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| Project: Fast as Light (FAL)  |
| Team No.: Team 12   |
| Class: CSE 3310; Fall 2022<br>Module: System Requirements Analysis (SRA)<br>Deliverable: SRA Document |

**Version: [1.0]**

**Date: [10/27/2022]**

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## Revision History

| <i>Version number</i> | <i>Date</i> | <i>Originator</i> | <i>Reason for change</i> | <i>High level description of changes</i> |
|-----------------------|-------------|-------------------|--------------------------|--|
| 1.0                   | 10/28/2022  | Team#12           | Initial draft            |  |
|                       |             |                   |                          |  |
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# 1. Introduction and Project Overview

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Design and make a 2D Android game where the player must bypass through endless waves of enemies and obstacles to get a high score. Our game will include the following:

**Setup:** All players will be asked to sign into a profile when the game is initially booted up. If a player needs to create a new profile, they will go through the steps of choosing a username, user ID, email address, password, and character sprite for their profile. Otherwise, returning players can simply login into their previously established profiles to play the game.

**Home Menu:** Presents the game's title and provides various UI options that allow the player to either view their profile, start a new playthrough, open the leaderboard, or change game settings.

**Profile:** Allows the player to see the details behind their profile, choose their character, and retrieve the highest gameplay statistics.

**Start Playthrough:** The player begins with three health states and no currency. The player must avoid contact with enemies and their respective attacks in order to keep their health states. The player can collect randomly generated currency packs which can be spent to either shoot enemies or reduce the game engine's overall speed. Med-kits may also appear over the course of a playthrough to help players retain their health states. The difficulty of the game will center around surviving as long as possible while the game engine's speed increases in speed over time.

**Enemy AI:** There will be three enemy types that the player may find themselves at odds with over the course of a single playthrough: basic, ranged, and grappler. These enemies will spawn randomly at the top of the screen and each enemy type will exhibit different behaviors to stop the player from progressing forwards.

**Continue:** When a player dies/loses a game session, they have a chance to continue with a full health state and keep their current time score by spending currency earned in game. They can at most continue three times with each continue increasing in price.

**Leaderboard:** Allows the player to view their current global rank and high score and displays the top scores of other players within a global leaderboard in descending order.

**Settings:** Enables the player to edit information concerning their profile and gives the player the option of muting and unmuting the game audio.

## 2. Objectives

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### 2.1 BUSINESS OBJECTIVES

The following is a list of business objectives:

**Objective 1:** Setup: All users must either login to an existing profile or make a new profile to make the game. When creating a new profile, the following information will be asked.

- Email address
- Username
- Password
- Select character

**Objective 2:** Home Menu: Allow users to enter:

- Profile page
- Settings Page
- Start Playthrough
- Leaderboards page

**Objective 3:** Profile: Display user information:

- Username
- User Id
- Email address
- Character
- High score
- Player rank

**Objective 4:** Start Playthrough: Keep track of and update:

- Spawning of enemies
- Spawning of obstacles
- Spawning of health items
- Spawning of currency items
- Character health
- User input
- Time score

- Background change

**Objective 5:** Enemy AI: Attempt to stop the player from proceeding onwards in their current playthrough. The system should support three different enemy types.

- Basic enemy type
- Ranged enemy type
- Grappler enemy type

**Objective 6:** Continue: Allow the player to continue game session while:

- Player has enough currency
- Player has continued less than three times

**Objective 7:** Leaderboard: Allow users to see their profile statistics and chosen character. The system should also give users the ability to swap characters here.

**Objective 8:** Settings: Allow users to:

- Change username
- Change password and verify new password
- Mute/unmute sound

## 2.2 SYSTEM OBJECTIVES

The following is a list of system objectives:

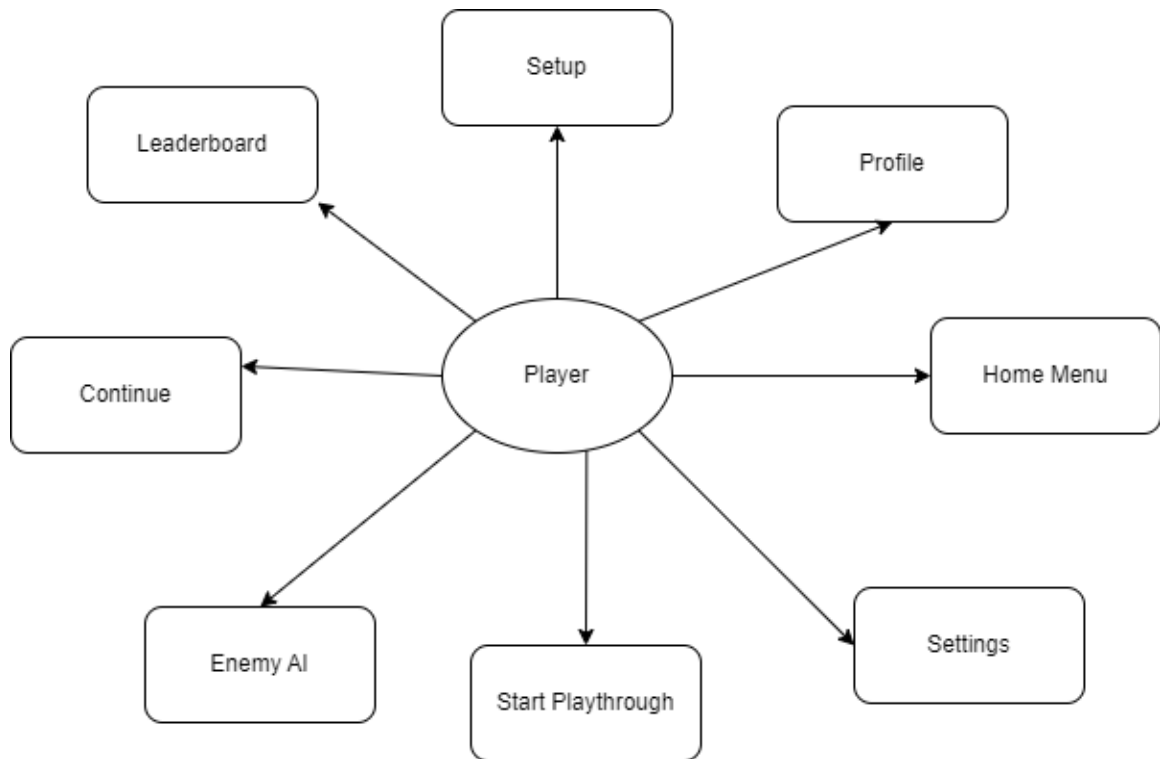
**Objective 1:** System will be an Android application

**Objective 2:** Firebase will be used to save limited amount of data

**Objective 3:** JavaMail API will be used to send verification e-mail

### 3. Project Context Diagram

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## 4. Systems Requirements

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### 4.1 "SETUP" REQUIREMENTS

