GAME DESIGN DOCUMENT
Team 6

STAR ROCK

Game one-liner

Star Rock is a 2.5D shooter where the player has to go through the level shooting enemies, and avoiding environmental hazards, in order to achieve the highest score aided by the use of power-ups.

Game theme

The games theme is rooted in science fiction, as the player controls a spaceship and has to eliminate alien ships on the surface of an alien planet.

The gaming experience will be friendly, yet challenging, including simplistic controls with the firing of projectiles being automatic. The challenge consists of moving around the screen in order to avoid collisions, and angling the ship at the right moments to make sure you destroy all the targets. The automatic firing will add some tension and difficulty in the context of eliminating enemies, as it requires forward thinking and strategic timing.

Context and backstory

The game is set on a rocky, alien planet where an explorer from Earth tries to find out if the atmospheric conditions are suitable to sustain a colony. Upon his arrival, he discovers that it is suitable for accommodating human life; though the planet is already inhabited by intelligent, hostile beings. It is at that moment when the explorer has to escape and navigates around enemy ships which seek his demise.

Game Aim

The goal of the game is to progress through each of the 10 levels, eliminating enemies and avoiding obstacles, in order to get as many points as possible to unlock the next level: which is achieved by getting a minimum of 2 stars. At the end of each level, the player's performance will be graded based on the score achieved and a rating of 1 to 3 stars will be awarded.

- If you get one star: the player will have to repeat the level.
- If you get two stars: the player unlocks the next level.
- If you get three stars: the player unlocks the next level and receives a bonus of an extra power up.

The game ends when the player runs out of life or reaches the end of level 10.

Game World and Aesthetics

The game world has futuristic overtones with a colorful and vibrant art style that revives the flavor of the classics and brings it to the present with minimalist geometry. The levels the player traverses depict landscapes of cheerful, yet faded, colors recalling the desolate beauty of desert planets, transporting the player to fictional worlds typical of the sci-fi genre.

The world of Star Rock aims to represent a fantastical journey, traversing worlds which captivate through their simple, colorful beauty, but which in turn are full of mysteries and dangers that threaten to end the utopian dream of colonizing worlds beyond planet Earth.

## Game Mechanics and Source Code

The mechanics of the game consists of moving the player around the height and width of the screen while they shoots automatically. The player must position the ship at the correct angle so that the projectiles launched from the ship hit different enemies and obstacles.

The game follows a straightforward control scheme, using Unitys event system interfaces such as, IDragHandler and IPointerDownHandler to control the input joystick. The player controls the ship using the fixed virtual joystick, the further they drag the joystick away from the pivot point in any direction, the more force is applied in that direction. For

example, should the player drag the joystick to the left, the ship will reverse, moving toward the left side of the screen. This is subject to change upon user feedback, as a floating point joystick, where the pivot point activates at the position of the users touch, has also been considered.

Input on the menu screens is also handled by Unitys event system interfaces, with the player tapping the screen to select an option, and swiping the screen on the level select menu.

