

# **“Prasart Dang Battle”**

**Created by**

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# “Prasart Dang Battle”

## 1. Introduction

Prasart Dang Battle is a 2D side-scrolling real-time strategy (RTS) game developed using JavaFX. Drawing inspiration from the classic web game *Age of War*, the objective is to manage resources and deploy units to destroy the enemy base situated on the opposing side of the battlefield while defending one's own. The game operates on a tug-of-war mechanic where players must strategically train specific unit types, construct defensive turrets, and purchase upgrades to overcome the enemy's AI. The game ends when either the player's or the enemy's base health reaches zero.

## 2. Gameplay

The main menu is the very first screen players see when launching the game. This menu displays three buttons:

- **Start Game** : This button begins the game, initializes the battlefield, and takes you to the gameplay area.
- **How to Play** : This button provides instructions on the game objectives and mechanics.
- **Exit** : This button quits the game and closes the application. (Figure 1) can be used as a reference to see a visual example of the main menu layout.

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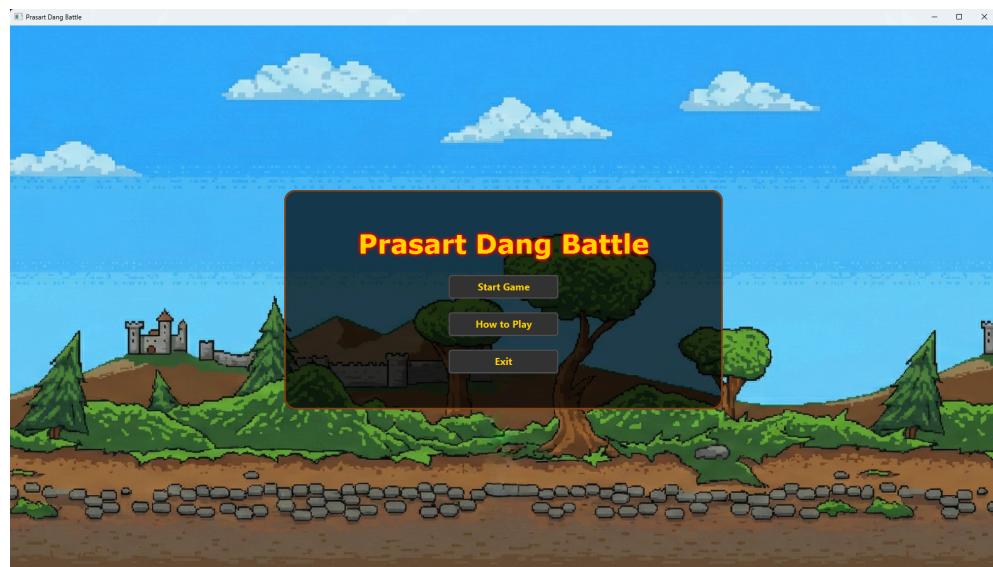


Figure 1 : The main menu

## How to Play Menu :

- Clicking the “How to Play” button from the main menu displays a **Battle Manual** screen explaining the rules and unit counters (refer to Figure 2 for a visual reference).
- This screen contains a list of objectives, resources, and the “Rock-Paper-Scissors” counter system logic.
- To return to the main menu, the player must click the “Return to Menu” button located at the bottom of the manual. This closes the tutorial view and re-enables the main menu interactions.

