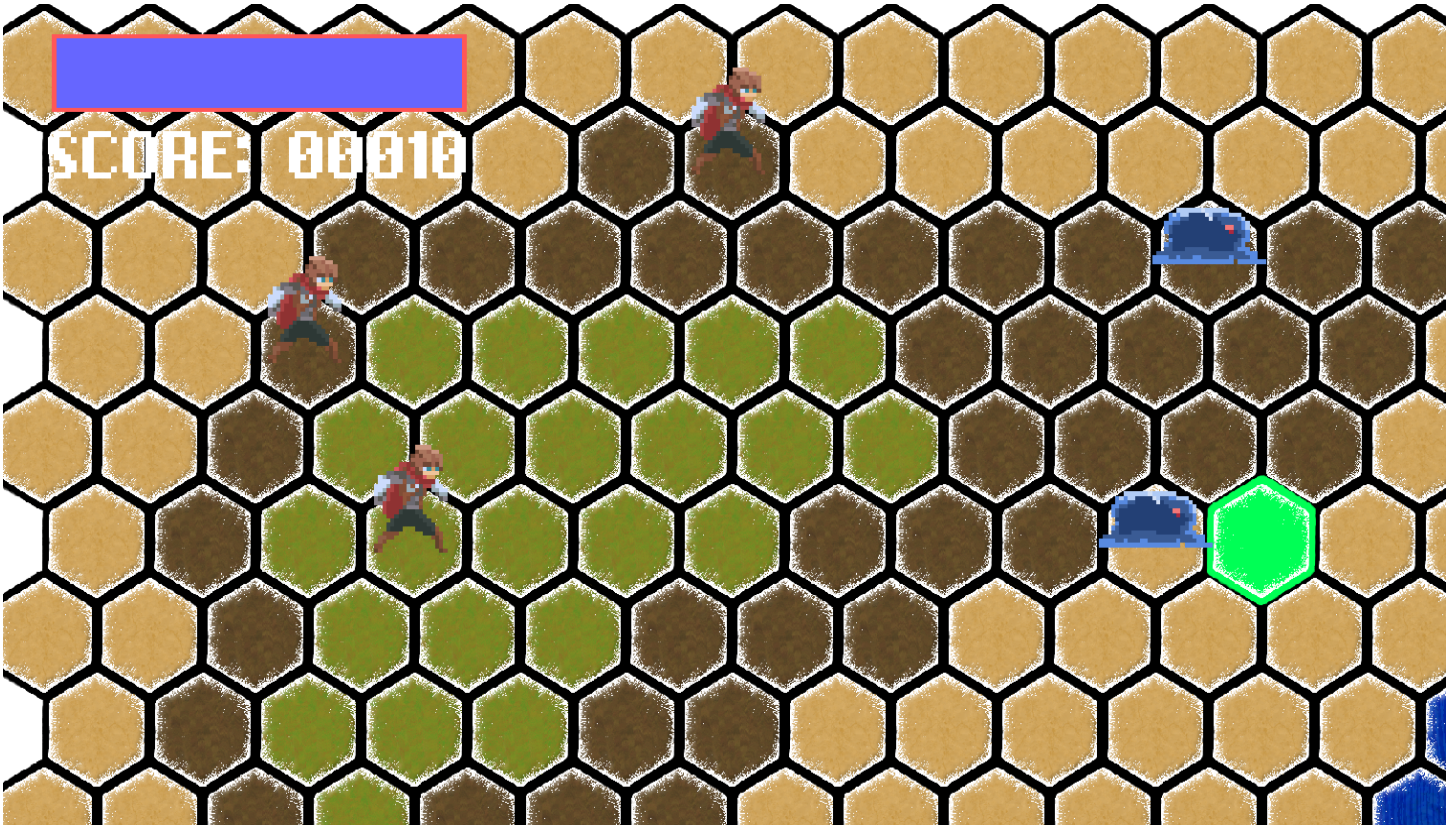


The game is fitted with multiple hexagon grids with different colors. This leads to an effective layout for the game that not only looks good but also puts emphasis on ease of use. The player and enemies are separated by the different colors.

