Project plan

Project Title: Angry Birds

Overview:

Objective:

The main goal of this project is to create a functional game, Angry Birds, using C++ as the programming language, coupled with SFML for multimedia processing and BOX2D for physics simulation.

Programming Language: C++

Libraries: SFML, BOX2D

Work scope:

Features:

Develop a robust slingshot mechanic to launch birds with varying trajectories.

Create different bird types, each possessing unique abilities or characteristics that influence their flight and impact. For example, some birds can be accelerated by clicking on the UI interface with the mouse, and some birds can explode by clicking on the interface.

Design and implement destructible structures that house enemy pigs, ensuring they react realistically to impacts based on their materials and construction. Consider the different levels of damage to glass and wood materials when struck by a bird.

Develop multiple levels(at least 3), each offering a unique challenge to the player. Levels should different in terms of layout, structure design, and the number and type of enemy pigs. Assign star ratings to player performances on each level, and devise logic to calculate them. Define criteria for earning stars, such as scores or birds remaining. Display earned stars on the level selection screen and during level completion.

Introduce various game modes like timed challenges, item collections, or other unique challenges. Define and implement rules for each game mode. Allow users to select game modes from the level selection screen.

Implement a level progression system, unlocking new levels as the player completes previous one. Implement a high score list that saves scores per level, allowing players to enter a nickname.

Create a user friendly interface that allows players to easily check through levels, access game options, and view their progress, scores and ranking.

Utilize SFML to implement appealing graphics, ensuring that game elements such as birds, pigs, and structures are easily distinguishable. The view follows the bird as it moves sideways.

Incorporate fitting audio elements, including background music, sound effects for various actions like launching birds and structure collapses, and feedback sounds for successful or failed level attempts.

Make use of BOX2D to handle the game's physics, ensuring that collisions, gravity, and object movements behave realistically.

Ensure that the code is well-documented, following best practices and coding standards, facilitating maintainability and future improvements.

How program is used:

UI:

Players will interact with the game through a graphical user interface (GUI). They can navigate through different menus to access various levels, view high scores, and modify game settings.

Gameplay:

Players can start each level by launching birds using a slingshot mechanic, aiming to knock down structures and defeat enemy pigs housed within them.

Players can interact with the birds using mouse clicks, activating special abilities such as acceleration or explosion.

Level Selection:

Players can choose levels from a level selection screen. Unlocked levels are accessible, and each level displays earned star ratings and high scores.

Game Modes:

Players can choose different game modes, such as timed challenges or item collections, adding variety to the gameplay and offering unique challenges.

How project works:

Slingshot Mechanic:

The slingshot mechanic allows players to launch birds by dragging and releasing the mouse, with the trajectory influenced by the drag direction and distance.

Bird Types and Abilities:

Different bird types possess unique abilities that players can activate using mouse clicks, enhancing the strategic aspect of the game.

Destructible Structures and Physics:

Structures made of various materials, like wood and glass, react differently to impacts. BOX2D manages the physics simulations, ensuring realistic collisions and destruction.

Levels and Progression:

Multiple levels offer diverse challenges. A progression system unlocks new levels as players complete previous ones, and star ratings evaluate player performance.

Graphics and Audio:

SFML is utilized for rendering graphics and playing audio, ensuring a visually appealing and engaging auditory experience. The camera follows the birds, keeping the action centered.

Main modules and classes:

Main Modules:

1. Game Engine Module

2. Graphics and Rendering Module

3. Physics Module

4. User Interface (UI) Module

5. Audio Module

Main Classes:

1. Bird Class:

Attributes: Type, Position, Velocity, Special Abilities

Methods: Launch, ActivateAbility

2. Pig Class

Attributes: Position, Health

Methods: SufferDamage

3. Obstacle Class

Attributes: Type, Position, Size,Health

Methods: SufferDamage

4. Level Class

Attributes: List of Birds, List of Pigs, List of Obstacles

Methods:LoadLevel, CheckCompletion

5. Slingshot Class

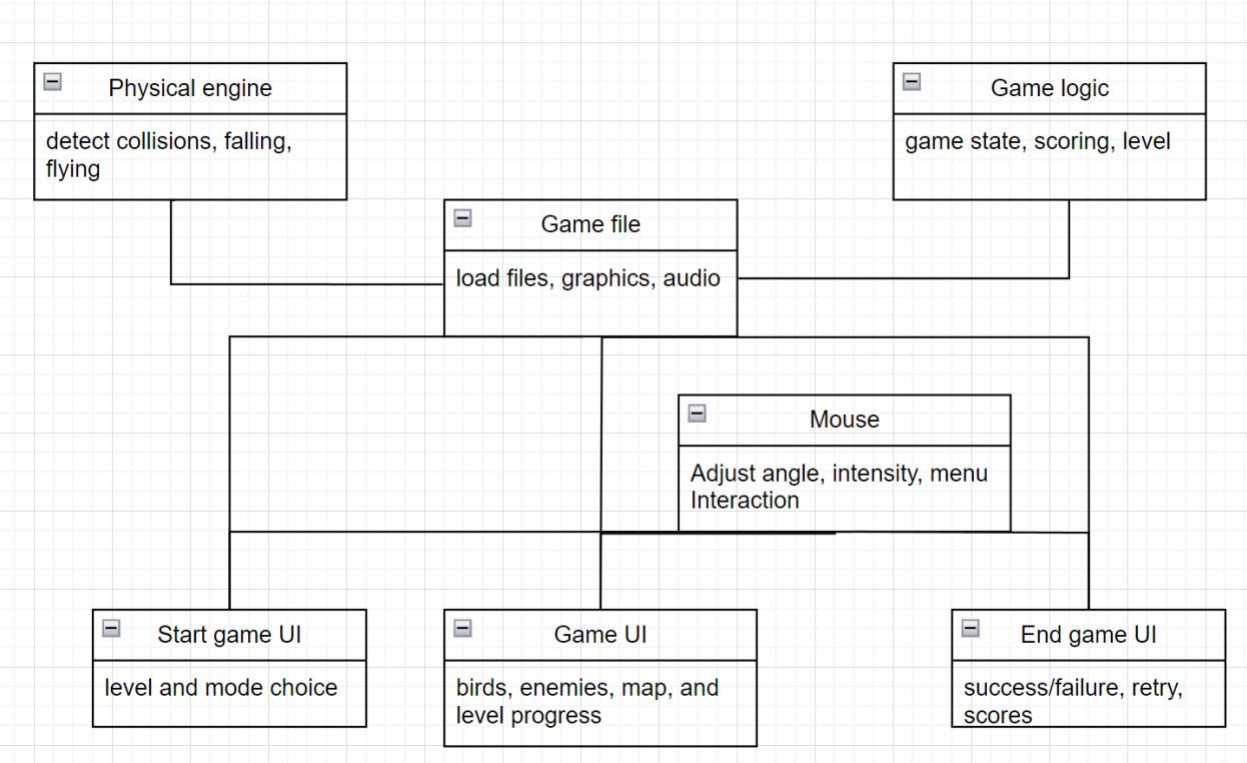
Attributes:Position, Elasticity

Methods:Drag, Release

6. ScoreManager Class

Attributes:Current Score, Highest Scores

Methods:UpdateScore, SaveHighScore



Division of work and responsibilities:

Qingyun Guo: Integrating the BOX2D physics engine for collisions and object behaviors.

Jingxiong Lu: Developing the user interface, including menus and level selectors.

Lujie Ban: Designing and creating levels. Implementing additional features like star ratings, high scores, and different game modes.

Nelly Nie: Managing and implementing game audio, including sound effects and background music. Leading the testing process, identifying bugs, and ensuring the game runs smoothly.

Planned Schedule and Milestones:

Week 1-2: Planning and Initial Development

Set up the project, finalize roles, and begin initial development.

Week 3-4: Core Functionality

Focus on implementing core game mechanics, basic graphics, and UI.

Week 5-6: Enhancement and Level Design

Enhance graphics, design levels, and implement additional features.

Week 7: Testing and Polishing

Conduct thorough testing, fix bugs, and polish the game.