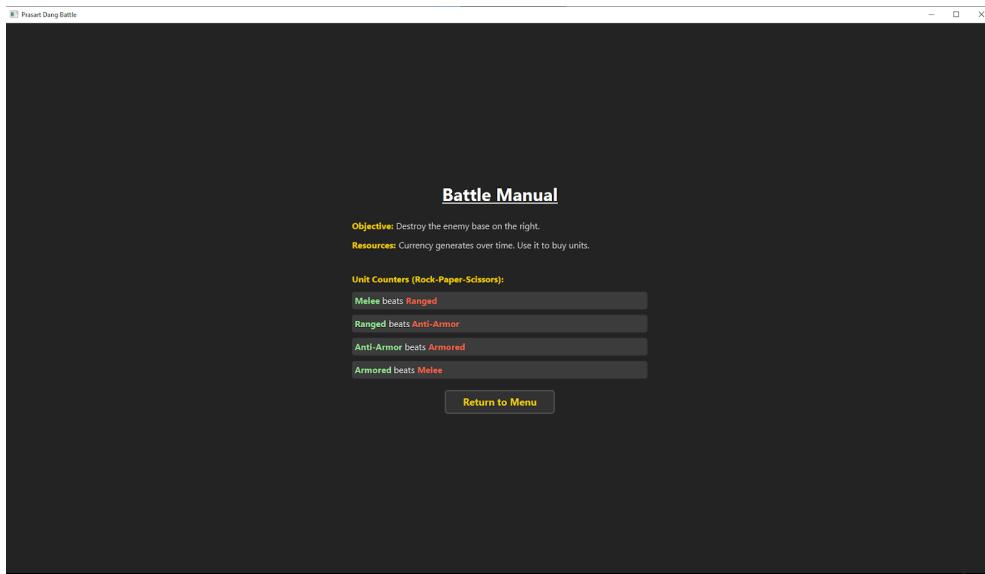


Figure 2 : Battle Manual (How to Play) Screen

## The Game Screen

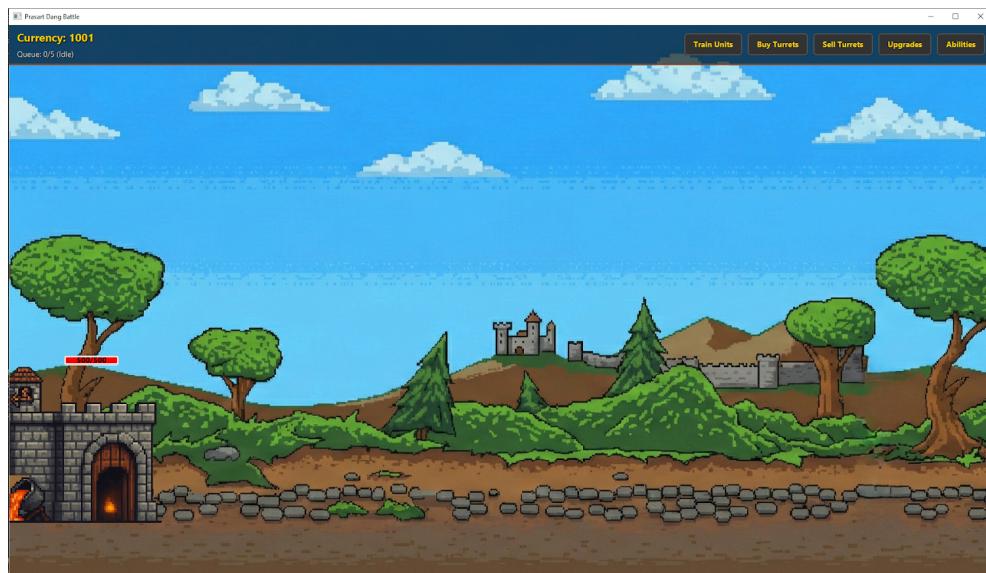


Figure 3.1 : The main Game Screen (Left side)

