VISVESVARAYA TECHNOLOGICAL UNIVERSITY,

BELAGAVI

Internship Report

on

"Juego Studios Pvt Ltd"

A report submitted in partial fulfilment of the requirements for the award a degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

Submitted by

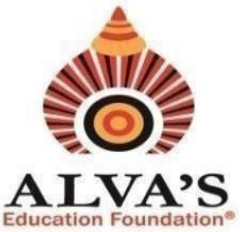
JAGATH S K **4AL20CS051**

Under Supervision of

Dr. Bramha Prakash H P

Associate Professor

Computer Science and Engineering



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

2023 – 2024

ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOODBIDRI-574225, KARNATAKA

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CERTIFICATE

This is to certify that the Internship report on "Juego Studios Pvt Ltd" submitted by JAGATH S K (4AL20CS051) is work done by him and submitted during the academic year 2023–24, in partial fulfilment of the requirements for the award of the degree of BACHELOR OF ENGINEERING in COMPUTER SCIENCE AND ENGINEERING

8/5/24

Internship Mentor
Department of CSE

BP. 8/5/24.

Internship Coordinator
Department of CSE

Head of the Department
Department of CSE

Examiners

Name	Signature
1)	
2)	

Acknowledgement

First, I would like to thank **Juego Studios Pvt Ltd** for giving me the opportunity to do an internship with the organization.

I also would like all the people that worked along with me in **Juego Studios Pvt Ltd** with their patience and openness they created an enjoyable working environment.

It is indeed with a great sense of pleasure and immense sense of gratitude that I acknowledge the help of these individuals.

I am highly indebted to Managing Trustee **Mr. Vivek Alva** and Principal **Dr. Peter Fernandes, Alvas Institute of Engineering and Technology, Mijar** for the facilities provided to accomplish this internship.

I would like to thank my Head of the Department **Dr. Manjunath Kotari, Professor, Department of Computer Science and Engineering** for his constructive criticism throughout my internship.

I would like to thank my internship Coordinator **Dr. Bramha Prakash H P, Associate Professor, Department of Computer Science and Engineering** for his guidance throughout my internship.

I am extremely grateful to my department staff members and friends who helped me in successful completion of this internship.

JAGATH S K 4AL20CS051

INTERNSHIP CERTIFICATE

Date: **24 April 2024**

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Jagath S K** is currently pursuing his internship with Juego Studio Pvt Ltd, commencing on **11th March 2024** and ongoing.

During his internship so far, he has been exposed to different processes and is punctual and hard-working.

Yours Truly,

For Juego Studio Pvt Ltd

Chitharanjan VM

Human Resources

Juego Studio Private Limited

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GR Grand Plaza, Sy. No. 70, 2nd Floor, Kanakapura Road, JP Nagar 6th Phase, Bangalore - 560078, India

ABSTRACT

Juego Studios Pvt Ltd is a Bangalore-based, award-winning game development company offering outsourcing services to a global clientele. They specialize in a broad range of areas including Unity, Unreal Engine, Artificial Intelligence, Augmented Reality/Virtual Reality, concept art, 3D modelling, and animation. Their proven methodologies in Learning & Development, Project Management Systems, and Information Security Management Systems ensure high-quality results for their clients. Juego Studios boasts a comprehensive game development team that tackles diverse projects with strategic execution. They are listed in Forbes India's Marquee Entrepreneur Special edition.

DAILY LOGS

DAY	DATE	TOPICS COVERED
Day 1-Day10	11/04/2022 – 21/04/2022	Company Intro
Day 11-Day 16	22/04/2023 – 27/04/2023	Office Round Up
Day 17-Day 20	28/04/2023 – 31/04/2023	Office Ethics & Behavior
Day 21-Day 25	01/05/2023 – 05/05/2023	Assessments
Day 26- Day 32	06/05/2023 – 12/05/2023	C# Master Class
Day 33-Day 45	13/05/2023 – 25/05/2023	Industrial Requirements

