

A pixel art illustration of outer space. The background is a deep blue with various celestial bodies. In the upper left, a large, dark, irregularly shaped planet or moon is visible. To its right, a small satellite with two long antennae orbits. Further right, a bright yellow star is surrounded by a faint, glowing nebula. In the upper right, a ringed planet, similar to Saturn, is shown. Below it, a smaller, reddish-brown planet is visible. In the lower left, there are several smaller, colorful planets (blue, green, and orange) and a cluster of stars. In the lower right, a large, detailed planet with a complex, swirling pattern of orange, yellow, and red is shown, resembling a gas giant. The overall style is reminiscent of early computer graphics or video game art.

GALACTIUM: DISTANT BATTLES

By Arminas Lietuvnikas & Alessandro De Concilio

Game Overview

Theme

Galactium: Distant Battles is a 2.5D Bullet Hell Shoot 'em up that takes place in the far reaches of space. You take the role of a galactic warrior pilot who must defeat the invading Sinister Fleet using your quick reflexes & your radical laser guns!

All enemies must be disposed of with utmost caution, every hit to your ship can cause devastating side-effects depending on the severity and the location of the damage.



Game Overview

General Information

Genre: Shoot em up / Bullet Hell

Style: Old School / Retro Arcade

Target Age: Suitable for ages 12 & Over

Target Audience: Retro fanatics / Challenge Seekers

Peripherals: Keyboard & Controller Support

Target Platform(s): Pc & Console



Aims & Objectives

- Battle through waves of enemies of varying attributes & attack patterns
- Maintain ship parts health and effectiveness by choosing to repair or upgrade your ship after every wave
- Losing lives leads to a full restart back to wave 1 of the first encounter, losing all lives leads to the game ending. Don't Die!
- Fight through 3 total waves before reaching the fleets boss, once the boss is defeated, the encounter is then finished and would continue to new encounters after the demo



Mechanics

Ship Mechanics

- Movement
- Rotation (cycle through sprite animations)
- Shooting
- Ship Health
- Individual Ship Part Degradation
- Power-up Activation
- Player Lives System

Other Mechanics

- Wave Progression
- Controller Support
- UI dynamics
- Enemy Detection Warning

Enemy Mechanics

- Movement
- Rotation (cycle through sprite animations)
- Shooting patterns
- Player Targeting
- Path finding
- Ship Health
- Ship Speed
- Enemy Spawning

Terminal Mechanics

- Repair Ship
- Stackable Ship Upgrades
- One Time Use Power-ups
- Upgrade and Power-up Rarities

USP

- A degradation system is something that isn't seen in many fast-paced shoot em ups or bullet hell games.
- Ship Deg can affect a player's experience if not properly maintained. This becomes an engaging way of encouraging the player to be mindful of the damage they take.
- Adding controller support creates another way that the game can be experienced. This allows users to play the game depending on their preference of playstyle.



Software & Technology Utilised

- **Unity Game Engine**
Used for game creation
- **Photoshop**
Used for creating certain UI Icons
- **Github**
Used for version control
- **Jira Project Tracking**
Used for project management
- **Discord**
Used for informal project discussions



Unity



Jira



Discord



GitHub

Production Roles

Arminas - Dev & Project Management

- Code & Mechanics Implementation
- Bug Testing & Solving
- Whiteboxing & Prototyping
- UI & VFX Implementation
- Track Project Progress & Deadlines
- Maintain all project management tools such as Jira (Project Management) and GitHub (Project Version Maintenance)

Alessandro - Game Designer & Generalist

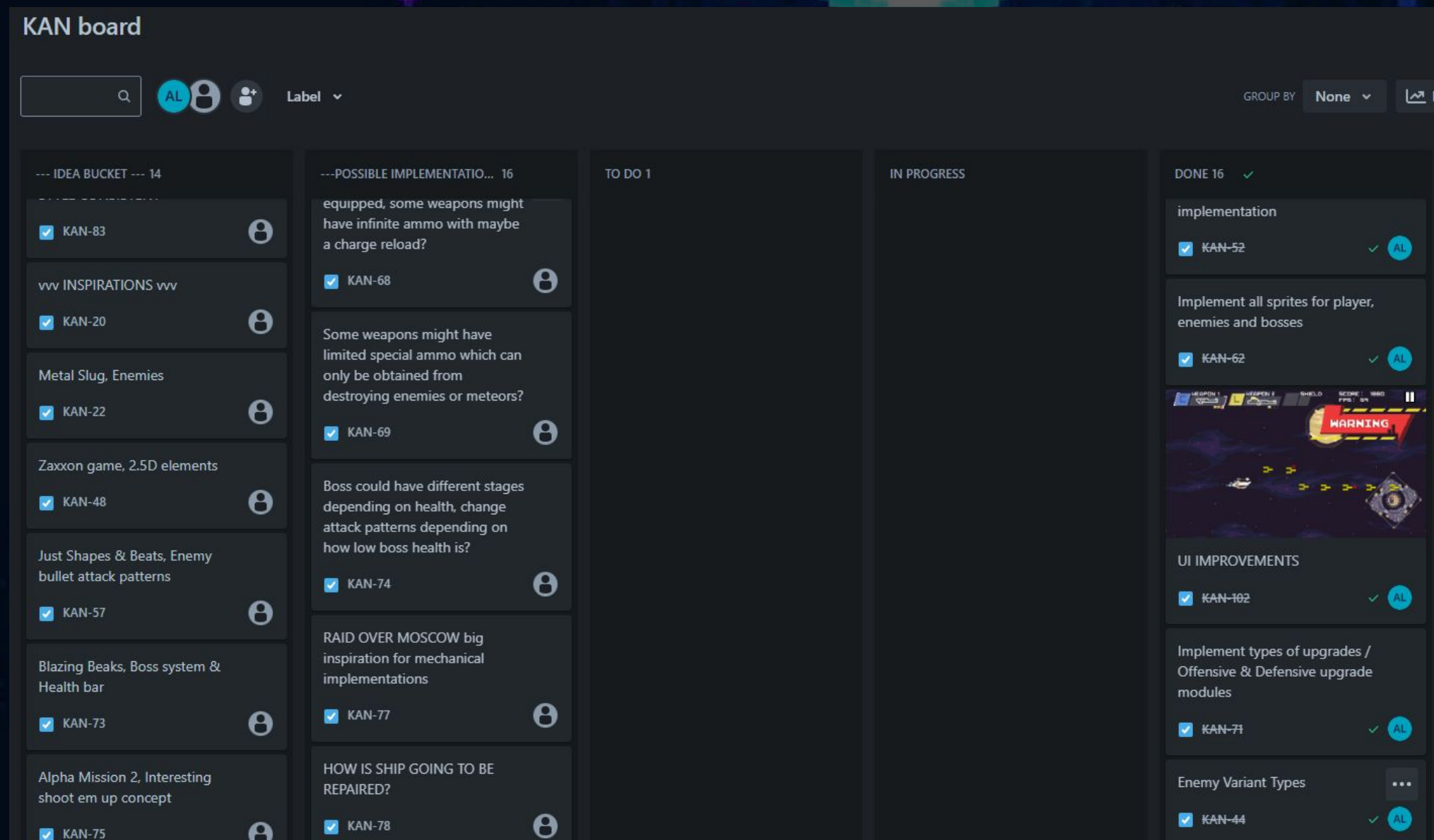
- Designing and developing the concept further
- Helping the import of assets and animations into the project
- Developing level ideas with sketches, moodboards
- Responsible of Researching
- Helping with the creation of storyboards