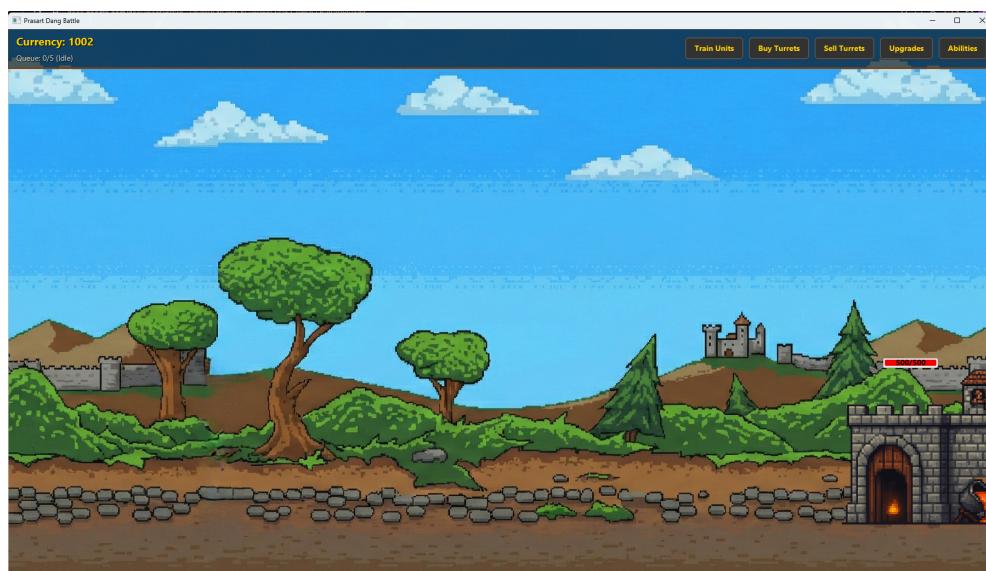


Figure 3.2 : The main Game Screen (Right side)

- **Player Base (Left)** : This is the player's stronghold. It must be defended from enemy attacks. (See Figure 3.1)
- **Enemy Base (Right)** : The target that must be destroyed to win the game. (See Figure 3.2)
- **Scrolling Battlefield** : The area between bases where units march and fight. Players can scroll left or right by moving the cursor on the left or right edge of the screen to view the action.
- **HUD (Heads-Up Display)** : Located at the top, this panel contains all controls for training units, buying turrets, and upgrading stats.
- **Currency Display** : Shows the current amount of gold available to spend.
- **Queue Status** : Displays how many units are currently waiting to be trained (limit of 5).

There are 4 types of units in this game:



Figure 4 : Unit Types

From left to right, the available units are **Melee**, **Ranged**, **Anti-Armor**, and **Armored**. In this battlefield, players interact with the HUD to deploy these sprites. The game requires currency to initiate the training process. The cost ranges from 80 to 150 currency depending on the unit type.

To prevent excessive unit spamming and maintain game balance, a **Training Queue** is implemented. The queue can hold up to five (5) units at a time. Each unit takes a specific amount of time to train (e.g., 1 to 4 seconds). When the queue is full, players cannot purchase additional units until a slot becomes available.



Figure 5.1 : Training Queue (Idle), and Training Queue (Active)

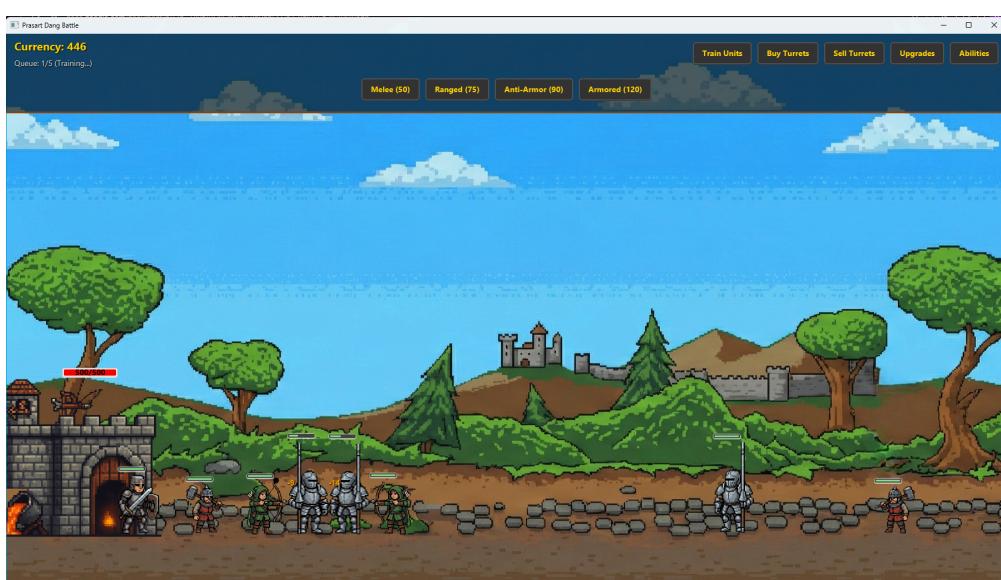


Figure 5.2 : Units fighting on the map and Turrets defending the base

## Defensive Structures (Turrets)



Figure 6.1 : Turret Types (Standard)