Main Character and Power Ups
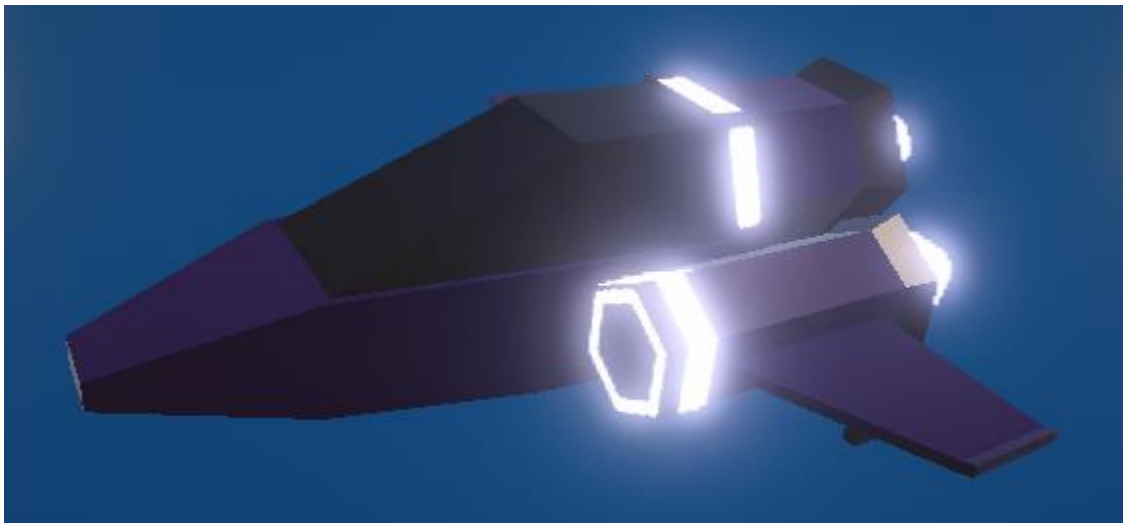

figure 1 - Main character model

The player controls a spaceship that shoots projectiles automatically with a variable rate of fire, and shooting pattern: which is affected by some of the variety of powerups they can obtain. These powerups can either appear randomly, or have a chance to appear upon the destruction of an enemy ship.

Some of these power-ups are:

1. Multiple barrels: the ship fires multiple shots in parallel.
2. Angled shot: multiple shot that project cone-shaped shots.
3. Shield: a barrier that protects the ship from being hit and makes it invulnerable for a few seconds.
4. Extra life: power-up that gives another attempt in case of death.
5. Attack rate increase: The time between 2 shoots is shorter.
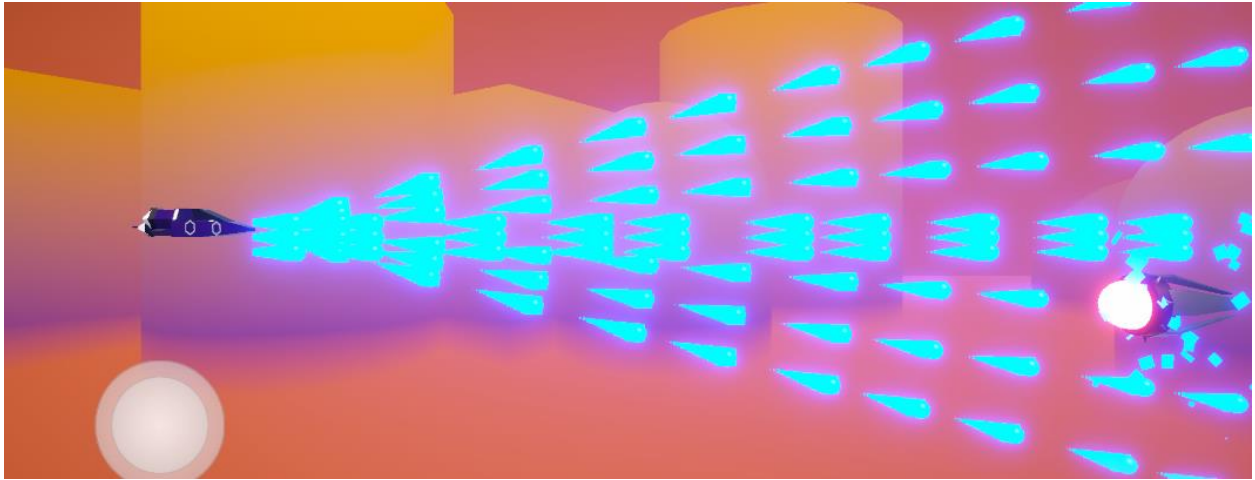
figure 2 - Attack pattern with additional barrel, angled and increased attack rate power ups
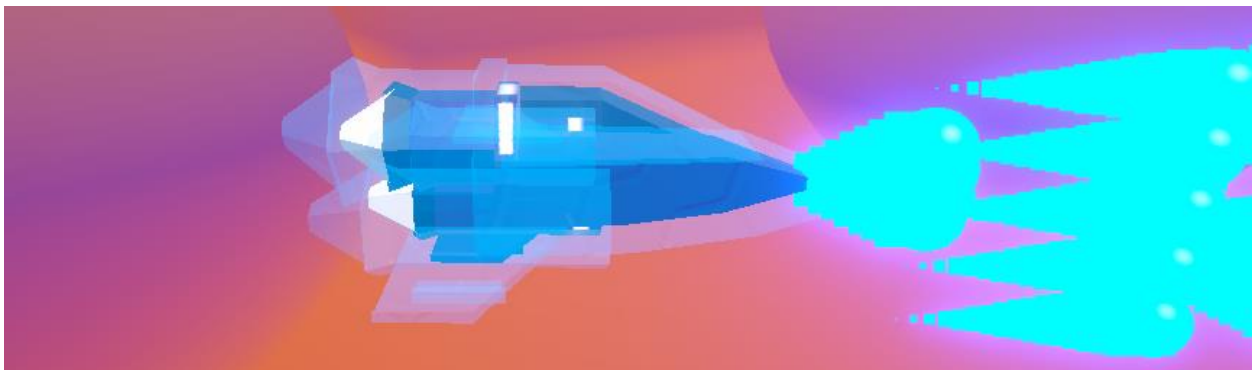
figure 3 - Player with shield power up