TABLE OF CONTENTS

LIST OF FIGURES

INTERNSHIP OBJECTIVES

The primary objective for this internship was to solidify my skills in Unity development and gain practical experience in a game development environment. I had the opportunity to work on a core game mechanic – a Pong game. This involved implementing essential functionalities like player movement using user input, collision detection to track interactions between the ball and paddles, and a scoring system to keep track of the game's progress. Beyond gameplay mechanics, I also delved into environment creation by designing a jungle-themed terrain within the Unity engine. This process involved utilizing Unity's terrain tools to sculpt the landscape, incorporating assets like trees and vegetation to bring the environment to life, and potentially even setting up lighting and atmospheric effects. This internship proved to be a valuable platform for me to not only hone my understanding of core Unity functionalities like scripting, physics, and asset management, but also to gain practical experience with development workflows and the iterative process of building a game within Unity.

CHAPTER 1

INTRODUCTION

Fueling my passion for game development, I secured an internship at Juego Studios, a leading game development company in Bangalore. This internship provided an invaluable platform to gain hands-on experience within a professional studio environment. I had the opportunity to collaborate with a talented team of developers and industry veterans, immersing myself in the collaborative nature of game creation. By contributing to real-world game projects, I not only applied my knowledge but also gained a deeper understanding of industry best practices and development workflows. This internship proved to be a transformative experience, allowing me to showcase my abilities and contribute meaningfully to the team's success.

Fig-1.1 Logo of Juego Studios

CONTACT DETAILS:

Websites: https://www.juegostudio.com/

Headquarters:

Bangalore

Year Founded:

2013

Company Type:

Juego Studios is an award-winning game development company headquartered in Bangalore, India. Operating as a premier outsourcing studio, they collaborate with a global clientele on a wide array of projects. Their expertise encompasses a vast technological landscape, including industry-leading engines like Unity and Unreal Engine, cutting-edge technologies like Artificial Intelligence and Augmented/Virtual Reality, and the foundational elements of game creation like concept art, 3D modeling, and animation.

Juego Studios has garnered recognition within the industry for their consistent delivery of high-quality results. This is achieved through their proven methodologies in Learning & Development, Project Management Systems, and Information Security Management Systems, ensuring a streamlined and secure development process. Beyond technical prowess, Juego Studios fosters a collaborative and talented team environment, consistently pushing the boundaries of game development. Their inclusion in Forbes India's Marquee Entrepreneur Special edition further underscores their position as a leading innovator within the gaming industry.

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CHAPTER 2

PROJECT DETAILS

2.1 PROJECT AREA/DOMAIN:

This internship focused on core game mechanics, game design principles and Unity development tools.

2.2 PROBLEM STATEMENT:

While the classic Pong game holds a nostalgic place in video game history, its core mechanics can feel repetitive and lack engagement for modern players. The core gameplay loop offers limited depth, and the user experience fails to provide the variety and immersion sought after by today's gamers. This project aimed to address these limitations by revitalizing the Pong concept while staying true to its classic design. The focus was on enhancing gameplay through the introduction of new mechanics or variations on existing rules, adding strategic depth and reliability. Furthermore, the project aimed to create a more engaging experience by implementing adjustable AI difficulty levels to cater to players of all skill sets. Visually appealing graphics, animations, and sound effects were incorporated to heighten immersion, while a user-friendly interface with features like score tracking, player options, and visual feedback further enriched the gameplay experience. Ultimately, this project sought to breathe new life into the classic Pong formula, offering a nostalgic experience with modern sensibilities.

2.3 EXPLANATION OF WORKING OF PROPOSED IDEA:

This project reimagined the classic Pong game by implementing core mechanics within the Unity game engine. Here's a breakdown of the functionalities:

1. **Ball Physics:** The core of this Pong game revolved around realistic ball physics, achieved through Unity's physics engine. This involved defining several key factors that govern the ball's movement. The initial velocity determined the ball's speed, while bounce properties dictated how it reacted upon colliding with the playing field walls or the player paddles. Collision detection played a crucial role in tracking these interactions, altering the ball's trajectory based on the point of contact to simulate realistic bounces and maintain a dynamic gameplay experience.

