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Zombie Runner Slides

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Welcome To Zombie Runner

Zombie Runner

This is a First Person Shooter game with a Zombie theme. We implement Ray Casting to shoot, weapon switching with ammo pickups and more.

This section is part of the Complete Unity Developer 3D course.

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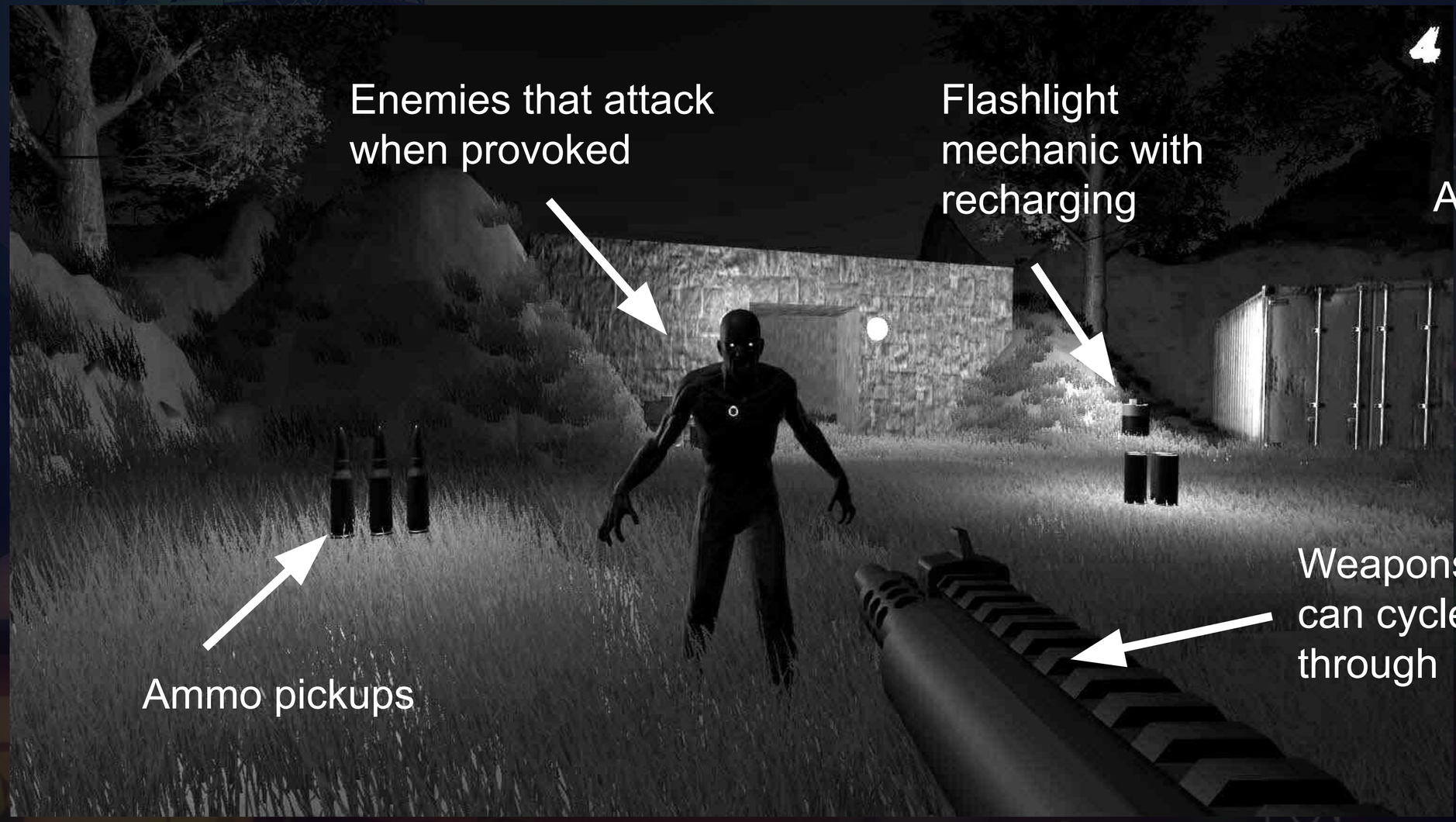
Zombie Runner Game Design

Using Unity 2019.1

- It is best to use same version as me
- Download now from Unity Hub if you haven’t already

Core Gameplay Overview



Game Design

Player Experience:

Intense

Core Mechanic:

Shoot enemies

Core game loop:

Collect ammo, shoot enemies, reach end of level

Game Theme

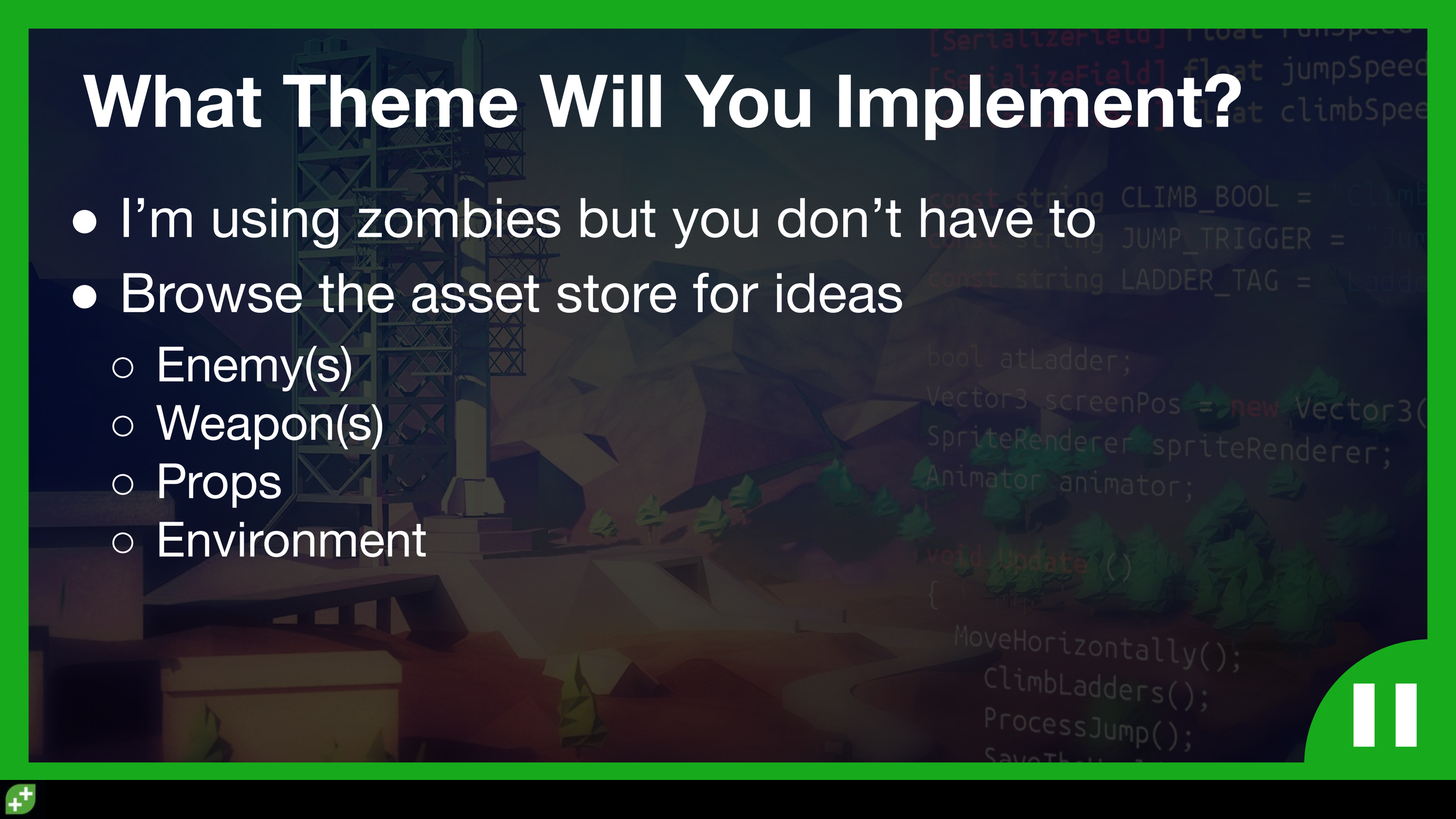
- Dark. Forest and bunkers. Zombies.

MVP Features - In Order Of Priority

- First Person Camera movement
- Raycasting to shoot
- Enemy move and attack AI
- Health and damage system
- Death / game over
- Weapon switching
- Ammo and ammo pickups
- Flashlight and battery pickup
- Probuilder geometry

What Theme Will You Implement?

- I’m using zombies but you don’t have to
- Browse the asset store for ideas
  - Enemy(s)
  - Weapon(s)
  - Props
  - Environment



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Adding First Person Controller

Import Standard Assets

- Cameras
- Characters
- CrossPlatformInput
- Editor
- Effects
- Environment
- Fonts (optional)
- Particles (optional)
- Prototyping
- Utility

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Make A Prototyping Sandbox

5 Minute Sandbox Challenge

- Give yourself 5 minutes
- Use the prototyping tools to make a sandbox environment for prototyping our game mechanics
- Share a screenshot!

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Using NavMeshAgent For AI

Complete The Code

- Use `SetDestination()` to move our `NavMeshAgent`
- Hints:
  - Our `navMeshAgent` calls `SetDestination()`
  - We want our destination to be the target's current position

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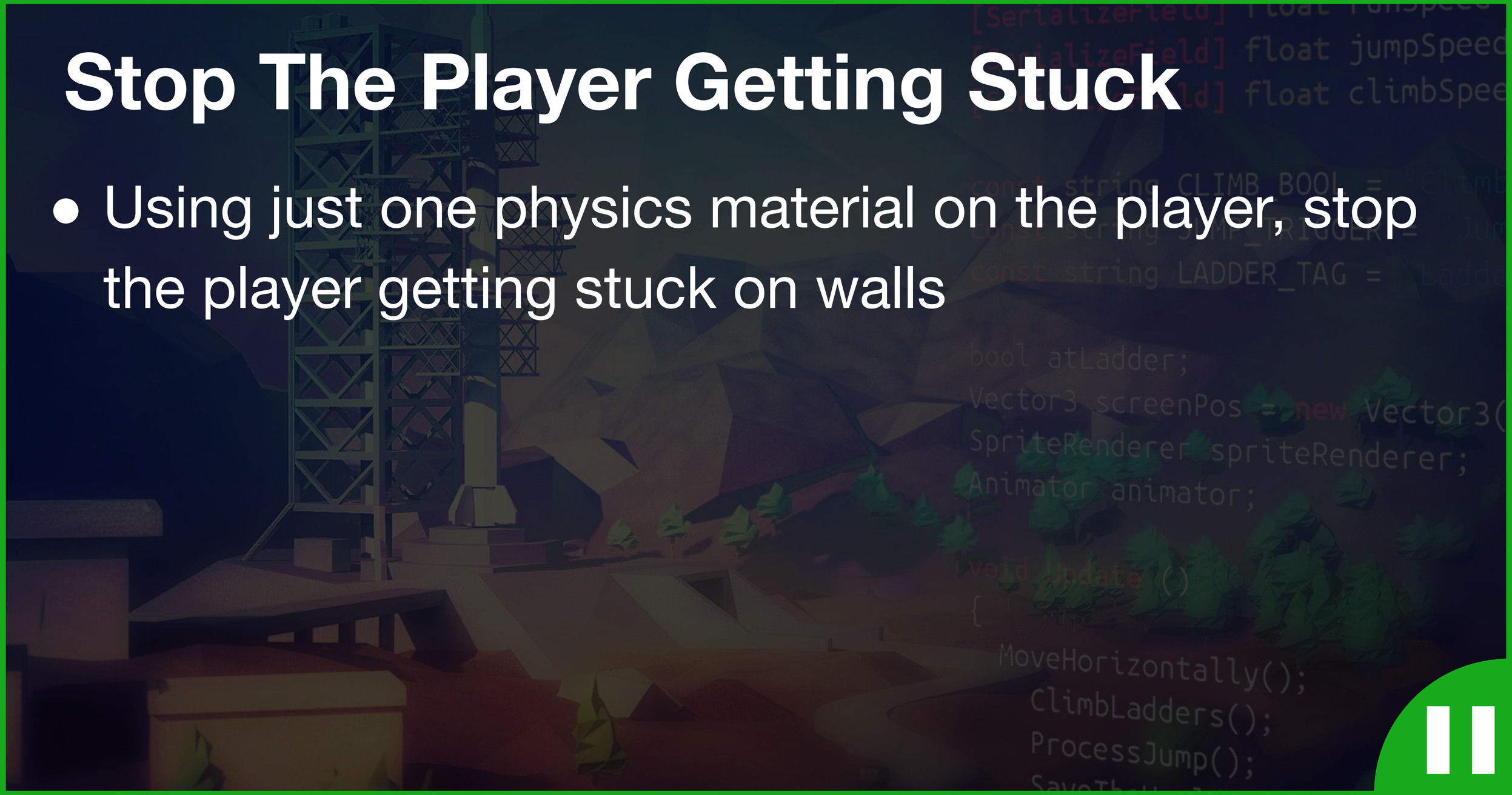
Getting Stuck & Jittering

