Part 2: 3D Melee Combat Controller

Brief – 08/21/2021

# Overview

The next logical step in character controller creation is to flesh out the combat controls. In the future I want this game to contain melee, ranged (bow and arrow) and magical combat. For now, I will start by adding in some basic combat logic to progress the character controller.

# Goals

* Create base for 3D melee combat by adding attack logic to the game
* Add new animations to the 3D model for combat
* Create 3, one-handed melee weapons for testing
* Create a stationary target to test melee combat on, with some reaction to being hit (shaking)

# Research

## Melee Attack Logic

A Redditt post [here](https://www.reddit.com/r/Unity3D/comments/1mgk79/how_do_you_or_would_you_implement_melee_combat/) explores how to implement melee logic. The prevailing idea is to use a distance based raycasting method to detect targets and affect them accordingly. One method mentioned used animation events to pinpoint exactly when the raycasts should be fired. Another used a cone in front of the weapon and chose the collider closest to the origin of the cone.

A less popular response to the OP’s inquiry was using a weapon-specific collider. The collider would simply be enabled and disabled (likely through animation events) at different points in the weapon’s swing. The collider could then apply its damaging effects in its own OnTriggerEnter function. The commentor lays out a nice pros and cons list of this method, in which he mentions that multiple enemies can be hit with one swing easily using this method. I think that would be neat in a game like mine, and it will also be easier to set up more complex combat mechanics than raycasts. I think this will be the method I try.

## Animations

Animations are straight forward. In some unreleased projects I have worked with animation events, using them as triggers for coded logic. I also have a nice animation pack to use for combat. If I end up stuck on this part, I will cover the resources I use in the debrief.

## Weapons

I plan to use a ScriptableObject based inventory system to create all items in the game, including weapons. For the weapons, I plan to use an implementation of the Strategy Pattern, as this pattern fits nicely into Unity’s ScriptableObject infrastructure to create modular and scalable weapons. I will be referring to Robert Nystrom’s [Game Programming Patterns](http://gameprogrammingpatterns.com/) if I have any issues with this implementation.

## Target

This should be simple. I have a UnityEvent-based system of targets responding to being hit that has worked well in some unreleased projects. I am excited to implement it and highlight it in this blog.