

Tank Battle Game Report

Introduction

The "Tank Battle Game" is an engaging project designed to demonstrate core game. This report provides a comprehensive analysis of the game, highlighting its mechanics, technical implementation, artistic elements, and potential areas for improvement. The project focuses on creating a dynamic simulation where player-controlled and AI-controlled tanks interact in a virtual environment, with the ultimate goal of defeating the enemy.

Key Features and Components

1. Concept

The "Tank Battle Game" provides players with an immersive tank battle experience, combining strategic gameplay with visually appealing elements. The core concept revolves around controlling a tank to defeat enemy AI tanks, which respond dynamically based on the player's actions. The game leverages classic tank battle mechanics while introducing innovative features, such as randomized enemy movements and AI decision-making, to keep the gameplay fresh and engaging.

2. Visual and Artistic Elements

The game uses Unity's graphical capabilities to deliver a visually appealing experience:

- Trail Effects: The "RainbowTail.cs" script adds a dynamic trail effect to objects, enhancing the visual feedback during tank movement.
- Camera Perspectives: Multiple camera views (first-person and third-person) allow players to choose their preferred perspective, increasing immersion and adaptability.
- Lighting and Shading: Effective use of Unity's lighting enhances the realism of the game environment, while object hierarchies ensure smooth animations for moving parts like the turret and barrel.
- Health Bars and Feedback: Real-time health indicators for both player and enemy tanks provide crucial gameplay feedback.

3. Algorithmic Complexity

The project employs several sophisticated algorithms to enhance gameplay:

- AI Decision-Making: The enemy tanks use a state machine to determine actions based on their distance from the player and health status. This approach allows for dynamic and context-sensitive behavior.
- Projectile Physics: The cannonballs are instantiated with realistic physics, including velocity, gravity, and timed destruction, ensuring an authentic gameplay experience.

- Pathfinding with Deviation: Enemy tanks navigate the environment using randomized deviations to simulate strategic movement.
- Shooting Cooldown Management: A coroutine ensures that enemy and player tanks cannot spam projectiles, maintaining a fair balance in gameplay.
- Randomized obstacles and bunkers size and locations: This game generates random obstacles in random locations on the map, satisfying the ability for players to replay the game over and over again.

4. Gameplay Mechanics

The game offers an intuitive and engaging gameplay experience:

- Player Tank Control: Players can move, aim, and fire using straightforward controls. The "TankMotionController.cs" and "BarrelAngle.cs" scripts handle the movement and barrel adjustments, respectively.
- Win and Lose Conditions: The game provides clear objectives, such as defeating all enemies to win or losing when the player's health reaches zero or the player falls off the margins of the map.
- Dynamic Enemy Waves: Enemies spawn randomly on the map after each defeat, ensuring continuous challenges for the player.

5. Completeness

The game includes essential components to ensure a complete experience:

- Introductory Scene: The game starts with a menu, offering options to begin or quit.
- Dynamic Environment: Tanks spawn at random locations, creating a unique experience in each playthrough.
- Audio and Visual Feedback: Shooting sounds, collision effects, and health bar updates provide real-time feedback on the player's actions and progress.

6. Intangibles

Beyond its technical and visual elements, the game incorporates features that enhance the overall experience:

- Audio Effects: Shooting and collision sounds add to the immersion.
- Customization: Players can switch between camera views to tailor the experience to their preferences.

Grading Criteria Analysis

1. Concept

The game introduces a competitive and strategic tank battle experience. While it incorporates traditional mechanics, it adds innovative features like randomized enemy behavior to maintain player engagement.

2. Visual and Artistic Elements

The visual elements are well-integrated, with cohesive lighting, shading, and animations. Health bars and camera transitions complement the gameplay, creating an immersive environment.

3. Algorithmic Complexity

The project demonstrates a high level of complexity through:

- State-based AI behavior.
- Projectile physics and interactions.
- Pathfinding with random deviations.

4. Gameplay

The gameplay is intuitive and engaging, with clear objectives and smooth controls. The dynamic spawning of enemies ensures replayability.

5. Completeness

The game is complete with all necessary components, including a tutorial, interactive elements, and clear win/lose conditions.

6. Intangibles

Audio and visual effects enhance the immersive experience. The ability to switch between camera views provides customization options.

7. Presentation and Report

This detailed report and the accompanying presentation comprehensively cover the game's features and technical implementation.

Conclusion

The "Tank Battle Game" is a robust project that showcases core game development principles. With its engaging gameplay, dynamic AI, and polished visual elements, it provides a solid foundation for further expansion and improvement. The game's modular design and clear objectives ensure a satisfying player experience, meeting the requirements for a high-quality submission.

Identify assets that is not created ourselves:

In the folders “Objects” and “ObstaclePrefabs”, we did not create those objects. Instead, we use the models from Kenny Nature Kit.