Stop The Player Getting Stuck

- Using just one physics material on the player, stop the player getting stuck on walls



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Enemy AI - Chase Range

Complete The Logic

- Add an if statement to make our enemy move if the player gets within range.
- HINT:

```
If (something is less than another thing)
{
    do something
}
```

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Using OnDrawGizmosSelected()

Draw A Gizmo For Chase Range

- When the enemy is selected, we draw a wire sphere to show chase range
- Use Unity docs to figure out how to implement

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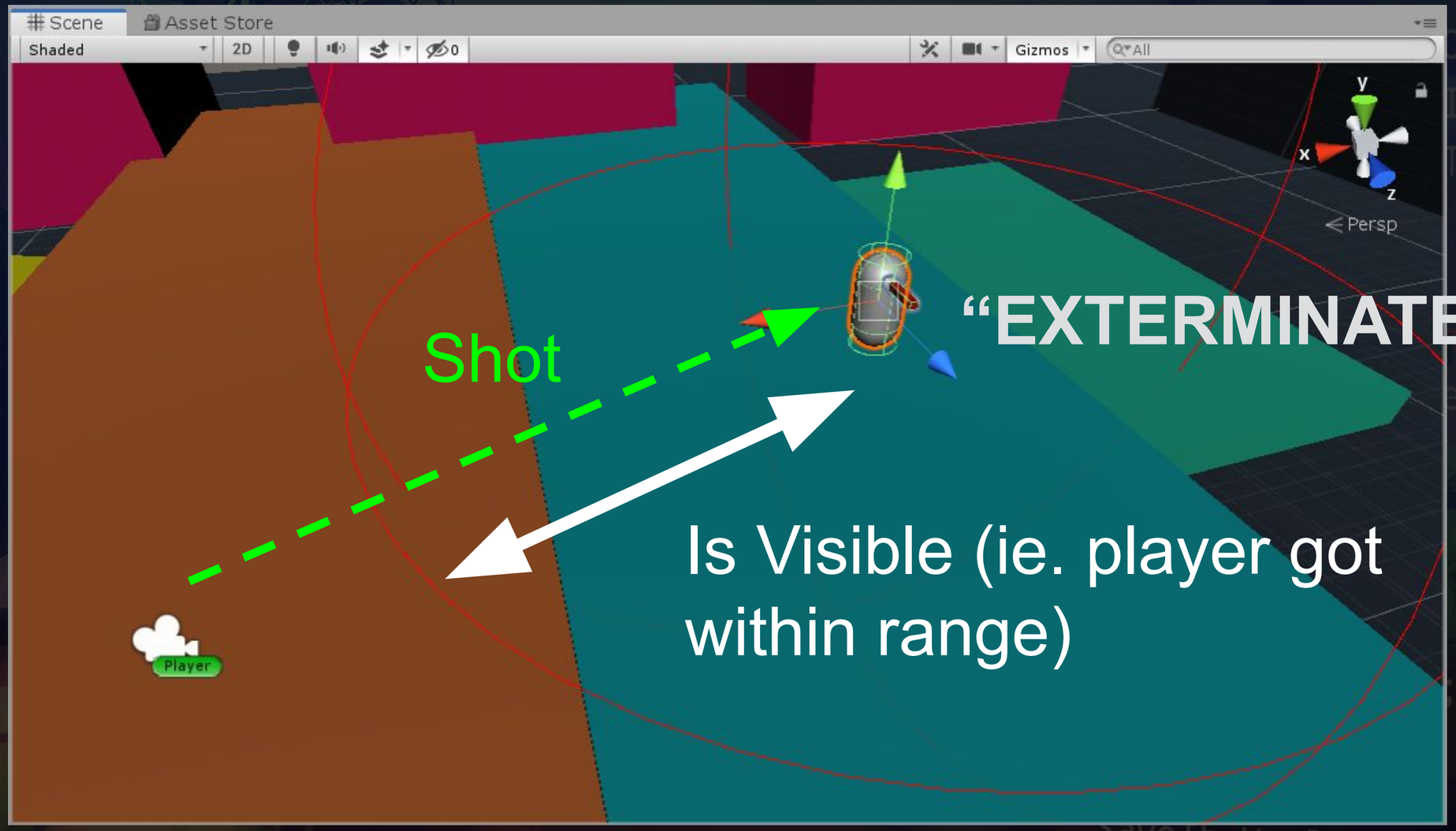
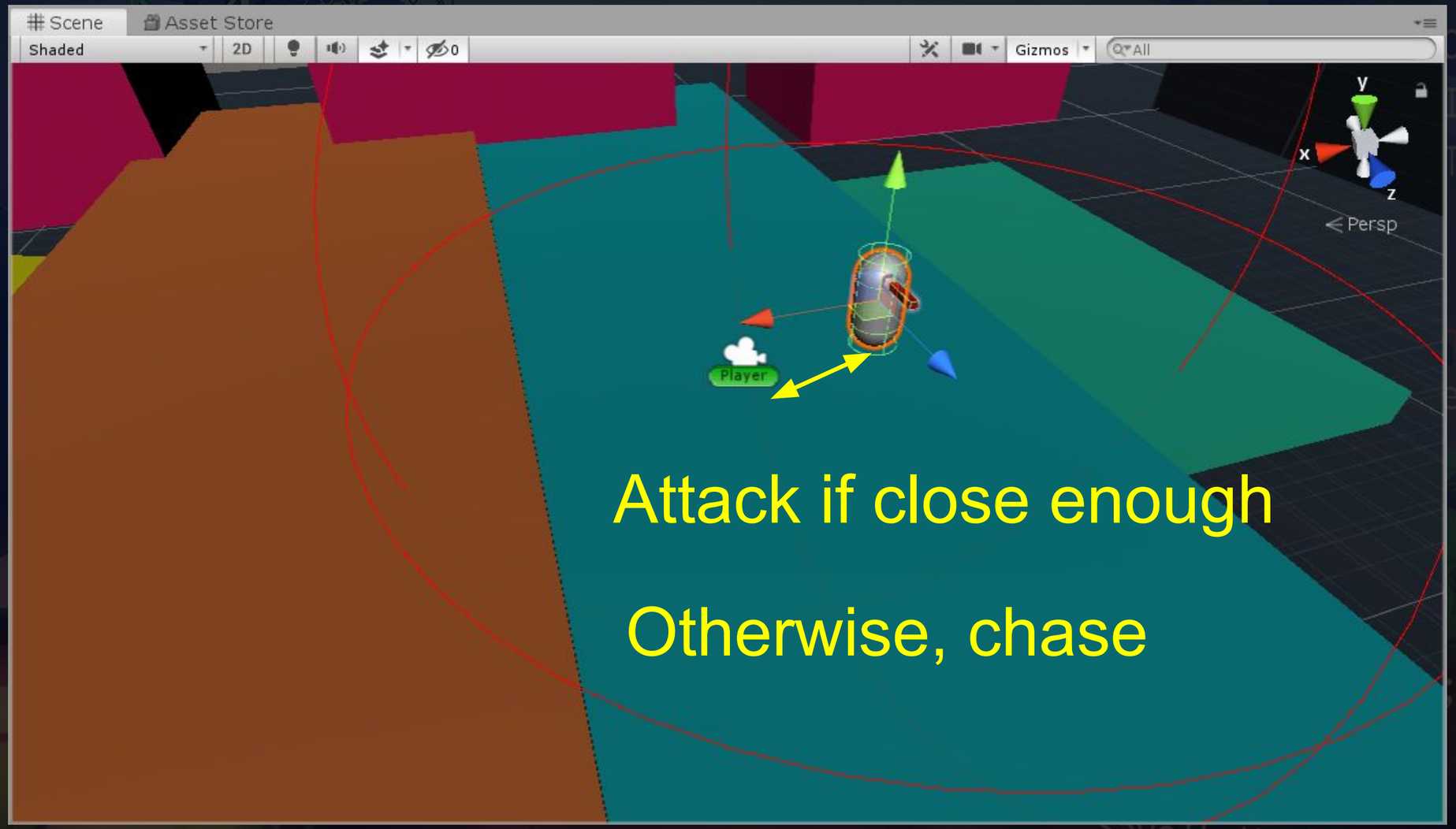
Enemy AI - Attack If Provoked

Enemy Behaviour - Provoked



Enemy Behaviour - Once Provoked



Finish Our Enemy AI Logic

- Complete the conditions for our `EngageTarget()` logic
- ChaseTarget() - move to target
- AttackTarget() - simply print something witty to the console

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Give That Player A Gun

Your Mission...