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Setup   |
| <b>Sequence No:</b>       | 001   |
| <b>Short description:</b> | Ask if it's a new user or returning user  |
| <b>Description:</b>       | Display message: <ul style="list-style-type: none"><li>- "Do you have a profile?"</li></ul> Player can press <ul style="list-style-type: none"><li>- Yes</li><li>- No</li><li>- Exit game</li></ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- Open app</li></ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- Player logs in if chose 'yes'</li><li>- Player makes a new profile if chose 'no'</li></ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Setup   |
| <b>Sequence No:</b>       | 002   |
| <b>Short description:</b> | New user registers into the game  |
| <b>Description:</b>       | New users will register. The following information will be collected from the user: <ul style="list-style-type: none"><li>- User name</li><li>- PasswordEmail</li></ul> User can press: <ul style="list-style-type: none"><li>- Submit</li><li>- Exit screen (or close)</li></ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- User chooses 'No' when asked if they have an existing profile</li></ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- Player chooses character</li><li>- Error if credentials already exist</li></ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>  |



|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Setup  |
| <b>Sequence No:</b>       | 003  |
| <b>Short description:</b> | User Logins  |
| <b>Description:</b>       | <p>Existing users will enter the following information:</p> <ul style="list-style-type: none"> <li>- Player username</li> <li>- Player password</li> </ul> <p>Players who forgot passwords can exit by 'Forgot password' button</p> <p>User can press:</p> <ul style="list-style-type: none"> <li>- Submit</li> <li>- Forgot password</li> <li>- Exit screen (or close)</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- User chooses 'Yes' when asked if they have an existing profile</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Player logs in if credentials are valid</li> <li>- Error if credentials don't match</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>   |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Setup  |
| <b>Sequence No:</b>       | 004  |
| <b>Short description:</b> | Error displays to the user   |
| <b>Description:</b>       | <p>Error message displays and upon closing the message, you get redirected to 'Do you have a profile?' page.</p> <p>Displays a pop-up reading:</p> <ul style="list-style-type: none"> <li>- 'Error - Please try again'</li> </ul> <p>User can press:</p> <ul style="list-style-type: none"> <li>- Close</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- User logs in but credentials already exist in the database</li> <li>- User makes a new profile but credentials already exists</li> </ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Player logs in if credentials if valid</li> <li>- Error if credentials don't match</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>   |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Setup  |
| <b>Sequence No:</b>       | 005  |
| <b>Short description:</b> | Choose Character for new user  |
| <b>Description:</b>       | <p>New user chooses the character that they want to play with in the game.</p> <p>Displays :</p> <p>All the characters in the game with their character names</p> <p>User can press:</p> <ul style="list-style-type: none"> <li>- Ready (ie; user chose character and is ready)</li> <li>- Close button</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- User registers successfully</li> </ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- User enters game once chosen character</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>   |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Setup  |
| <b>Sequence No:</b>       | 006  |
| <b>Short description:</b> | If the user forgot password then there will be a two way authentication to verify that it's their profile  |
| <b>Description:</b>       | <p>User will be asked their username and a code will be sent to their registered emails to authenticate.</p> <p>Displays :</p> <p>'A code has been sent to email xyz' (where xyz is their email)</p> <p>User enters:</p> <ul style="list-style-type: none"> <li>- code sent to their emails</li> </ul> <p>User can press:</p> <ul style="list-style-type: none"> <li>- Submit</li> <li>- Close button</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- User chose forgot password when logging in</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- User resets password</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>   |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Setup  |
| <b>Sequence No:</b>       | 007  |
| <b>Short description:</b> | User resets password if forgot password  |
| <b>Description:</b>       | <p>User will be asked their new password for resetting it</p> <p>Displays :</p> <p>Enter new password</p> <p>User enters:</p> <ul style="list-style-type: none"> <li>- New password</li> </ul> <p>User can press:</p> <ul style="list-style-type: none"> <li>- Submit</li> <li>- Close button</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- User gets authenticated via two way authentication</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- User is taken back to the returning player page</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>   |

## 4.2 “HOME MENU” REQUIREMENTS

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Home Menu   |
| <b>Sequence No:</b>       | 001   |
| <b>Short description:</b> | Provide a user interface for users to navigate  |
| <b>Description:</b>       | <p>The home menu will display the game's title as well as a background that reflects the game's thematic scenery.</p> <p>The user will be able to click on icons to bring them to the following sections:</p> <ul style="list-style-type: none"><li>- Profile</li><li>- Start Playthrough</li><li>- Settings</li><li>- Leaderboards</li></ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- The user is signed into a profile.</li></ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- The home menu should transition to the user's selected choice.</li><li>- The user can return to the home page if they exit from their selected choice.</li></ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>  |

### 4.3 "PROFILE" REQUIREMENTS

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Profile  |
| <b>Sequence No:</b>       | 001  |
| <b>Short Description:</b> | View Profile and Edit Character  |
| <b>Description:</b>       | <p>A dedicated button for the profile will be present on the Home Menu page. When the user clicks the button the following profile information will be shown on a separate window:</p> <ul style="list-style-type: none"><li>- Profile ID</li><li>- Name</li><li>- Email</li><li>- High Score</li><li>- Profile Rank</li></ul> <p>The user can change their character sprite here.</p> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- The user must click on the profile button from the Home Menu.</li></ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- If the user changes their character, their new character will replace their previous character and can be viewed from their profile page.</li></ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- The high score is only changed when there is a new high score.</li><li>- The profile rank is only changed when the profile rank increases or decreases.</li></ul>  |

#### 4.4 “START PLAYTHROUGH” REQUIREMENTS

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Start Playthrough   |
| <b>Sequence No:</b>       | 001   |
| <b>Short description:</b> | Load game   |
| <b>Description:</b>       | Load the background graphics, buttons, and the player avatar.   |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- The player must have already started a playthrough.</li></ul>   |
| <b>Post Conditions:</b>   | <p>Start timer for</p> <ul style="list-style-type: none"><li>- Spawning health items</li><li>- Spawning objects</li><li>- Spawning enemies</li><li>- Evaluating high score</li></ul> <p>Set the game engine's starting speed.</p> |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>  |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Start Playthrough  |
| <b>Sequence No:</b>       | 002  |
| <b>Short description:</b> | Evaluates player health  |
| <b>Description:</b>       | <p>This starts the player with three health states at the beginning of a new playthrough.</p> <p>This records the health changes to the player.</p> <p>If the player is at max health, do not spawn any health items.</p> <p>If the player is not at max health and picks up a health item, then the player gains one health state.</p> <p>If the player interacts with an object or enemy that delivers damage, then the player loses one health state.</p> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- None</li></ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- The game evaluates the player's health accordingly.</li></ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>   |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Start Playthrough  |
| <b>Sequence No:</b>       | 003  |
| <b>Short description:</b> | Spawn health items   |
| <b>Description:</b>       | <p>The game will spawn health items to renew the player's health if they are not at max health.</p> <p>Health items will be generated according to RNG and based on whether the player is at max health.</p> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- The player must not be at max health.</li> </ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Generate health items</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- Player's health</li> </ul>  |