*figure 4 - Power up dropped from the enemy*

Enemies and Obstacles

The enemy ships and obstacles are trying to prevent the player to reaching the end of the level. Colliding with them decreases the player lives by one and results in losing the active effects of all powerups obtained up to that point.

Every enemy and obstacle has unique features such as: shooting projectiles towards the player, charging at a high speed towards the player, and simple rotating obstacles which force the player to avoid them, decreasing the available movement area.

figure 5 - Shooting Enemy
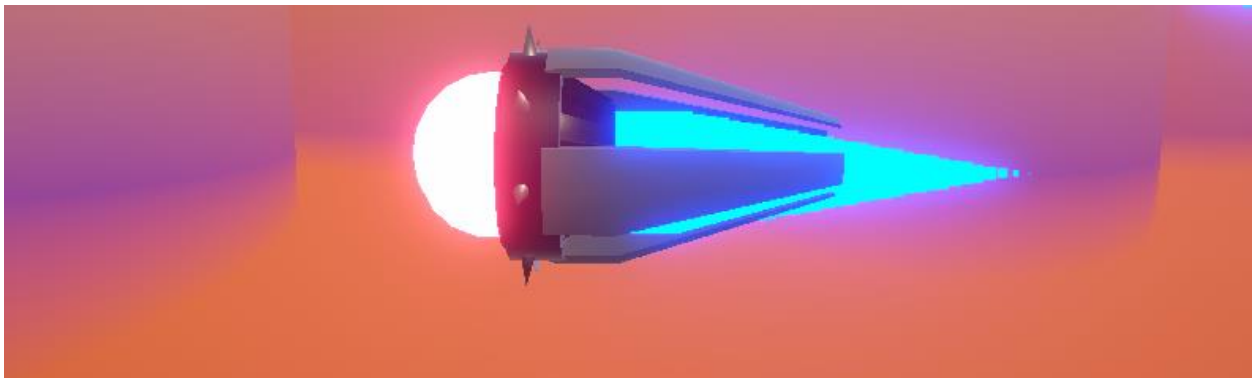
figure 6 - Charging enemy

figure 7 - Rotating obstacle

Gameplay

The main activity of the player is to shoot enemies and avoid hazards which would result in the player being damaged upon collision. For each enemy that the player eliminates, he will be awarded a number of points that will be added to the score. Each level has a finite amount of available points. The player is encouraged to get the best score possible, and outperform their previous attempts, through the use of visual feedback in the form of star ranking system: attempting to appeal to the players inner 'completionist' by incentivizing the replay of completed levels, providing a reason to remain engaged.

At the end of each level, the player obtains a rating of 1 to 3 stars. To go to the next level the player must get a minimum of 2 stars, otherwise they have to repeat the level. Currently, the player wins after completing a total of 10 levels; though given the scalable nature of the games design, the future implementation of more levels could provide a longer experience with a greater diversity in present features.

