CGRA151 Project Report

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Name of game/artwork: The tower

Vision: The vision for the game was to create a tower defense game where the player controls a tower to defend against waves of enemies. The player would be able to upgrade the tower's attributes and strategically defeat enemies to progress through rounds. The game's objective was to survive as many rounds as possible while earning money through enemy kills to purchase upgrades.

Achievement: I was able to achieve the core functionality of the tower defense game as outlined in the initial plan. The game features a tower that can be upgraded in terms of attack speed, damage, health points, and range. Enemies spawn at random edges of the screen and move towards the tower, and the tower automatically targets and shoots at enemies within its range. Rounds progress as enemies are defeated, and a boss enemy spawns every tenth round. The player earns money for each enemy killed, which can be used to purchase upgrades. The game also includes a graphical user interface with upgrade buttons.

Technical Challenges:

1. Implementing Target Selection: One of the main technical challenges was implementing the logic for the tower to select and target enemies within its range. This required iterating through the list of potential targets (both regular enemies and bosses) and selecting the closest one. To overcome this challenge, I created an `ArrayList` to store the targetable objects (enemies and bosses), iterated through them, and calculated distances to find the closest one that was within the tower's range.
2. Implementing Button Interactivity: Another challenge was implementing the interactive behavior of the upgrade buttons. I needed to ensure that buttons changed color when hovered over or clicked, and the corresponding tower attributes were upgraded when the player clicked on them. To address this, I modified the `Button` class to handle button click states and trigger upgrades when clicked.

Reflection: Creating this tower defense game was a valuable learning experience. The core functionality of the game aligned well with the initial plan. However, some aspects, such as button interactivity and visual feedback, required more attention than anticipated. Implementing these features, especially ensuring that only the clicked button changes color, was more challenging than expected. Overall, the plan served as a solid foundation, but flexibility was necessary to adapt to unexpected challenges. In the future, I would consider adding more features and levels to make the game even more engaging and challenging for players.