Hexagonal Grid:



Character Image:



2. User manual:

<u>Description</u>:

<u>Controls</u>:

There are two types of controls available for the users.

They are:

I) by using the mouse pointer, the player can move.

II) by using the arrows of the keyboard.

By pressing the arrow keys allows the player to move respective to the location of the arrow key towards the enemies.

1. By clicking the up arrow, the player moves upwards.
2. By clicking the down arrow, the player moves downwards.
3. By clicking the right arrow, the player moves towards the right side.
4. By clicking the left arrow, the player moves towards the left side.

Note:

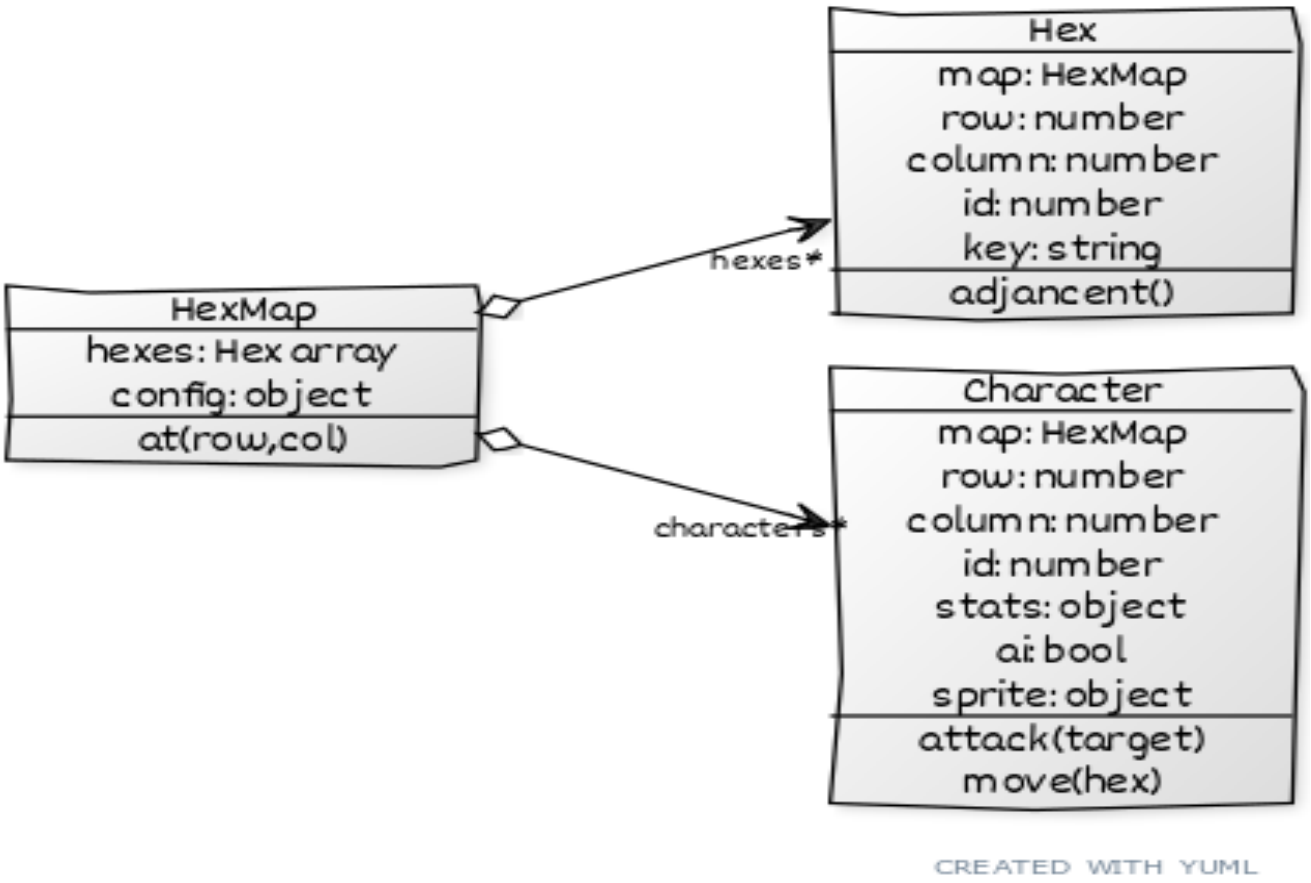
The player can initially move from a standing point to any direction on a hexagonal grid.

