Technical Design Document

# Section 1 – List of Features Captured from GDD

## List of Features Based on the Game Design Document:

* + - Third person
    - Game world, including
      * 3D objects
      * Characters
      * Weapons
      * Buildings with walls
    - Windows platform deployed
    - Background story
    - Opening scene
    - Guide
    - Different levels:
      * Varying difficulty
      * Varying challenge
      * New levels introduce varying of health and ammo
    - Audio and sound effects
    - Realistic AI of enemies’ tanks
    - Scoring system
    - Menus
    - Lighting effects

# Section 2 – Choice of Game Engine

The game engine that has been chosen is Unity. Unity is a development platform, which implements the Unreal engine for the users to edit and manipulate. Some of the features that Unity possesses are:

* + - Animation
    - AI
    - Audio system
    - Editing of the game environment
    - Physics support with physics assets
    - Rendering
    - Scripting

This game engine was chosen since it was considered to be the most adaptable. Furthermore, all three team members have prior understanding of Unity, which is the most widely acknowledged by many companies. Furthermore, Unity is extensive, allowing for multiple plugins, which will be beneficial when diverse things are created using other art tools.

# Section 3 – Schedule

The schedule for the development of the game is shown below:

Table

Description automatically generated

* Every member of the group will participate in every task
* Each task will be led by a member of the group.
* This lead group member will be in charge of the job at hand and will contribute more to it than the other members of the group.
* The lead group members will be selected based on the team members' strengths and prior expertise.

# Section 4 – 3D Objects, Terrain, & Scene Management

## 4.1 3D Objects:

* + - Main Scene:
      * Player Tanks
      * Enemies Tanks
      * Bullet
      * Barrels
      * Ground
    - Tanks
      * Turret
      * Body
      * Left tracks
      * Right tracks
      * Armor
      * Cubes for Collisions
      * Hull
      * Gun
      * Main Gun
      * Turret Ring
      * Empty Object for firing
    - UI:
      * Health Bar
      * Score Bar
      * Bullet Count
      * Main Menu

## 4.2 Sounds:

* + - Background Music
    - Explosion Sound effect
    - Driving the tank engine sound
    - Shell Explosion
    - Tank Firing
    - Shot Charging sound
    - Particle Systems:
      * Fire
      * Explosions

## 4.3 Terrain:

* + - Outdoors:
      * Motorway
      * Roads
      * Buildings
      * Obstacles
      * Enemies’ tanks
      * Particle Systems
      * Sky
      * Fog

## 4.4 Scene Management:

* + - The responsibility of the scene management system is the efficient rendering and loading of complex scenes
    - It includes components:
      * Loading the First Scene that shows all the options
      * Choosing the first options would load the guide scene
      * Other options each will load a different level of the game (Easy, Medium and Hard)

# Section 5 – Collision Detection, Physics & Interaction

## Collision Detection:

* + - This is where there will need to be detection of the intersection of two or more objects within the game
    - Characters cannot walk through objects – objects must remain solid
    - Characters will need to walk around items as characters cannot walk through the items
    - Collision detection will be needed for when:
      * Player shoots the tanks
      * Tanks and characters collide
      * Tanks hitting into all objects
      * Bullets Shot
      * Objects hitting into each other
    - To enforce collision detection in the game:
      * Unity Collision Detection can be used

## 5.2 Physics:

* + - This is the component that makes the game real
    - Player reacts to player input and decisions
    - Must be realistic
      * All objects fall over realistically
      * All objects must be destroyed realistically
    - Friction and gravity
    - Physics will be needed for:
      * Picking up items
      * Dropping items (gravity & speed)
      * Objects that break shatter
      * Shooting from the tank
    - To enforce physics in the game:
      * Unity was used with physics assets implemented onto objects

## 5.3 Interaction:

* + - This is how characters interact with the game world
    - Interaction with objects:
      * Picking up weapons
      * Interacting with the enemies’ tanks
      * Collecting health
    - Enemies’ tanks interaction:
      * Tanks remain moving unless triggered by player’s presence
      * Once triggered, tanks start changes to follow player’s tank and shoot the player until either the enemy or the player’s dead or the ammo is out of stock
    - To enforce interaction in the game:
      * Unity can be used with triggers

# Section 8 – Game logic & Artificial Intelligence

## Section 8.1 Artificial Intelligence:

* The tanks path will use AI
  + - * They will keep moving using animation until they see the playable character
      * When they have seen the playable character then they will continue to go after them

# Section 9 – Audio & Visual Effects

## Section 9.1 Audio Effects:

* + Free sounds from the internet

## Section 9.2 Visual Effects:

* + Free visual effects from the internet
  + Visual effects in Unity Asset Store

# Section 10 – Delivery Platform & Hardware/Software Requirements

## Section 10.1 Delivery Platform:

* + PC Windows platform

## Section 10.2 Hardware Requirements:

* + Dual core processor
  + 1 GB RAM
  + Keyboard
  + Mouse
  + Monitor
  + Speakers
  + Hard drive
  + Graphics
  + CD Drive/USB

## Section 10.3 Software Requirements:

* + Windows XP, Windows Vista or Windows 7
  + Direct X version 9, 10 or 11