The player has a certain number of Lives to last until the end of the level, if the Lives counter reaches 0, the player will have to start the level again from the beginning, without checkpoints.

Game Objectives & Rewards

The objectives of the game are to eliminate enemies and increase your score in order to unlock the next level, and beat your previous attempts.

As for challenges, reaching the end of the level is a challenge in itself but perhaps the most significant challenge is reaching a perfect score, giving you 3 stars at the end of the level.

Finally, some of the penalties are as follows: the classic mechanic of losing a life every time an enemy or an obstacle hits the player, starting the level again if the player loses all their lives, and restarting the level if the player reaches the goal but has not got enough points to unlock the next level.

| Objectives	Challenges	Rewards	Penalties
Kill enemies. Add points to the score. Reach the end of the level.	Reach the end of the level. Get 3 stars at the end of the level.	Get an extra life if player gets 3 stars at the end of the level.	Lose a life if hit by an enemy or obstacle. Restart de level if there are no lives. Restart the level if the player gets only 1 star.

If the prototype were to become a ready-to-market game, many more features would be included and expanded to make the game much more fun and entertaining. Some of these improvements could be the inclusion of original music and sound effects, a much more varied range of enemies, extending the number of levels, and including a variety of mini-bosses and bosses at the end of each level.

The game would also include a ship with a broader arsenal that would offer much more variety when it comes to shooting and eliminating enemies, such as lasers, bombs, enemy chaser rockets, and other power-ups that would provide much more variety.

In terms of monetization, the game would include a store option where the player could acquire in-game currency to buy new ships or different shader types to customize their own ship. There would also be the option to buy the game with a single payment and get a premium version that had no ads. Otherwise, the free-to-play option would contain ads at the end of each level and ads would also be included when the player ran out of lives, so the player could get a life in exchange for playing one or more ads.

Level designs
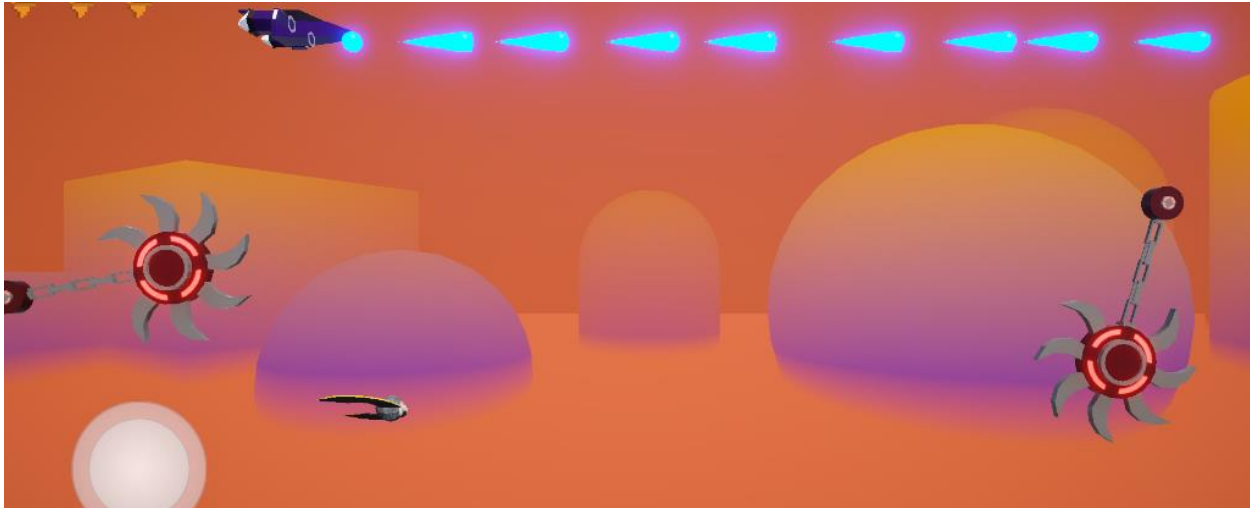
figure 8 - Prototype level design

