CS135601 Introduction to Programming (II)

MiniProject 2 (Demo: 5/24)

1 Goal

In this project, you are asked to extend the 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.

2 Problem Description

In this game, you need to control the armies to destroy all the defenses (except walls) shown on the map to win the game.

The game consists of two main components:

1. Defense: Predefine in the .txt file in the Resource/ folder

   There are currently two defenses: wall and cannon.

2. Armies: Created by the player.

   There are currently two armies: warrior and bomb (if you finish the hackathon)

In the playing scene:

- Press key 0-9 to change the speed multiplier.
- Press Q, W to perform a quick select on different armies.
- Press M can mute / unmute the bgm.
- Click on the empty spaces in the map to place the selected army.
- Press TAB to swap to debug mode.

The rule of armies placement:

- To simplify the game, the walls will enclose a rectangle area where the defenses are placed in.
- You cannot place the armies on the rectangle area and the walls.

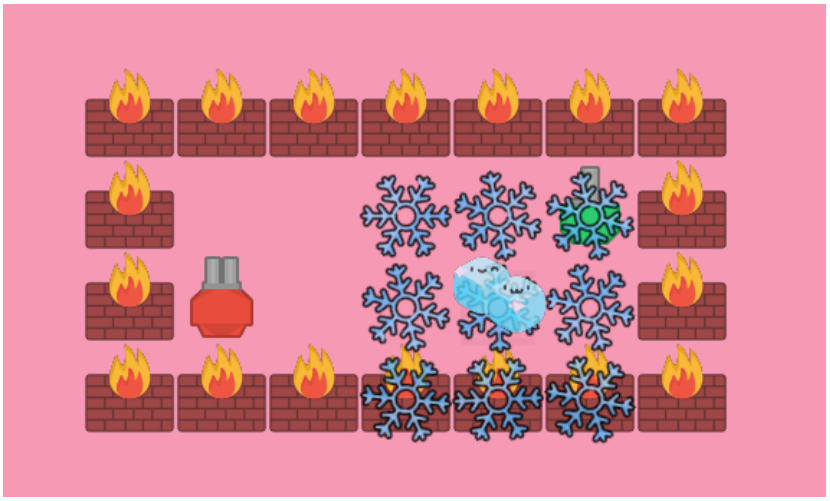
If you finish the hackathon, all the functions should work properly.

3 Code Requirements (Finish the game)

1. Add a new defense. (1%)
    a. Add a new defense shoots faster and further than the cannon defense, but with smaller damage.
    b. Its bullet can slow down the army
2. Add a new army (1%)
    a. Add a new army that is not able to move and attack defense.
    b. The army has high HP which can resist attack for a while.
3. Add a frozen spell (1.5%)
    a. The spell won't show on the armySelect scene. Instead, you will directly have 2 spells in the playScene.
    b. There is no constraint of the placement of the spell (i.e. you can place the spell anywhere on the map.)
    c. The spell effect region is a nine-square grid. When the spell is placed, it will have an iced effect in the region. Also, it will freeze the defenses' attack for 2 seconds in that region.

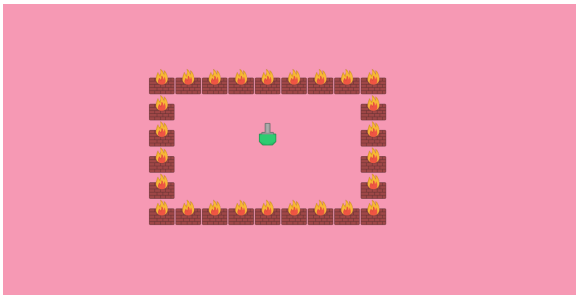
Frozen Spell

Iced Effect

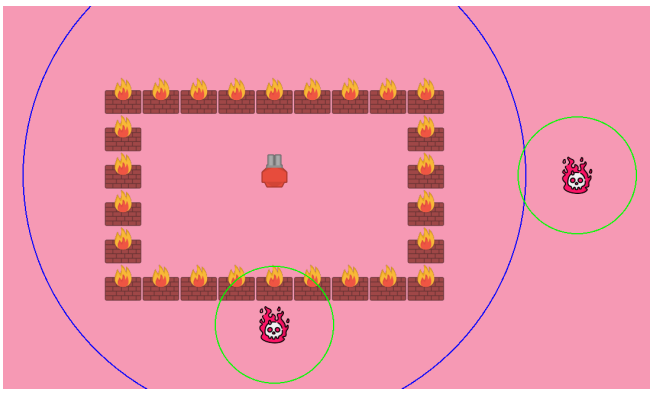


4. Add a new trap (defense) (1.5%)
    a. The placement of the trap cannot overlap with the defenses.
    b. The trap is invisible and will be triggered when an army is on the same block.
    c. Once the trap is triggered, the trap will kill the armies in a fixed region.
    d. After the trap is triggered, the trap will disappear.
    e. When switching to debug mode, the trap becomes visible. The region where all the armies will be killed will also become visible as well.
    f. Create a new map which consists of two kinds of defense and the trap.

Normal mode



Debug mode (the traps and the region will show up)



5. Do extra functions that are not mentioned in the above. (1%)

   Please use your creativity to do what you want. If you don't have any idea then you can implement the following examples:

   EX1: Create a hero with a special ability that can increase its speed and damage .

   EX2: Set a countdown timer to confine the attack time. If not all the defenses are getting destroyed in time, the player will also lose the game.

   [NOTE] You can consider an extra function to get 0.5%, unless your function is very complicated or skillful. In other words, you need to do 2 extra functions to get the points of this part !

4 Demo

Make sure you finish all the requirements above and demo the game to TA to get the points of miniProject 2. Otherwise, you might receive a points deduction.

Same as the hackathon, you have 10 minutes to demo the work, you need to show all the requirements above to get points of miniProject 2. Notice that TAs will score only by your demonstration, so make sure you prepare before the demo. Otherwise, you might get points deduction for missing showing some of the requirements.

[NOTE] If there's still some parts of the hackathon that you have not demoed, make sure you also demo them to get the points of the hackathon.