- Import a gun into your scene and place it in the player's hands
- Add a gun reticle so we know where to stick the pointy end (I've put mine in the "misc" folder in the download)

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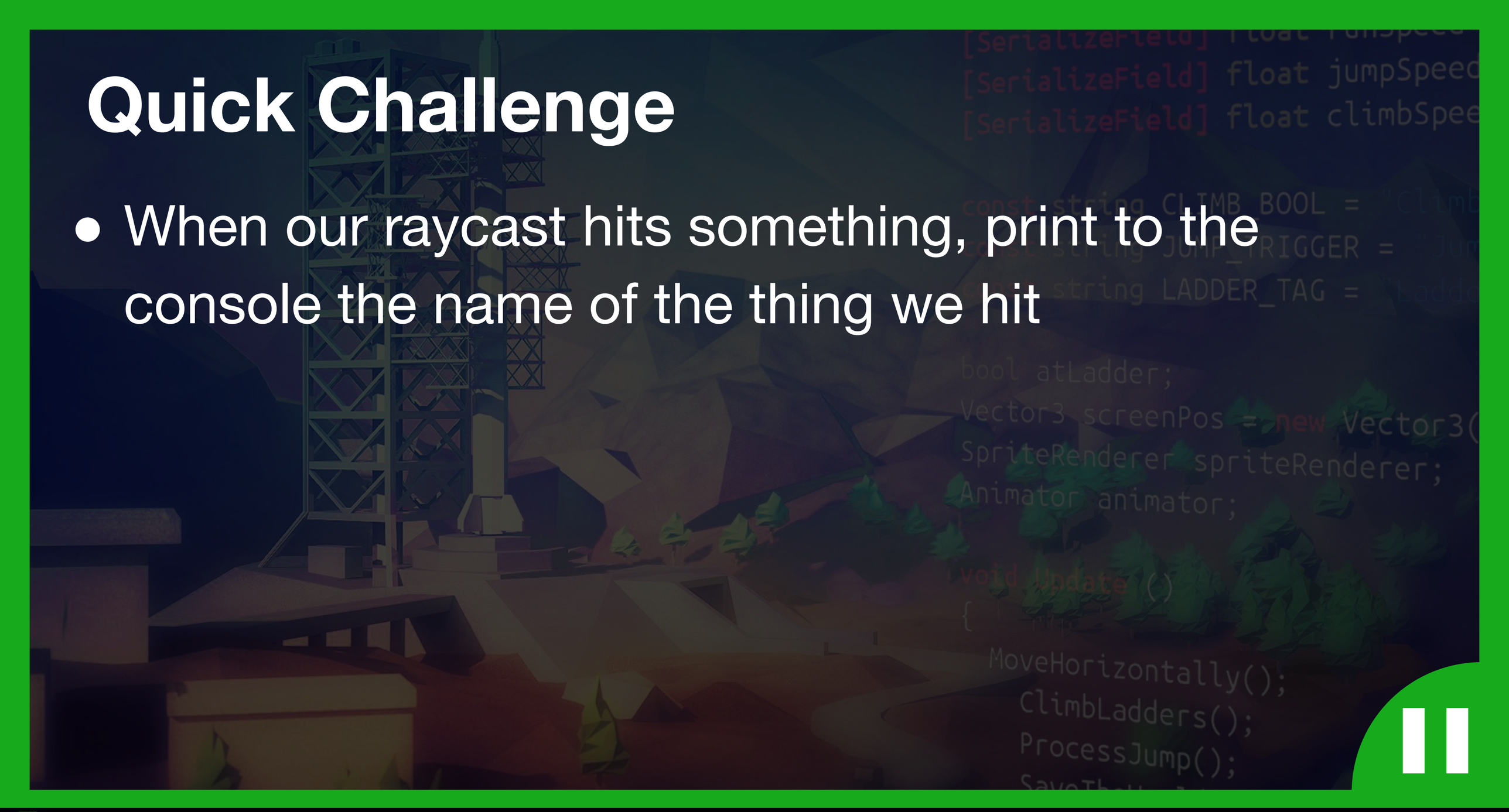
Introduction To Raycasting

What Is Raycasting?

- Raycasting is the process of shooting an invisible ray from a point, in a specified direction, to detect whether any colliders lay in the path of the ray.

Quick Challenge

- When our raycast hits something, print to the console the name of the thing we hit



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Enemy Health & Damage

Create Take Damage Method

- Create a public method `TakeDamage()`
- When called, decreases health
- The method should take in `damage` as an argument which is passed in from Weapon class when `TakeDamage()` is called
- Call `TakeDamage()` in our `Shoot()` method
- When health reaches zero, destroy enemy

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Implement A Muzzle Flash

Make Your Own Muzzle Flash

- Create something that says “I just shot my weapon” for the player
- Be creative
- Share what you come up with
- (I’ll provide mine so you can use it if you don’t want to make your own)

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Create Shooting Hit Effect

Instantiate A Hit Effect

- Instantiate hit effect to be created when our raycast returns true
- Instantiate the effect where the raycast collides
- Destroy the hit effect after short amount of time

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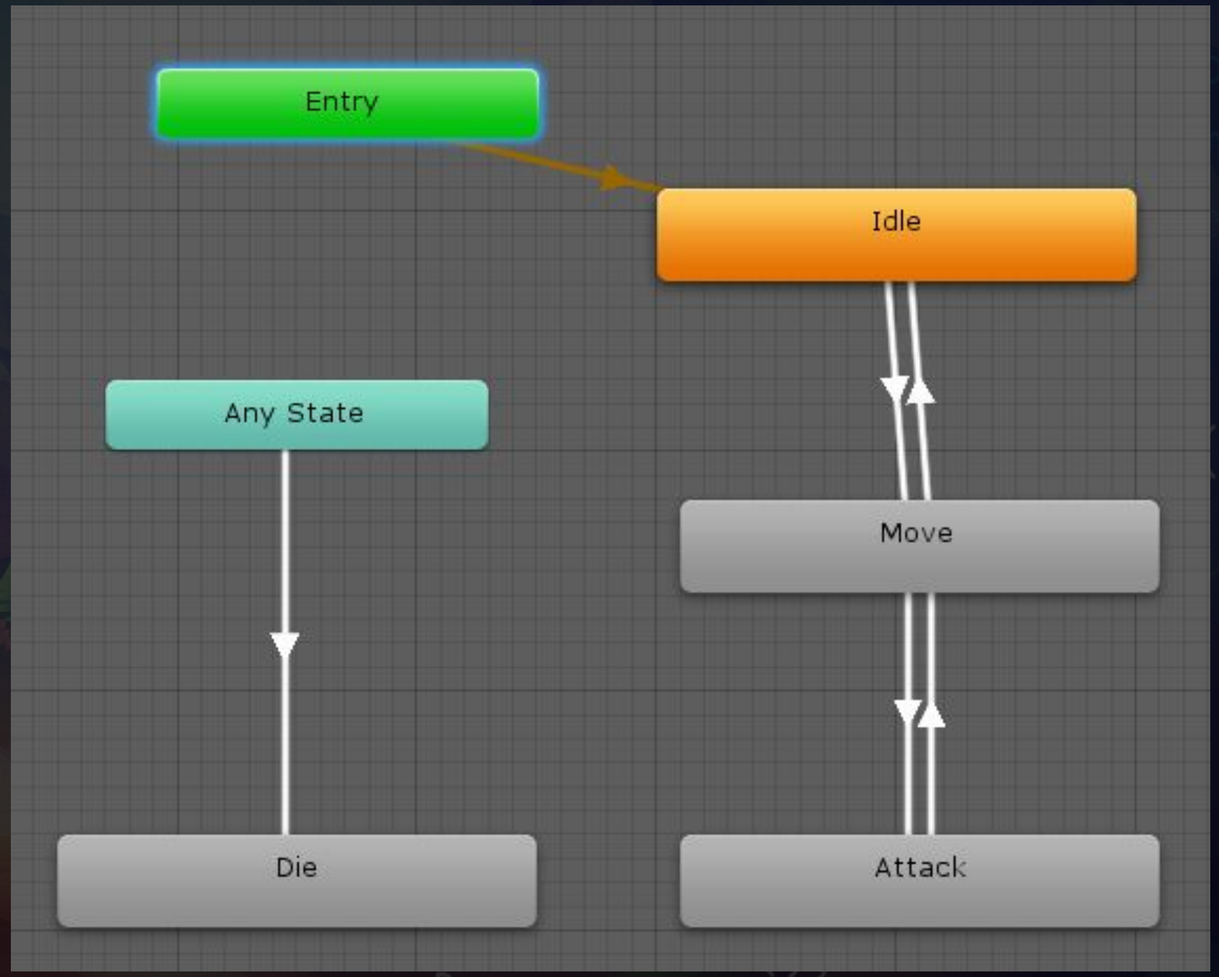
Introducing Animator Controller

Terminology

- **Animator Component:** Assigns animations to GameObjects through an Animator Controller
- **Animator Controller:** Arrangement of animations and transitions (state machine).
- **Animation:** Specific pieces of motion
- **Transition:** Rules to move from one state to another



Adding States And Transitions

- Add an Attack state
- Idle -> Move -> Attack -> Idle
- Exit time Idle -> Move = 1
- Exit time Move -> Attack = 2
- Exit time Attack -> Idle = 3

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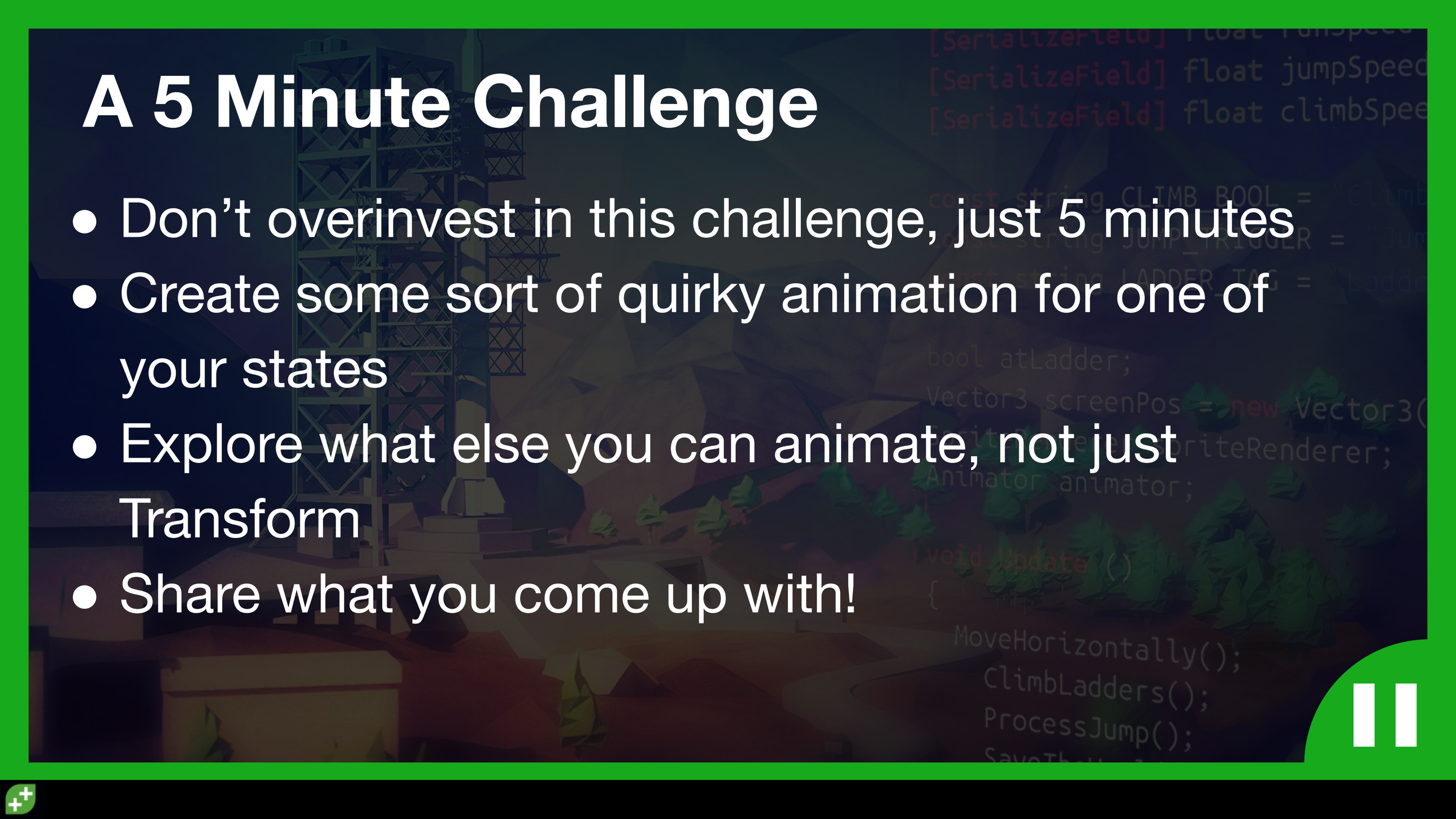
Creating A Simple Animation

A 5 Minute Challenge

- Don’t overinvest in this challenge, just 5 minutes
- Create some sort of quirky animation for one of your states
- Explore what else you can animate, not just Transform
- Share what you come up with!