For this project the appearance of the models changed based on the theme of the map. The placement on the screen is randomized, but the number of enemy and obstacle in each level is fixed, so the player is able to reach the same maximum amount of score. Given the structure of the scoring system, each playthrough of a level must have the same amount of available points, but, having each playthrough identical to the last would result in an experience which stales rapidly. The decision to fix the number of hazards, but randomize their spawning positions means the 'three star' ranking is always attainable, but an element of freshness is maintained in each playthrough. The emphasis is on the players ability to control the ship dexterously, rather than their capacity to memorize the levels layout.

Audio

Music and sound effects for this prototype will be exclusively sourced and copyrighted.
For the background music, a series of songs belonging to the Super Smash Bros game will be implemented, which belong to recognized franchises such as Star Fox and Nintendo's F-Zero X. These songs convey the rhythm and energy that the game demands and fit very well with the theme of the game.

As for sound effects, a wide library of sounds belonging to Konami's Contra III: The Aliens War video game will be used since it will provide the necessary sounds for the different shots with power-ups, item collection, scoring, and explosions that respond to the action of the game.

All of these sounds are subject to change and other solutions are still being explored and evaluated.

User Interface
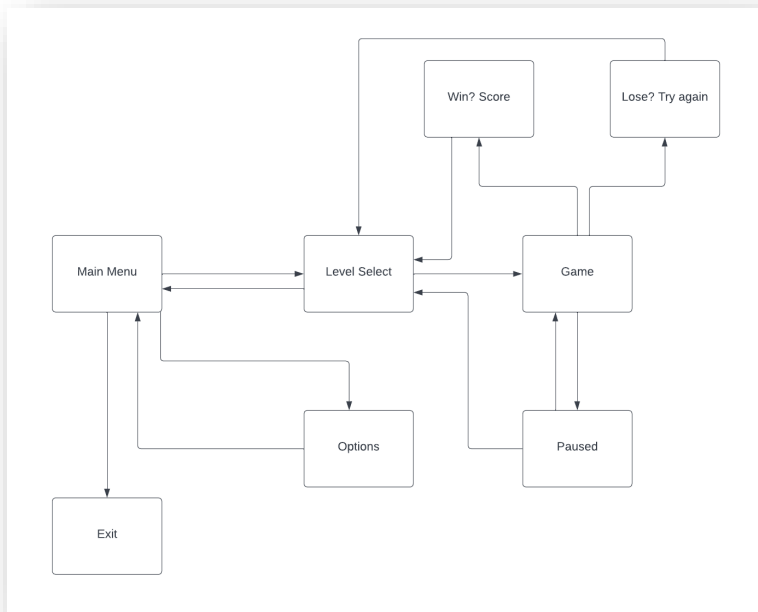
The application's user pathway shows the different screens through which the user is going to navigate. The player starts at the main menu where he has 3 buttons with 3 different options: Level Select, Options, and Exit.

figure 9 - Main menu layout

If the player presses the Exit option, the application closes without being able to take any more action.