2. **Collision Detection**: A critical aspect of this Pong reimagining was the implementation of a sophisticated collision detection system. This system acted as the referee, constantly monitoring the playing field for interactions between the ball and the player discs (paddles). But unlike a simple on/off switch, this system went beyond just registering a collision. When the ball contacted a paddle, the system meticulously analysed the exact point of impact. This information was then used to dynamically alter the ball's trajectory. Imagine the ball hitting the top or bottom of the paddle – it would not simply bounce straight back. Instead, the collision point would influence the bounce angle, mimicking real-world physics where the angle of impact dictates the ball's direction. This approach not only added a layer of realism to the game but also introduced a strategic element. By skilfully manoeuvring their paddles and anticipating the ball's trajectory based on the point of contact, players could gain an edge and outmanoeuvre their opponent.

3. **Building Engagement:** Building upon the core mechanics of ball physics and collision detection, the project incorporated additional features to create a more engaging experience. A competitive scoring system with a predetermined winning score and "game over" state provided a clear objective and sense of accomplishment. An interactive user interface (UI) utilized Unity's tools to display a start button, player scores, and a "game over" screen, ensuring players remained informed of the game state. For single-player mode, an AI opponent was implemented, likely tracking the ball's position to strategically control its paddle and prevent the player from scoring. Finally, sound effects for collisions, scoring events, and background music, along with potential visual cues like color changes or animations, further enriched the gameplay by providing immediate feedback and creating a more immersive atmosphere. These elements transformed the project from a basic Pong reimagining into a user-friendly and engaging game experience.

CHAPTER 3

METHODOLOGY

3.1 Planning and Design:

The project kicked off with a planning and design phase. Here, the focus was on clearly defining the project's overall scope – what the game would be and what it would achieve. This involved hammering out the core mechanics, the fundamental gameplay elements that would define the Pong experience. Additionally, desired functionalities were mapped out – features like scoring, AI control, and a user interface. To visualize these elements and ensure a smooth gameplay flow, storyboards or mock-ups might have been created, acting as a blueprint for the game's development. This initial planning stage laid the groundwork for the entire project, ensuring everyone involved was on the same page about the game's direction and functionalities.

3.2 Asset Creation, Scripting and Functionality Development:

The project unfolded using an iterative development methodology within the Unity engine. The initial phase focused on planning and design. Here, the focus was on clearly defining the project's overall scope – what the game would be and what it would achieve. This involved hammering out the core mechanics, the fundamental gameplay elements that would define the Pong experience. Additionally, desired functionalities were mapped out – features like scoring, AI control, and a user interface. To visualize these elements and ensure a smooth gameplay flow, storyboards or mockups might have been created, acting as a blueprint for the game's development. This initial planning stage laid the groundwork for the entire project, ensuring everyone involved was on the same page about the game's direction and functionalities.

Next came asset creation. If the project utilized custom 2D or 3D assets, this stage focused on creating the game objects like the ball, paddles, and any visual elements. Unity's asset creation tools provided the platform for building these assets from scratch, while the option to import them from external sources also existed. Following this, the core stage of scripting and functionality development came into play. Here, C#, Unity's programming language, was used to write scripts that implemented the game's functionalities. These scripts brought the game to life, defining aspects like ball physics, collision detection, scoring logic, AI control for Player 2, and the user interface elements. This scripting stage essentially translated the planned functionalities into the working code that powered the Pong game.

3.3 Integration and Testing

The development process transitioned into integration and testing. This crucial phase involved bringing all the disparate pieces together – the custom assets (if used), the functionality-defining scripts, and the various game elements. Within the Unity editor, these components were integrated and rigorously tested. This involved playing the game extensively, identifying and fixing any bugs or errors that might hinder smooth gameplay. Through this iterative process of integration and testing, the project ensured that all functionalities worked seamlessly together, creating a polished and enjoyable Pong experience.