Figure 6.2 : Turret Type (Long Range)

To protect the base from incoming enemy waves, players can construct defensive turrets. These automated structures are stationary and automatically target the nearest enemy unit within their range.

There are two types of turrets available for purchase:

- **Standard Turret** : A balanced defense option costing **300 Currency**. It deals consistent damage with slight random variance to enemies within a moderate range.
- **Long Range Turret** : A specialized sniper tower costing **450 Currency**. It has a significantly longer attack range and features a unique mechanic where it deals **1.5x damage** to targets that are far away (more than 50% of its max range).

### Turret Mechanics :

- **Placement & Capacity** : The player's base starts with **1 turret slot**. Players can upgrade the base capacity to hold a maximum of **2 turrets** via the Upgrade menu. If a slot is empty and the player has enough funds, clicking the buy button instantly places the turret on the base.
- **Auto-Attack** : Turrets operate on a cooldown system (1.5 seconds). Every game tick, they scan for the closest valid enemy. If an enemy is found and the cooldown is ready, the turret fires a projectile.
- **Selling** : If a player wants to replace a turret or needs quick cash, they can sell an existing turret. This action removes the turret from the base and refunds **50% of its original cost** back to the player's currency.

## Upgrades

Players can invest currency into permanent technological improvements via the **Upgrade Menu**. These enhancements are crucial for keeping pace with stronger enemy waves in the late game. Each upgrade is a **one-time purchase**.

- **Unit Attack (Cost: 300)**: Increases the attack damage of all player units by **20%**. This applies immediately to existing units and all future trained units.
- **Unit HP (Cost: 300)**: Boosts the maximum health of all player units by **50%**, making them significantly more durable in combat.
- **Turret Attack (Cost: 400)**: Enhances the damage output of all defensive turrets by **20%**.
- **Turret Range (Cost: 400)**: Extends the firing radius of turrets by **20%**, allowing them to engage enemies sooner.
- **Slot Cap (Cost: 800)**: Upgrades the base infrastructure to support an additional turret slot, doubling the defensive capacity from **1** to **2 turrets**.