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Animator Transition Conditions

Adding Conditions

- Add a bool parameter called “attack”
- Add conditions:
  - Move -> Attack when “attack” parameter is true
  - Attack -> Idle when “attack” parameter is false
- Remember to turn off “has exit time”

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Trigger Animation In Code

Set Attack Animation

- Figure out where we would change our animation into attack and out of attack
- Add code to set our attack state to true
- Add code to set our attack state to false
- Remember, attack is a bool, not a trigger

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Use Animation Events

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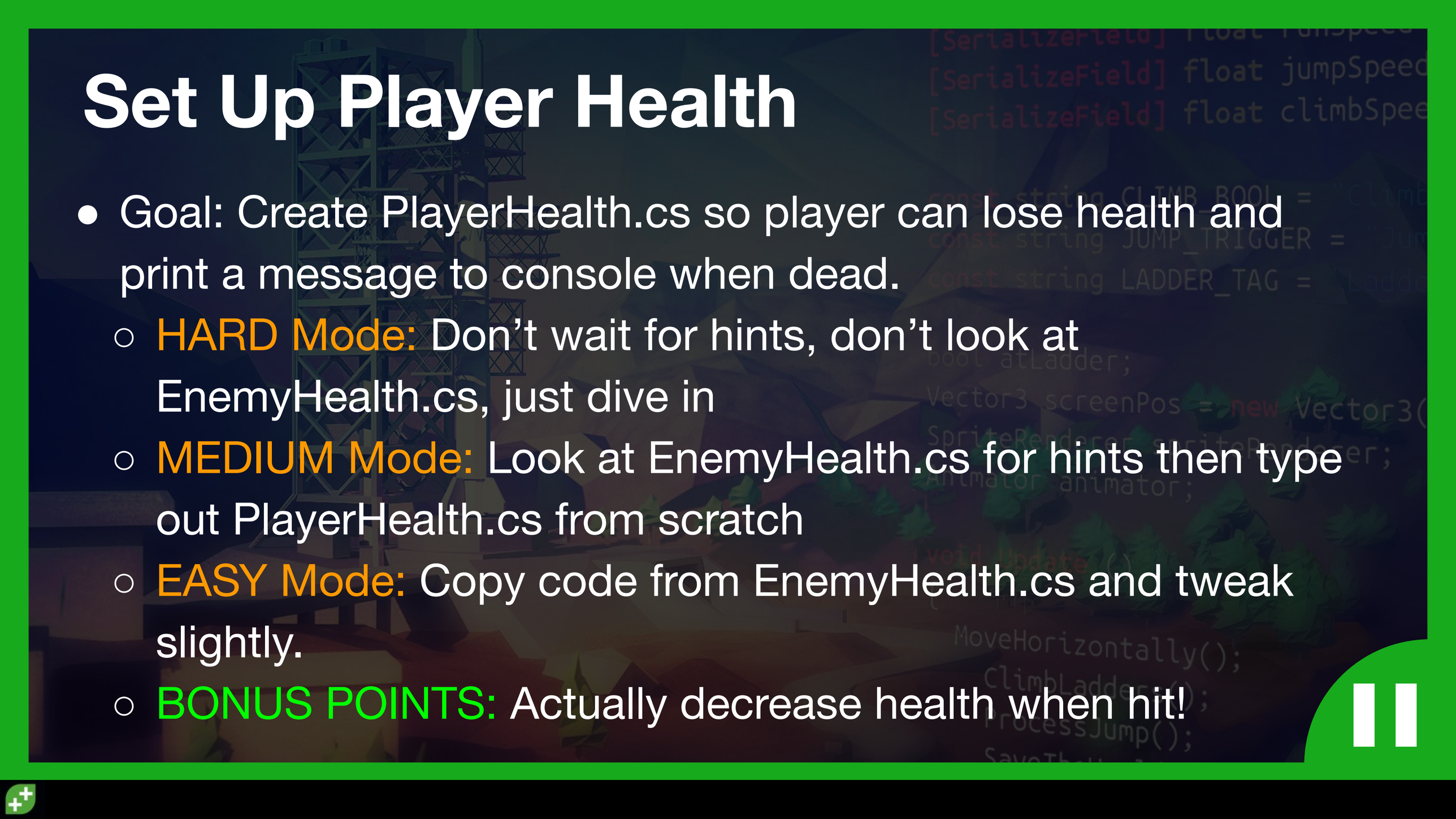
Create Player Health Class

Set Up Player Health

- Goal: Create PlayerHealth.cs so player can lose health and print a message to console when dead.
  - HARD Mode: Don’t wait for hints, don’t look at EnemyHealth.cs, just dive in
  - MEDIUM Mode: Look at EnemyHealth.cs for hints then type out PlayerHealth.cs from scratch
  - EASY Mode: Copy code from EnemyHealth.cs and tweak slightly.
  - BONUS POINTS: Actually decrease health when hit!



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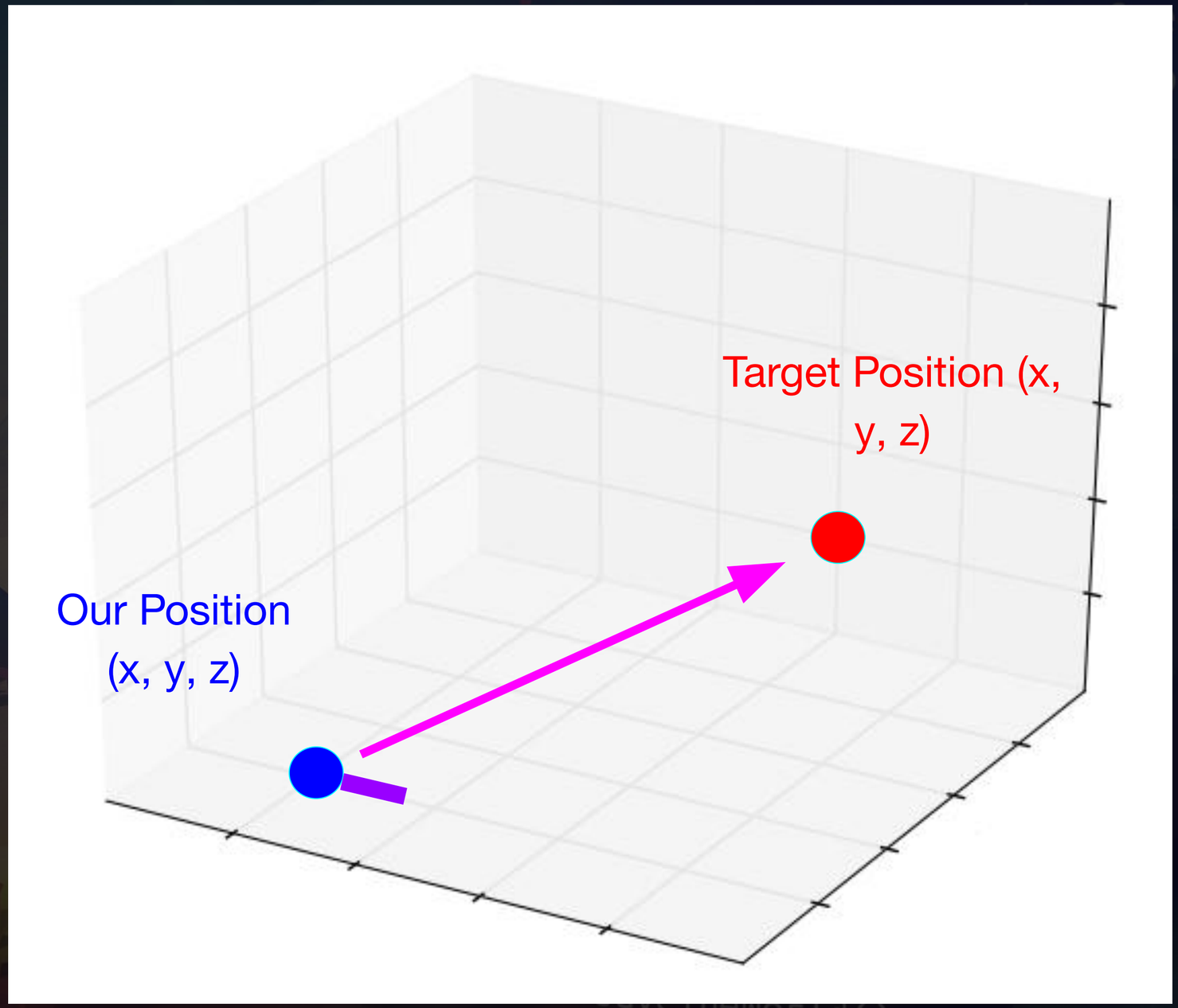
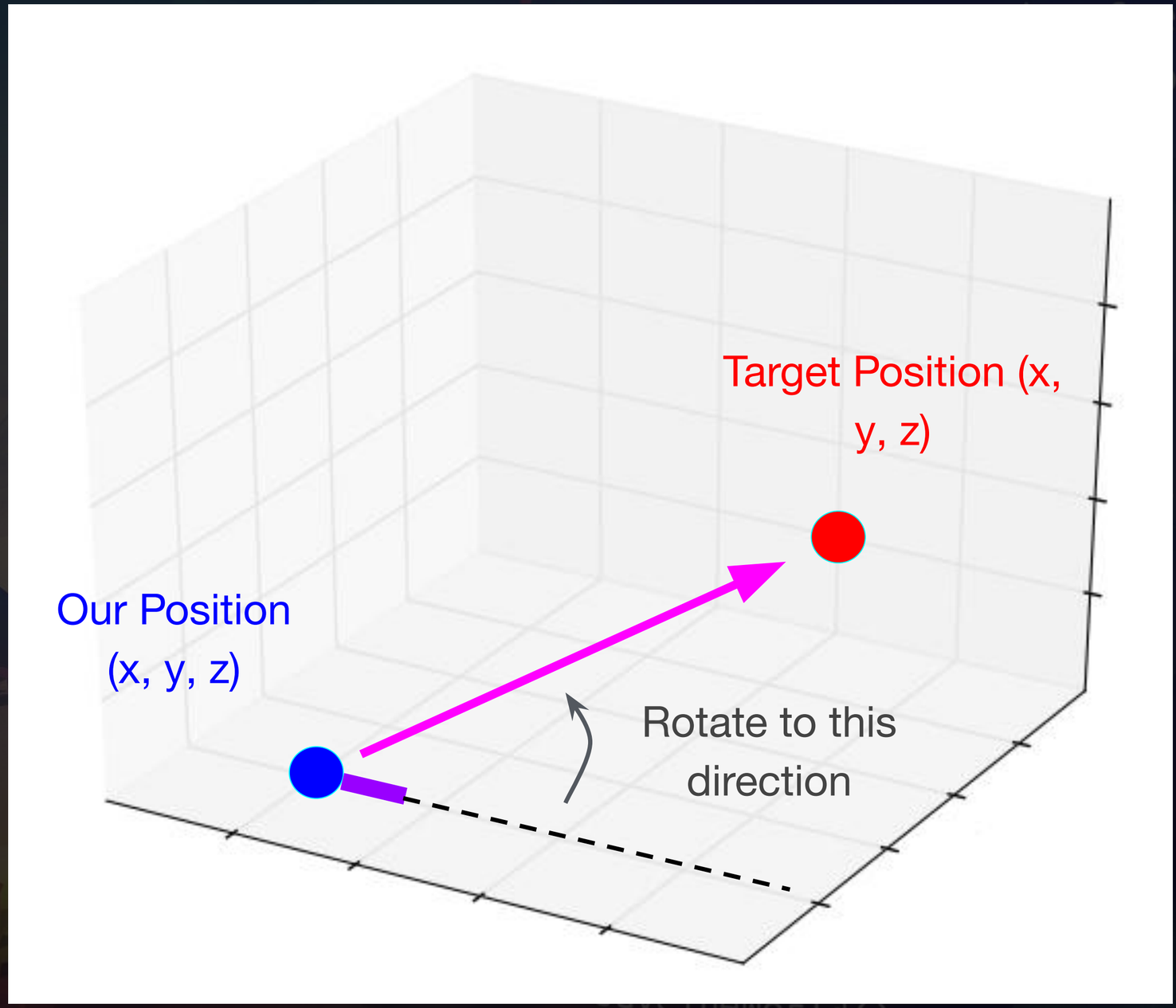
Rotate To Face Target

- A Vector has a magnitude and a direction.
- We can subtract our position from target position.