3.4 Iteration and Refinement:

Following the integration and testing phase, the project embarked on an iterative refinement journey to transform it from a functional Pong game into a truly engaging experience. This wasn't just about fixing technical hiccups; it was about meticulously polishing the gameplay. Playtesting, both internal and potentially with external testers, provided valuable feedback that fuelled adjustments across various aspects. Core mechanics might have been tweaked to strike a perfect balance between challenge and accessibility. Difficulty levels for the AI opponent could have been meticulously calibrated to cater to a wider range of player skill sets. The AI's behaviour itself could have been further refined to offer a more strategic challenge, perhaps implementing more complex movement patterns or reaction times. Finally, the visual and audio elements came under scrutiny. Color palettes, animations, and sound effects might have been fine-tuned to enhance the overall atmosphere and provide clearer feedback to players. These iterative cycles of refinement ensured the project wasn't simply a reimagining of Pong, but an engaging and well-balanced game experience that captivated players and provided hours of enjoyment.

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CHAPTER 4 IMPLEMENTATION

4.1 SOURCE CODE

Back To Menu:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.SceneManagement;

public class PlayButton : MonoBehaviour
{
    // Start is called before the first frame update
    public void PlayGame()
    {
        Debug.Log("PlayGame was pressed");

        //Moves us to game scene
        SceneManager.LoadScene("Game");
    }
}
```

Play Button:

```
using System.Collections;

using System.Collections.Generic;

using UnityEngine;

using UnityEngine.SceneManagement;

public class PlayButton : MonoBehaviour

{

    public void PlayGame()

    {

        Debug.Log("PlayGame was pressed");

        SceneManager.LoadScene("Game");

    }
```

Collision Controller:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
public class CollisionController : MonoBehaviour
{
    public BallMovement ballMovement;
    public ScoreController scoreController;
    void BounceFromRacket(Collision2D c)
    {
        Vector3 ballPosition = this.transform.position;
        Vector3 racketPosition = c.gameObject.transform.position;

        float racketHeight = c.collider.bounds.size.y;
        float x;
        if (c.gameObject.name == "Racket1")
        {
            x = 1;
        }
        else
        {
            x = -1;}
```

```
    float y = (ballPosition.y - racketPosition.y) / racketHeight;
    this.ballMovement.IncreaseHitCounter();
    this.ballMovement.MovBall(new Vector2(x, y));
}
private void OnCollisionEnter2D(Collision2D collision)
{
    if(collision.gameObject.name == "Racket1" || collision.gameObject.name == "Racket2")
    {
        this.BounceFromRacket(collision);
    }
    else if(collision.gameObject.name == "WallLeft")
    {
        Debug.Log("Collision with Wall Left");
        this.scoreController.GoalPlayer1();
        StartCoroutine(this.ballMovement.StartBall(true));
    }
    else if (collision.gameObject.name == "WallRight")
    {
        Debug.Log("Collision with Wall Right");
        this.scoreController.GoalPlayer2();
        StartCoroutine(this.ballMovement.StartBall(false));
```

```
        }
    }
}
```

Player1:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
public class RacketPlayer1 : MonoBehaviour
{
    public float movementSpeed;
    private void FixedUpdate()
    {
        float v = Input.GetAxisRaw("Vertical");

        GetComponent<Rigidbody2D>().velocity = new Vector2(0, v) * movementSpeed;
    }
}
```

Player2:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
```

```
public class RacketPlayer2AI : MonoBehaviour
{
    public float movementSpeed;
    public GameObject ball;
    private void FixedUpdate()
    {
        if(Mathf.Abs(this.transform.position.y - ball.transform.position.y) > 50)
        {
            if(transform.position.y < ball.transform.position.y)
            {
                GetComponent<Rigidbody2D>().velocity = new Vector2(0, 1) * movementSpeed;
            }
            else
            {
                GetComponent<Rigidbody2D>().velocity = new Vector2(0, -1) * movementSpeed;
            }
        }
        else
        {  GetComponent<Rigidbody2D>().velocity = new Vector2(0, 0);
        }
    }
```