Clear instructions on how to compile/run both your program and your test cases (the program must compile/run):

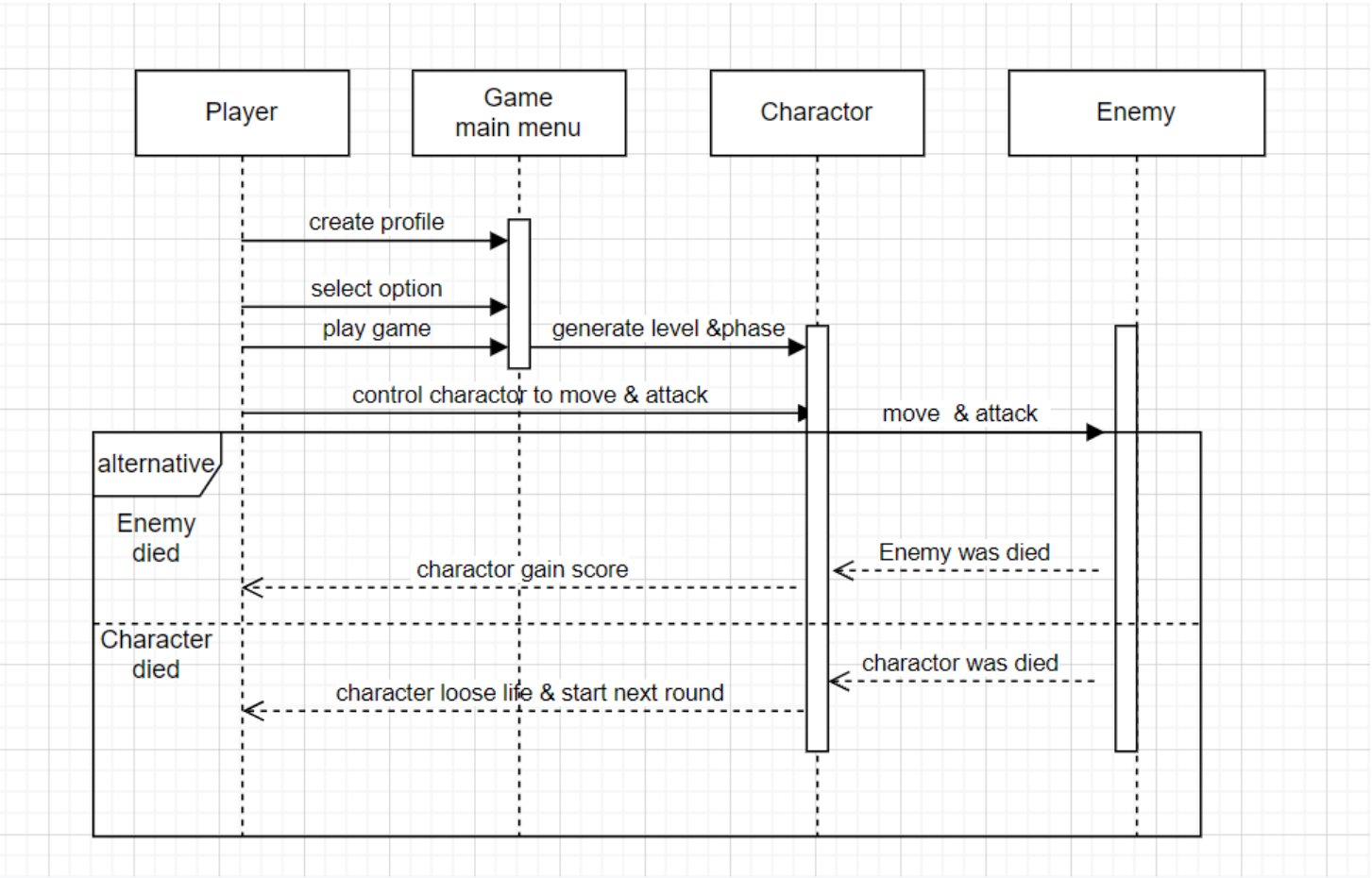
```
# Install dependencies (must be done once initially and any time a new dependency is added to project)
npm install

# Run the project in a server (connect with your browser to test)
npm run serve # Use this command
npm run test  # OR this, both commands are the same
# Run the project in a server open to LAN devices (can be useful for mobile testing)
npm run serve:lan
# Just build the project to www/ folder (production mode)
npm run build

#clone the repo
git clone https://github.com/jeremyglebe/5430-Software-Engineering.git
#use visual studio code to compile and run the code
code .
run start.js file
```