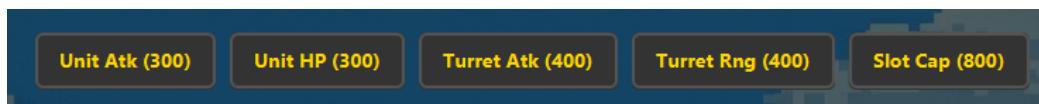


Figure 7: Upgrade Menu

## Special Abilities

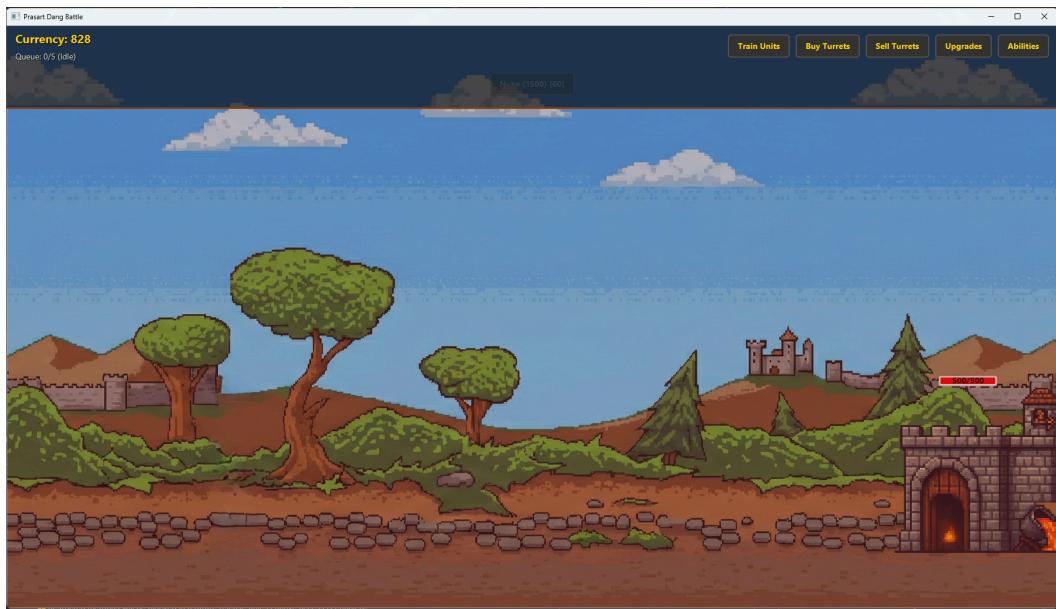


Figure 8 : Nuke Ability Button and Effect

Beyond standard units and turrets, the player has access to a powerful **Ability System** designed to turn the tide of battle in critical moments. Currently, the game features the **Nuke Ability**, a high-impact ultimate attack.

### Nuke Ability Mechanics :

- **Effect** : When activated, the Nuke targets **all alive enemy units** currently on the battlefield. It deals **9,999 damage** to each unit, effectively wiping out the entire enemy wave instantly regardless of their health.
- **Cost & Economy** : This power comes at a steep price of **1500 Currency**. This creates a strategic trade-off, as saving for a Nuke delays the player's ability to train units or buy upgrades. It is best used when the player is being overwhelmed by a massive enemy push.
- **Cooldown Management** : To prevent spamming, the ability has a **60-second cooldown**. After use, the button in the HUD becomes disabled and displays a countdown timer (e.g., "[59]"). The player cannot use the ability again until the timer reaches zero and the button reactivates.
- **Visual Feedback** : Activation triggers a global visual effect where the entire screen flashes red, signaling the devastation of the enemy forces.

## The Control Panel (HUD)

The control panel keeps things organized. There are no complex input sequences.

- **Action Menu** : This area lets players toggle between different sub-menus: Train Units, Buy Turrets, Sell Turrets, Upgrades, and Abilities. (Figure 9.1: Action Menu)
- **Sub-Menu Area** : When a category is selected, specific buttons (like "Unit Atk" or "Standard Turret") appear here. (Figure 9.2: Sub-Menu Area)
- **Health Bars** : Visual bars near the bases show how close the player is to winning or losing. (Figure 9.3: Health Bars)

Players can select a unit or turret and ensure they have the necessary currency to complete the purchase. Pure strategy and resource management are key.

In the **Train Units** menu, players will see buttons for all available units. If the player hovers the mouse over a button, a **Tooltip** box will pop up with more details. This box tells the name of the unit and its specific counter-ability (e.g., "Deal 2 times damage against Ranged unit"). (Figure 9.4: Unit Selection Buttons)

