



**TRIBHUVAN UNIVERSITY INSTITUTE
OF ENGINEERING PURWANCHAL
CAMPUS DHARAN**

" Ping Pong Game "

**A COURSE PROJECT SUBMITTED TO THE DEPARTMENT OF ELECTRONICS AND COMPUTER
ENGINEERING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE PRACTICAL COURSE
ON
OBJECT ORIENTED PROGRAMMING [CT 451]**

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Abstract

The "PingPongGame" project seeks to create an engaging and dynamic two-player ping pong game using the C++ programming language and the Raylib library for game development. This project focuses on delivering a responsive and enjoyable gaming experience, with smooth animations and sound effects to enhance gameplay. The game features an AI opponent, player controls, and score tracking, ensuring an immersive and competitive environment. Hosted locally, the game will be developed over a two-week timeline, emphasizing design, coding, testing, and iteration. Success will be measured by the game's playability, stability, and user satisfaction.

Acknowledgment

We would like to express our sincere gratitude to our mentors and instructors for their unwavering support and guidance throughout the development of this PingPong Game project. Their knowledge of C++ programming and game development has been essential in guiding us through this project.

We also extend our thanks to the Raylib community for providing the tools and resources that made the creation of this game possible. Their contributions have been invaluable.

Our heartfelt appreciation goes to our team members for their dedication and hard work in planning, developing, and testing the PingPong Game. Their collaboration and effort have been crucial to the project's progress.

Finally, we are grateful to our friends and family for their continuous encouragement and support. Their belief in us has been a constant source of motivation, driving our commitment to achieve our project goals.

Thank you to everyone who has contributed to the development of this project.

1 Introduction

The "PingPongGame" project aims to develop an engaging two-player ping pong game using C++ and the Raylib library. This project focuses on providing an enjoyable and competitive gaming experience with smooth animations and sound effects.

Our primary goal is to create an accessible and fun game for a wide range of players. The game includes player controls, score tracking, and a basic AI opponent. Using C++ and Raylib, we aim to ensure responsive gameplay and an immersive experience.

This project is designed for casual gamers, C++ developers, and anyone interested in game development. By showcasing the capabilities of C++ and Raylib, we hope to inspire and entertain users with a well-crafted digital game.

This introduction highlights the project's goal, audience, and technologies, setting the stage for a fun and interactive gaming experience.

1.1 Objective

1. Develop an Entertaining Game:

- i) Create a ping pong game that provides a fun and interactive experience for users.
- ii) Include essential features like player controls, scorekeeping, and an AI opponent to ensure engaging gameplay.

2) Focus on Usability and Accessibility:

- i) Design the game to be intuitive and accessible to a broad audience, from casual gamers to developers.
- ii) Offer straightforward instructions and easy-to-use controls to enhance the user experience.

3) Implement Modern Technologies:

- i) Utilize C++ and the Raylib library to develop the game, ensuring smooth animations and responsive controls.
- ii) Leverage the strengths of these technologies to deliver a high-quality gaming experience.

4) Facilitate Efficient Testing and Development:

- i) Set up a testing environment to allow developers to efficiently test the game.
- ii) Design the game with clear logic and predictable behavior, making it easy to test both manually and automatically.

5) Optimize Performance and Stability:

- i) Ensure the game performs well, with quick response times and smooth gameplay.
- ii) Make the game adaptable to different screen sizes and resolutions to provide a consistent experience across devices.

6) Adhere to Project Timeline:

- i) Complete the project within the designated timeline, ensuring all major features are developed, tested, and deployed.
- ii) Follow a structured development plan with defined milestones to track progress and maintain timely delivery.

7) Address Development Challenges:

- i) Anticipate and resolve potential issues related to game development, such as collision detection and AI behavior.
- ii) Ensure the game runs smoothly on various platforms and devices, addressing any compatibility challenges.

By meeting these objectives, the PingPongGame project aims to deliver a well-crafted, enjoyable, and user-friendly game that appeals to a wide range of players.