3. **UML design**

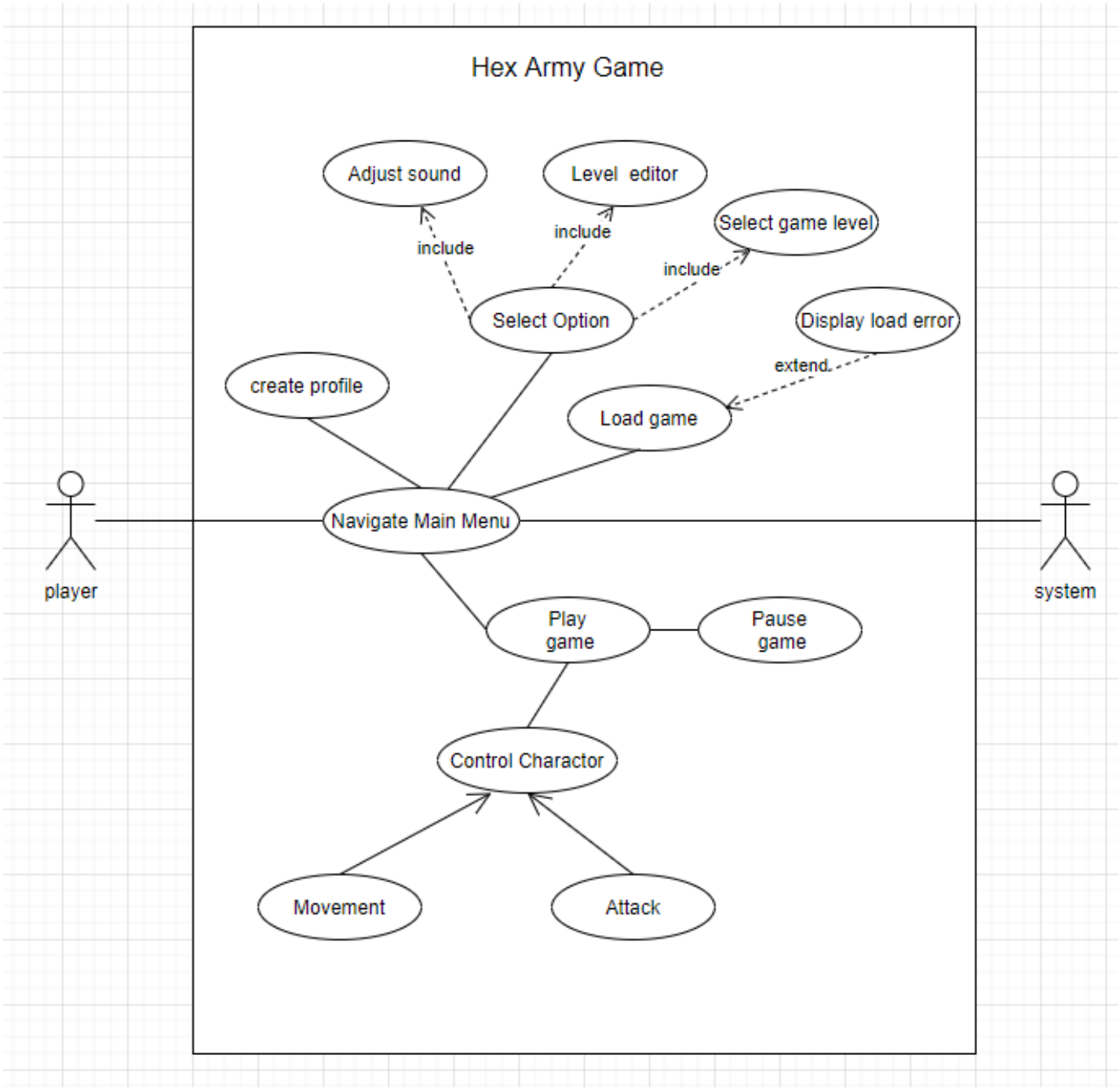
3.1 Class Diagram:



3.2 Sequence Diagram:



3.3 Use case Diagram:



4. Software Requirement Specifications:

4.1 Functional Requirements:

1. The game board(User Interface):

- Created hexagon-based digital board
- Created 20*20 tile grid
- Created 2-dimensional table of the board with odd rows visually stagger to display as hexagons

2.Avatars/Characters:

- Created character of the player and enemy
- Created character will display animations when moving and attacking
- Created health bar of the player and enemy
- Created the weapon of the player and will display animations when attacking
- Created the score when the player gain

3.Inputs

- Accomplished the moving that player can move to any of their six neighbours and could not exceed the board
- Inputs outside of the board's grid should be ignored
- Adjacent characters can attack each other, and a prompt is provided to the player to do so

4.User main page

- Created the main page, the player could choose to play and level editor.
- Create the setup of the board, the player can choose the colour, appearance, size of the board.

5.Sounds

- Added the sound of some backgrounds
- Adder the sound of some clicks and buttons
- Added the sound of the player attack

6.Level Structure

- Levels should contain a unique map of hexagonal tiles
- Levels should contain one or more enemies, with a positive correlation between level number and number of enemies
- The number of tiles an enemy can move each turn should have a positive correlation with level numbe

4.2 Non-Functional Requirements:

4.2.1 Performance Requirements

a. The application should respond to user quickly to user input.

b. Have error handling mechanism that deals with slow internet or no internet issues.

c. Our baseline device for performance is the iPhone 7; Devices with slower processors or less memory are not supported.

d. The game should run at 30 frames per second on the baseline device

4.2.2 Security Requirements

a. Protecting the application data.

b. Make sure that the application data should not be stealed.

4.2.3 Usability Requirements

a. Ensure each navigation works like how they should

b. Ensure that user interface is user friendly and intuitive.

4.2.4 Reliability Requirements

a. The system should not crash on common use cases

b. Connection issues should resolve cleanly and display errors on screen

4.2.5 Maintainability Requirements

a. Project source code should follow OOP paradigm

b. Project source code should utilize JSDoc comment structure

c. Developers should utilize the GitHub repository for version control

4.2.6 Portability Requirements

a. The system will be portable to any device with WebView, such as Android, iOS, and most desktop devices

4.3 Interface Requirements:

4.3.1 User Interface:

A frontend will be created with html, CSS and Java Script

Initially, the game can be started by giving a player name, after inputting the player's name it leads to the new page where the player can select the controls and the sounds of the game and start playing the game. It also consists of an exit button if the player wants to leave.

The hex game is the game that takes place within the hexagonal grids. The user is considered as a player who continuously moves towards the enemies and kills them respectively. This is a one-on-one play where the player moves towards the enemy by selecting the path and attacks the enemy after the player kills the enemy the next one starts attacking. If the player defeats all the enemies in level one and heads to the next level. For each kill, the player can gain a certain amount of score.

The goal of the game is to kill the enemy who was placed in random places on the hexagonal grid. The game gets tougher while getting to the next levels.

4.3.2 Hardware Interface:

Our application can be accessed and can be opened in devices like laptops, computers as well as mobile phones.

4.3.3 Software Interface:

a. Backend

JAVA SCRIPT

b. Development Languages:

HTML,CSS,JAVASCRIPT

5. Test Cases:

5.1 Test Cases for phase 1

List a set of test cases used for testing the working program including descriptions of tests (e.g., what functionality they test, and inputs/outputs for them).