If we (the enemy) is not looking at target, we want to rotate to that direction



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Game Over User Interface

Create Scene Loader

- Create a public method that reloads the game
- Hook this up to the Play Again button
- Create a public method that quits the game
- Hook this up to the Quit button
- Test the Play Again button

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Create A Death Handler

Call HandleDeath()

- Figure out where and how to call `HandleDeath()` so that our Game Over logic is called.

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Using BroadcastMessage()

Play With BroadcastMessage

- Find another component on your enemy where you can add `OnDamageTaken()` method to test that our BroadcastMessage works.

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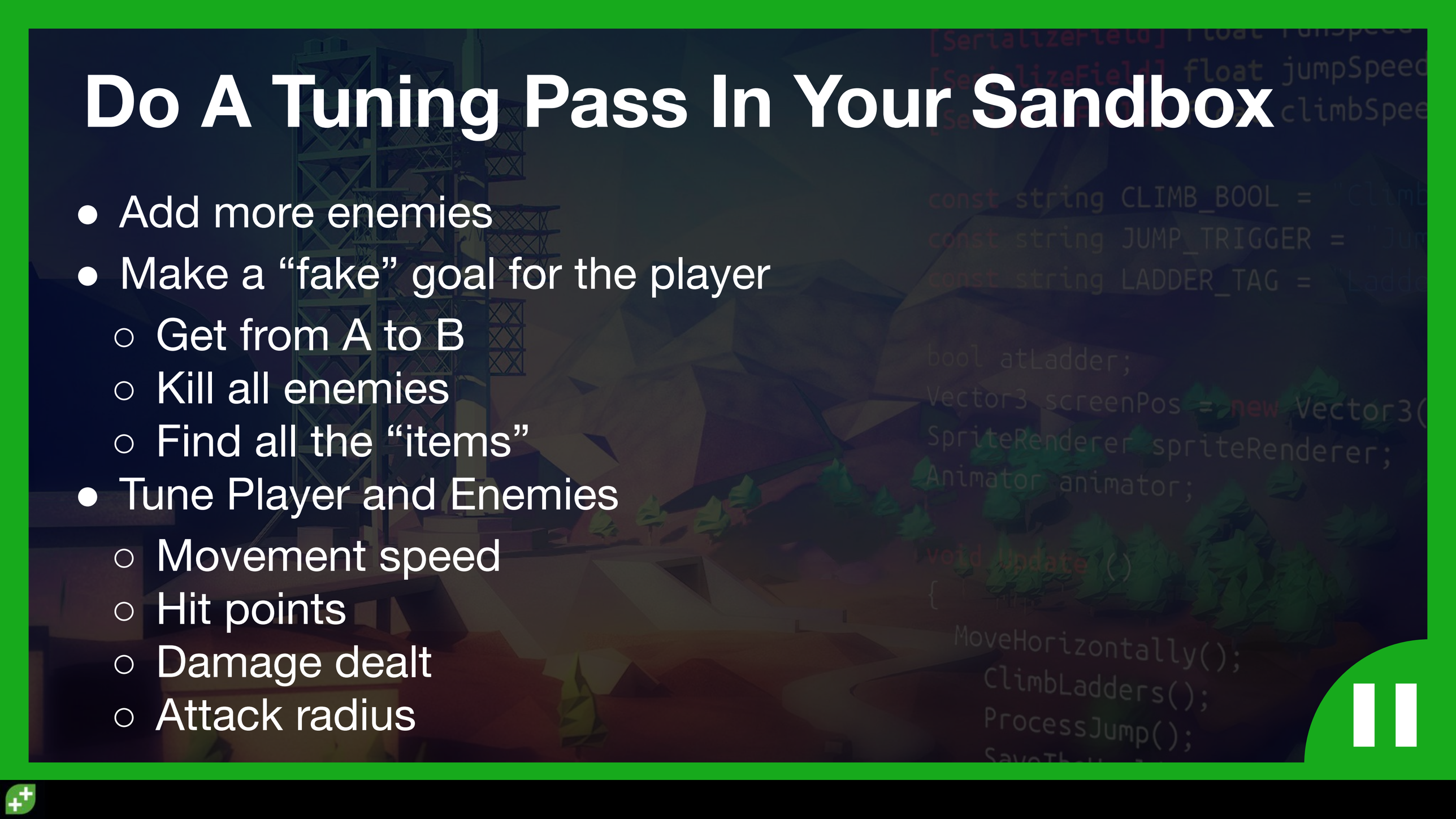
Early Gameplay Loop

Do A Tuning Pass In Your Sandbox

- Add more enemies
- Make a “fake” goal for the player
  - Get from A to B
  - Kill all enemies
  - Find all the “items”
- Tune Player and Enemies
  - Movement speed
  - Hit points
  - Damage dealt
  - Attack radius



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Weapon System Overview

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Weapon Zoom - Field Of View

Start Our Camera Zoom

- Figure out where we can change Field Of View (FOV)
- Create a reference to the relevant object that will give us access to FOV
- Create 2 variables that we can adjust for zoomed in and zoomed out FOV values

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Weapon Zoom - Mouse Sensitivity

Change Mouse Sensitivity

- Find where we change mouse sensitivity
- Create a reference to that place
- Create variables with different sensitivity amounts
- Change sensitivity for our 2 states - zoomed in or zoomed out

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Basic Ammo Functionality

Finish Our Basic Ammo Functionality

- Only shoot if we have some ammo
- When we shoot, decrease the amount of ammo we have

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Multiple Weapon Types

Add A Third Weapon Type

- Use your own assets or tweak our carbine weapon (sorry Michael) to make a third weapon
- I'll be calling mine "pistol"
- Reminder: be clear on which level of prefab your settings are stored in

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Weapon Differentiation

Tune Your Weapons

- Look at what tuning variables we currently have available to us
- Tune your 3 weapons so that they are different to each other. What I'll be doing:
  - Carbine is a sniper rifle
  - Pistol shoots fast but isn't as powerful
  - Shotgun is slow, powerful and close range

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Set Active Weapon

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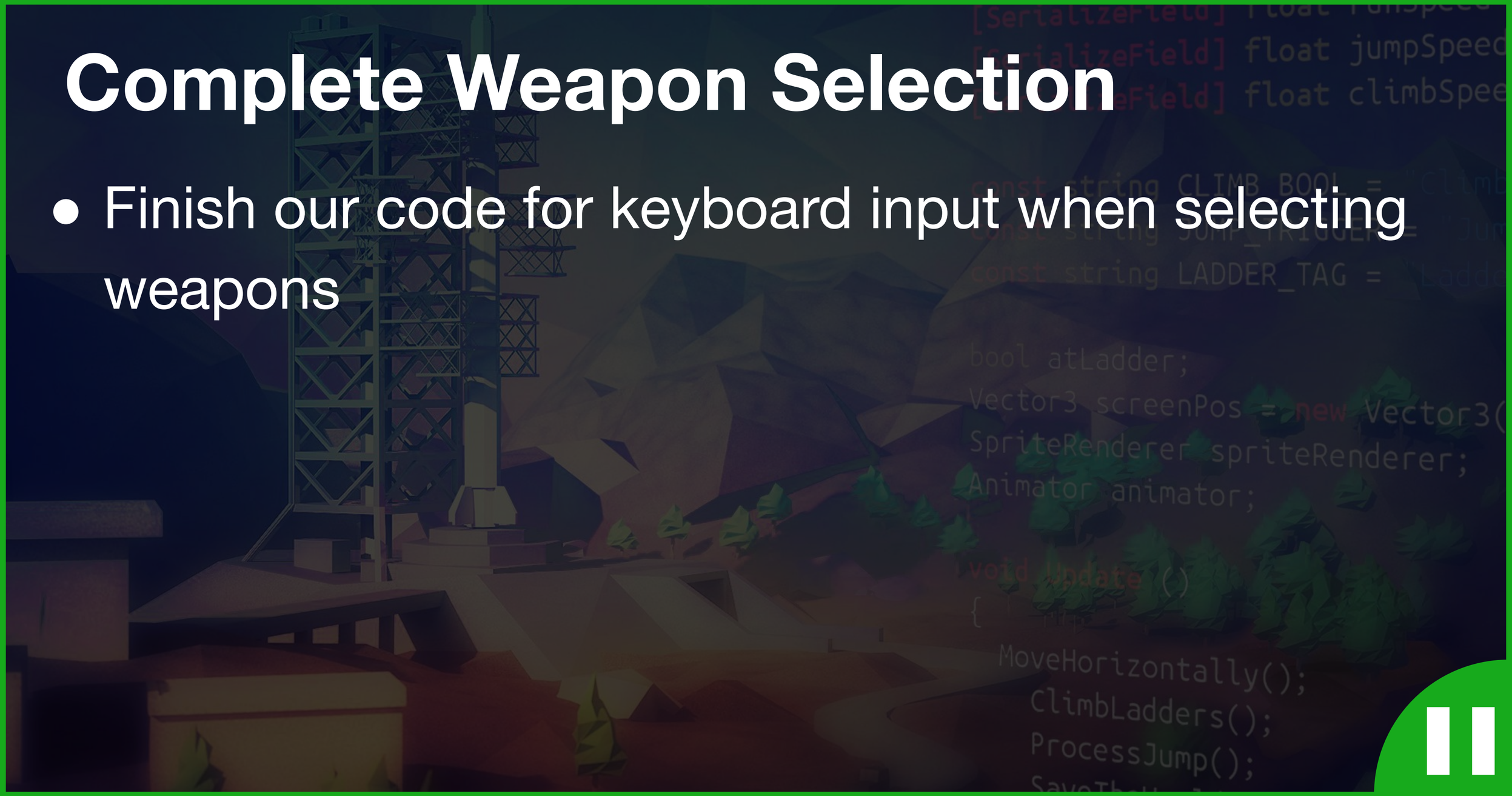
Player Input To Select Weapon