2 Existing System

Current ping pong games often lack engaging features, relying on simple mechanics or outdated graphics. These games may suffer from limited player control options, unresponsive AI opponents, and basic scoring systems. Additionally, they often lack smooth animations and responsive gameplay, leading to a less enjoyable user experience. These shortcomings highlight the need for a modern solution like our Ping Pong Game, which aims to provide a fun, interactive, and user-friendly experience using advanced C++ programming and the Raylib library.

3 Proposed System

Modern Game Development: Utilizes C++ with the Raylib library for creating a visually appealing and engaging game.

Smooth Gameplay: Features responsive controls and realistic ball physics for an immersive experience.

Advanced AI: Incorporates a challenging AI opponent that adapts to the player's skill level.

User-Friendly Interface: Designed to be intuitive and easy to navigate for players of all ages.

High Performance: Optimized for smooth animations and quick response times.

Comprehensive Features: Includes detailed scoring, collision detection, and game state management.

This game aims to overcome the limitations of traditional ping pong games with enhanced interactivity, better graphics, and a more enjoyable player experience.

4 Methodology

4.1 Development Tools

- **Programming Language:** C++
- **IDE:** VISUAL STUDIO CODE, Dev C++
- **Libraries/framework:** Raylib

4.2 Development Process

- **Requirement Analysis:** This stage focuses on gathering detailed requirements for the Ping Pong game, considering both functional and non-functional aspects. We engage stakeholders to understand their needs and expectations, prioritize features based on importance and feasibility, and document the requirements to guide development.
- **Design Phase:** During this phase, we translate the requirements into a detailed game architecture and technical specifications. This involves designing the game mechanics, defining object interactions, planning the user interface, and creating a comprehensive design document to serve as a blueprint for implementation.
- **Implementation:** In this phase, we develop the game based on the design specifications. This includes coding the game logic using C++ and the Raylib library, implementing player controls and AI behavior, integrating collision detection and scoring systems, and ensuring smooth gameplay. We adhere to coding standards, use version control, and conduct regular code reviews to maintain code quality.
- **Testing:** Testing ensures the game functions correctly and provides a good player experience. We conduct unit tests to verify individual components, integration tests to ensure smooth interaction between game elements, and system tests to evaluate overall game performance. We also perform performance testing to ensure the game runs smoothly under various conditions.
- **Deployment:** The deployment phase involves preparing the game for release. We set up deployment environments, package the game for different platforms, and ensure optimal performance. We closely monitor the deployment process to identify and resolve any issues quickly, ensuring a smooth release.
- **Documentation and Training:** We provide comprehensive resources for users and developers to understand and effectively use the game. This includes creating detailed game documentation with instructions and examples, developing user guides and tutorials, and conducting training sessions to facilitate onboarding and maximize user engagement.
- **Maintenance and Support:** Post-deployment, we ensure the game remains functional and enjoyable for players. This involves monitoring game performance, addressing reported issues and bugs, planning and implementing updates and enhancements, and providing continuous support to users to resolve queries and maintain high satisfaction levels.

By following this structured methodology, we aim to deliver a high-quality, engaging, and user-friendly Ping Pong game.

5 Project Scope

- **Game Functionality:**

1. Develop a comprehensive Ping Pong game using C++ and the Raylib library.
2. Implement core game mechanics, including player controls, ball physics, and scoring systems.
3. Integrate AI for the CPU player to provide a challenging experience for single players.
4. Ensure the game includes collision detection and response for realistic gameplay.

- **Assumptions:**

1. Assumptions will be detailed during the requirement analysis phase.

6 Project Schedule

1. Timeline

| Phase | Start Date | End Date |
|----------------------|------------|------------|
| Requirement Analysis | 2081-04-01 | 2081-04-03 |
| System Design | 2081-04-04 | 2081-04-07 |
| Implementation | 2081-04-08 | 2081-04-09 |
| Testing | 2081-04-10 | 2081-04-11 |
| Deployment | 2081-04-12 | 2081-04-13 |
| Maintenance | 2081-04-13 | --- |

Table 1: Project Schedule