Test case:

1. Test all hexagonal grids, walls and characters
   - Make sure the characters can move to each and every hexagonal
   - No character is moving outside the grid
   - When two characters came across make sure they don't pass through each other
2. Test the main page
   - Check all the buttons and their functionality
   - Make sure all the buttons serve their purpose
3. Test for health bar
   - Check if the health is being reduced for every attack
   - Make sure both players and enemy are attacking each other
   - No two enemies should fight with each other
4. Test the controls
   - Test every possible control button
   - Make sure character moves according to the controls
   - Test the whole GUI (colours, buttons, appearance, etc,.)

5.2 Test Cases for phase 2

List a set of test cases used for testing the working program including descriptions of tests (e.g., what functionality they test, and inputs/outputs for them).
Test case:

1. Test all hexagonal grids, walls, player, and enemy

- Make sure the enemy can move up, down, left, right by computer.
- No enemy is moving outside the grid, if they meet the border, they will move to opposite direction.
- Check the setup of different enemy with different score in different level.
- Check if the player restart at one hex when it loses its life.

2. Test the player and enemy attack attribute

- Make sure the number of attack and the possibility of attack successfully could make right function (Ex:input different attribute value ,output different damage value)
- Check the attack attribute of player and enemy have different value in different level.

3. Test the main page

- Check the level choose button and page
- Check all the buttons and their functionality
- Make sure all the buttons serve their purpose

4. Test for health bar and score

- Check if the health is being reduced for players loose in the attack with enemy.
- Check if the health is reduced when the enemy touched player first.
- Check if the score is being increased when player destroyed one enemy.
- Make sure the number of the adding score is right with different enemy destroyed.

5. Test the sound

- Check if the sound of the different background work normally

6. Test the controls

- Test every possible control button
- Make sure character moves according to the controls

- Test the whole GUI (colours, buttons, appearance, etc,.)

6. Feedback received during the code inspection session

When our pair member do code inspection of our code, they suggested that we should declare variable name clearly, such as nw=northwest, this could make sense.

We declare the variable name:

nw = northwest, n = north, ne = northeast, w = west, e = east, sw = southwest , s = south ,se = southeast.

```
adjacent() {
    // Since we store as a 2D-array (rectangular) calculate the neighbors for a
    rectangular grid initially
    const nw = { row: this.row - 1, column: this.column - 1 };
    const n = { row: this.row - 1, column: this.column };
    const ne = { row: this.row - 1, column: this.column + 1 };
    const w = { row: this.row, column: this.column - 1 };
    const e = { row: this.row, column: this.column + 1 };
    const sw = { row: this.row + 1, column: this.column - 1 };
    const s = { row: this.row + 1, column: this.column };
    const se = { row: this.row + 1, column: this.column + 1 };
    // Now drop neighbors since it is a hex grid and has 6 neighbors rather than 8
    // Which neighbors are dropped depends on the row, as hex grids are staggered
    if (this.row % 2 == 0) {
        // Even rows drop northeast and southeast
```

7. Brief reflection on what has been accomplished (Phaser 2)

1. Html page
   - Created the game level choose page (level1-level 5);

2. Add the player score
   - Created the display of the score
   - Completed the function of gaining score, when a player destroyed the enemy, he will gain score.

3. Add the play health bar
   - Created the display of the health bar display
   - Completed the function of player healthbar, when a player is attacked by an enemy successfully, he will lose one life.

4. Enemy move & attack
    - Completed enemy move up, down, left, right by computer, when it meet board, it will return and move opposite direction.
    - When enemy move to the same hex, they can move, not has collision.
    - Complete the attack function, when enemy touch player, player will lose one life, player will restart at one hex position.

5. Player attack
    - Created attack attribute of player (the value of attack and the possibility of attack successfully)
    - Created attack attribute of enemy (the value of attack, the possibility of attack successfully, the speed)
    - Completed the function of calcdamage.
6. Sound
    - Created Different level has different background sound.

8. Member Contribution Table:

Member	Contribution description	Overall Contribution (%)
Jeremy Glebe	Created player and enemy character moving character animation using JavaScript, the function of gaining score and healthbar when player attack.	60
Haiyi Wang	Created the function of attack damage, the main and level choose page using HTML, the healthbar and score display. Add sound for Background.	40

9. **References**

https://photonstorm.github.io/phaser3-docs