Score Controller:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.UI;
using UnityEngine.SceneManagement;
public class ScoreController : MonoBehaviour
{
    private int scorePlayer1 = 0;
    private int scorePlayer2 = 0;
    public GameObject scoreTextPlayer1;
    public GameObject scoreTextPlayer2;
    public int goalToWin;
    void Update()
    {
        if(this.scorePlayer1>= this.goalToWin || this.scorePlayer2 >= this.goalToWin)
        {
            Debug.Log("Game Won");
            SceneManager.LoadScene("GameOver");
        }
    }
```

```
    private void FixedUpdate()
    {
        Text uiScorePlayer1 = this.scoreTextPlayer1.GetComponent<Text>();
        uiScorePlayer1.text = this.scorePlayer1.ToString();
        Text uiScorePlayer2 = this.scoreTextPlayer2.GetComponent<Text>();
        uiScorePlayer2.text = this.scorePlayer2.ToString();
    }

    public void GoalPlayer1()
    {
        this.scorePlayer1++;
    }
    public void GoalPlayer2()
    {
        this.scorePlayer2++;
    }
}
```

Sound Controller:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
```

```
public class SoundControle : MonoBehaviour
{
    public AudioSource wallSound;
    public AudioSource racketSound;

    private void OnCollisionEnter2D(Collision2D collision)
    {
        if(collision.gameObject.name == "Racket1" || collision.gameObject.name == "Racket2")
        {
            this.racketSound.Play();
        }
        else
        {
            this.wallSound.Play();
        }
    }
```