Gameplay Video

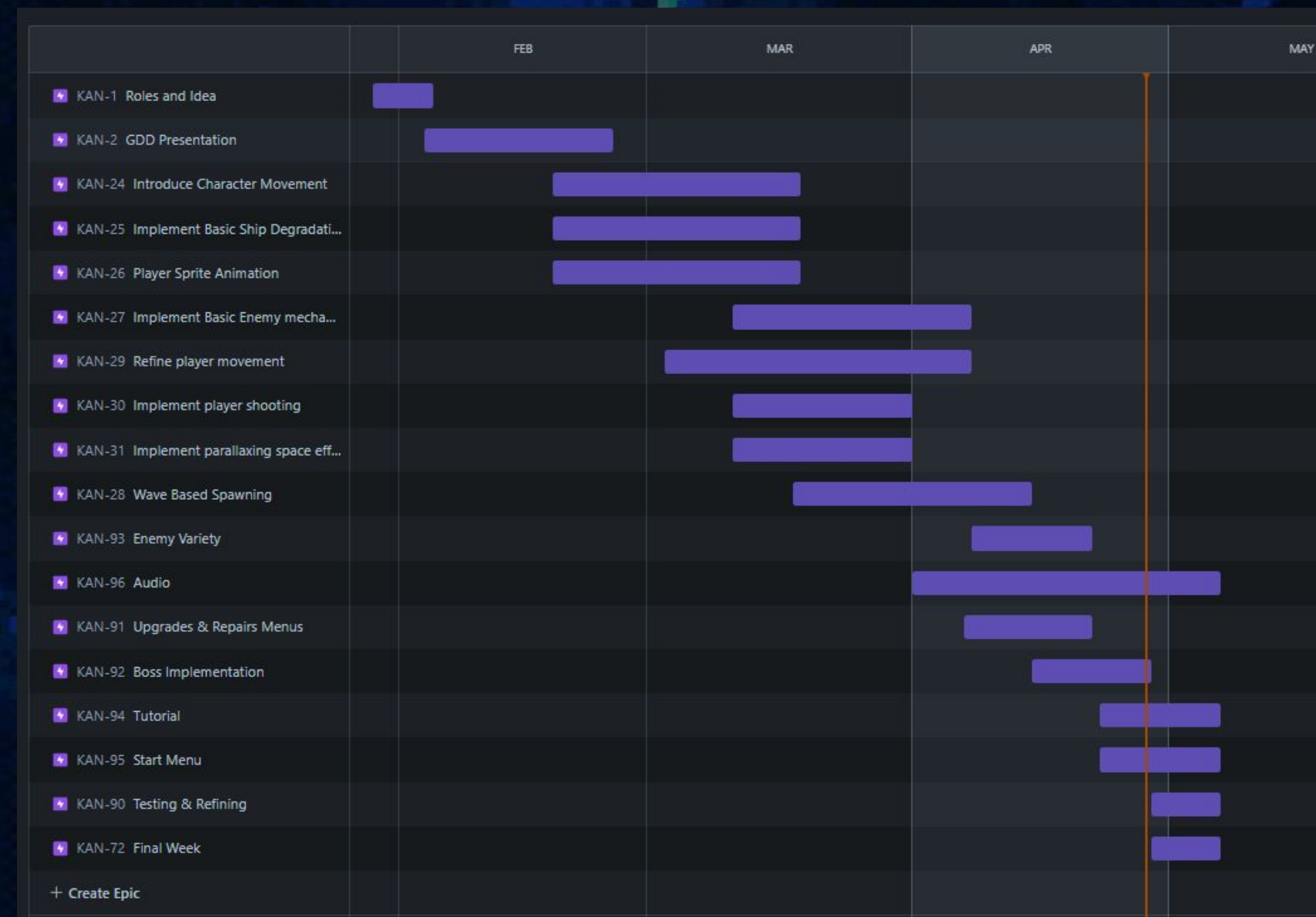


Project Management - Jira

Progress Tracking



Timeline Tracking



Project Management - Github

Commit Logs

Commits

Arminas

Commits on Apr 22, 2024

Boss & Player health changed
CoolArminuux committed last week

Commits on Apr 21, 2024

Bulk Implements
CoolArminuux committed last week

Commits on Apr 15, 2024

Changed Deg Color and function
CoolArminuux committed 2 weeks ago

Commits on Apr 14, 2024

Bunch of upgrades implemented / Also waves work
CoolArminuux committed 2 weeks ago

Wave display & Warning Icons
CoolArminuux committed 2 weeks ago

Commits on Apr 13, 2024

Fixed some terminal features
CoolArminuux committed 2 weeks ago

Commits on Apr 7, 2024

Bulk Addition
CoolArminuux committed 3 weeks ago

Commits on Apr 6, 2024

BULK COMPLETION
CoolArminuux committed 3 weeks ago

Commits on Apr 4, 2024

Enemy Spawning & Path follow
CoolArminuux committed 3 weeks ago

Commit changes

File Edit View Repository Branch Help

Current repository GalactiumREPO

Current branch Arminas

Fetch origin Last fetched yesterday

Changes 300+ History

GalactiumGame\Assets\Animations\Button.controller

This diff contains a change in line endings from 'LF' to 'CRLF'.

2069 changed files

GalactiumGame...\Button.controller

Galactium...\Button.controller.meta

GalactiumGame...\PlayAgain.anim

GalactiumG...\PlayAgain.anim.meta

GalactiumG...\barcadbold SDF.asset

Galactiu...\barcadboldital SDF.asset

GalactiumGam...\barcade SDF.asset

GalactiumG...\barcade3d SDF.asset

Galactiu...\barcade3dital SDF.asset

Galactiu...\barcadecond SDF.asset

Stashed Changes

Summary (required)

Description

Commit to Arminas

1 + %YAML 1.1

2 + %TAG !u! tag:unity3d.com,2011:

3 + --- !u!91 &9100000

4 + AnimatorController:

5 + m_ObjectHideFlags: 0

6 + m_CorrespondingSourceObject: {fileID: 0}

7 + m_PrefabInstance: {fileID: 0}

8 + m_PrefabAsset: {fileID: 0}

9 + m_Name: Button

10 + serializedVersion: 5

11 + m_AnimatorParameters: []

12 + m_AnimatorLayers:

13 + - serializedVersion: 5

14 + m_Name: Base Layer

15 + m_StateMachine: {fileID: 8987127329551114323}

16 + m_Mask: {fileID: 0}

17 + m_Motions: []

18 + m_Behaviours: []

19 + m_BlendingMode: 0

20 + m_SyncedLayerIndex: -1

21 + m_DefaultWeight: 0

22 + m_IKPass: 0

23 + m_SyncedLayerAffectsTiming: 0

24 + m_Controller: {fileID: 9100000}

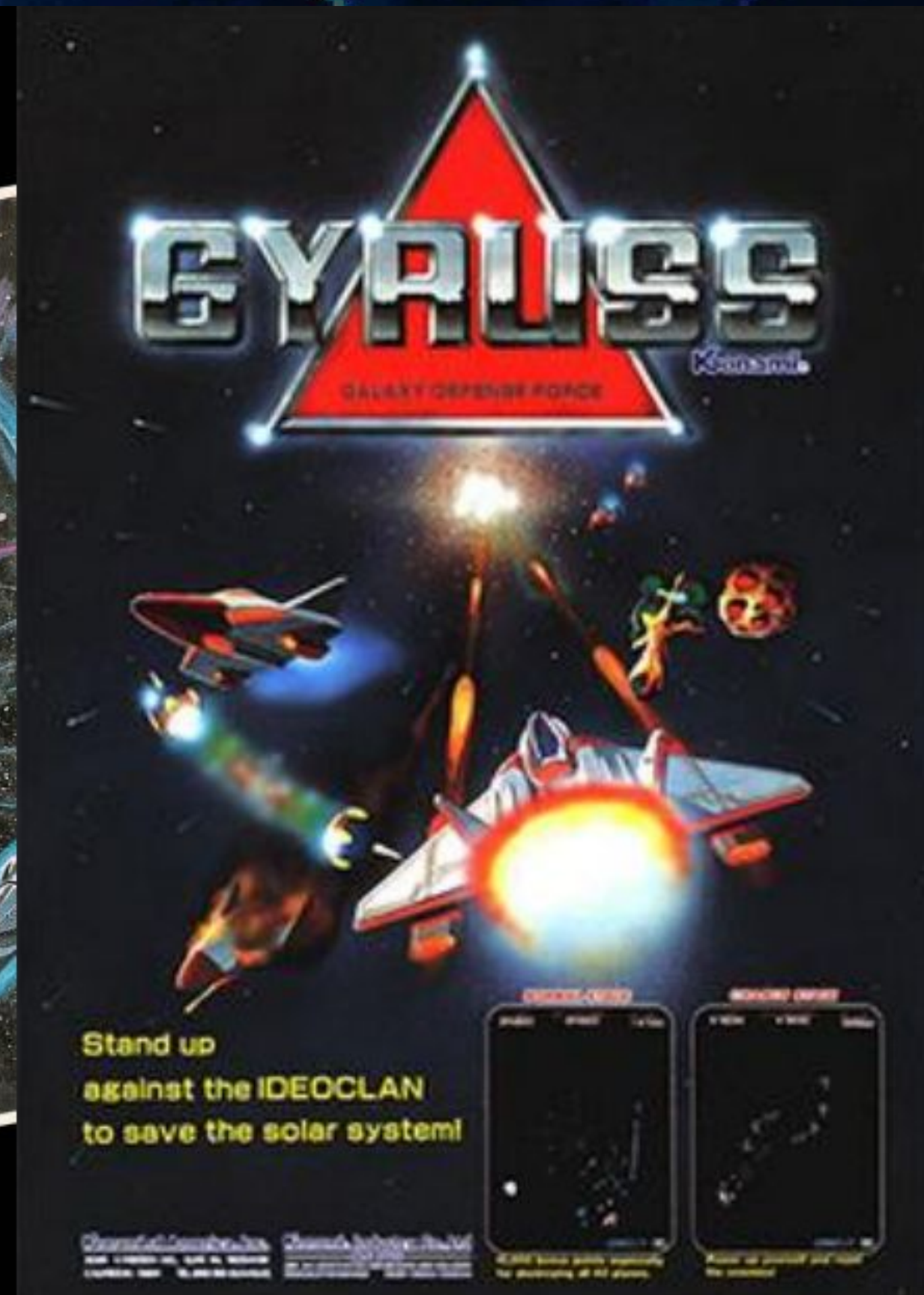
A pixel art illustration of outer space. The background is a deep blue, speckled with white stars of varying sizes. In the upper left, a large, dark, crescent-shaped planet or moon is visible. To its right, a small satellite or space station with two solar panels is orbiting. Further right, a ringed planet, similar to Saturn, is shown. In the lower right corner, a large, detailed planet with a blue and white swirling pattern, resembling a gas giant, is partially visible. The overall style is reminiscent of 8-bit or 16-bit video game graphics.