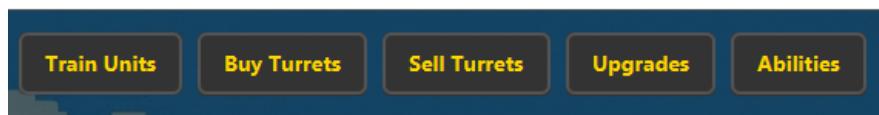


Figure 9.1: Action Menu

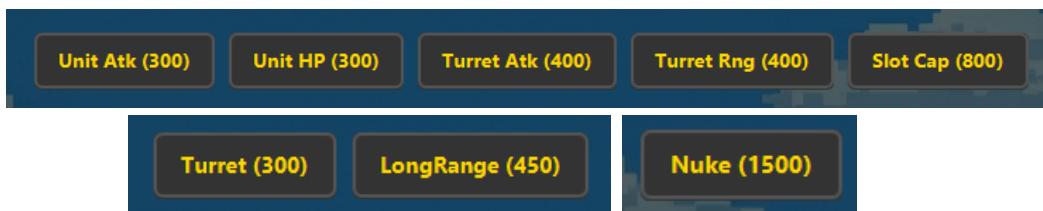


Figure 9.2: Sub-Menu Area



Figure 9.3: Health Bars



Figure 9.4: Unit Selection Buttons With Tooltip box

## The End Screen

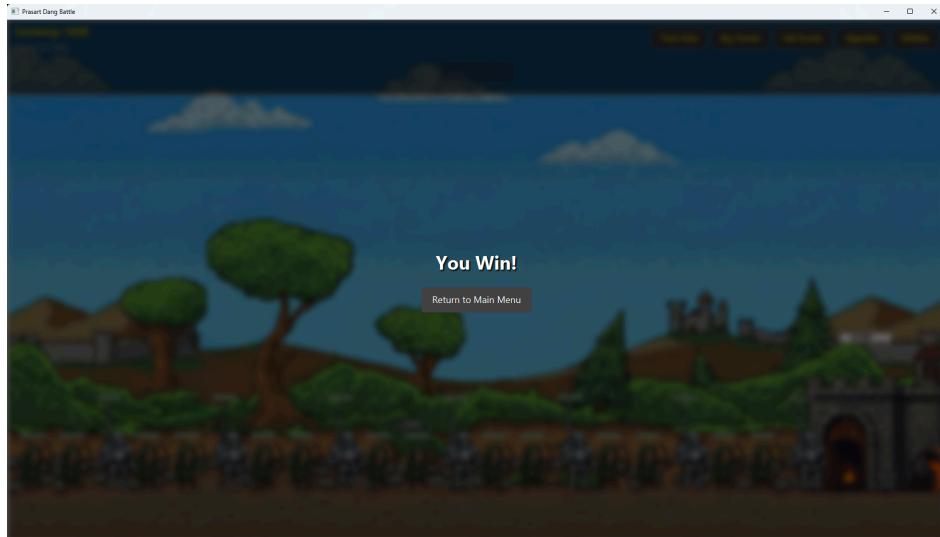


Figure 10 : The Winning Screen

The goal is to reduce the **Enemy Base HP** to zero. Deploy units and build turrets to push the battle line forward. Once the player destroys the enemy base, they win the game.

