Project Description:
Bloons Tower Defense

Bloons Tower Defense is a game where a board appears with a path. The path can be autogenerated or it can be built yourself. As the game goes along balloons will start appearing from one side of the path and the goal of the balloon is to reach the end of the path. Different balloons have different speeds. The players' goal is to buy monkeys and place them, where these monkeys pop the balloons and make sure the balloons do not reach the end where we lose health. Different monkeys attack in different speeds and have different reach.

Comparative Analysis:
Similar projects I've seen online are on the Carnegie Mellon 112 website. The projects of Nora Wai and Matthew Coyle are some projects that I have seen and think my project will be very similar to theirs. We have a similar project since we are doing Bloons Tower Defense where there's an autogenerating map and you place monkeys, each having a different cost and area of range that pop the balloon. It is different from Nora's project since with her project you can control individual monkeys. Mine will also be different from Matthew's project because he has different color rows and cols which can only take certain monkeys while mine will not have that. Mine will have a similar feature to Nora's as one game mode will allow the user to create their own map and play with it.

Structural Plan:
The final project will be organized in a python file which I will submit it.

Algorithmic Plan:
Map generations: This part of the project will be quite complex as I will have to create a way for the game to create random maps that the player may use to play. I will do this by randomly selecting a row, col which has to be on the side of the map, and from there if the side is either north or south, I place the first few square paths to be vertical, else it should be horizontal. From there, I should create a code that should check if adding 3 square blocks in any direction is legal and place it. Once the path touches aside again, and with a certain length, it should stop.

Balloons on the path and moving along: First of all, I gotta create an empty list that shall have the coordinates of the first balloon. On every timer fired, the balloon should move a certain direction on the path which means I will have to find the next direction of the balloon by finding how the path moves either north, south, east, or west. I could do this by setting app.north, app.south, and the other two directions to False and as it goes, one will remain true, but if it needs to shift direction, the current direction will turn false while the new direction turns True. This will be done until the last square of the path is covered.

Monkey and Balloons interaction: I will have to create a class for the monkeys and for the balloons. The monkeys will have a specific radius and if the balloons enter the area of the monkey, one will be popped. Different monkeys will have different radius/areas and some will pop more balloons than others in the same period of time. The class of monkeys will have all

the area, damage type, damage speed, etc. The balloons will have their class too, some balloons will be faster than others and some may be tougher to pop than others.

Timeline Plan:
I plan to complete balloons on the path and move along by Monday and the monkey and balloons interaction by Wednesday. If this is possible I will be done with map generation by next Saturday and therefore reach MVP.

From TP1 to TP2:

My plan from TP1 to TP2 is to allow the monkeys to be added to the board once the balloon start moving along, and allow the monkey and balloons to interact with each other. This means that when the balloons get close to any monkey, the monkey should shoot a projectile at the balloon and consequently popping the balloon or making the balloon disappear. The next part I want to work on is to get the board to autogenerate maps meaning that when the game starts, there is a different board or path on the board everytime. If the player doesn't like the path or current board, they can press a key and a different path could be displayed.

Monday to Wednesday: Worked on the interaction between the monkey and balloons as I had to create and implement the three different classes of balloons, monkey and projectile. The biggest issue was the math of getting the projectile to find the balloon and go the right direction. It kept having bugs therefore debugging was a great pain and took me longer than expected.

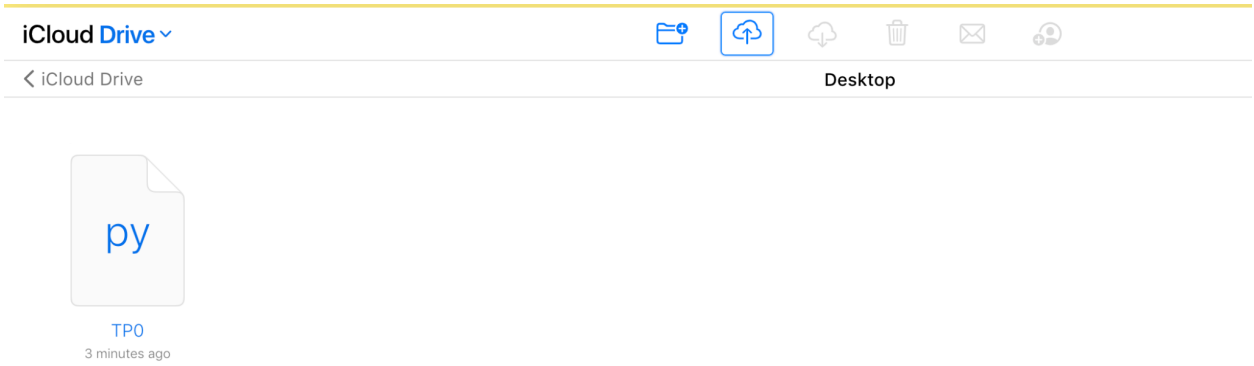
Thursday to Friday: Worked on the autogeneration of the map to allow the user to have a different map everytime without hardcoding it in. I did this by first finding the sides of the board and it has to autogenerate a start row and startcol at one of the sides. From there, we want to add three blocks or paths in any legal directions. If the path was a certain length and it reaches the side, we have completed the map.

From TP2 to TP3:

From Saturday to Sunday: I worked on fixing up some bugs I had with the map generations as sometimes it would crash. I also added a key to press to randomly generate a different map. I also added a the different screen such as loading screen, instructions screen and game screen. The instructions page clearly state the overview of the game.

Monday to Tuesday: I worked on created the different colors of balloons and making sure they are generated and move in different speed which make the game fun and harder. This means I have different balloons as well as procedurally harder enemy generation.

Version Control Plan:
I am backing up my code by updating and uploading my code on Icloud to be able to access it in any of my devices.



Module List:
I am not using any module list.

TP 2 Updated Design:
No changes in design were made

TP 3 Updated Design:
No changes in design were made