Alessandro

Game Designer & Generalist

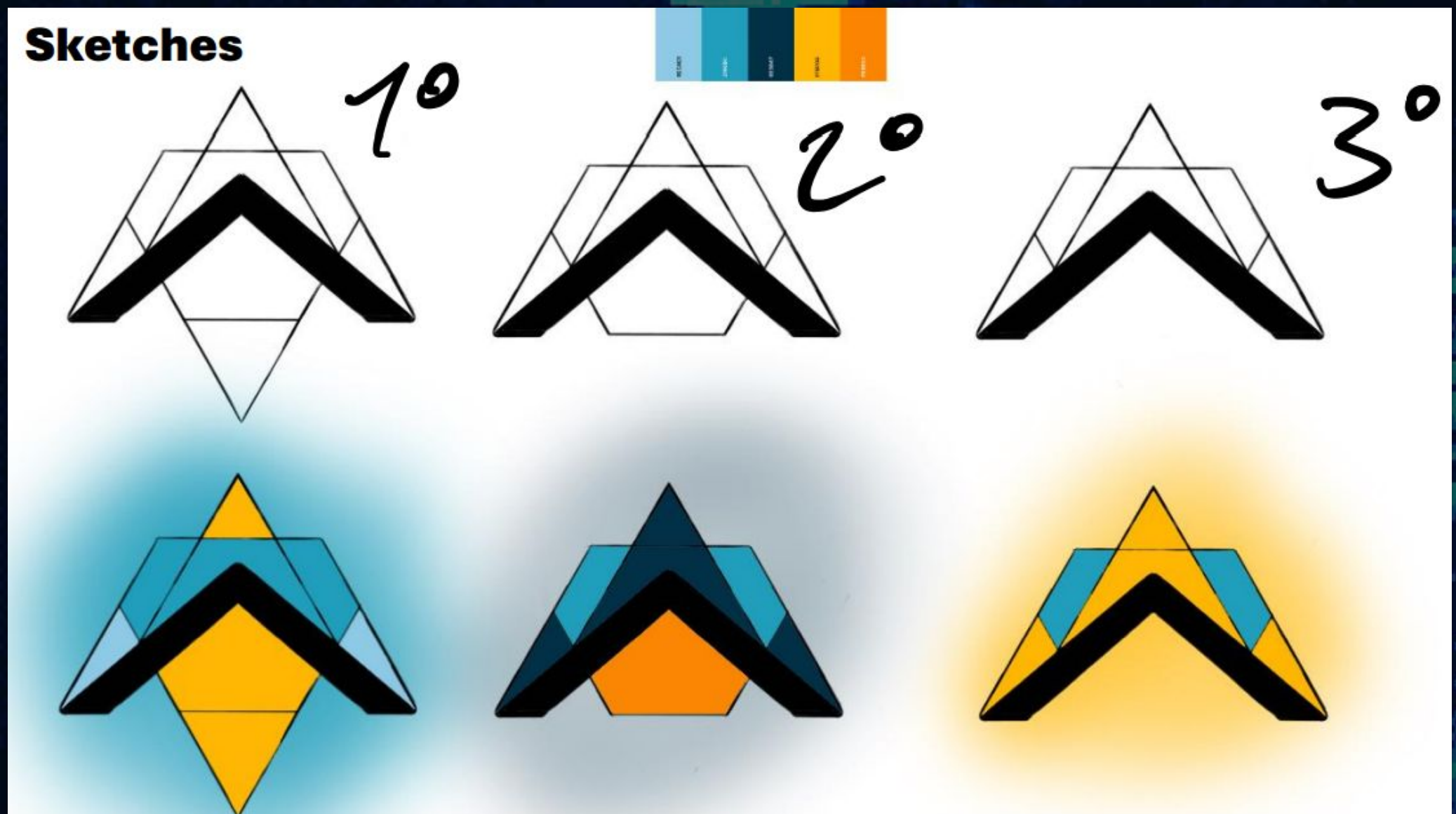
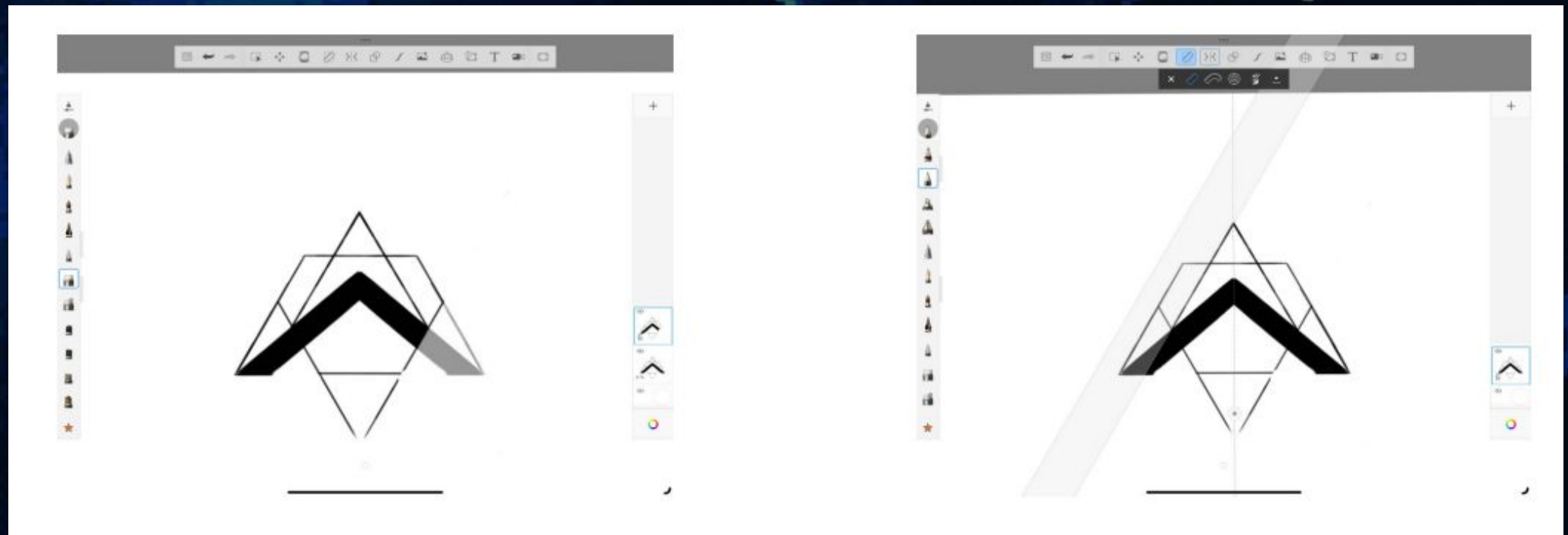


UI
Ship
Dama
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Rese
arch



[Link to the full research diary](#)

For the icon that shows the damage of the ship, I thought about creating something that would remember the geometrical shapes that are usually seen in the first sci-fi games in history.



For the final shape of the design I thought about subdividing the ship into different sections.

Each red section would be damaged and so on, a simple and functioning idea that helped the development.



Main Menu/Logo Research and Development

There are three elements to look out for a main menu that would suit this kind of game.

- A minimalistic approach to logos and text around the menu area
- Just a few elements on screen to keep it simple for the player
- A theme that would match the game's feel.