If the player presses the Options, they access a new screen where they can control sound settings and return to the main menu.
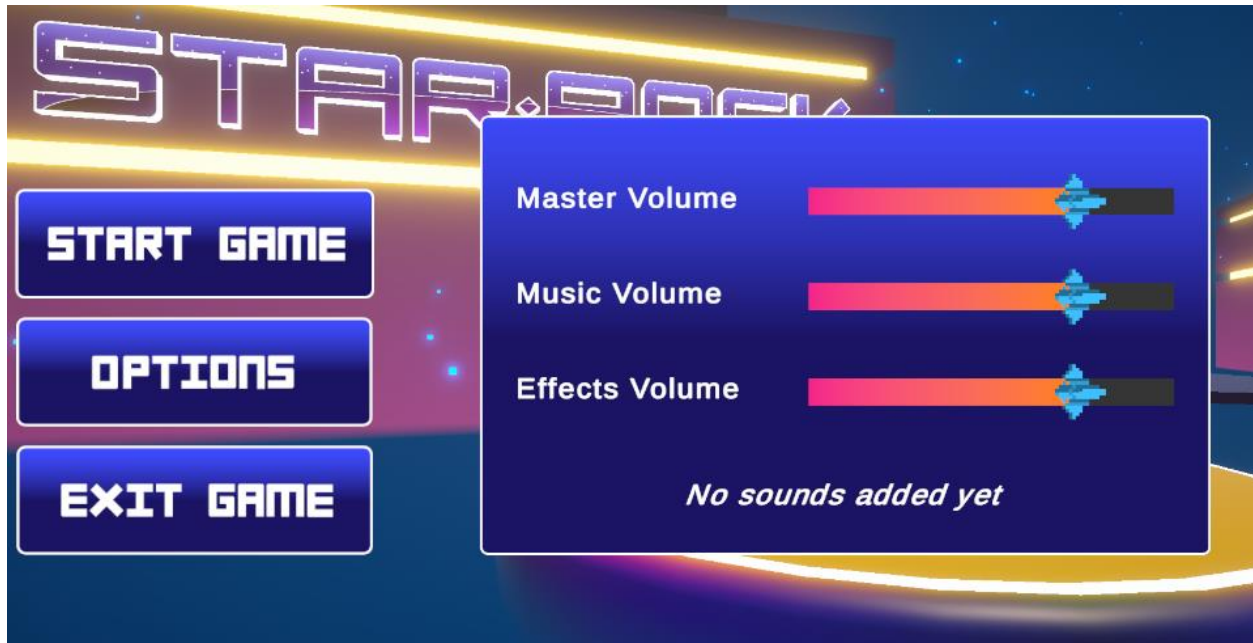
figure

10 - Options menu (volume controls)

Back at the main menu, if the player presses the select level button, the player is brought to this screen where they can select up to a maximum of 10 levels if they are unlocked. If the player selects any level, the game starts.
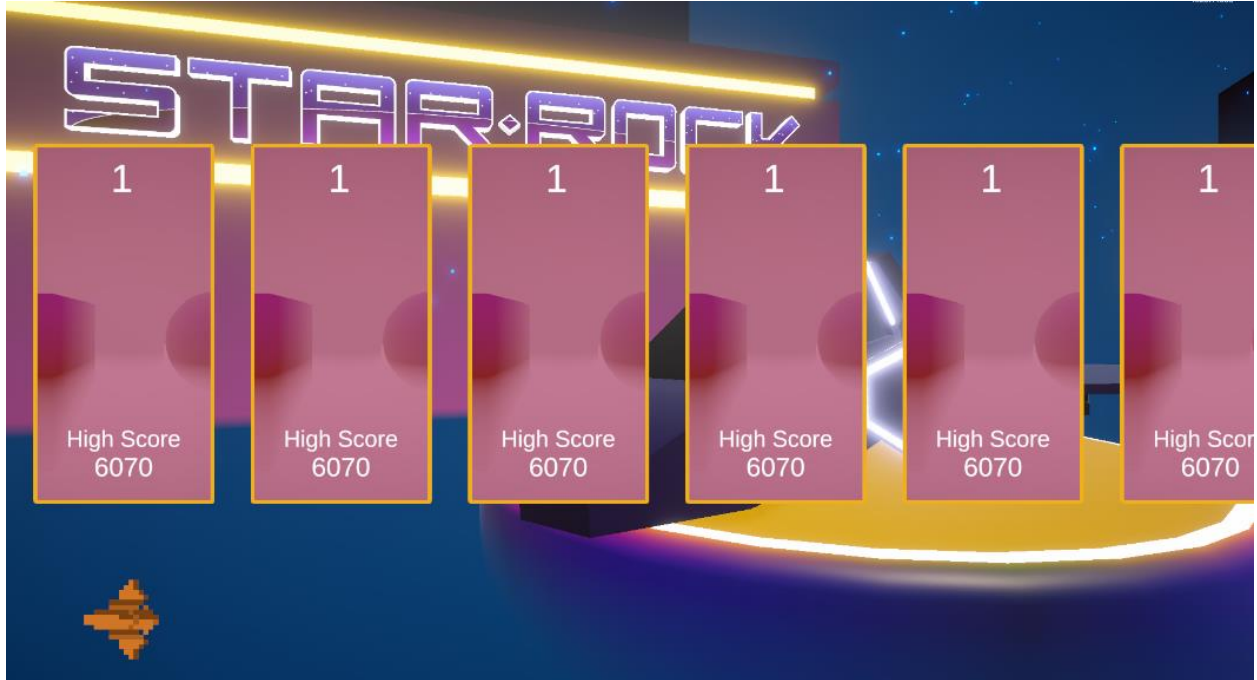
figure 11 - Level selector (Swipe to scroll between the levels) (not finished yet)