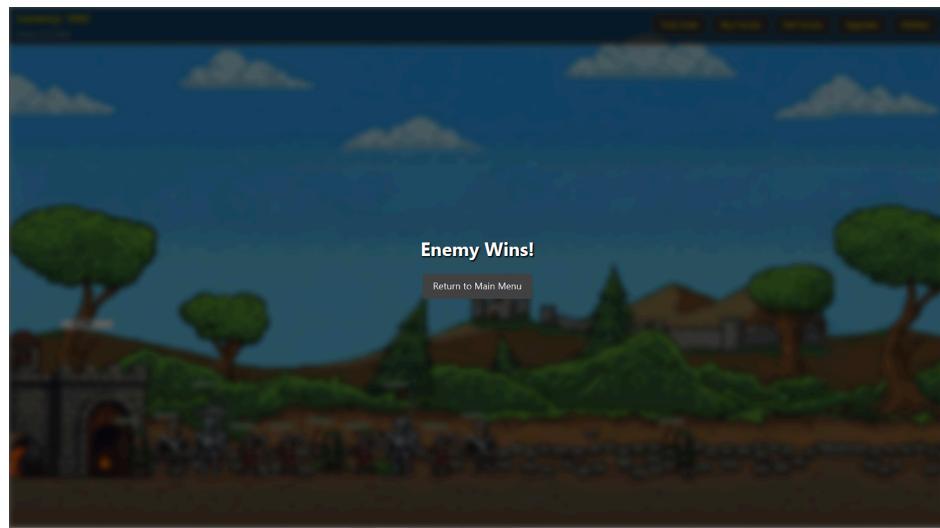
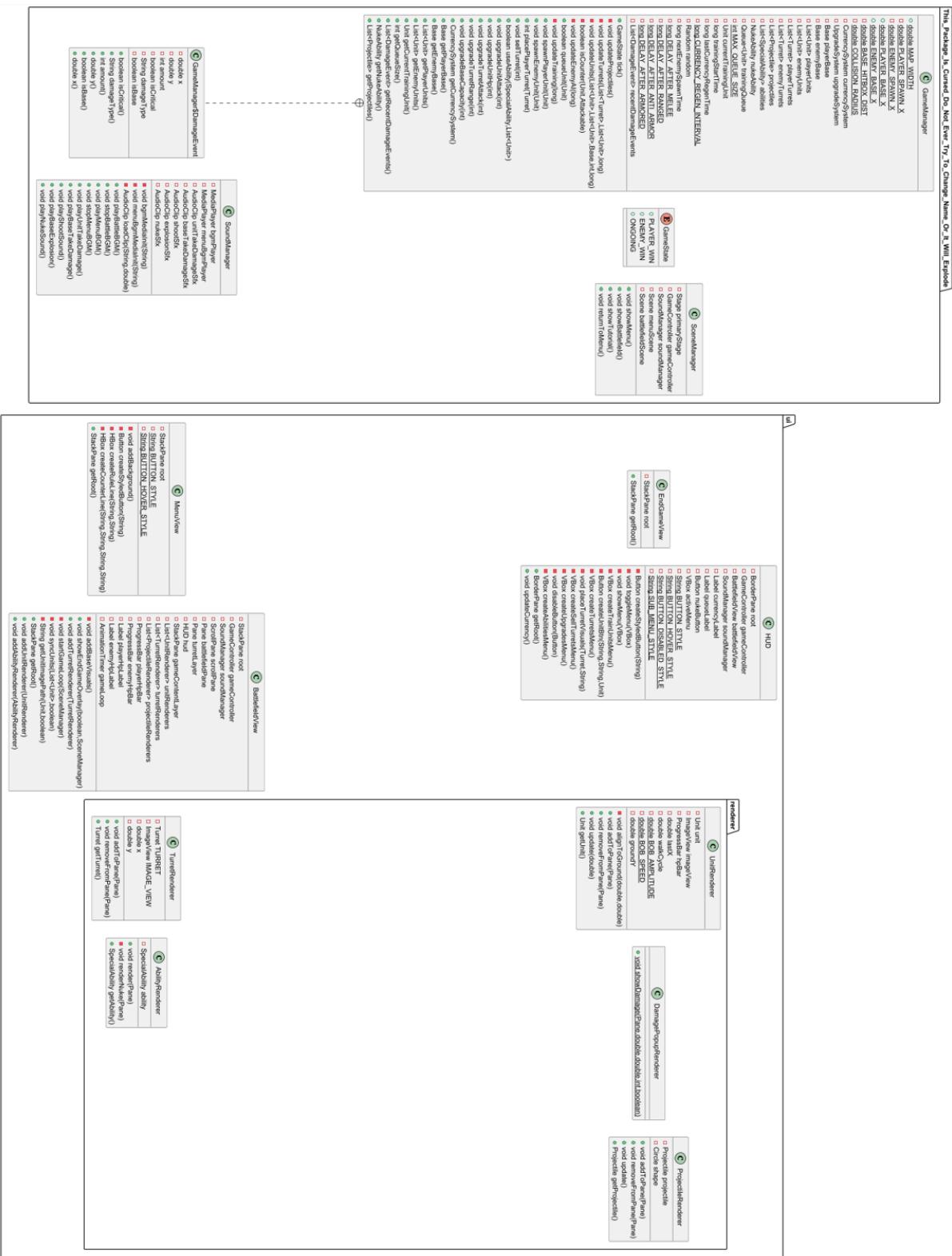