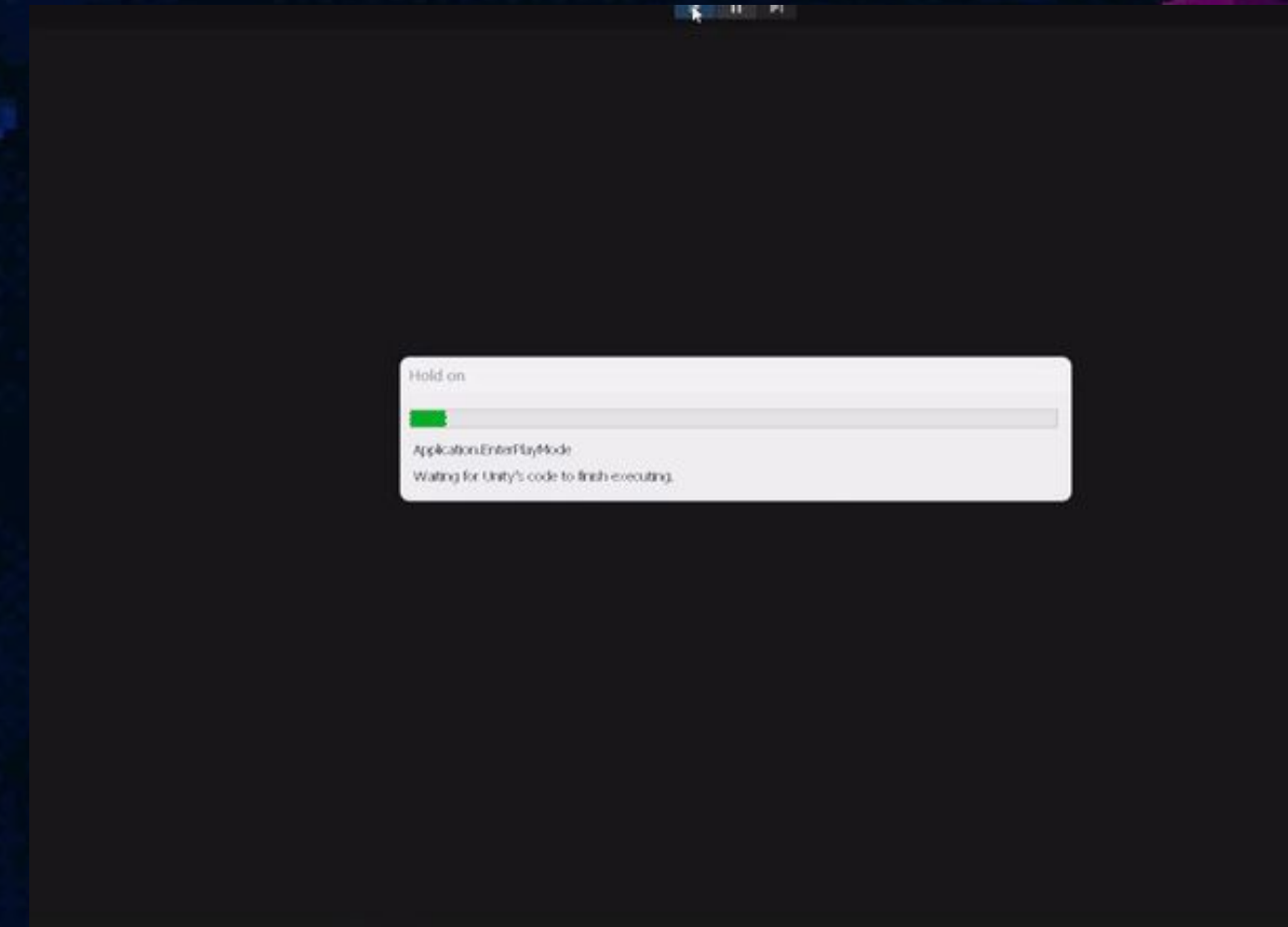
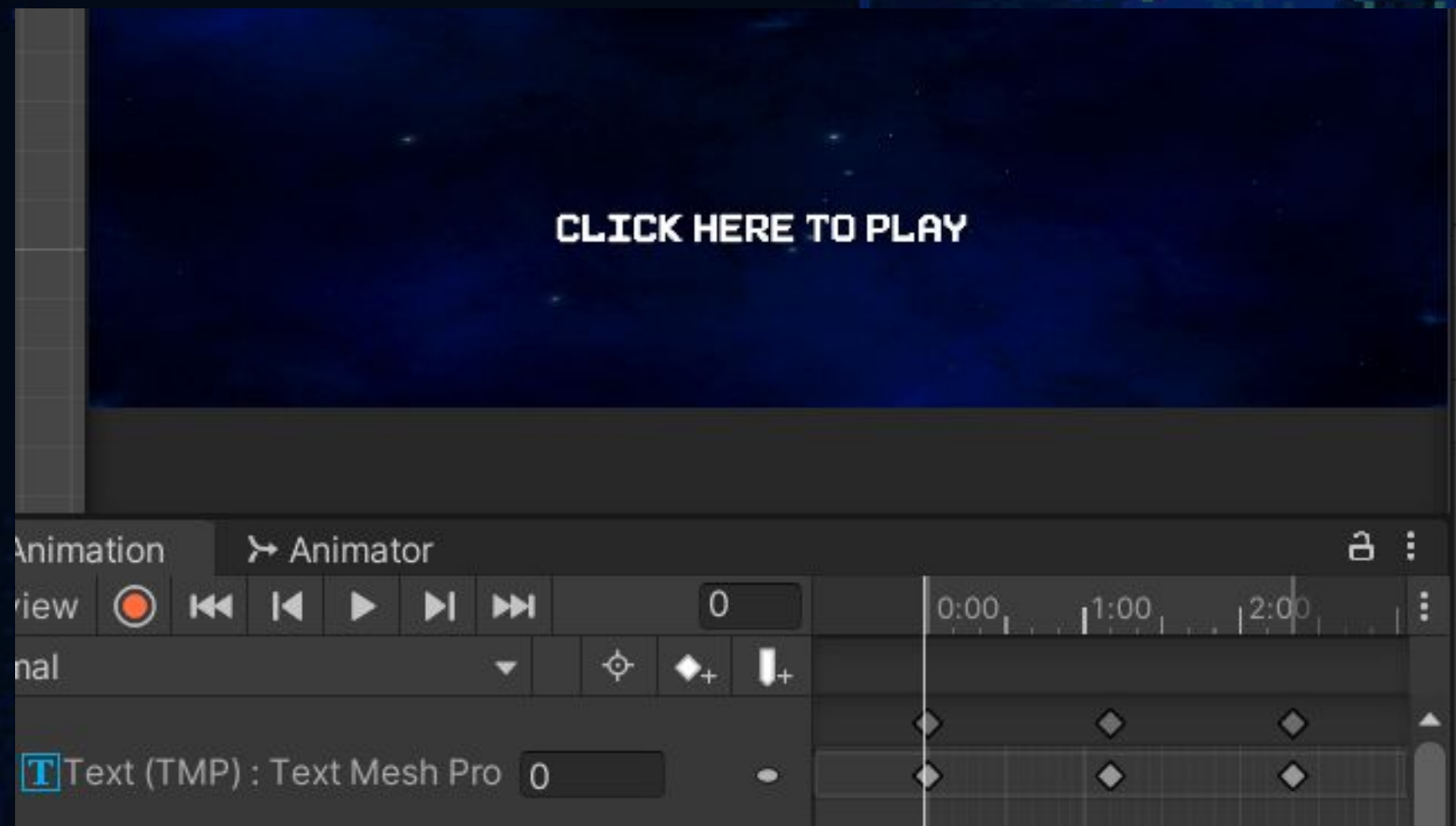


As it can be seen from this moodboard, games like Metal Slug or Puzzle Bobble have a consistent design through all their titles and there always these elements:

1. Huge iconic logos that draw attention
2. "Insert coin" or "Press X to start".



Development Progress



To achieve the intended results I have created a small animation that would mimic how text is animated in some arcade games, this text would usually have a "breath" animation.