The player can pause the game whenever they want by clicking the pause icon on the upper right corner. The game is paused (The moving is disabled) and the player have three option to choose: continue the game, restart the level, or go back to the main menu.

figure 12 - Pause Menu (not finished yet)

When the player loses all his lives the Game Over screen is pops up and the player can restart the level or go back to the main menu.
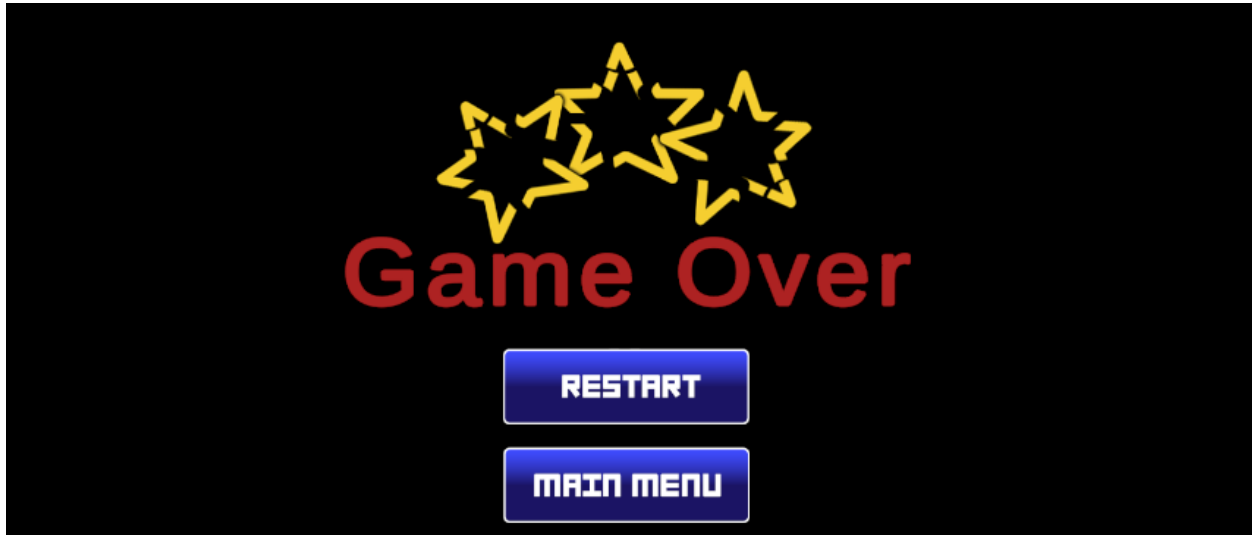
*figure 13 - Game Over screen (not finished yet)*

After completing the level, the game ends and the Win screen pops up showing the statistic from the game such as score, enemy killed, multiplier time and the amount of stars they earned for the current level.