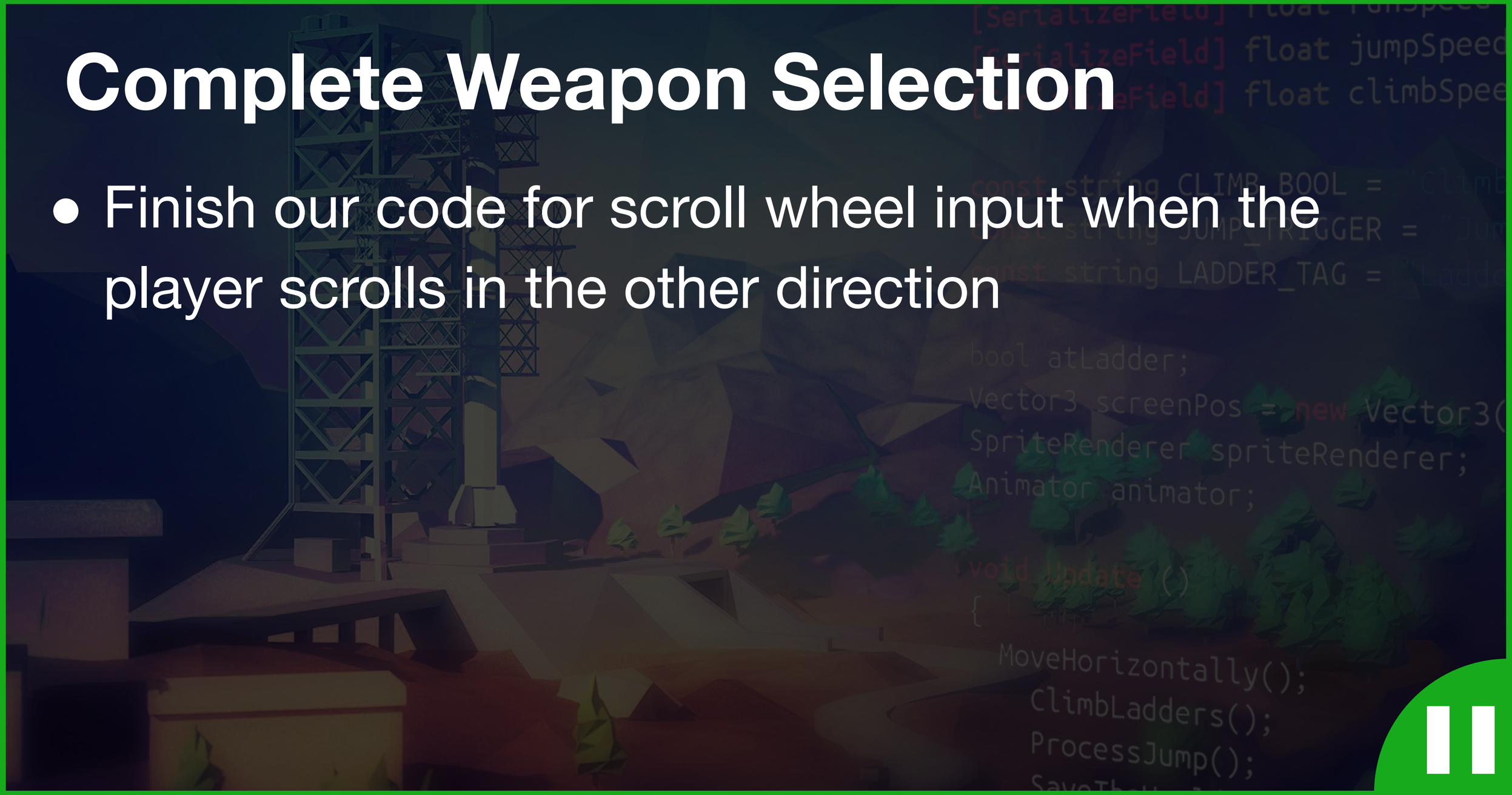
Complete Weapon Selection

- Finish our code for keyboard input when selecting weapons



Complete Weapon Selection

- Finish our code for scroll wheel input when the player scrolls in the other direction



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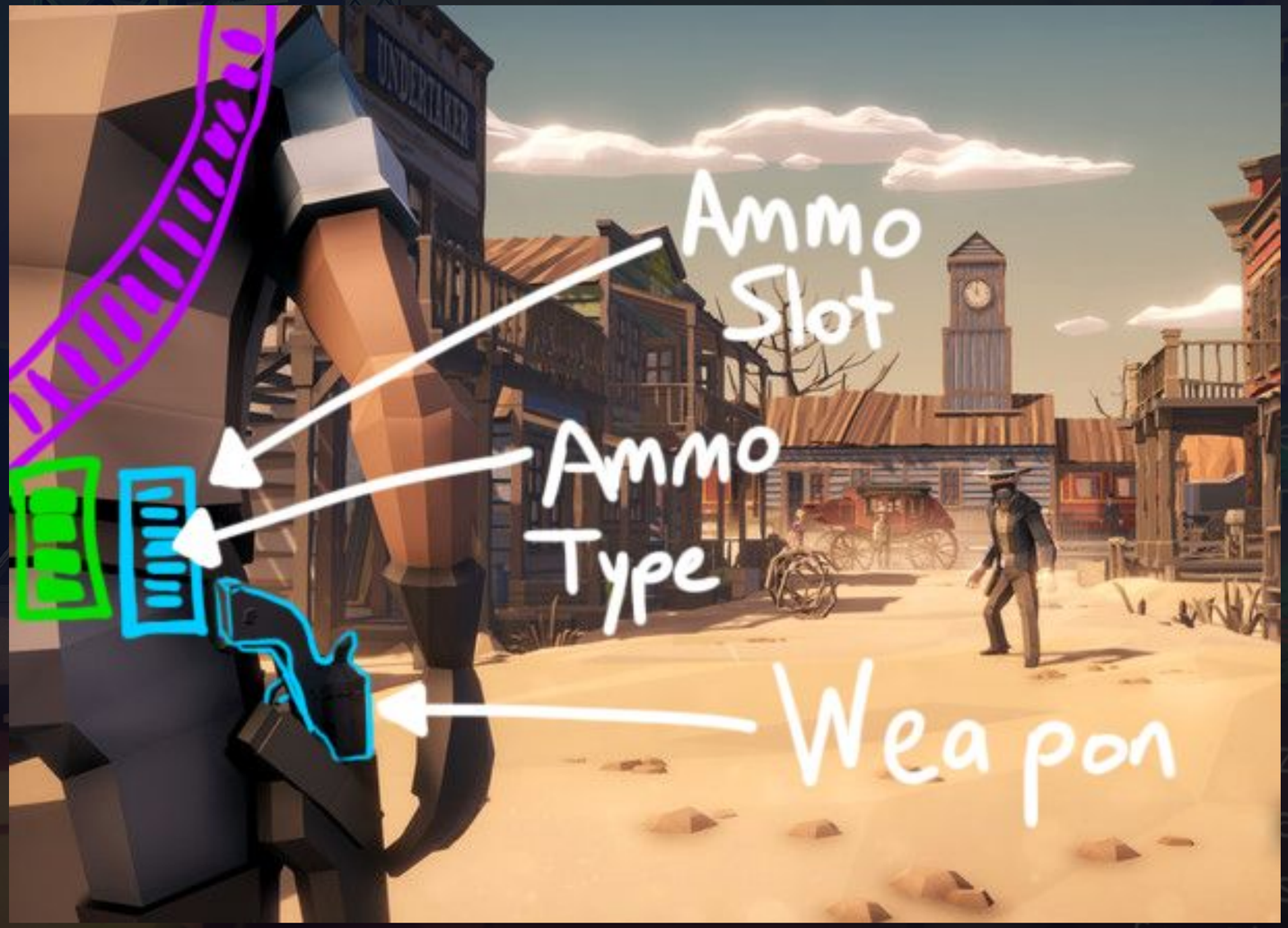
Public Enum & Private Class

Terminology I'll Use



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Different Weapon Different Ammo

Complete Our Ammo Class

- Fix our remaining methods so we can get ammo amount and reduce ammo.

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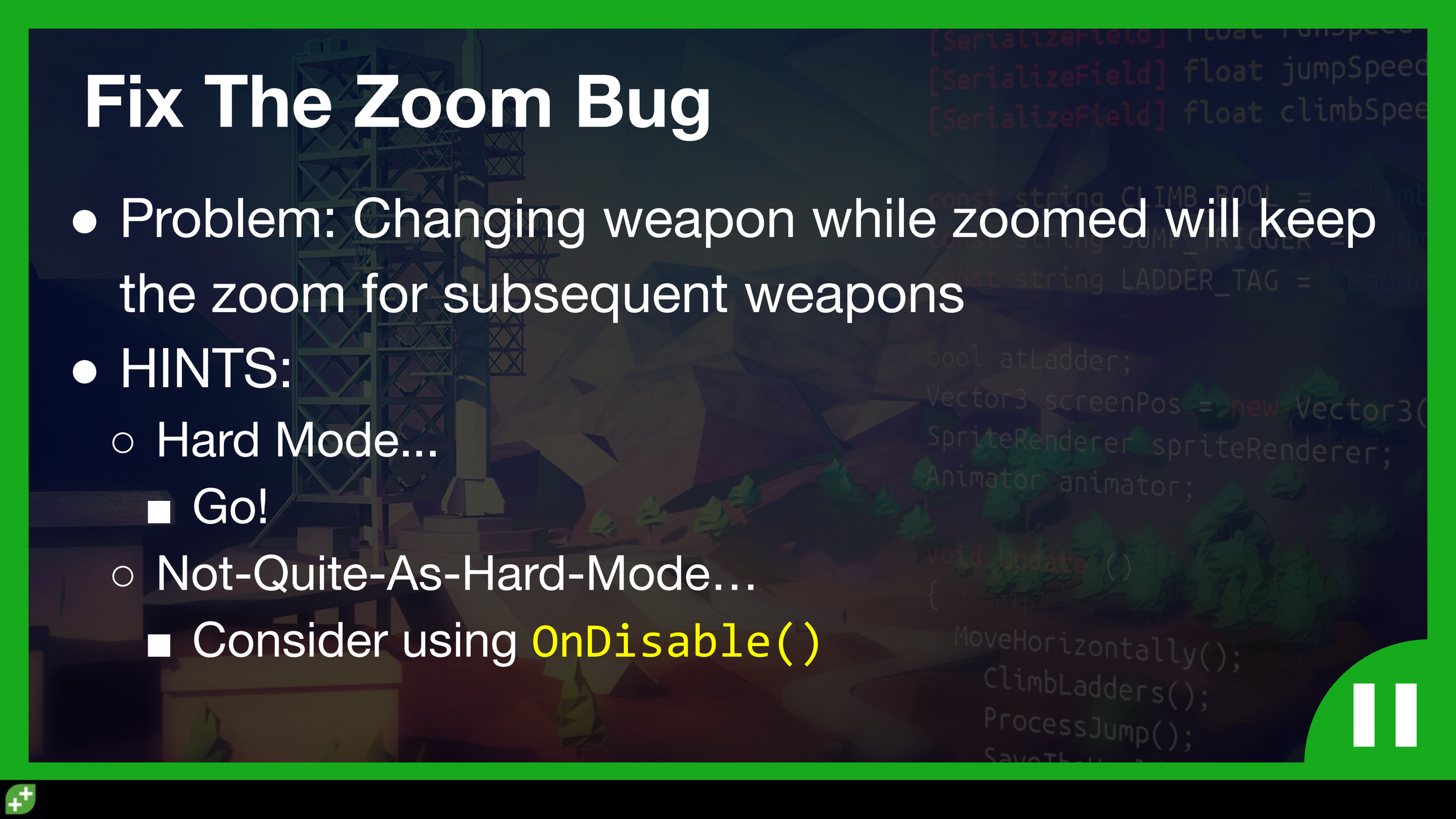
Quick Bug Fix Challenge

