CS135601 Introduction to Programming (II) TowerDefense

PROJECT OVERVIEW

Goal

In this hackathon, you are asked to finish the implementation of the partly Tower Defense game and learn the following skills:

- Understand Allegro5 game development process.

- Get familiar with the OOP concept and the code structure.

- Using Allegro5 and C++ to develop a game.

Game Introduction

In this game, you need to place the turrets to destroy all the enemies through the enemy wave to win the game.

The game consists of two main components:

1. **Enemies**: Will spawn at the top–left corner, and walk to the bottom–right corner to attack the player's home base.

   - Enemy waves are defined in **enemy*.txt** files in the **Resource/** folder.

   - There is currently 2 enemies: **SoldierEnemy** and **TankEnemy**

2. **Turret**: Placed by the player, will attack enemies or give special effects automatically.

   - There is currently one turret: **MachineGunTurret** and **LaserTurret**

   - Turrets cannot block all possible paths that the enemies can pass by.

   - Turrets cannot be placed at where another turret has already been placed.

In the play scene, you can use the following hotkeys:

- Press key **0-9** to change the speed multiplier.

- Press **Q, W, E** to perform a quick select on different turrets.

- Press **Tab** to toggle debug renderer.

- **Left–click** on the empty spaces in the map to place the selected turret.

However, there are some problems and incomplete parts of the code. You can solve it by following the under requirement.
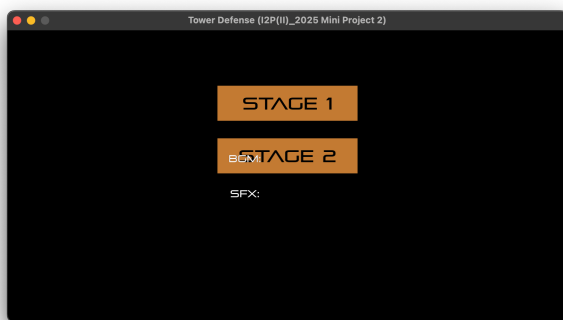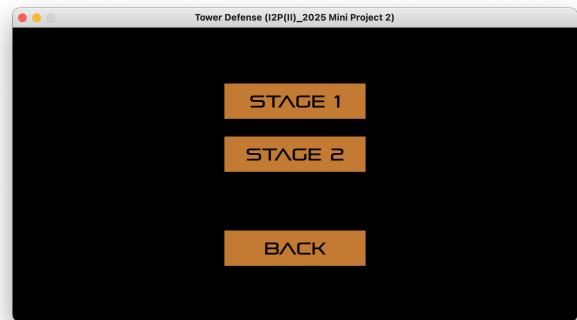
CODE REQUIREMENTS

Hackathon

1. (3%) The game now starts at **StageSelectScene**. Make it start at **StartScene**.

2. (6%) Add a new **SettingsScene** scene, and modify other scenes.
   - (3%) The volume sliders are now in **StageSelectScene**. Move them to **SettingsScene**.
   - (3%) Add a "BACK" button in **SettingsScene**, which can switch to **StartScene**.
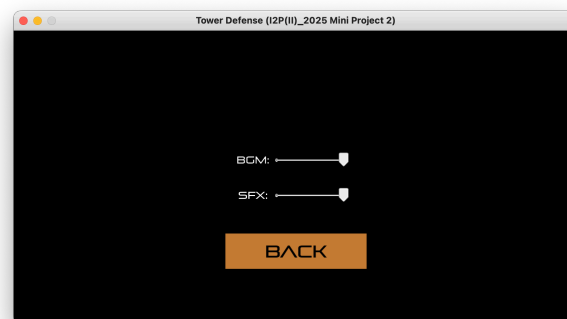
Original **StageSelectScene**   Complete **StageSelectScene**

Complete **SettingsScene**

3. (6%) Add a new **PlaneEnemy**, and make it show up in the game.
   - (3%) Imitate the existing **SoldierEnemy** to create a new **PlaneEnemy**.
     - ✦ Use **play/enemy-2.png** as its sprite.
     - ✦ You can modify other stats in any ways you like.
   - (3%) Make your new **PlaneEnemy** appear in the game.

4. (3%) Set a key sequence for the cheat code.
   - The key sequence should be: Up, Up, Down, Down, Left, Right, Left, Right, B, A, Shift, Enter.
   - When the player pressed the sequence, a **Plane** object should be spawned, and the player should earn 10,000 money.

- For Mac users only: It's known that the shockwave and the explosion effect cannot be displayed correctly on Mac. If you know how to fix it, please contact us.

5. (12%) Fix the bugs in the game.

   - (3%) The game crashes when the player wins (i.e. entering `WinScene`). Try to fix it.

   - (3%) The UI text of "LIFE" in PlayScene doesn't decrease normally when getting attacked by the enemies. Try to fix it.

   - (3%) The white line of the volume slider cannot be drawn correctly. Try to fix it.

   - (3%) The volume slider cannot be dragged correctly, and the volume is not updated. Try to fix it.

NOTE: Finish the hackathon part on time, you will get 1 bonus point.

Mini Project 2

1. (10%) Fix the pathfinding of the enemies.

   - The enemies should walk on path blocks. Currently, they will walk straight to the bottom–right corner.

2. (30%) Add a new `ScoreboardScene`.

   - (4%) Add a way to navigate to or exit `ScoreboardScene`.

      ✦ E.g., create a button in `StageSelectScene` to open the `ScoreboardScene`, etc.

   - (6%) You need to save the score when the player wins.

      ✦ You can use any score calculation method as you want. Just briefly show your formula on demo.

   - (4%) Sort the scoreboard entries in a certain way.

      ✦ You must show us how you sort the entries on demo.

   - (8%) The scoreboard must be multi–page.

      ✦ You need "PREV PAGE" and "NEXT PAGE" buttons to change the displayed page.

   - (8%) The scoreboard must be stored in a file to be permanent

      ✦ The content of the scoreboard should remain after re–opening the game.

   - [Bonus] (3%) Add date time information to each record and display them.

   - [Bonus] (7%) Add a text box in `WinScene` to record the user's name.

Example `ScoreboardScene`

3. (30%) Add 3 new turret/enemy/tool.

   - New turret: can be placed and will automatically attack enemies.

   - New enemy: can follow the path and be damaged by turrets.

- New tool: can be use in the map (not turret)
    - e.g., shovel to remove turret, landmine to immediately damage enemies…
- The new turret/enemy/tool cannot be the same as, or too similar to, those in the template.
    - Merely changing the stats of existing turret/enemy doesn't count.
    - You must describe what's special about your new turret/enemy/tool.

4. [Bonus] (Max 10%, subjective) Optimize or add features not mentioned above.

5. [Bonus] (5%) Use version control tools (e.g., Git) to manage your project.

NOTE: Your Mini Project 2 score can be at maximum 125% (Hackathon 30% + Mini2 70% + Mini2 Bonus 25%).