Stars:	37350
Total Score	29250
Time score:	3750
Enemy Killed:	30/30
Lives Multiplier:	3
1.0 Multiplier Time:	25
1.5 Multiplier Time:	70
2.0 Multiplier Time:	10

figure 14 - Win screen (end of the level) screen (not finished yet)

The gameplay UI is currently consists of the following:

- Score, score multiplier (upper left corner)
- Player health (upper left corner, under the score)
- Pause button (upper right corner)
- Joystick to move the character (lower left corner)
- Power ups (Sphere models) on the screen (Will change).
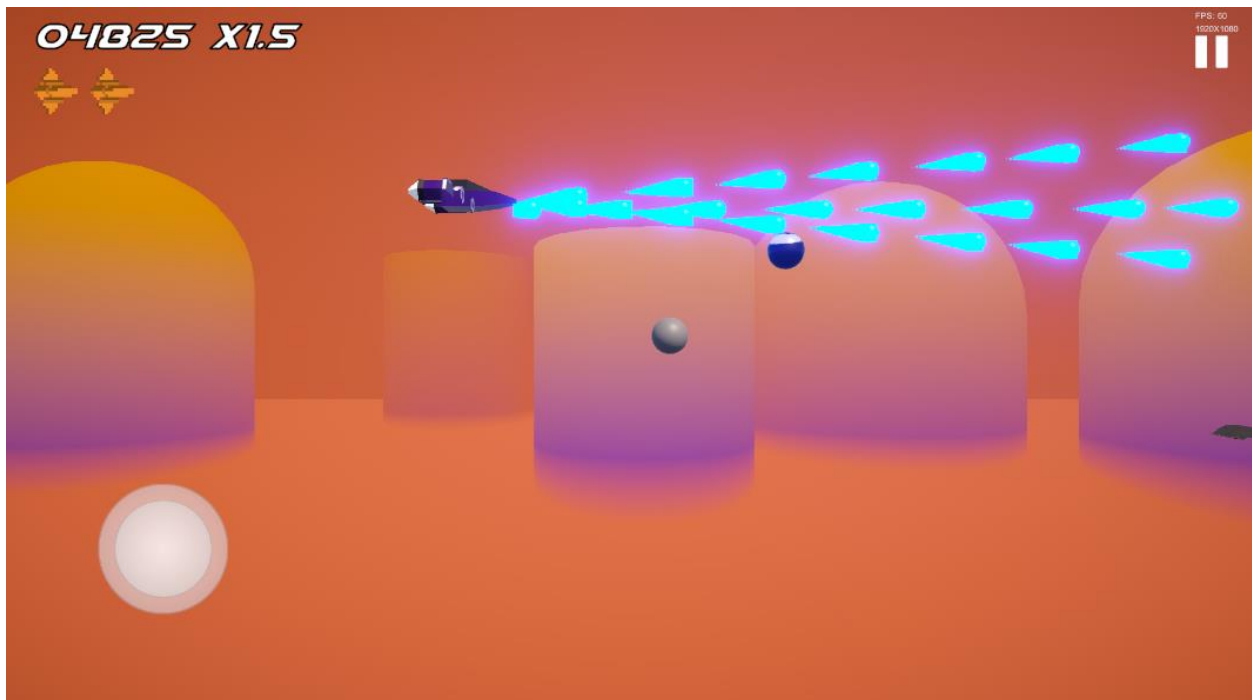
figure 15 - Gameplay UI (not finished yet)

When the player picks up any power up, a text message pops on the screen to inform the player about its effect (not yet implemented).

On the upper right corner, the player able to track the current score and the remaining health.

References

1. valkiriforce (2017) *Contra III: The alien wars sound effects*. Youtube. Available at: https://www.youtube.com/watch?v=P0gJxljRMI4 (Accessed: October 12, 2022).

2. Video Games Music (2019a) *Big Blue [Remix] - super smash bros. Ultimate*. Youtube. Available at: https://www.youtube.com/watch?v=XTYHopsf5gM (Accessed: October 12, 2022).

3. Video Games Music (2019b) *Corneria - Star Fox - Super Smash Bros. Ultimate*. Youtube. Available at: https://www.youtube.com/watch?v=Z-mhMdl9g0w (Accessed: October 12, 2022).

4. Video Games Music (2019c) *Mute City [Brawl] - super smash bros. Ultimate*. Youtube. Available at: https://www.youtube.com/watch?v=jW4NjJfPXtc (Accessed: October 12, 2022).