[Link to the video](#)

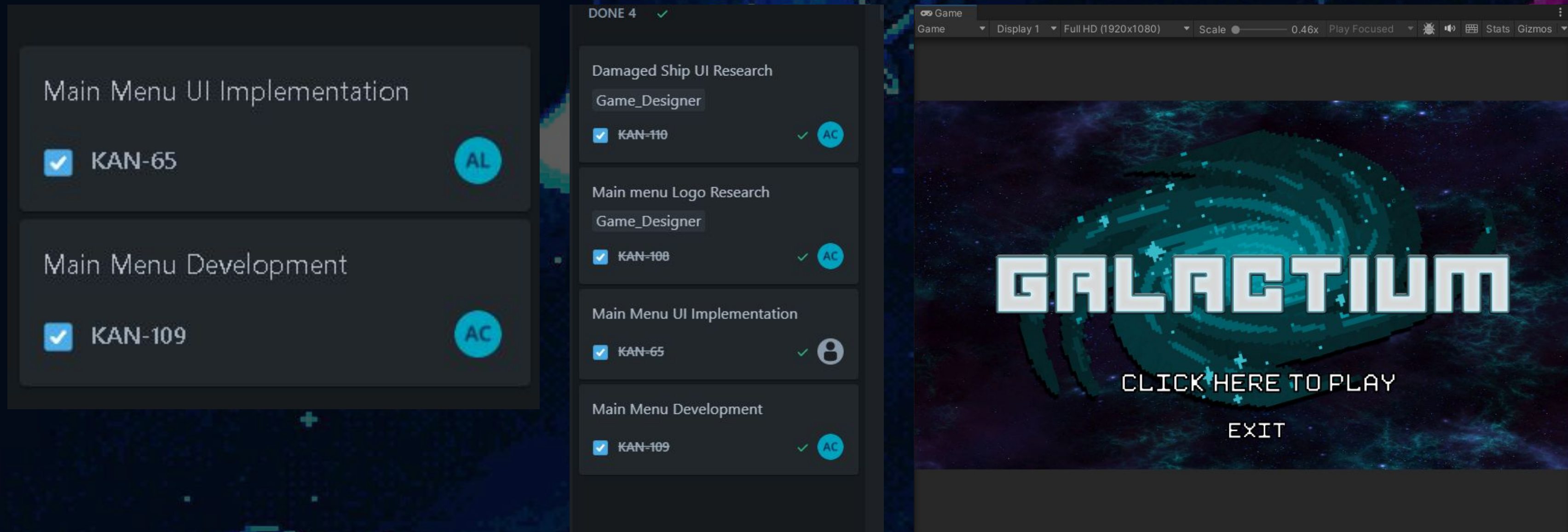
Then I made sure to add some arcade sounds to the main, this would add some game feel to the project.
For the SFX I have used MixKit.com as source.

Logo and Details

For the logo instead I thought about something that would match the general theme of the game, a galaxy would be perfect for this purpose.



Final Work, Assets used and Jira



The collage consists of three panels. The left panel shows two Jira tasks: 'Main Menu UI Implementation' with a blue checkmark, 'KAN-65', and a blue circle with 'AL'; and 'Main Menu Development' with a blue checkmark, 'KAN-109', and a blue circle with 'AC'. The middle panel shows a Jira summary page for 'DONE 4' with a green checkmark. It lists four tasks: 'Damaged Ship UI Research' (Game_Designer, KAN-110, AC), 'Main menu Logo Research' (Game_Designer, KAN-108, AC), 'Main Menu UI Implementation' (KAN-65, AC), and 'Main Menu Development' (KAN-109, AC). The right panel shows a game screenshot with a dark space background and a large, glowing, pixelated 'GALACTIUM' title. Below the title are the buttons 'CLICK HERE TO PLAY' and 'EXIT'. The game window has a top bar with 'Game', 'Display 1', 'Full HD (1920x1080)', 'Scale 0.46x', 'Play Focused', and icons for Stats and Gizmos.

For the creation of the main menu I have used

-
- Background and Asteroids Sprites from OpenGameArt
- <https://foozlecc.itch.io/void-environment-pack>
- <https://patrickdearteaga.com/en/arcade-music/>

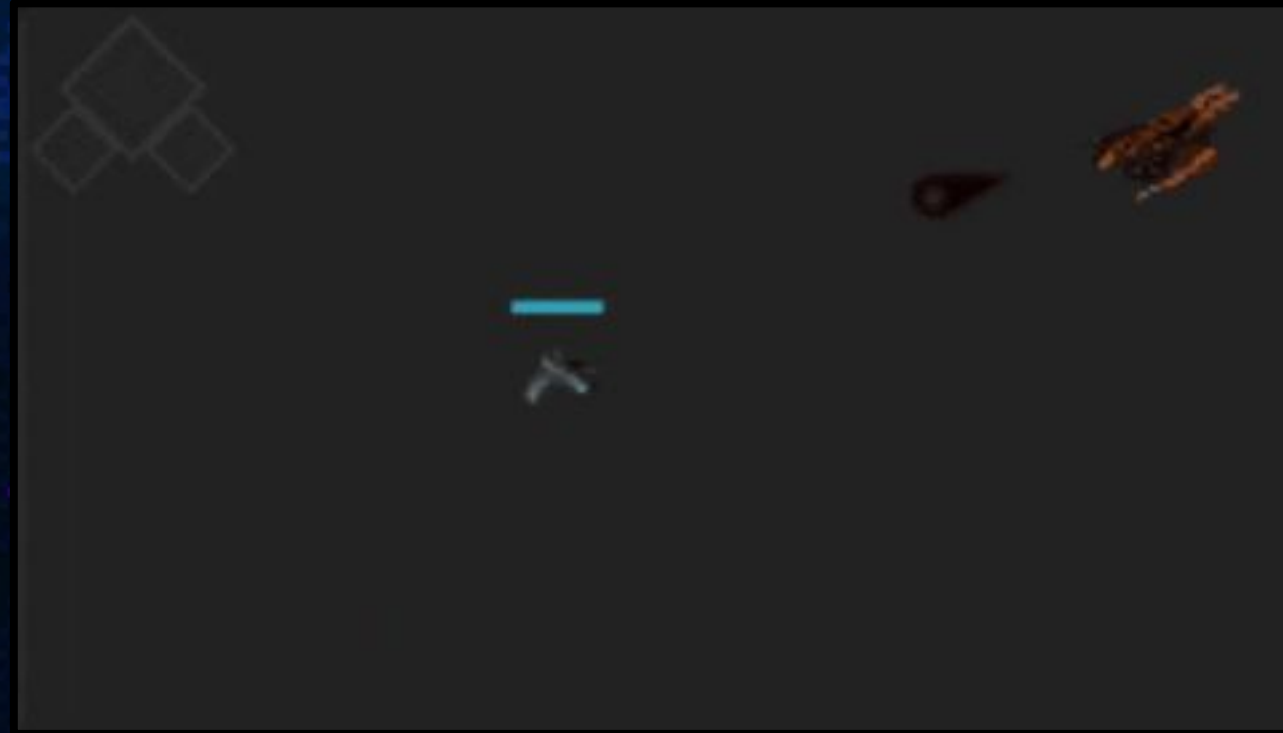
A pixel art style background depicting outer space. It features a dark blue sky filled with numerous small white stars. Several celestial bodies are visible: a large grey planet in the upper left, a ringed planet in the upper right, a red planet in the middle right, and a large, detailed planet with blue and white clouds in the bottom right. A small satellite with two solar panels is positioned in the upper center. The overall aesthetic is reminiscent of early computer graphics or video game art.

Arminas

Development & Project Management

Early Production

- During the early stages of production, my objective was to get the basic rotation and movement mechanics implemented as soon as possible
- Rotation took quite some time to figure out as I had to come up with a way to cycle between different sprites in an animation sequence depending on what keys were pressed
- Depending on which sprite was active, the ship object would face in the direction that the sprite would be facing



```
void GetSpriteFrame()
{
    currentSprite = GetComponent<SpriteRenderer>().sprite;
    SpriteFrame = currentSprite.name;
    string[] words = SpriteFrame.Split(' ');
    string lastPart = words[words.Length - 1];
    string num = lastPart.Remove(0, 3);
    int.TryParse(num, out spriteInt);
    Player.transform.eulerAngles = new Vector3(0, 0, (spriteInt * 10));
}
```

