Jesse Lam											June 3rd

Period 1

Final Project Design Document

Bloons Tower Defense 5

Goal:

     To copy part of the tower defense games "Bloons Tower Defense 5." I will only add extra maps and towers if I have extra time.

     I will focus on implementing the core functionality of the "fun" part of the game. (Enemy movement and mechanics) (Tower attack and progression)

Functionalities:

     Clickable GUI

     Store an array of clickableUI. Clicking on this UI allows you to spawn towers (monkeys), upgrade, or start and end the game. For example, the fast forward button will double the framerate to make the game progress faster. (Unless it crashes)

     Enemy Pathfinding and Appearance

     Enemies (Bloons) will spawn in waves, travel the path using checkpoints, and head towards the end to deplete player health. They will spawn for 100 waves (Won't implement random waves). I will use hard coded data to spawn bloons at each wave. I already have an array of data containing this data from a past project. This will be a class. They have a unique health mechanic that will be copied from the original game.

     Tower Placement and Mechanics

     Players can spend money to create new towers (monkeys). These will use darts to pop the enemies and stop them from reaching the end. Towers can be upgraded.

Guide:

     Press the start button. Each wave of enemies will require you to press the start button to start

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Bloons: They will spawn on the start of the path after you press the start button. If they reach the end of the path, you will lose hearts until you fail at 0.

Monkeys: The class of tower used to defend the path. Click on a monkey that you have enough money for and click on a valid area to place it. A transparent radius representing the tower's range will appear indicating if you have met the conditions to place it. Use as much of the range as you can to cover the path.

You will receive money for each time a tower damages an enemy or the wave ends. This money will be used to upgrade or place monkeys.

This game ends once you complete wave 100 without depleting your hearts.

Progress Since Last Time:
Buttons: Added spawn buttons and monkey buttons to display information when selecting from shops or towers.

Bloons: Fully completed bloon class and bloon sprites.

Monkeys: Added towers and targeting to the game.

Projectiles: Added projectiles to the game. Records if already interacted with bloon or ancestors in the path.

Entity Components: Added entity components to bloons, monkeys, and projectiles in order to apply upgrades and dynamic behavior.

Optimization: Added HashSet, HashMap, WeakHashMap to record interactions and optimize collision checking.

Next Week's goals:
Complete entity component system and add upgrades. Add more monkeys and projectiles. Full completion by then.

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Challenges:

Processing gives terrible errors. It's impossible to find out where runtime errors come from.

Logic is slowly becoming too hard to follow because the code is so long.

Which of 294027 fields to add to UML diagram.

Class "File" is broken specifically on lab computers????

I have terrible organization and debugging programs right now. It's a whole maze trying to find out what is where and what functions I need to debug.

UML Diagram: Attached. Has little detail (the code is like 1500 lines long...)