Fix The Zoom Bug

- Problem: Changing weapon while zoomed will keep the zoom for subsequent weapons
- HINTS:
  - Hard Mode...
    - Go!
  - Not-Quite-As-Hard-Mode...
    - Consider using `OnDisable()`



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Ammo Pickup - Part 1

Create The PickUp Framework

- Create a simple object that we can trigger when collided with (ie. a pickup)
  - Add simple mesh to visualise it
  - Add collider
  - Create script with basic trigger
  - Ensure only player can trigger it
  - Print something spiffy to console
  - Destroy pickup

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Ammo Pickup - Part 2

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Let's Add A Zombie

Update Enemy Death Moment

- Add Die state
- Transition to Die from “Any State”
- Set up trigger
- Trigger the animation state from your code

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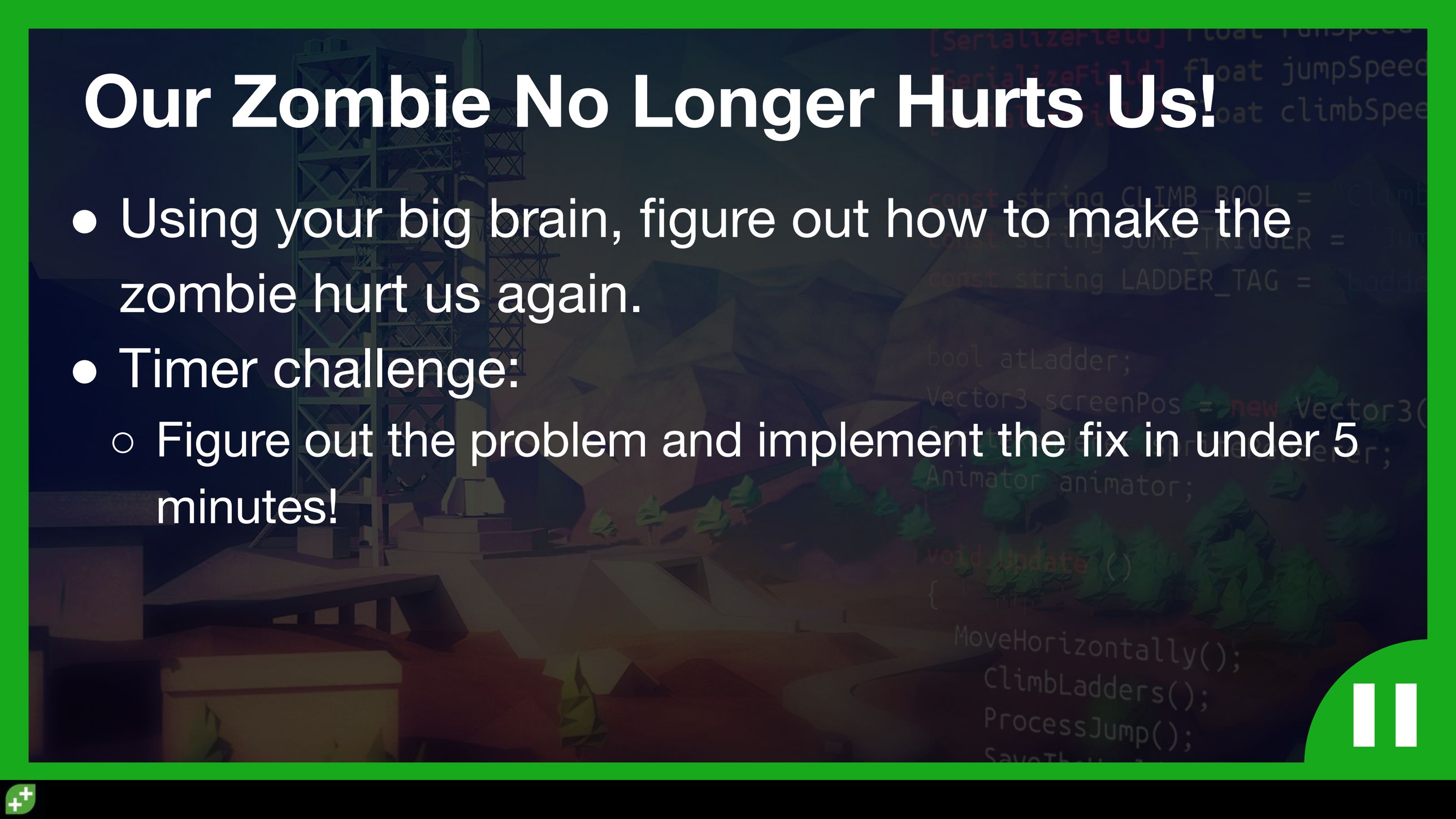
Quick Zombie Attack Challenge

Our Zombie No Longer Hurts Us!

- Using your big brain, figure out how to make the zombie hurt us again.
- Timer challenge:
  - Figure out the problem and implement the fix in under 5 minutes!



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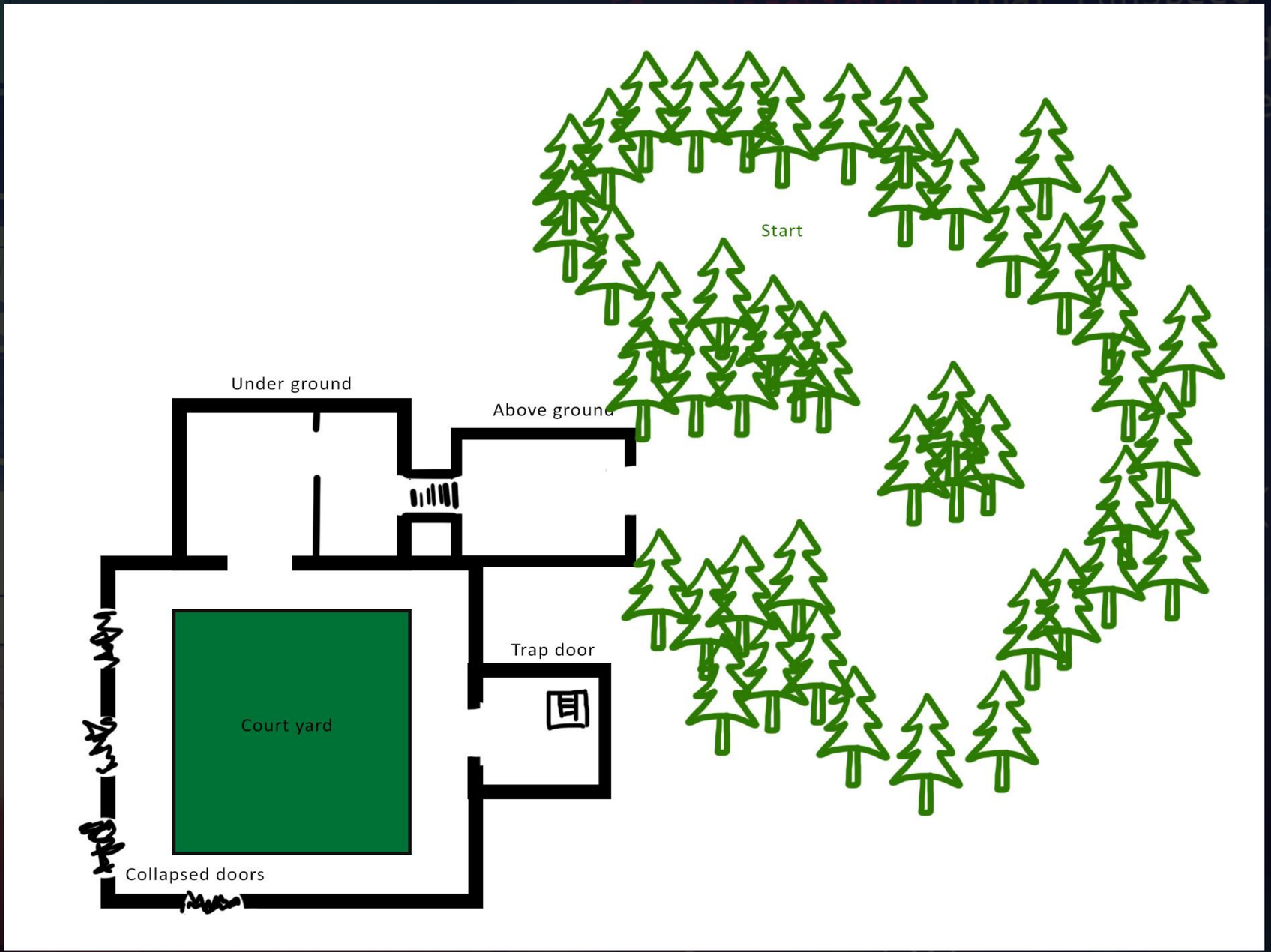
Flex Your Level Design Muscles

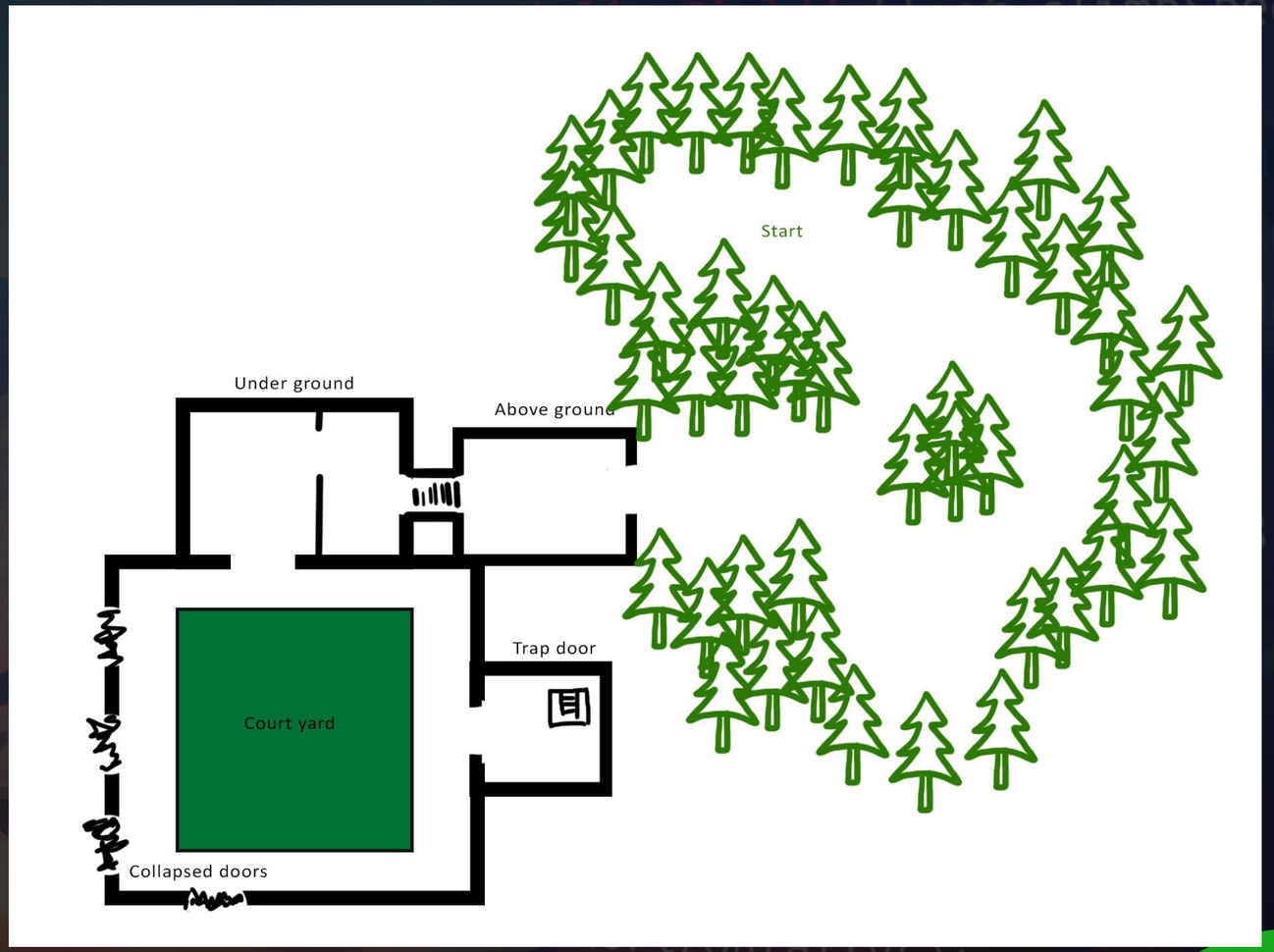
- **Theme:**
  - Abandoned underground asylum.
- **Flow:**
  - Find above ground entrance within a forest.
  - Go down stairs into the facility.
  - Find the trap door that leads to dungeon.