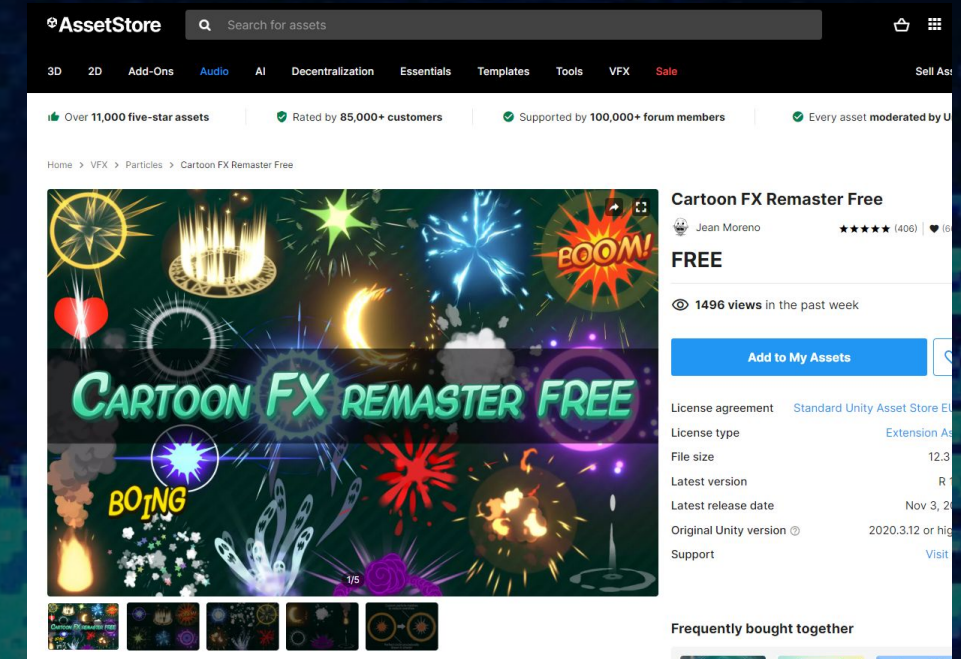
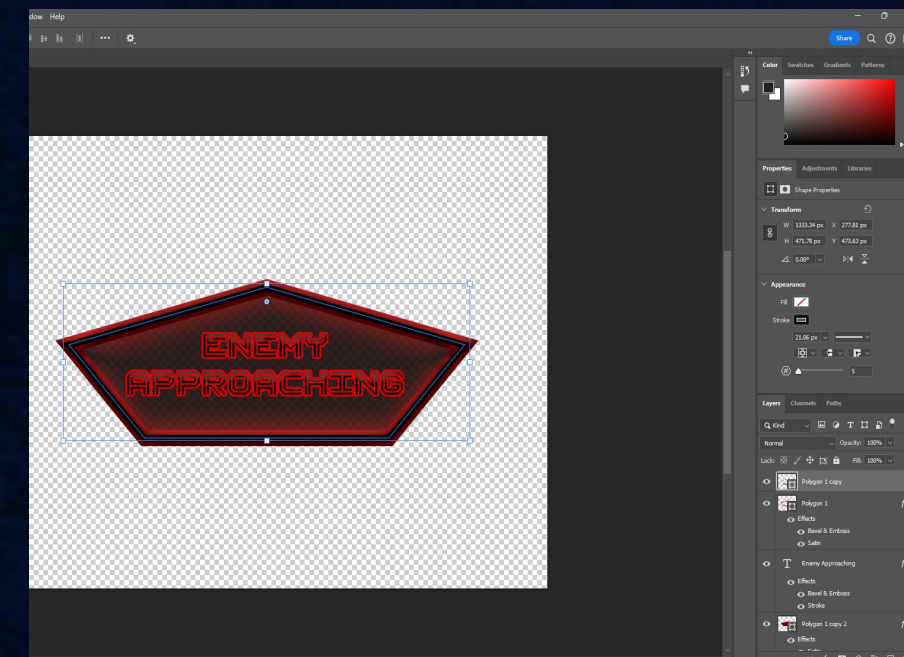
Whiteboxing & Prototyping

- Once I felt confident with the movement and rotation, I could then move on to designing some aspects of the scene such as the scrolling background and the player degradation meter in the top right of the screen
- I tried using unity's built in spline tool to create a path for the enemies to follow which worked to an extent, In the ended I decided to create my own spline pathing script which allowed me to spawn and attach enemies to various different splines seamlessly and decide if the enemies should loop or end their pathing once they reach the end



Asset Sourcing

- Player & enemy sprite assets were sourced from OpenGameArt. Assets Created by Meowx
- Various other sprites, particles and assets were sourced from the Unity Asset Store
- Music and Audio effects sourced from Pixabay
- Some UI such as the Warning icons seen below were made by me using photoshop



ENEMY
APPROACHING

WARNING!!!
ENEMY
APPROACHING

WARNING!!!
ENEMY
APPROACHING



Pixabay

<https://pixabay.com> › music

Royalty Free Music Download - Pixabay

Pixabay is a vibrant community of creatives, sharing royalty-free images, videos, audio and other media. All content is released by Pixabay under the Content ...

Inspirational References

- Space combat theme mainly inspired by 'Galaga' as well as the hearts system that was used
- 'Zaxxon' was another great inspiration for the space shooter game idea due to the 2.5D visuals used within the game
- 'Raid Over Moscow' contributed to the enemy fighting mechanics as well as the overall rotation and movement of the player ship
- 'Metal Slug' contributed to the bullet hell theme of the game where each enemy has their own unique attack styles



Mechanical Implementations

- Every functional aspect of the game was programmed by me, the list of most of the mechanics can be seen on the Mechanics slide
- Depending on if the player is using a controller or keyboard, the UI will change real-time to match the peripherals that the player is currently using
- Object pooling is used to reduce the amount of objects that are spawned and destroyed. Everything is re-used such as the bullets, the enemies, and the vfx in order to maintain game stability.



Managing Project Progress

- As the project manager of the team, my role is to ensure that all objectives are listed, a timeline is created and that project versions are saved and maintained
- On Jira, if someone is working on a feature, they assign their name to the feature block as well as the label which defines what role they are undertaking
- On Github, we have different branches that we can work on, A main, a test and our individual branches.
- Once we contribute our changes, the project can then be moved to the test to be tested and then to main as the up-to-date project.

Add parent / ☒ KAN-102

UI IMPROVEMENTS

Attach

Add a child issue

Link issue

▼

...

Description

Change warning icon to not be a warning (colour also changed). Enemy Approaching warning

Improve enemy bullets (cool effects maybe)

Look at arcade games for reference for UI elements



Done ▼

✓ Done

⚡ Actions ▼

Details

Assignee

AL Arminas Lietuvnikas

Labels

Dev

Parent

NEW

None

Development

Create branch

Create commit

Releases

Reporter

AL Arminas Lietuvnikas

Branches

New branch

Overview | Yours | Active | Stale | All

Q Search branches...

Default

Branch	Updated	Check status	Behind	Ahead	Pull request
main	2 months ago			Default	

Your branches

Branch	Updated	Check status	Behind	Ahead	Pull request
Arminas	last week		0	22	
Test	last month		0	8	
Alessandro	last month		0	0	

Active branches

Branch	Updated	Check status	Behind	Ahead	Pull request
Arminas	last week		0	22	
Test	last month		0	8	
Alessandro	last month		0	0	

Bug Fixing & Game Testing

- As well as the one who writes and implements the code, I am the one who also tests if the game is functional and if the currently implemented mechanic is compatible with everything else around it
- I run tests consistently to check if any small changes need to be made
- Before committing any serious changes, I run multiple playthroughs and experience the game from start to finish
- To get second opinions from people not part of the project, I ask some of my friends what they think of the game in its current state, and what could be improved to make it more enjoyable