4.2 SNAPSHOTS

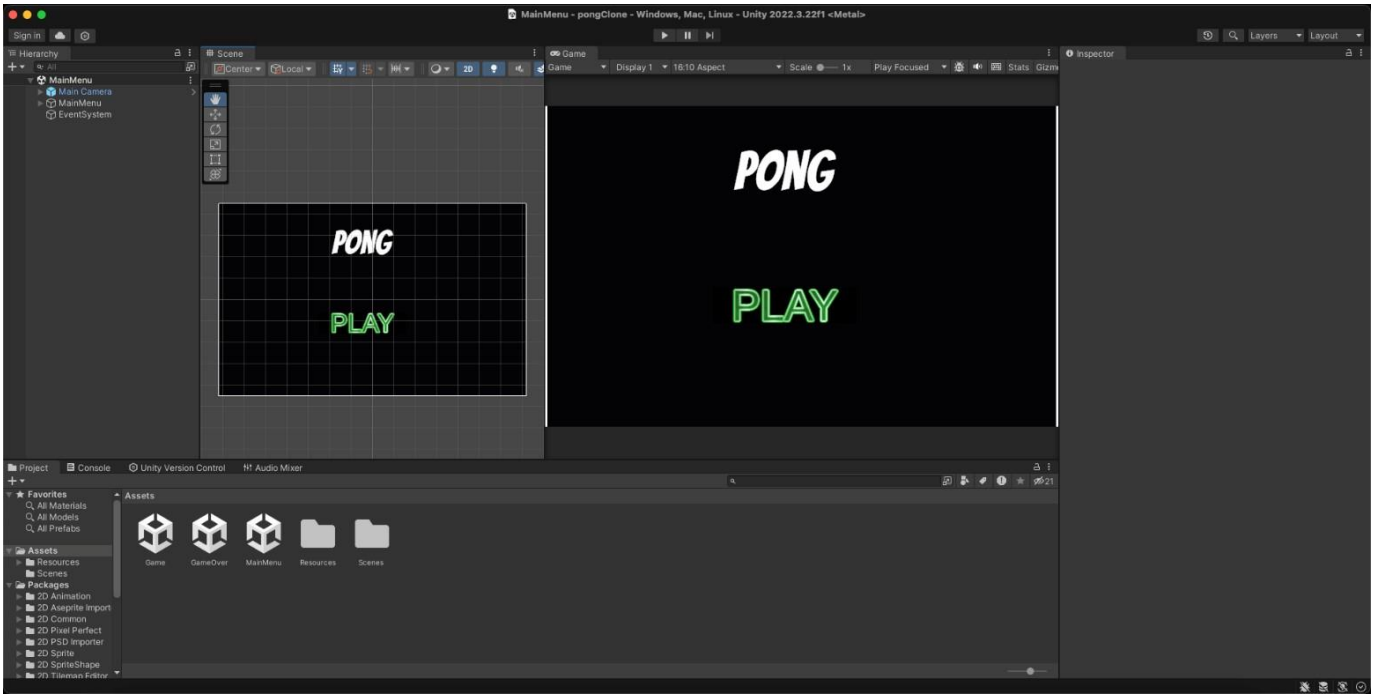

Fig 4.1: Menu page

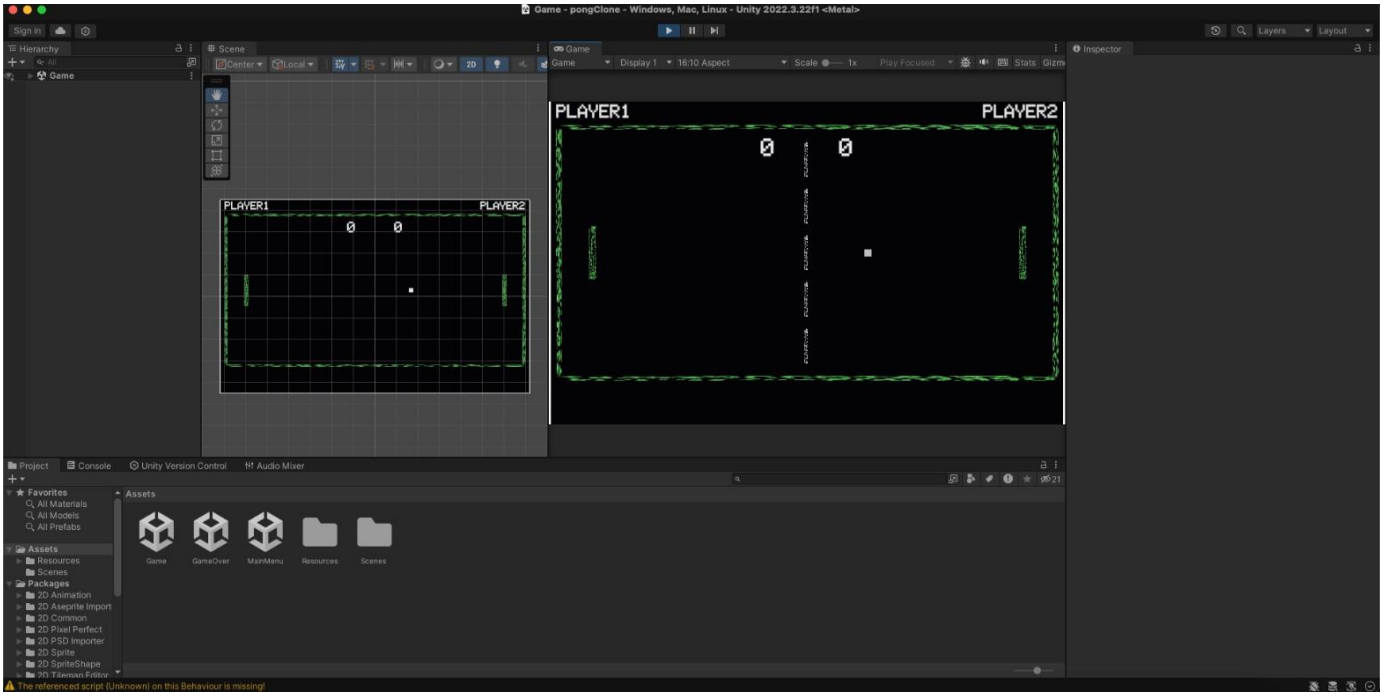

Fig 4.2: Game Play

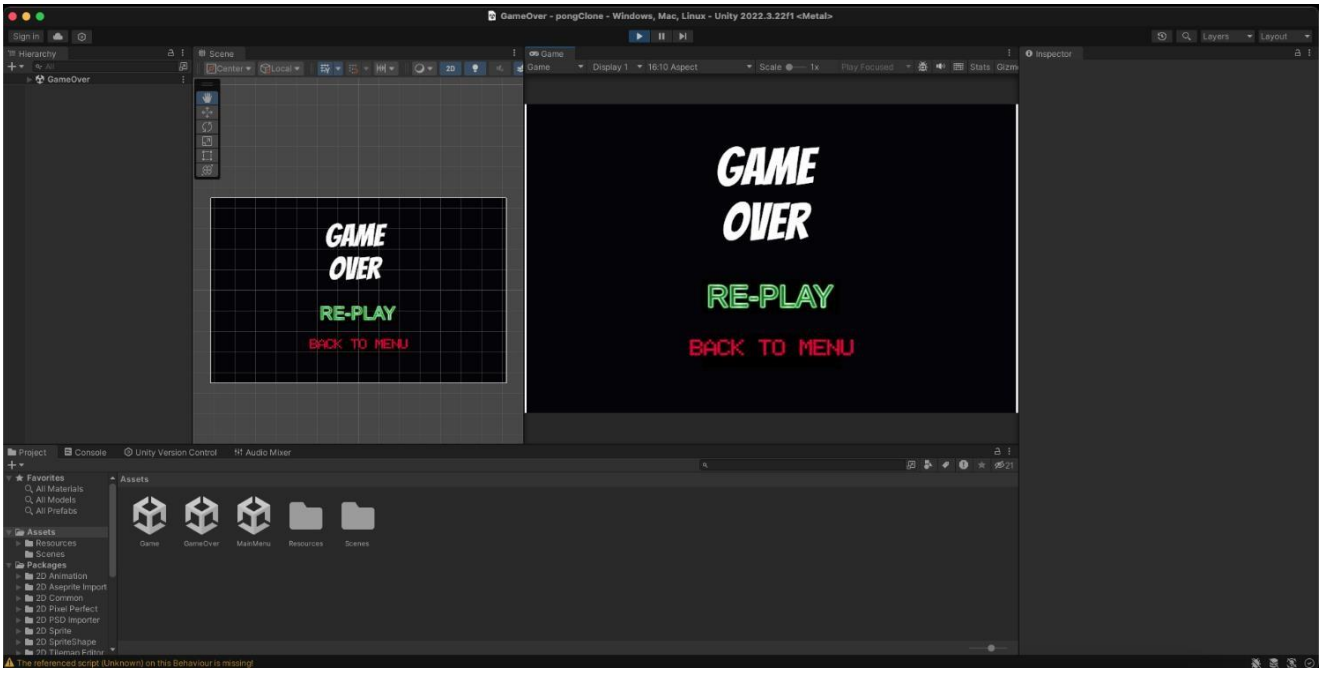

Fig 4.3: Game Over Page

CHAPTER 5

INTERNSHIP BENEFITS

My internship at Juego Studios proved to be an invaluable stepping stone into the world of game development. Beyond the thrill of bringing a classic game concept to life, the experience significantly bolstered my technical skillset. Hands-on work with the Unity engine provided a solid foundation in scripting (likely C#), core mechanic implementation, and asset creation/integration tools. Furthermore, the project deepened my understanding of game design principles, encompassing physics, collision detection, scoring logic, and user interface design. The internship wasn't simply about technical skills; it fostered valuable professional development. Working within a team environment honed my communication and collaboration abilities, while experiencing the iterative development process firsthand provided insights into project management. The internship also fueled my personal growth. The completed project serves as a tangible asset for my portfolio, showcasing my game development skills to potential employers. Moreover, the experience solidified my passion for this field and boosted my confidence and motivation to pursue a career in game development.

CHAPTER 6

CONCLUSION

In conclusion, my internship at Juego Studios transcended the act of simply reimagining a classic game. It served as a transformative experience that propelled me into the exciting world of game development. The project not only fostered a deeper appreciation for the craftsmanship behind game mechanics but also equipped me with a robust skillset. My hands-on experience with the Unity engine solidified my understanding of core development practices, and the collaborative nature of the project honed my communication and teamwork abilities. This internship proved to be a valuable stepping stone, solidifying my passion for game development and equipping me with the technical skills and professional experience to confidently pursue a career in this dynamic field.