Checklist:

Required function	Implement
Step 1: Modelling the environment 20%	completed successfully
Step 2: Physics 30% total	completed successfully
Step 3: Keyboard (and/or mouse) interaction 10%	completed successfully
Step 4: Gameplay 20%	completed successfully
Extra 20%	completed successfully

1. Environment details and how to run the program

System:

- Windows 10 Professional 20H2

Software version:

- Unity 20.20.3.3f1c1
- Visual Studio Community 2019 16.9.3
    - MSVC v142 – VC 2019 C++ x64/x86
    - Windows 10 SDK (10.0.18352.0)

How to run program:

Three ways to run program: (Download the ZIP file and unzip it)

1. Run execution (recommend): Find the folder with the name *EXE*, click in and run the program with the *battleLite.exe* suffix
2. Unity Hub: Add and select the *Unity Project -> battleLite* folder
3. Create a new project in Unity, import the *battle.unitypackage* suffix file into the new project, and click Play to run the program

2. Describe : *Tank battle mini game*

Modelling environment and Physics:

Game scenes and models are built with 3D models, each item comes with ambient light, shadows and textures.

Physics:

All items have object collision detection. If a tank hits an object or a wall in the scene, it will not pass. The fired bullets will explode and disappear when they hit any object. When the enemy or player tank life goes to zero, it will be removed from the game. It is restored when respawn starts

Keyboard interaction:

The game allows the player to control his tank in third person view and to attack the tank enemies. WASD and arrow keys are to move, space is to attack.

Gameplay:

The game has a total of three card stages, each stage scene is different, the number of enemies is also different. The further you go, the harder it gets.

Extra:

The UI interface has the current number of stages, the remaining time, and the number of enemies killed. Players need to pass the stage within a certain time. The game adds background music, firing sounds and bullet, etc.

Game process description:

How to start the game: In the game interface, click the “Start” button to start

When the game is played, the player needs to control the tank action by using the arrow keys, and press space to fire the shells. If you enter the enemy attack range, you will be attacked by the enemy tank.

If you destroy all the enemy tanks in the change scenario, the pass screen will pop up, press the ‘N’ button to enter the next scene

When the player dies, then the death screen pops up and there is a confirmation button to click to restart the game.

3. Explaining how the functionalities and additional requirements are implemented

Scripts: (C#)

GameManager.cs

Game scene switch, death interface, UI interface scene number, kill enemy number, time

CameraFlow.cs

Third-person camera following the player

Tank_Attack.cs:

Tank attack script that instantiates a bullet model at the firing port.

Tank_health.cs

Tank health script, show blood (HP 100), detect bullet impact then deduct blood, damage range 15-25, destroy the object if life is less than or equal to 0

Tank_Movement.cs

Tank movement script, the player is controlled by the keyboard to move, the enemy tank is automatically patrolling, when the distance between the enemy and the player is less than or equal to 15f, then stop patrolling and towards the player, call `Tank_Attack` script to launch an attack

Shell.cs

Shell script, add sound effects, object collision detection, destroy the Shell Object if it hits an item

DestroyForTime.cs

Shell flight time, more than 1.5 seconds to destroy the Shell.