

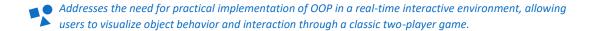
# PING PONG GAME **OOP PROJECT PROPOSAL**

#### **GROUP MEMBERS – BCS 2H**



## **OVERVIEW**

#### Background



 This project focuses on interactive game development using Object-Oriented Programming (OOP) principles. The game is a simple Ping Pong (Pong) simulation that utilizes the raylib graphics library and C++ for implementation.

#### **Problem Statement**



An engaging C++ Ping Pong game that showcases core OOP principles through real-time player and AI paddle interactions using the raylib graphics library.

• The goal is to design an interactive application that demonstrates the implementation of OOP principles like classes, encapsulation, inheritance, polymorphism, and abstraction. The game will simulate real-time paddle and ball interactions with basic AI for the CPU paddle.

#### Objectives



To create a functional and educational game application that reinforces the practical understanding of OOP principles in C++, while incorporating user interaction, simple AI behavior, and graphical rendering using the raylib library.

- To design and implement a Ping Pong game.
- To demonstrate core OOP concepts through game mechanics.
- To provide a hands-on application of simple AI behavior and real-time user input handling.

# **SCOPE OF THE PROJECT**



This project focuses on the development of a 2D Ping Pong game using C++ and the raylib library to demonstrate Object-Oriented Programming concepts. It covers basic game mechanics including paddle and ball movement, collision detection, scoring, and simple AI for the opponent paddle.

The scope is limited to a single-player mode against a CPU and local gameplay on desktop environments. The project is designed for educational purposes, highlighting the practical application of OOP in game development.

#### Inclusions:



The features, functionalities, and components that are **included** in the project. It's a way to outline what your project offers or what has been implemented.

- Movable player paddle using keyboard
- Al-controlled opponent paddle
- Real-time 2D graphics using the raylib library
- Ball physics and collision detection
- Sound effects
- Scoring system
- Classes (Ball, Paddle, CPU Paddle)
- Inheritance and virtual functions
- Encapsulation of object properties

#### **Exclusions:**



The features, functionalities, and components that are ex**cluded** in the project. It's a way to outline what your project doesn't offer or what has not been implemented.

- · Mobile or web version of the game
- Advanced game physics or power-ups
- Filling to store player information
- Multiplayer over network

## **PROJECT DESCRIPTION**

The project is a desktop-based Ping Pong game. It demonstrates the use of C++ classes and OOP techniques in game development. Players use arrow keys to control their paddle, and an AI algorithm moves the CPU paddle based on the ball's position.

#### **Technical Requirements**

- Language: C++
- Library: raylib
- IDE: Microsoft Visual Studio or Visual Studio Code
- OS: Windows

#### **Project Phases**

- Research Study basic game loops and OOP concepts.
- Planning Define class structures and interactions.
- Design Develop Ball and Paddle classes and integrate AI.
- Implementation Code the game loop and handle real-time interactions.
- Testing Debug paddle movement, ball behavior, and collision detection.

## **METHODOLOGY**

#### Approach

The group will follow a basic development process, starting with creating a blank screen and game loop. Then, the paddles and ball will be added, along with ball movement and edge collision detection. The player's paddle will be controlled via keyboard, and a simple AI will move the CPU paddle. Paddle ball collision detection and a basic scoring system will be added at the end. Each member will handle different parts to complete the project efficiently.

#### Team Responsibilities

- Mehak: Create blank screen, game loop, draw paddles and ball.
- Areesha: Move ball, detect collision with screen edges, Control player paddle
- Maryam: CPU paddle AI, paddle-ball collision detection, scoring and sounds.

## **EXPECTED OUTCOMES**

#### **Deliverables**

- A functional Ping Pong game (.exe file or source code)
- Project report

#### Relevance

This project is primarily based on Object-Oriented Programming (OOP) concepts. It demonstrates the use of classes, encapsulation, inheritance, and polymorphism to design and organize a structured, maintainable codebase. Through this project, students gain practical experience in applying OOP principles in a real-world scenario, enhancing their understanding of software design, code reusability, and modular development.

# **RESOURCES NEEDED**

#### Software

- Microsoft Visual Studio / Visual Studio Code
- raylib C++ library

#### Other Resources

• C++ tutorials for game development