Fix player deg overlapping with current health and lost health

☒ KAN-105

✓ AL

Commits on Apr 13, 2024

Fixed some terminal features

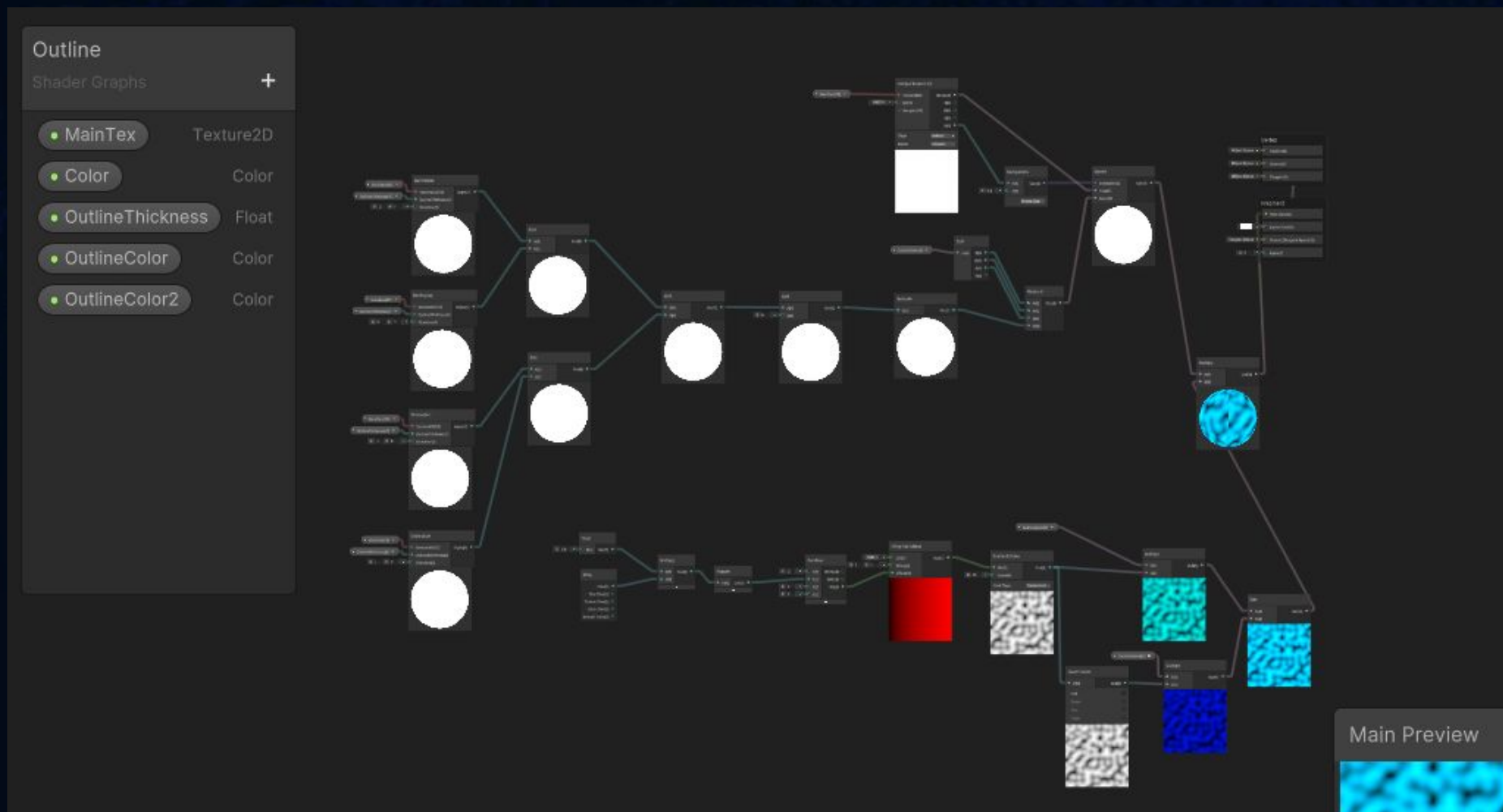
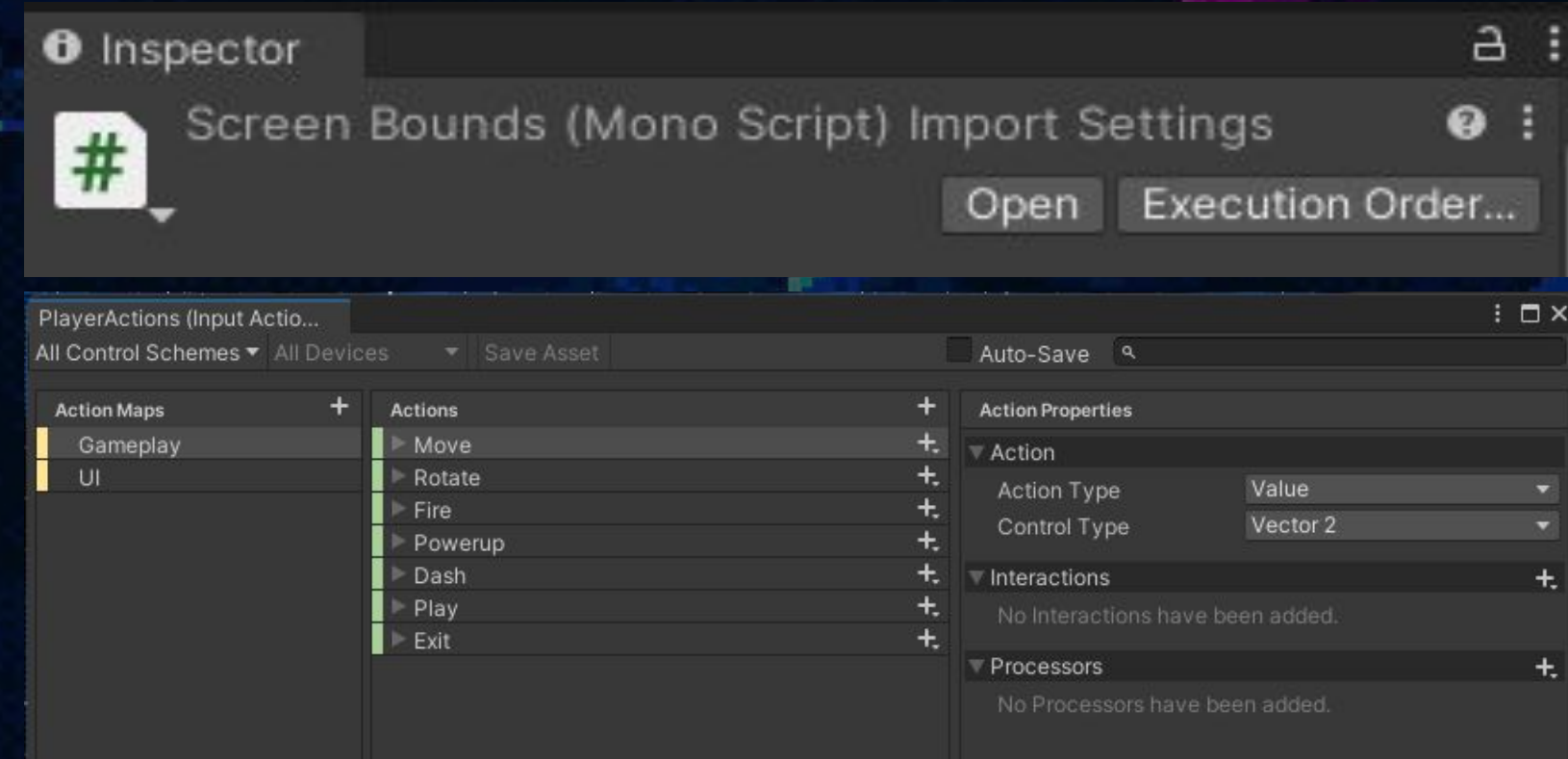