|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Start Playthrough  |
| <b>Sequence No:</b>       | 004  |
| <b>Short description:</b> | Spawn plane and spawn clouds   |
| <b>Description:</b>       | <p>After the game starts and background and player are loaded, objects will spawn every three seconds. These objects include:</p> <ul style="list-style-type: none"> <li>- Planes</li> <li>- Clouds</li> </ul> <p>Planes will fly horizontally across the screen and are immune to the player's projectiles. If the player gets hit by a plane, they will lose a health state.</p> <p>Clouds will move vertically from the top to bottom of the screen and pass through all characters, enemies, projectiles, and objects. Clouds will hide the visibility of anything that it covers.</p> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- Seven seconds must have passed since the last spawn of an object.</li> </ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Spawn a plane object.</li> <li>- Decrement the player's health if the player gets hit by a plane.</li> <li>- Spawn a cloud object.</li> <li>- Hide the visibility of anything under the cloud.</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- Player's health</li> </ul>  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Start Playthrough   |
| <b>Sequence No:</b>       | 005   |
| <b>Short description:</b> | Change the background image   |
| <b>Description:</b>       | Change the image of the background to show the change in time   |
| <b>Pre-Conditions:</b>    | - Two minutes have passed   |
| <b>Post Conditions:</b>   | - The changed background will remain on screen until another two minutes have passed within the player's playthrough. |
| <b>Other attributes:</b>  | - None  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Start Playthrough   |
| <b>Sequence No:</b>       | 006   |
| <b>Short description:</b> | Player interaction with game  |
| <b>Description:</b>       | <p>The player can</p> <ul style="list-style-type: none"> <li>- Press the up button</li> <li>- Press the down button</li> <li>- Press the left button</li> <li>- Press the right button</li> <li>- Press the shoot button</li> <li>- Press the slow game speed button</li> <li>- Press the pause button</li> </ul> <p>When the player presses any of the directional buttons, the character will move in the direction that was pressed.</p> <p>When the player presses the shoot button, the character will send projectiles in front of the character</p> <p>When the player presses the slow game speed button, the game engine will slow down, and the player's currency will decrease accordingly until the player releases the slow game speed button.</p> <p>The player can pause the game through the pause button. From this point, the player can either</p> <ul style="list-style-type: none"> <li>- Resume their playthrough once they are done pausing</li> <li>- End their playthrough to return to the home menu</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- The player has touched one or more control buttons.</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Any buttons pressed will reflect changes to the gameplay that is happening on screen.</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Start Playthrough   |
| <b>Sequence No:</b>       | 007   |
| <b>Short description:</b> | Spawn enemy   |
| <b>Description:</b>       | Spawn an enemy of any random type at the top of the screen  |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- The player must have already started a playthrough.</li> <li>- Five seconds have passed</li> </ul> |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Generate an enemy.</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Start Playthrough   |
| <b>Sequence No:</b>       | 008   |
| <b>Short description:</b> | Manages the game information, elapsed time, and game speed.   |
| <b>Description:</b>       | <p>Keep track of the player's health and manage user input. Call subroutines based on in game interactions and the player's input.</p> <p>Increase the game's engine speed over time unless the player uses their currency to slow down the game's speed.</p> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- Game has started</li> </ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- None</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>  |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Start Playthrough  |
| <b>Sequence No:</b>       | 009  |
| <b>Short description:</b> | Evaluate currency  |
| <b>Description:</b>       | <p>Start the player with zero currency at the beginning of a new playthrough.</p> <p>Ensures the player's currency is never below zero.</p> <p>If the player collides into a currency item, the player will receive the full amount of currency that item offered into their overall currency balance.</p> <p>If the player spends their collected currency to slow down the game's speed, then their currency balance will be lowered respectively.</p> |
| <b>Pre-Conditions:</b>    | - None   |
| <b>Post Conditions:</b>   | - Reflect changes to the player's currency balance if the player collects currency items and spends their currency throughout a playthrough.   |
| <b>Other attributes:</b>  | - None   |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Start Playthrough   |
| <b>Sequence No:</b>       | 010   |
| <b>Short description:</b> | Spawn currency items  |
| <b>Description:</b>       | <p>The game will spawn currency items over the course of a playthrough.</p> <p>The amount of currency that a currency item spawns off with will be determined by RNG and the player's overall progression in their current playthrough.</p> |
| <b>Pre-Conditions:</b>    | - Four seconds have passed since the last currency item spawned.  |
| <b>Post Conditions:</b>   | - Generate a currency item that the player can collect.   |
| <b>Other attributes:</b>  | - None  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Start Playthrough                                   |
| <b>Sequence No:</b>       | 011   |
| <b>Short description:</b> | Declare the game as ended                           |
| <b>Description:</b>       | Update the player value as dead and pause the game. |
| <b>Pre-Conditions:</b>    | - Player health is empty                            |
| <b>Post Conditions:</b>   | - Maintain game information                         |
| <b>Other attributes:</b>  | - Player's high score                               |

## 4.5 “ENEMY AI” REQUIREMENTS

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Enemy AI   |
| <b>Sequence No:</b>       | 001  |
| <b>Short description:</b> | Spawn a basic enemy type   |
| <b>Description:</b>       | <p>A basic enemy type will be chosen at random to spawn at the top of the screen throughout a playthrough.</p> <p>A basic enemy type will fall straight down and cause the player to lose a health state if they collide with the player.</p> <p>A basic enemy type will die if it</p> <ul style="list-style-type: none"><li>– Reaches the end of the screen</li><li>– Gets shot down by the player</li><li>– Collides with the player</li></ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>– The player must have already started a playthrough.</li><li>– Five seconds have elapsed within the playthrough so that a new enemy can be spawned.</li></ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>– Delete the enemy based on the conditions listed in the description above.</li><li>– Decrease the player’s health if player gets hit by the enemy.</li></ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>– The player’s health</li></ul>  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Enemy AI  |
| <b>Sequence No:</b>       | 002   |
| <b>Short description:</b> | Spawn a ranged enemy type   |
| <b>Description:</b>       | <p>A ranged enemy type will be chosen at random to spawn at the top of the screen throughout a playthrough.</p> <p>A ranged enemy type will stay on the top of the screen and shoot directly downwards. If any of its projectiles hit the player or the player collides with it at the top of the screen, the player will lose a health state.</p> <p>A ranged enemy type will die if it</p> <ul style="list-style-type: none"> <li>– Gets shot down by the player</li> <li>– Collides with player</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>– The player must have already started a playthrough.</li> <li>– Five seconds have elapsed within the playthrough so that a new enemy can be spawned.</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>– Delete the enemy based on the conditions listed in the description above.</li> <li>– Decrease the player's health if player gets hit by the enemy.</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>– The player's health</li> </ul>   |



|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Enemy AI  |
| <b>Sequence No:</b>       | 003   |
| <b>Short description:</b> | Spawn a grappler enemy type   |
| <b>Description:</b>       | <p>A grappler enemy type will be chosen at random to spawn at the top of the screen throughout a playthrough.</p> <p>A grappler enemy type will fall and tilt its descent towards the player's location. If it collides with the player, the player will lose a health state.</p> <p>A grappler enemy type will die if it</p> <ul style="list-style-type: none"> <li>– Reaches the end of the screen</li> <li>– Gets shot down by the player</li> <li>– Collides with the player</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>– The player must have already started a playthrough.</li> <li>– Five seconds have elapsed within the playthrough so that a new enemy can be spawned.</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>– Delete the enemy based on the conditions listed in the description above.</li> <li>– Decrease the player's health if player gets hit by the enemy.</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>– The player's health</li> </ul>   |