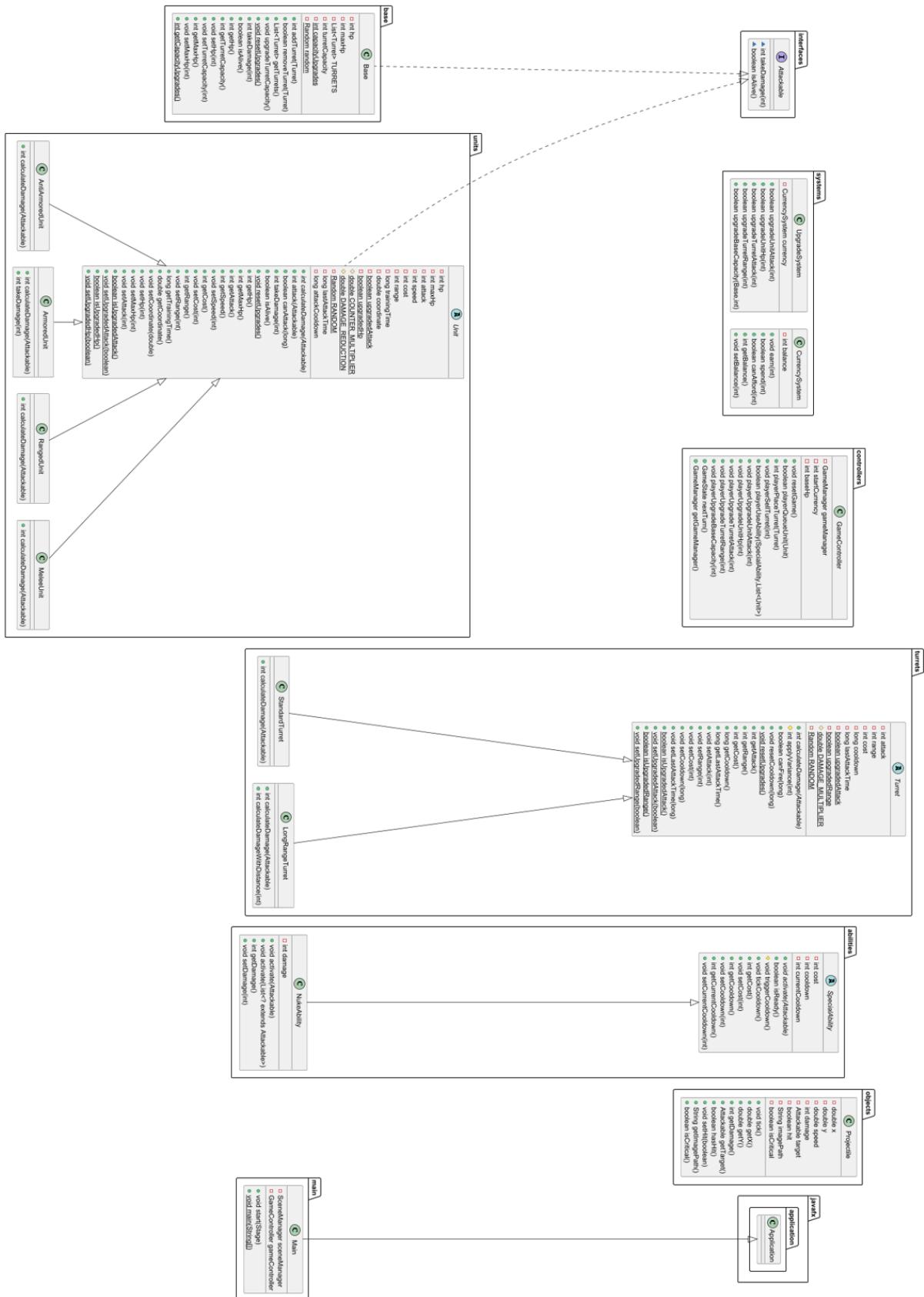
Figure 11 : The Losing Screen

If the **Player Base HP** reaches zero before the enemy does, it is game over. Even if the player has upgraded everything, failing to protect the base will result in a loss. The screen displays a message indicating the result and a button to return to the main menu.

### 3. UML Diagrams



### **3. UML Diagrams (continued)**



## **4. Implement Details**

<https://szipery.github.io/MethOverFent-implement-details/>