CoolArminuxx committed 2 weeks ago



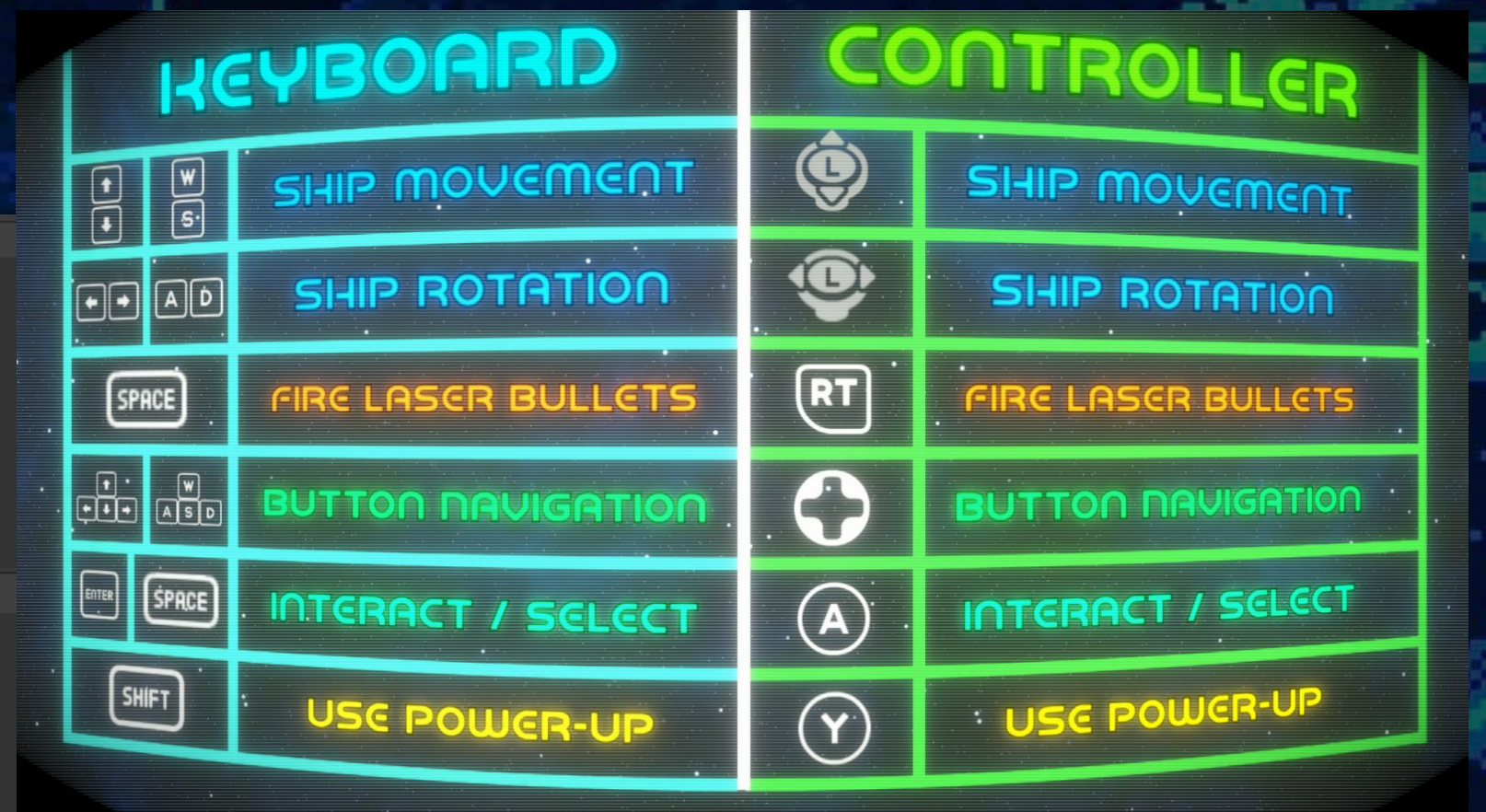
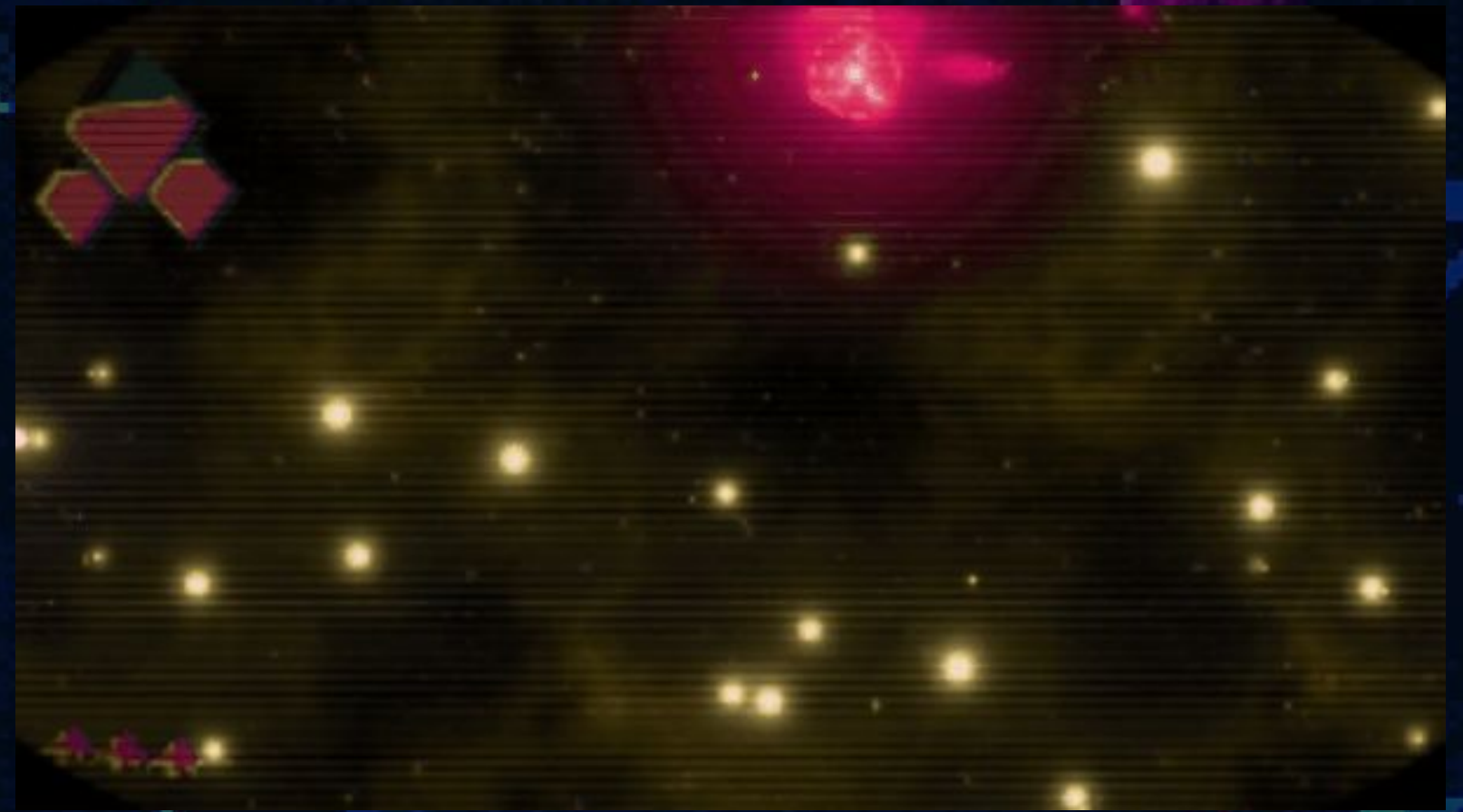
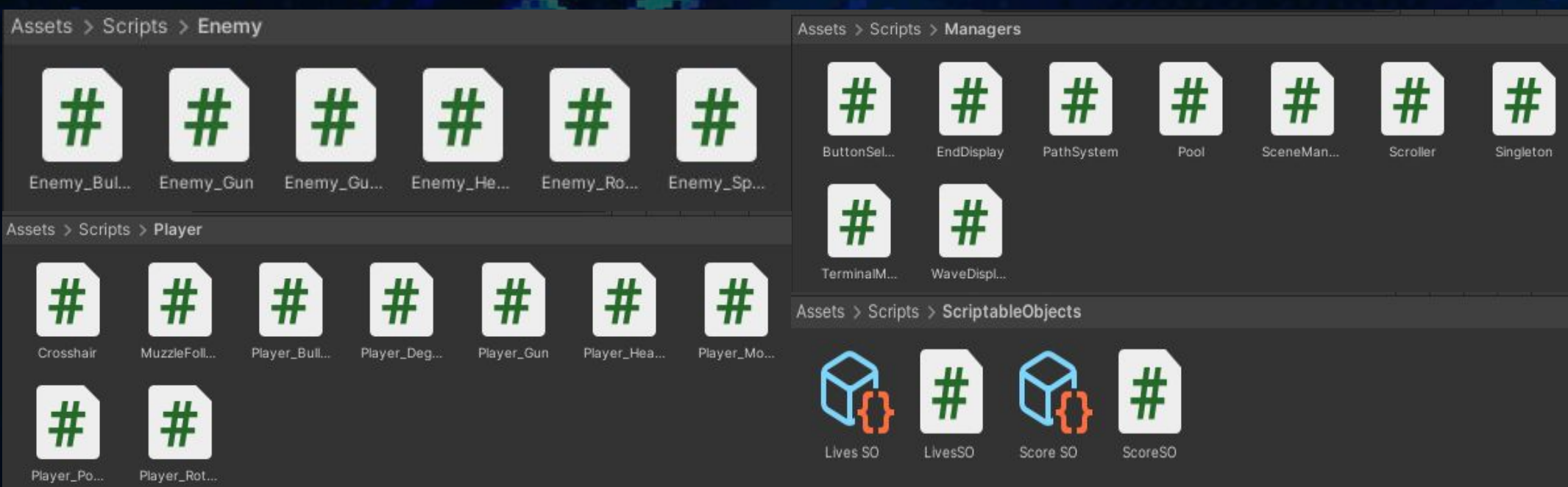
Final Contributions

- Dashing mechanic with thruster particles to represent short boost
- Out of bounds borders which bring character back to main screen once exiting
- Player outline shader to make the ship stand out from the background



Final Contributions

- Worked on creating that 'Arcade' feel by experimenting with global volumes
- Implemented a keybind tutorial screen at the start of the game in order for players to understand what certain keys do
- Good & Bad endings implemented depending on if the player lives to the end or dies before reaching it
- List of all scripts used in game are shown below



A pixelated space scene with a dark blue background. In the upper left, a large black planet with a grey crescent is visible. To its right, a satellite with two solar panels orbits. Further right is a ringed planet with a brownish-orange ring. In the lower left, there are several smaller planets, including one with blue and white stripes. The bottom right corner shows a close-up of a planet's surface with craters. The word "Conclusion" is centered in a white, pixelated font.

Conclusion

Project Outcome

Overall, the content outcome of this project had been more than initially expected. Everything that had been written down as top priority elements are more or less present within the final product as well as some extra features that weren't necessary but added more to the overall experience of this demo.

Having had this game tested by various individuals, it was ensured that all major bugs would have been fixed by the end of the submission point. In general, we believe that this project was a success from a functionality as well as an enjoyability standpoint.

Performance of Team

- Personal goals set by individual members were more or less successfully accomplished and marked on Jira progress board
- Contribution was lacking from Designer, due to personal reasons. If not for that, more progress could have been made
- Communication was present all throughout production using Discord. However, little to no in person discussions were made.

Areas Of Improvement

Game Improvements

- Better UI designs
- Improved controller support
- Boss stage could have been more unique with complex attack patterns and support enemies
- Player movement & rotation still feels un-refined. Smoother rotation & gradual increase to max speed could have made it better

Team Improvements

- Progress from team members felt more one-sided in terms of contribution. Needed more balance
- Communication was fairly consistent, but face to face discussions could have been much more beneficial to the project outcome
- Direction of the concept felt unclear between members, better thought out design document would have been beneficial