## 4.6 “CONTINUE” REQUIREMENTS

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Continue  |
| <b>Sequence No:</b>       | 001   |
| <b>Short description:</b> | Evaluate whether player can continue their ended playthrough  |
| <b>Description:</b>       | <p>Count the number of times that the player has continued their playthrough.</p> <p>Compare the count of continues to the number 3.</p> <ul style="list-style-type: none"><li>- If the count is less than three, then the player will have the ability to continue their playthrough.</li><li>- If the count is greater than or equal to three, the player cannot continue their playthrough and their playthrough score is finalized.</li></ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- Player has lost all health in the game session</li></ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- None</li></ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>  |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Continue  |
| <b>Sequence No:</b>       | 002   |
| <b>Short description:</b> | Ask to continue game  |
| <b>Description:</b>       | <p>Show the current time the player has achieved and give the player the option to continue the game session.</p> <ul style="list-style-type: none"><li>- Show the player's current currency balance.</li><li>- Show the amount of currency needed to continue.</li></ul> <p>Player can press</p> <ul style="list-style-type: none"><li>- Continue</li><li>- Quit</li></ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- Count was valid</li></ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- None</li></ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- Player's currency balance</li></ul>   |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Continue  |
| <b>Sequence No:</b>       | 003   |
| <b>Short description:</b> | Compare player currency to Continue currency  |
| <b>Description:</b>       | <p>Compare the values of the player's current amount of currency to the amount of currency needed to continue</p> <ul style="list-style-type: none"> <li>- If the player's currency is greater than or equal to the currency amount needed to continue, the check is valid</li> <li>- If the player's currency is less than the currency amount needed to continue, the check is invalid</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- Player pressed Continue</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- None</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- Player's currency balance</li> </ul>   |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Continue   |
| <b>Sequence No:</b>       | 004  |
| <b>Short description:</b> | Continue current game session  |
| <b>Description:</b>       | <p>Continues the current game session and do the following before the game continues:</p> <ul style="list-style-type: none"> <li>- Return player to full health</li> <li>- Subtract the player's currency by the Continue amount</li> <li>- Increase the cost of the next Continue</li> <li>- Increase the count by one</li> </ul> <p>Pause the game session when the player's health reaches zero</p> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- Player's currency was valid</li> </ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- None</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>   |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Continue  |
| <b>Sequence No:</b>       | 005   |
| <b>Short description:</b> | Displays Error  |
| <b>Description:</b>       | <p>Display pop-up with error message. Error message will read:</p> <ul style="list-style-type: none"> <li>- "Not enough currency"</li> </ul> <p>Player can press</p> <ul style="list-style-type: none"> <li>- OK</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- Player's currency was invalid</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Remove pop-up</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>  |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Continue   |
| <b>Sequence No:</b>       | 006  |
| <b>Short description:</b> | Compare player high score with current session score   |
| <b>Description:</b>       | <p>Compare the player's high score with the current score of the game session</p> <ul style="list-style-type: none"> <li>- Evaluate as true if the current session score is greater than the current player's high score</li> <li>- Evaluate as false if the current session score is less than the player high score</li> </ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- Player quits the game session or count was invalid</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Return to main menu if evaluation is false</li> </ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>   |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Continue  |
| <b>Sequence No:</b>       | 007   |
| <b>Short description:</b> | Update player's high score  |
| <b>Description:</b>       | Update the value of the player's high score with the value of the score of the current game session |
| <b>Pre-Conditions:</b>    | - Compare high score evaluated to true  |
| <b>Post Conditions:</b>   | - Return to main menu   |
| <b>Other attributes:</b>  | - None  |

## 4.7 “LEADERBOARD” REQUIREMENTS

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Leaderboard  |
| <b>Sequence No:</b>       | 001  |
| <b>Short Description:</b> | View Global Leaderboard from Home Menu   |
| <b>Description:</b>       | <p>A dedicated button for Leaderboard will be present on the Home Menu page. When the user clicks the button all the registered profiles will be shown from highest rank to lowest rank. For each profile on the leaderboard the following will be shown:</p> <ul style="list-style-type: none"><li>- Profile ID</li><li>- Profile Name</li><li>- Profile Rank</li></ul>   |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- Application must be loaded already.</li><li>- The user must be at Home Menu.</li><li>- The user must have clicked on the Leaderboard button on the Home Menu.</li></ul>  |
| <b>Post Conditions:</b>   | <p>To update the profile rank of a profile on the Leaderboard:</p> <ul style="list-style-type: none"><li>- Once a profile has a new high score, it is compared to the high scores of all the other profiles.</li><li>- The profile rank of the profile with the new high score is set to the profile rank of the profile with the highest of the high scores that are lower than the new high score and that profile's profile rank will be decreased by 1.</li><li>- If there are no profiles with high scores lower than the new high score, then the profile with the new high score will have an unchanged profile rank.</li></ul> |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- All newly created profiles will be initially assigned High Score of 0 and the Profile Rank will initially be the current last rank increased by 1 on the leaderboard.</li></ul>  |

## 4.8 "SETTINGS" REQUIREMENTS

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Settings   |
| <b>Sequence No:</b>       | 001  |
| <b>Short description:</b> | Enter settings   |
| <b>Description:</b>       | Area where you can: <ul style="list-style-type: none"><li>- Edit User info</li><li>- Mute/Unmute sound</li><li>- Change Username</li><li>- Change Password</li><li>- Verify password</li></ul> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- Enter settings</li></ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- Return to settings</li></ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>   |

|                           |  |
|---------------------------|--|
| <b>Requirement Title:</b> | Settings   |
| <b>Sequence No:</b>       | 002  |
| <b>Short description:</b> | Area where you can change multiple user parameters   |
| <b>Description:</b>       | In edit user info, multiple different parameters can be changed. These parameters include: <ul style="list-style-type: none"><li>- Change username</li><li>- Change password</li><li>- Verify Password</li></ul> After editing these settings, you will be able to return to settings home page. |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"><li>- Open settings</li></ul>  |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"><li>- Return to settings</li></ul>   |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"><li>- None</li></ul>   |

|                           |   |
|---------------------------|---|
| <b>Requirement Title:</b> | Settings  |
| <b>Sequence No:</b>       | 002   |
| <b>Short description:</b> | Area to control sound settings  |
| <b>Description:</b>       | <p>In this area, the user will be able to control whether they want sound to be on or off.</p> <p>After selecting the sound setting they want, the user will be asked to save settings and be able to return to settings home page.</p> |
| <b>Pre-Conditions:</b>    | <ul style="list-style-type: none"> <li>- Open settings</li> </ul>   |
| <b>Post Conditions:</b>   | <ul style="list-style-type: none"> <li>- Return to settings</li> </ul>  |
| <b>Other attributes:</b>  | <ul style="list-style-type: none"> <li>- None</li> </ul>  |



## 5. Software Processes and Infrastructure

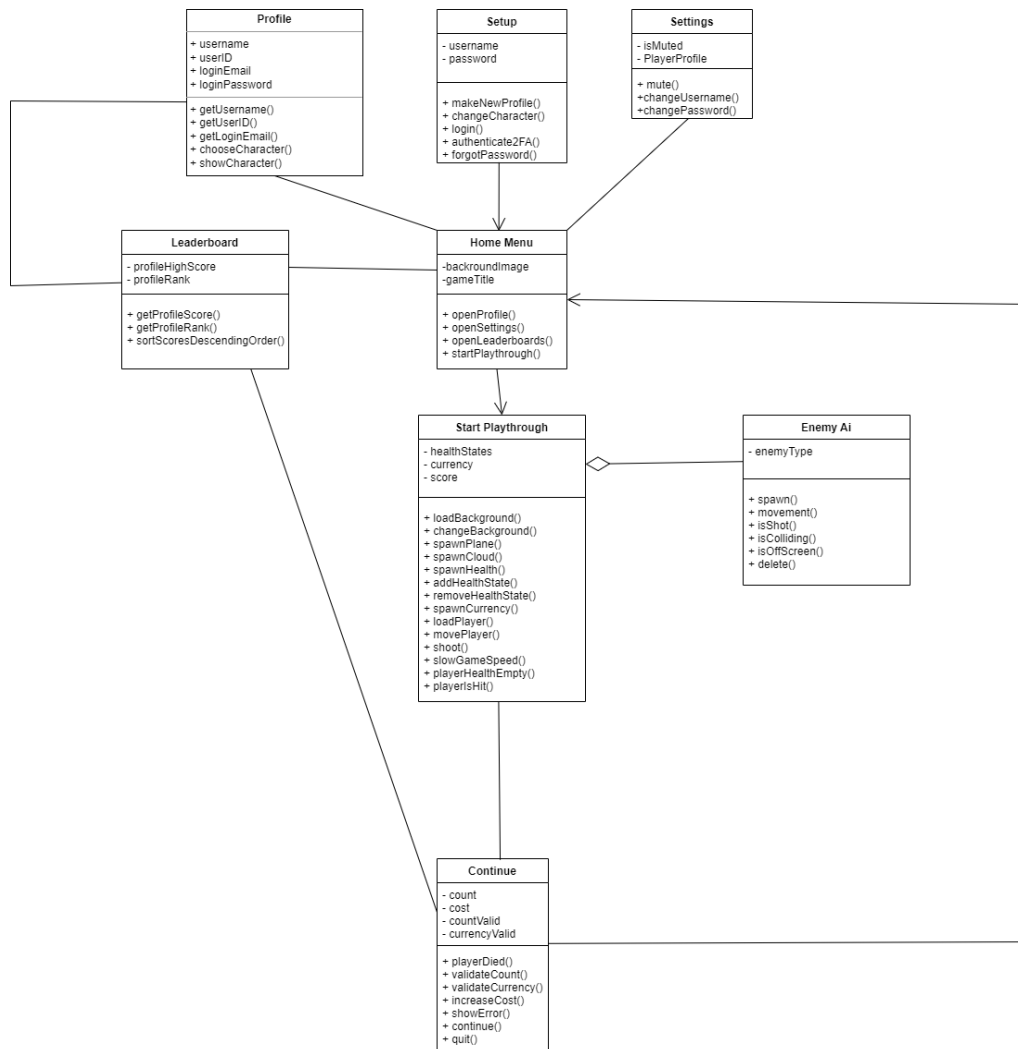
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### 5.1 HARDWARE AND INFRASTRUCTURE

