COMP4490 Group Project:

**Kill Mosquito**

Group members:

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**Introduction:**

In this project, we use unity game engine to build an FPS game, **kill mosquito.** In this game people can use w,a,s,d to control the move direction, and space to jump(if you are on ground, not in air or on big scope). You need to shoot the mosquito (which represented as a sphere floating and moves randomly in the air) with right mouse button to get score. You can exit the game by pressing the escape on your keyboard. If you shoot the ground object like rocks or boxes, you will lose you mark. Once you dropped into the lake, you will lose. You target is to get as much score as you can by shooting mosquitos.

**Background:**

In this project, we use Unity Game Engine as our development tool, C# as our developing language. We want to build an FPS game to shoot floating objects (mosquitos) in a well rendered scene. We used several techniques to establish an much more reality scene. Since Unity has many build in features in game development. Using unity gives us great understanding of the computer graphics.

**Techniques:**

In this project, we build the ground with the terrain which is an build in feature in unity, it gives us a simple tool to get a mesh of an game object. And then it allows us to load the texture of the ground and put trees and grass objects on the terrain. In this way, we can create the prefab (which means a package of objects and their attributes) of the ground. Then we using the Phong model shader to render our scene, we added an direction light to light all our models. Then we added an terrain collider attribute to the ground to hold all game objects on it.

Since it is a first person shooting game, we don’t need the model of the person, so we use an empty object to represent our player and in the hierarchy of our game objects, we place a camera as a child of our player which means the camera will follow the player while player moving and turning around. We added an C# script to control the player moving.

We added a weapon to the player object by using the script. Because in our original design, the weapon can be changed dynamically. People can pick up the weapon on the ground. Unfortunately, we don’t have enough time to implement this feature. We have the animation of the weapon to indicate it is shooting or not. And we have an script to control the weapon shoot, which is bounded on the player game object. We added a partial system at the top of the gun to indicate it is shooting.

There several breakable objects in the scene (including the mosquitos), it can break into pieces. We use 3dsMax to divide the model into pieces and recreate them to the original object. In Unity, we add box collider to every piece of the pieces in the object, and make it kinematic. Once we need it to explode, we simply change the kinematic attribute to false. It will explode because every fragment in the objects pushes each other.

Once the weapon shooting, we generate the bullet game object which has a tail after it using the tail render. The bullet runs fast, and the tail will exist 0.5 seconds after the bullet. But we determine if the bullet hit the object in the scene by the ray tracing. We create an ray cast from our camera positon and follow the direction of the camera forward vector. If the ray hits an object, we determine if the object is the mosquito or the other objects on the ground. We will call “broken” function which we implemented in the boxBreak script, to break the object.