Design A Level

- Sketch a level to use in your game
- Output should be an image that we can import into our project

- **Level Requirements:**
  - At least 1 branching path
  - At least 2 choke points
  - At least 1 area for a big battle with lots of enemies



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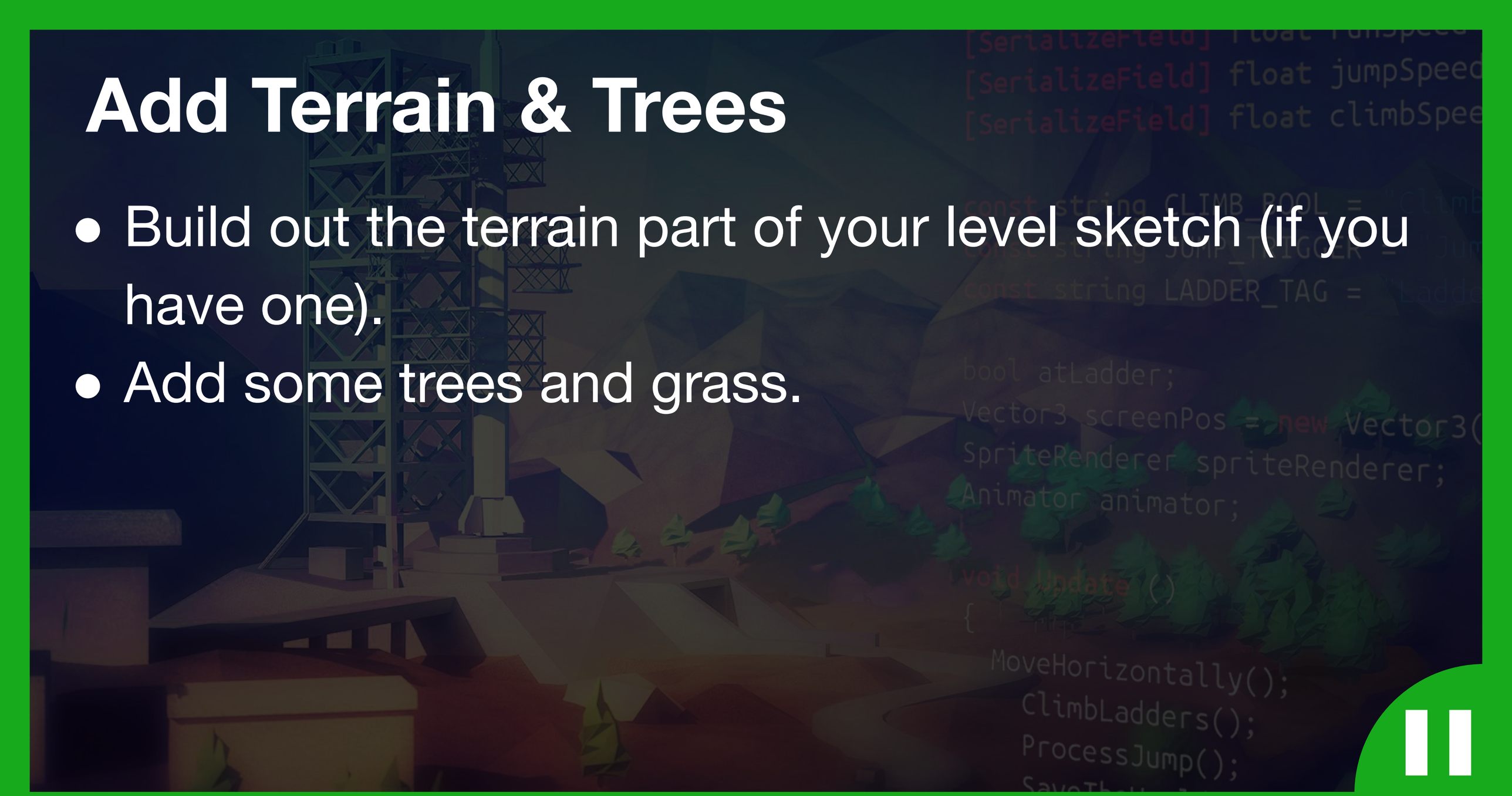
Add Terrain & Trees

Add Terrain & Trees

- Build out the terrain part of your level sketch (if you have one).
- Add some trees and grass.



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ProBuilder For Making Props

Make A Bullet Prop

- Using ProBuilder, make a bullet that can be used for our Bullet pickup

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ProBuilder To Make Rooms

Add A Roof

- As a quick challenge, add a roof to the room we created.

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ProBuilder To Make Levels

Finish Your Level

- Block out all of the rooms in your level
- Join together anything that needs joining
- Do a fly-through to make sure it all looks fine

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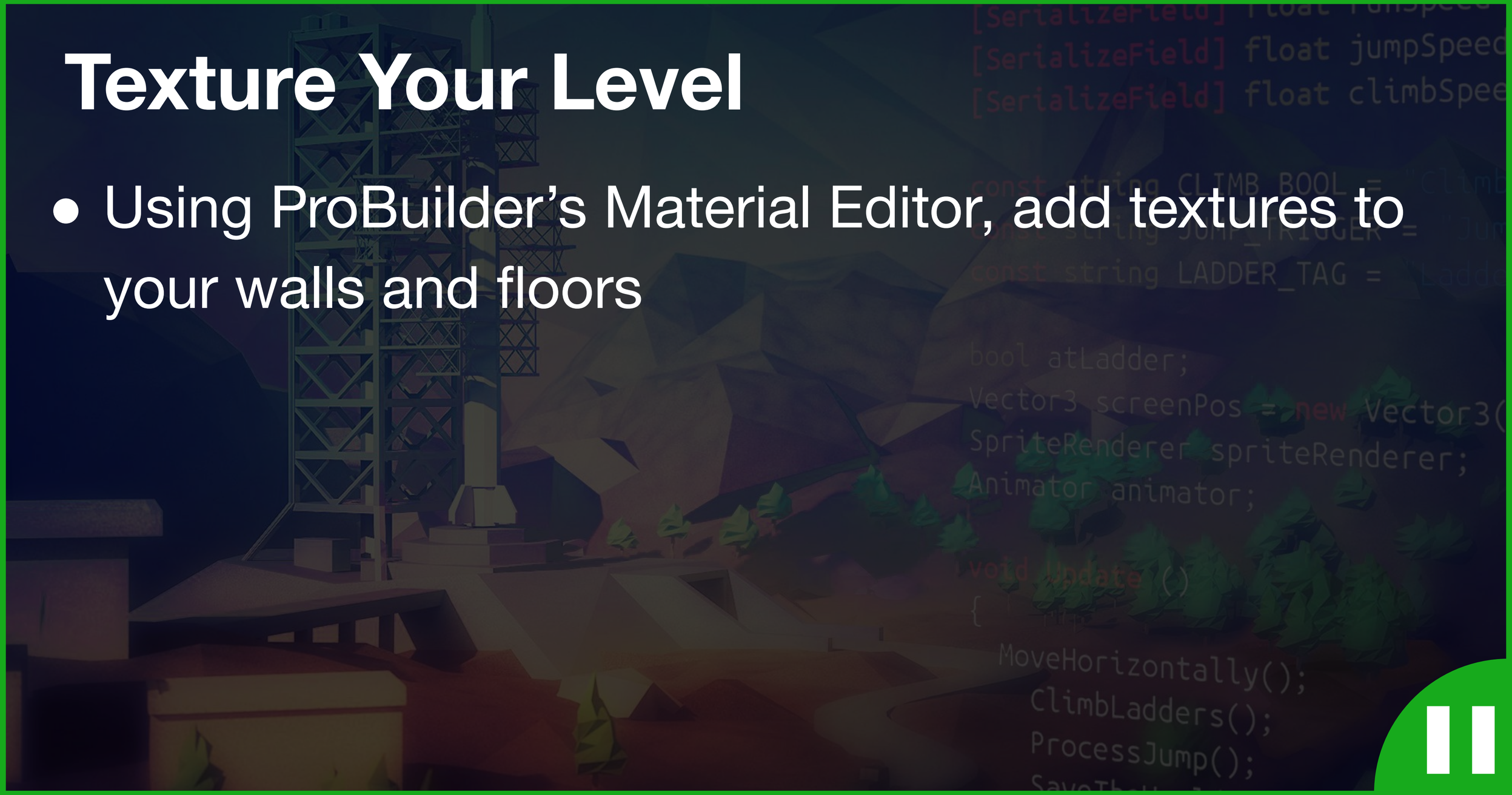
Adding Textures With ProBuilder

Texture Your Level

- Using ProBuilder’s Material Editor, add textures to your walls and floors



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We Need Some Lights

Light Your Level

- Get your outdoor lighting how you want it
- Place indoor lights in appropriate places

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Create A Flashlight

Decay Your Flashlight

- Complete our 2 methods for decaying our flashlight.

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Create A Battery Pickup

Make A Battery Pickup

- Create `BatteryPickup.cs`
- Increase intensity and angle when the player picks up the pickup
- Create a simple battery prop asset using ProBuilder
- HINT:
  - You may need to use `GetComponentInChildren`

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Display Current Ammo UI

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Damage Received UI

Give Visual Indicator Of Damage

- Find something that matches the tone of your game when player takes damage
- Add the UI to a canvas that we can turn on and off
- Create new script - DisplayDamage.cs
- When player takes damage, enable canvas
- Disable canvas again after time has elapsed.

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Props & Polish

My Challenge To You

- Make an incredible 5 minute experience
- Use your “Player Experience” as your guide
- Tune and polish your game
  - Add SFX for feedback and immersion
  - Add props to make a story
  - Add post-processing
  - Tune your pickups and enemy placement
  - Give the player an objective
- Share with us!