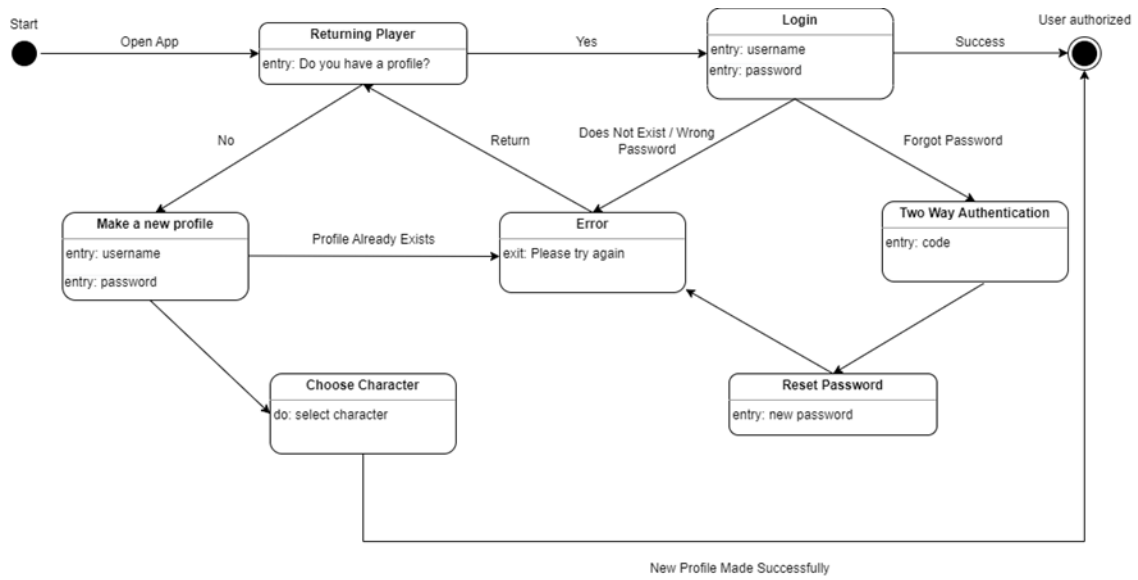
Our team will be building our game for Android devices, specifically for Android versions 11.0 (Red Velvet Cake) and onwards.

### 5.2 UML DIAGRAMS

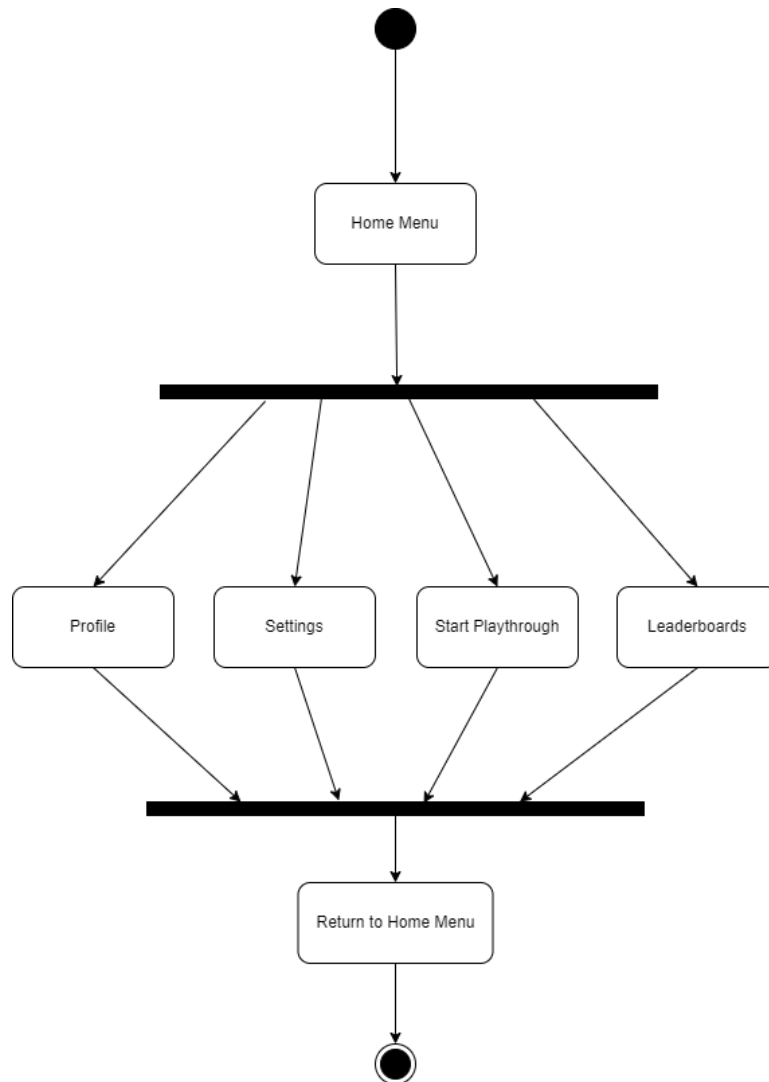
#### UML – CLASS DIAGRAM – “SYSTEM”



