Project Plan

I Scope

The original Angry Birds game was first distributed in 2009. The game requires the player to launch birds toward several pigs to destroy all of them using a slingshot. As players advance through the game, the scenery setting would make it harder for the players to eliminate all the target pigs within certain tries.

In this project, we would follow the same logic as the original game. The player would be able to use the mouse to control the slingshot and thus launch the birds. The birds would then follow certain trajectories to try to strike the target pigs. Information about the game would be shown in real-time. In order to increase the playability of the game, several difficulty levels would be created, with the target pigs surrounded by other materials as potential protections.

If time permits, the game would also feature an advanced game information display, enhanced sound effects, and enhanced graphics. In section IV, we will list a detailed description of the features that would be implemented throughout the project.

II Schedule

Below we've listed a preliminary timeline for the development of the game. The timeline would be changed accordingly during the development in the case of a task overdue.

TABLE I

Preliminary Development Timeline

Time	Event
Week 46	• Develop basic classes • Learn about external libraries
Week 47	• Learn about external libraries • Build user interfaces
Week 48	• Design game logic and graphics • Implement game physics • Unit tests

Week 49	• Design game logic and graphics • Implement game physics • Manual tests and bug fixes • Final commit
Week 50	• Project demo

III Roles

Programmer: A programmer is an individual that writes/creates computer software or applications by giving the computer specific programming instructions.

Project manager: A project manager is a professional who organizes, plans, and executes projects while working within restraints like budgets and schedules. Project managers lead entire teams, define project goals, communicate with stakeholders, and see a project through to its closure.

UI Designer: UI designers design all the screens that make up a digital user interface, as well as the individual elements featured on those screens and sound effects. In other words, the UI designers' task including art design, level design, interaction design, sound design.

The assigned roles of each team's members are as following:

- Quang Ngo: Programmer + Project Manager + UI Designer
- Viet Ngo: Programmer + UI Designer
- Barnik Brata: Programmer + UI Designer
- Chen Wang: Programmer + UI Designer

Apparently, one member will specialize in one aspect of the UI Design, however, the specific task division will be decided later after everyone has a good glance at everything.

IV Features

1. Basic Features

Like Angry Bird, this game contains several iconic characteristics of the original game, including:

- **Basic graphics,** the graphics are designed with color, helping players recognize objects and creating excitement when playing.

- **Birds with special ability,** birds that are controlled by players have special abilities like speed boost, explode, etc.

- **Pigs and materials,** the pigs will be protected by materials such as wood, stone, and ice that the birds aim to destroy to gain points and annihilate all the pigs to pass the level.

- **Using mouse to throw the birds and use the birds' abilities,** the players are required to use a mouse to interact with the game.

- **The game contains levels with increasing difficulty,** at least 3 levels will be included, and the difficulty will increase after each level.

- **Interface that shows information,** there will be displayed scores, throwable left, enemies left that help the players keep track of the situation.

- **Physics simulation,** the laws of physics will be applied to increase the realism of the game.

2. Additional Features

Besides those basic features, additional features are chosen by group members to enhance the quality of the game, including:

- **High score list,** the player can review their high scores through a list

-**Player can enter a nickname,** the high scores of the players will be stored and displayed alongside the player nickname.

- **Rating stars,** if the players meet specific logical criteria, they will receive stars that show how well the players played.

- **Sound effects,** to enhance gaming experience, sound effects will be added.

- **Different game modes**, game mode such as reach goal in time, collect all items, and other kind of modes will be added to challenge players.

- **Better graphics,** animation of the birds and pigs, camera animation, and well-designed texture will be added to enhance the game’s graphics.

V Class Structure

There will be a **MoveableObject** abstract base class which will provide API to get coordinates of visible objects (like Birds, Pigs, and Building Blocks) in the game user interface.

A **Bird** class will be implemented which will inherit from the **MoveableObject** class. This **Bird** class will be the base class for all the bird objects surrounding which the game will be built. All the objects representing Birds with special capabilities will inherit from the **Bird** class.

A **Hostile** class will be implemented which will inherit from the **MoveableObject** class. The **Hostile** class will be the base class for all the objects that the bird is supposed to attack. For instance, the **Pig** class will inherit from the **Hostile** class.

A **Material** class will be implemented which will inherit from the **MoveableObject** class. The **Material** class will be the base class for all the objects that the bird is supposed to collide with. For instance, the **Building Block** class will inherit from the **Material** class.

There will be a **Map** class in which the game environment will be built. For instance, all the new **Birds** and **Hostiles** will be created, owned, and stored by this class. This class will implement the physics for the game using **Box2d** and will change the coordinates of the objects on the screen accordingly. The **Map** class will also keep track of the score and levels. The **Map** class will also be responsible for handling game modes. Finally, there will be a **Graphic** class that will render the graphics from the API provided by the **Map** class. The **Graphic** class will be responsible for creating and storing the **Map** class. The main.cpp will simply initialize a new **Map** object and a new **Graphic** object.

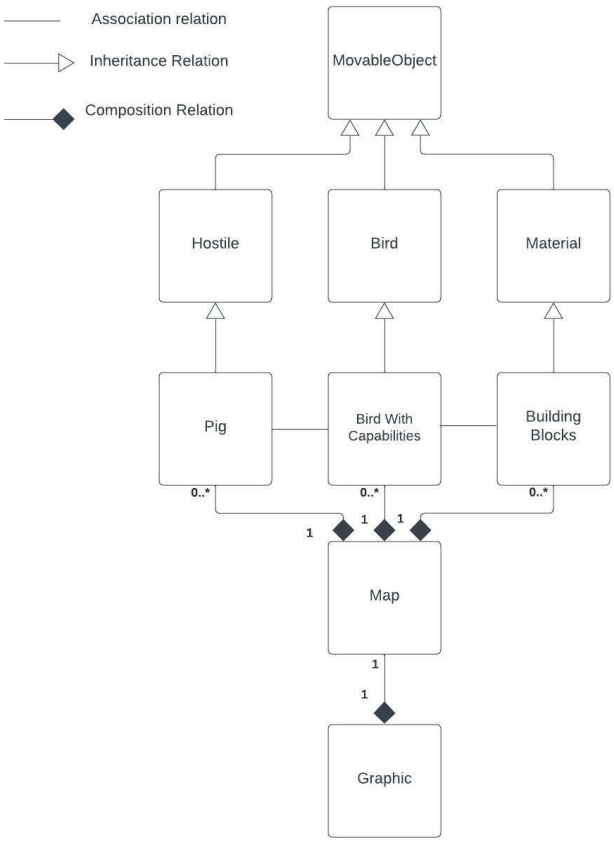

Figure 1. Class Hierarchy

VI External Libraries Used

Two external libraries are going to be used. They are as follows

- Box2D: Box2D is a free open source 2-dimensional physics simulator engine written in C++.
- SFML: SFML stands for Simple and Fast Multimedia Library. It is a cross-platform software development library designed to provide a simple application programming interface to various multimedia components in computers.
- SDL: SDL is a library designed to provide low level access to audio, keyboard, mouse, joystick, and graphics hardware.