

F20 15-112 Term Project Project Proposal
Spencer Long
Section G1

Project Description:

My project is called Shapes Tower Defense. It is based on the popular online game Balloon Towers Defense. The game is a 1 player strategy game where players place towers with different abilities on the board. These towers will pop balloons that spawn at a beginning and travel along a path. When a balloon reaches the end of the path, the player's health is decreased. When the player's health reaches 0, the player loses.

Competitive Analysis:

This project will be mostly similar to other projects. We all have randomly generated maps where players have an assortment of towers to place on the grid. Most of the past TP that did do a Balloon Tower Defense Game had similar towers. These towers are the basic default towers that players initially are given at the beginning of the game. This includes a spike like contraption on the balloon path, a regular dart tower, a tower that shoots in 8 directions and a machine gun tower that shoots at a super fast rate.

My project will include an Ice tower, which I have not seen in previous years. This tower will shoot out a snowball that can freeze up to 5 balloons. In addition, I will also include invisible balloons that can only be detected by the Sniper towers. Sniper towers are long range, low DPS towers that can shoot balloons anywhere on the map. They are also the only tower in my game, besides the Ice Tower that can detect invisible balloons. Lastly, I have made my game super hard in order to create a differentiation from the relatively slow and laid back style of the original game. The number of balloons spawned will be growing exponentially, and the number of balloons with more lives (blue/green) balloons will also spawn more often as levels go up. Note that these features appear super early into the game in order to increase the difficulty of the game.

Structural Plan:

Currently, I cannot see a clear way to split the file into appropriate parts. My program is around 1500 lines of code. I have organized them into default MVC order where model functions are on top, controller functions in the middle, and view functions in the end. Since I did use Object-Orientated Programming to create the towers and balloons, it could be a reasonable idea

to put these in a separate document. However, this does not seem to do much, since they only take up around 200 lines of code.

Algorithmic Plan:

The trickiest parts of the project will definitely be the random map generation, path planning for the balloons, and the overall gameplay.

- Map Generation: Since I won't need a maze, I would need to modify popular maze generating algorithms to produce a labyrinth that has only one start and one end and also no dead ends. This will be implemented using recursive backtracking. For the randomness of the generator, I will randomly choose the length of the balloon path, where the path goes, and the end of the path. For stylistic purposes to account for the faultiness of the random module, I will also include a stylistic function that will make the map for readily a path rather than a path that goes around itself.
- Path Planning: I won't need to find the fastest path from the start to the end, so I modified a standard Depth First Search algorithm to do so. This algorithm will also use recursive backtracking to find the path that the balloon will travel. I will first find the neighbors of the default first cell ((0,0)) and then go down as far as possible on the children's neighbors. This will allow me to test every possible case of direction and find the best path.
- Gameplay: The gameplay will be very user interactive. Users will have the opportunity to choose which towers to place and also upgrade them. I also chose different kinds of balloons that will add extra features to the gameplay and more so allow for more kind of strategic play. An example would be the invisible balloon that can be only detected and popped by the sniper tower.

Timeline Plan:

Since I hard pivoted after TP1, my current timeline will include everything I plan to do for post MVP. This will include: invisible balloons, spawning of balloons, machine guy tower that is controlled by arrows keys, and upgrade features

Invisible Balloons - December 6th

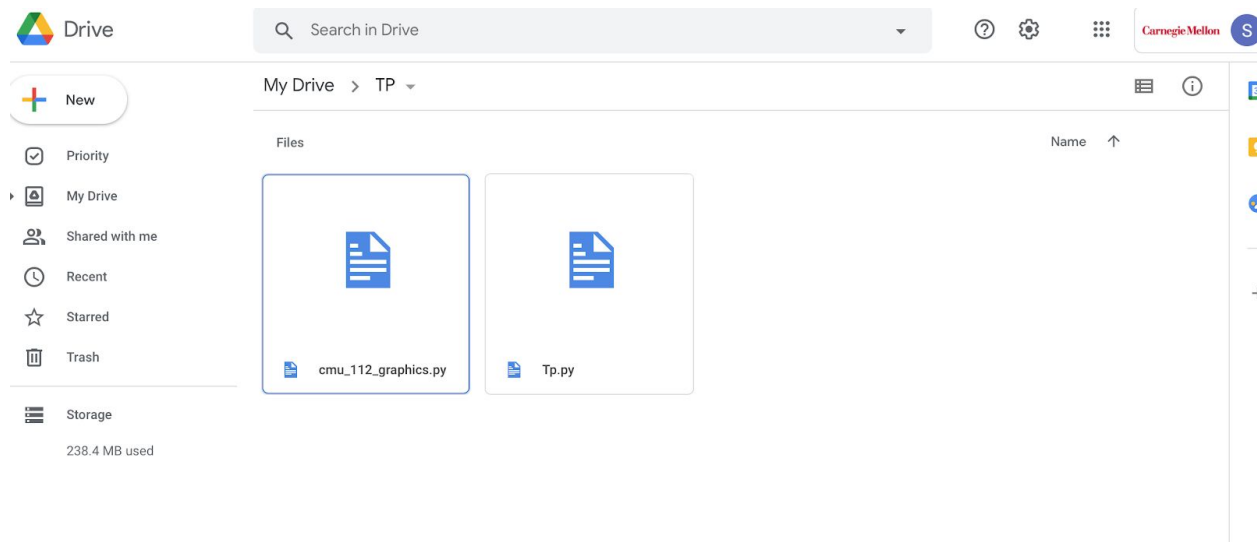
Spawning of Balloons - December 7th/8th

Machine Gun Tower - December 8th

Upgrades for towers - December 9th if time permits

Version Control:

I will backup my code using Google Drive. Since I hard pivoted late, this current version is the only and most up to date version.



Module List:

None were used.

TP2 Update:

None

TP3 Update:

Added an upgrade feature.

Changed machine gun to a bomb spawning tower.

Implemented invisible balloons that can only be detected by the sniper tower and the ice tower.