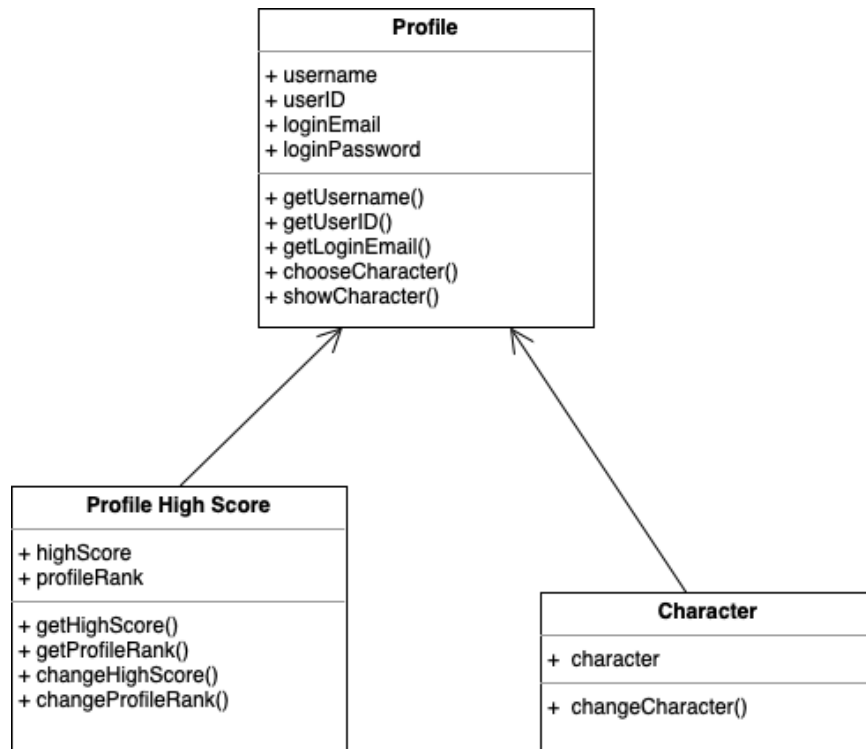
## UML – STATE TRANSITION DIAGRAM – “SETUP”



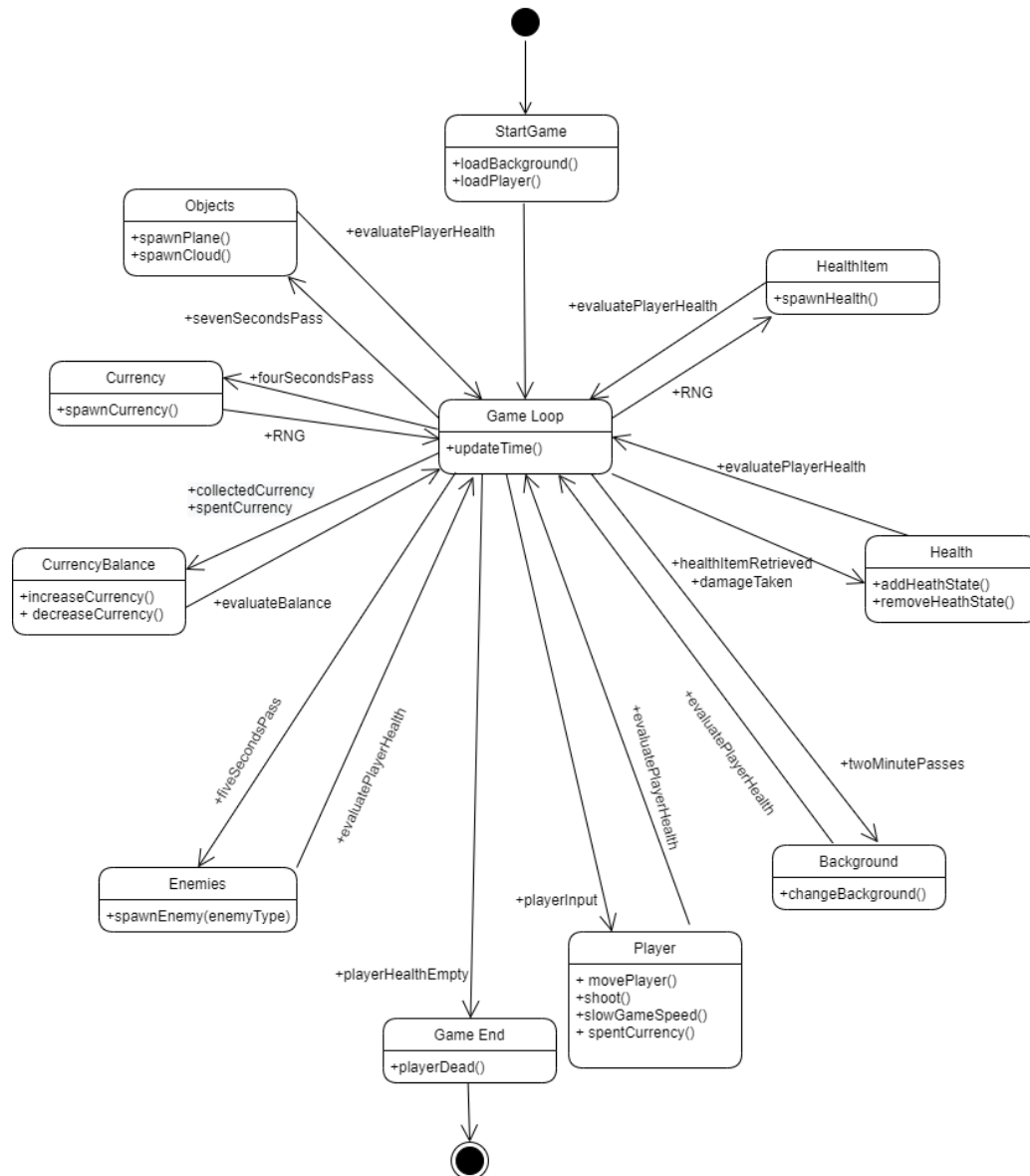
## UML – ACTIVITY DIAGRAM – “HOME MENU”



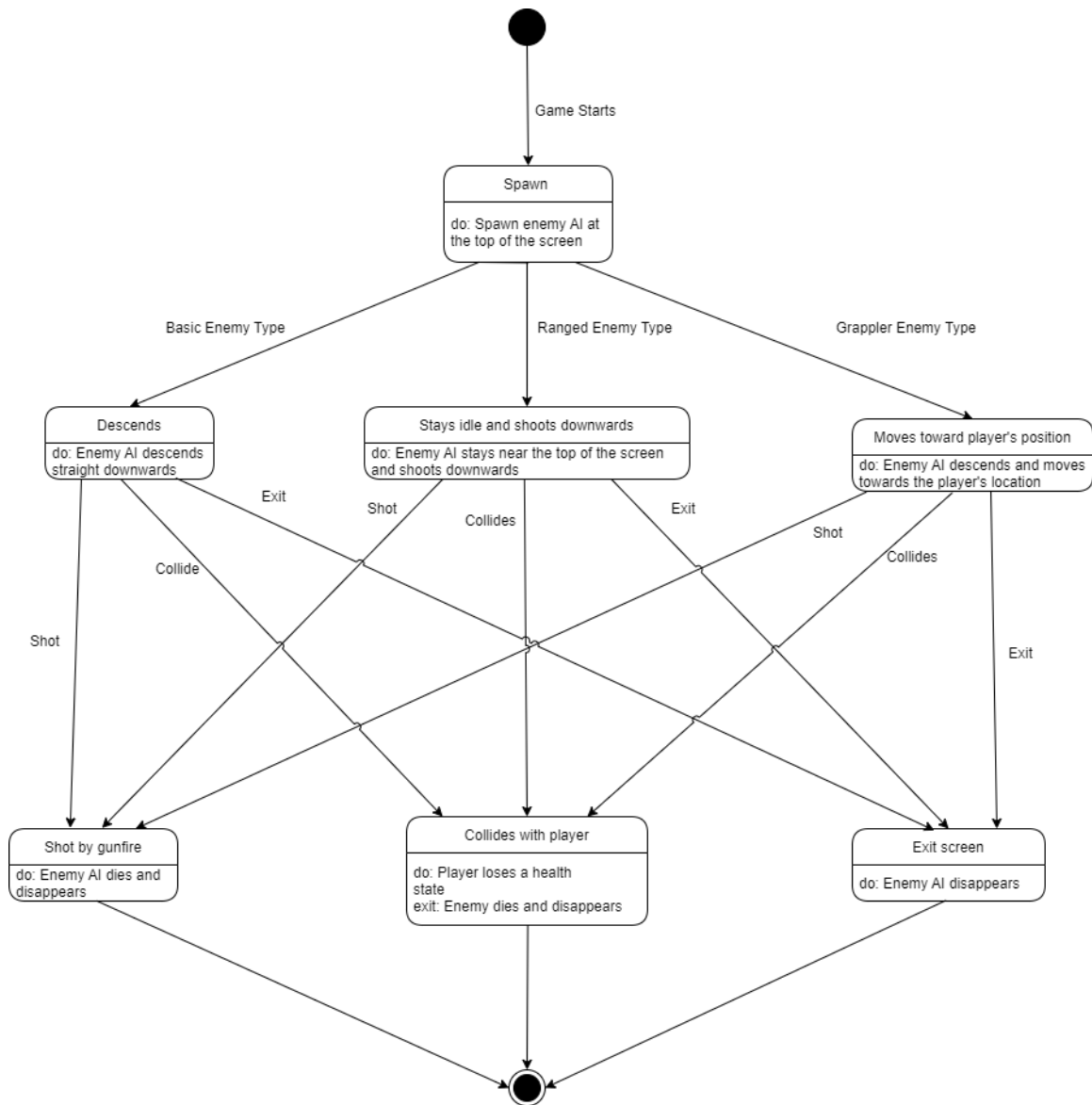
## UML – Class Diagram – “Profile”



