Assignment Brief: FPS – Physics for Games

Overview:

Modern first-person shooters make heavy use of in-game physics engines to implement their game mechanics.

Imagine your favourite FPS game, like HALO or Call of Duty. The player can drive vehicles that behave differently on different surfaces; throw grenades; interact with objects like platforms, doors, and crates; and shoot enemies that immediately turn to ragdolls.

Throughout this subject you have learnt how to simulate various physical effects in a 3D simulated world. In this assignment, you are tasked with creating a simple first-person shooter that contains a series of gameplay mechanics, the implantation of which will require the application of the physics simulation techniques you have learnt.

Implementation:

Create a simple first-person shooter in the Unity 3D game engine that has the following features:

- A player-controlled character implemented using the Character Controller component.
  Your player character may or may not have a model, depending on whether you choose to use a first- or third-person camera.
- The player can shoot enemies. Rather than shooting bullets implemented as GameObjects and controlled via the physics engine, use ray tracing to determine which enemy is shot when the player shoots.
- The player can throw a grenade that will affect nearby enemies upon detonation.
- When an enemy is shot or a grenade explodes nearby, they should turn into a ragdoll.
- Have a platform that is raised and lowered via a trigger or button.
- A door or pendulum, or another example of a joint.
  You may want to optionally attach a motor to your joint.

For this assessment you will only be assessed on the physical simulation, but consider adding other game elements to your simulation, like a menu, GUI or score.