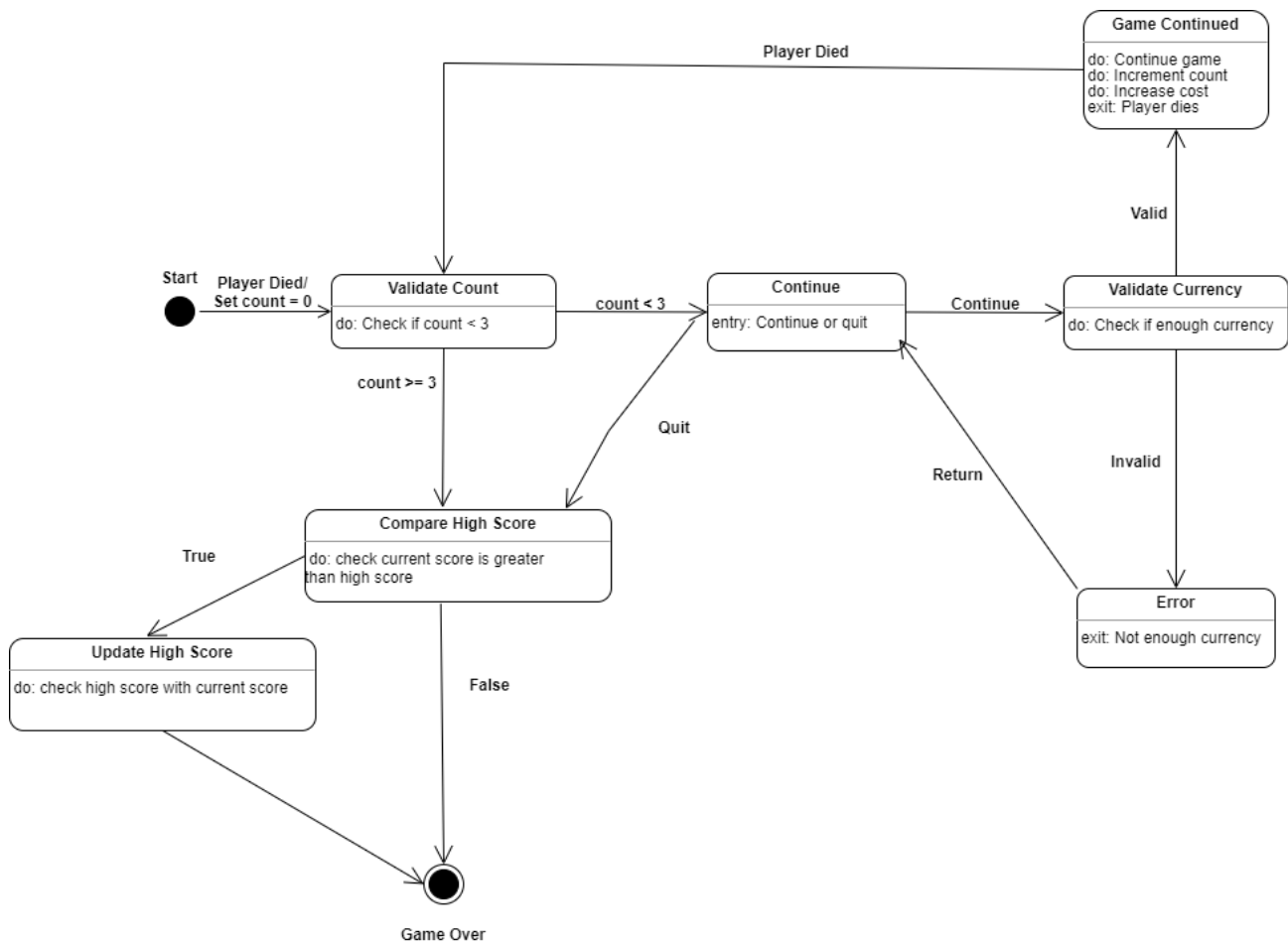
## UML – State Transition Diagram – “Start Playthrough”



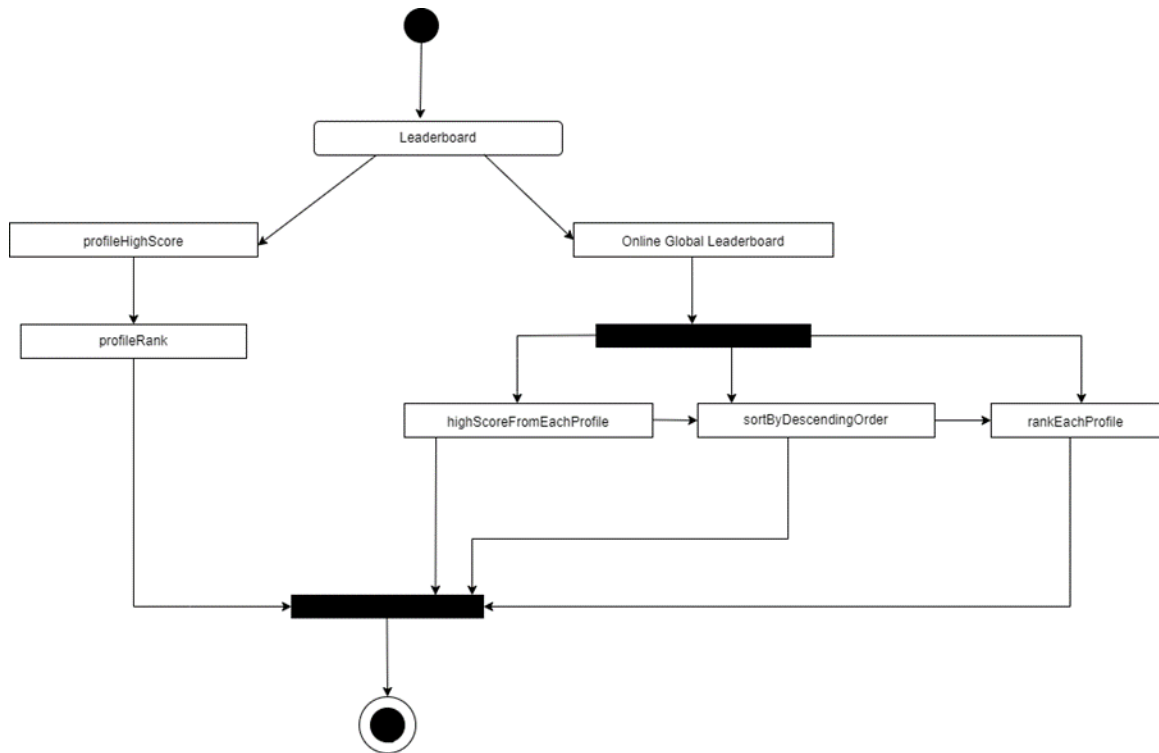
## UML – STATE TRANSITION DIAGRAM – “ENEMY AI”



## UML – STATE TRANSITION DIAGRAM – “CONTINUE”

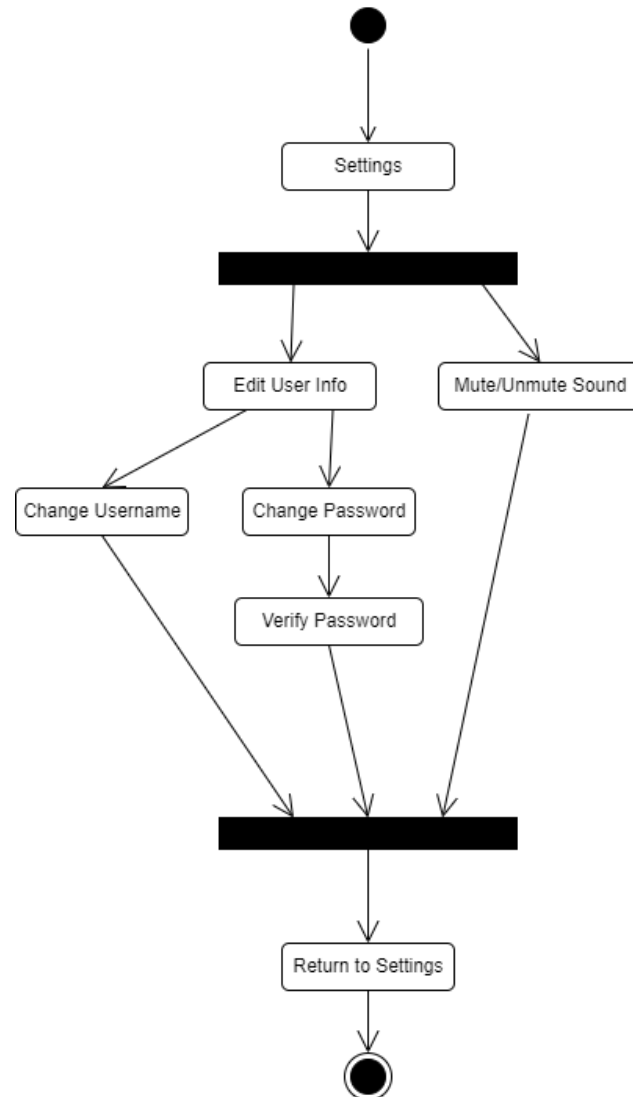


## UML – ACTIVITY DIAGRAM –“LEADERBOARD”





## UML – Activity Diagram – “Settings”



### 5.3 SCREEN SHOTS

None available at this time

### 5.4 TEST PLAN

A test plan will be provided at a later stage of the project.

## 6. Assumptions and Constraints

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### 6.1 ASSUMPTIONS

The following is a list of assumptions:

- The player provides a valid email for their profile.

### 6.2 CONSTRAINTS

The following is a list of constraints:

- Our team lacks mobile development experience, especially for Android.
- Our team lacks Google Firebase experience.
- Our team lacks API implementation experience
- Our team lacks pixel art and animation experience.

### 6.3 OUT OF SCOPE MATERIAL

The following is a list of “out of scope” material:

- Maintaining the project after it has been delivered and presented.






## 7. Delivery and Schedule

{List all tasks/milestones from start of the project to the end with specific dates for both Anticipated Start & End Dates

| Task/Milestone Description  | Anticipated Start Date | Anticipated End Date | Status   | Comments   |
|---|------------------------|----------------------|----------|--|
| Prepare Requirements and UML diagram  | 9/12/2022              | 9/28/2022            | Complete | Deliverable UML document. <b>Increment 1 Deliverable</b>   |
| SRA document (Includes project objectives, Requirements and UML diagrams)         | 9/29/2022              | 10/27/2022           | Complete | Deliverable will be the SRA document. All stakeholders agree on the content of the SRA by signing in section 8. <b>Increment 2 Deliverable</b> |
| Setup (login, registration, and implementation)                                   | 10/30/2022             | 11/10/2022           | TBC      | Abbas Zaidi<br>Asad Mirza  |
| Home menu (design and implementation)   | 10/30/2022             | 11/3/2022            | TBC      | Daniel Duy Phan  |
| View profile statistics and selected character (design and implementation)        | 11/20/2022             | 11/26/2022           | TBC      | Mubtasim Ahmed Rakheen   |
| Player controls and mechanics (design and implementation)                         | 11/5/2022              | 11/12/2022           | TBC      | Daniel Duy Phan  |
| Game objects, obstacles, and items (design and implementation)                    | 11/12/2022             | 11/24/2022           | TBC      | Abbas Zaidi  |
| Game engine, changing backgrounds, elapsed high score (design and implementation) | 11/11/2022             | 11/16/2022           | TBC      | Joseph Salas-Leon  |
| Enemy AI (design and implementation)  | 11/15/2022             | 11/24/2022           | TBC      | Daniel Duy Phan  |
| Continue menu (design and implementation)   | 11/18/2022             | 11/22/2022           | TBC      | Joseph Salas-Leon  |
| Leaderboard (design and implementation)   | 11/11/2022             | 11/18/2022           | TBC      | Mubtasim Ahmed Rakheen   |

|  |            |            |     |                         |
|--|------------|------------|-----|-------------------------|
| Settings (design and implementation)                           | 11/13/2022 | 11/22/2022 | TBC | Asad Mirza              |
| ...<br><b>List all required functionality and tasks</b><br>... | 10/28/2022 | 11/17/2022 |     | Increment 3 Deliverable |
| Test case design   | 12/4/2022  | 12/6/2022  |     |                         |
| External Documentation (i.e. User Manual)                      | 11/29/2022 | 12/6/2022  |     |                         |
| Project presentation   |            | 12/6/2022  |     | Increment 4 Deliverable |
| Final Milestone: project delivery                              |            |            |     |                         |

## 8. Stakeholder Approval Form

| Stakeholder Name       | Stakeholder Role | Stakeholder Comments | Stakeholder Approval Signature and Date   |
|------------------------|------------------|----------------------|---|
| Bahram Khalili         | Development Mgr  |                      |   |
| Aidan Gennuso          | Assistant Mgr    |                      |   |
| Daniel Duy Phan        | Developer        |                      | <br>Date: 10/27/2022    |
| Joseph Salas-Leon      | Developer        |                      | <br>Date: 10/27/2022  |
| Mubtasim Ahmed Rakheen | Developer        |                      | <br>Date: 10/27/2022 |
| Asad Mirza             | Developer        |                      | <br>Date: 10/27/2022 |
| Abbas Zaidi            | Developer        |                      | <br>Date: 10/27/2022 |

Appendix:

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None