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TileVania Section

Rick Davidson

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Section Intro - TileVania

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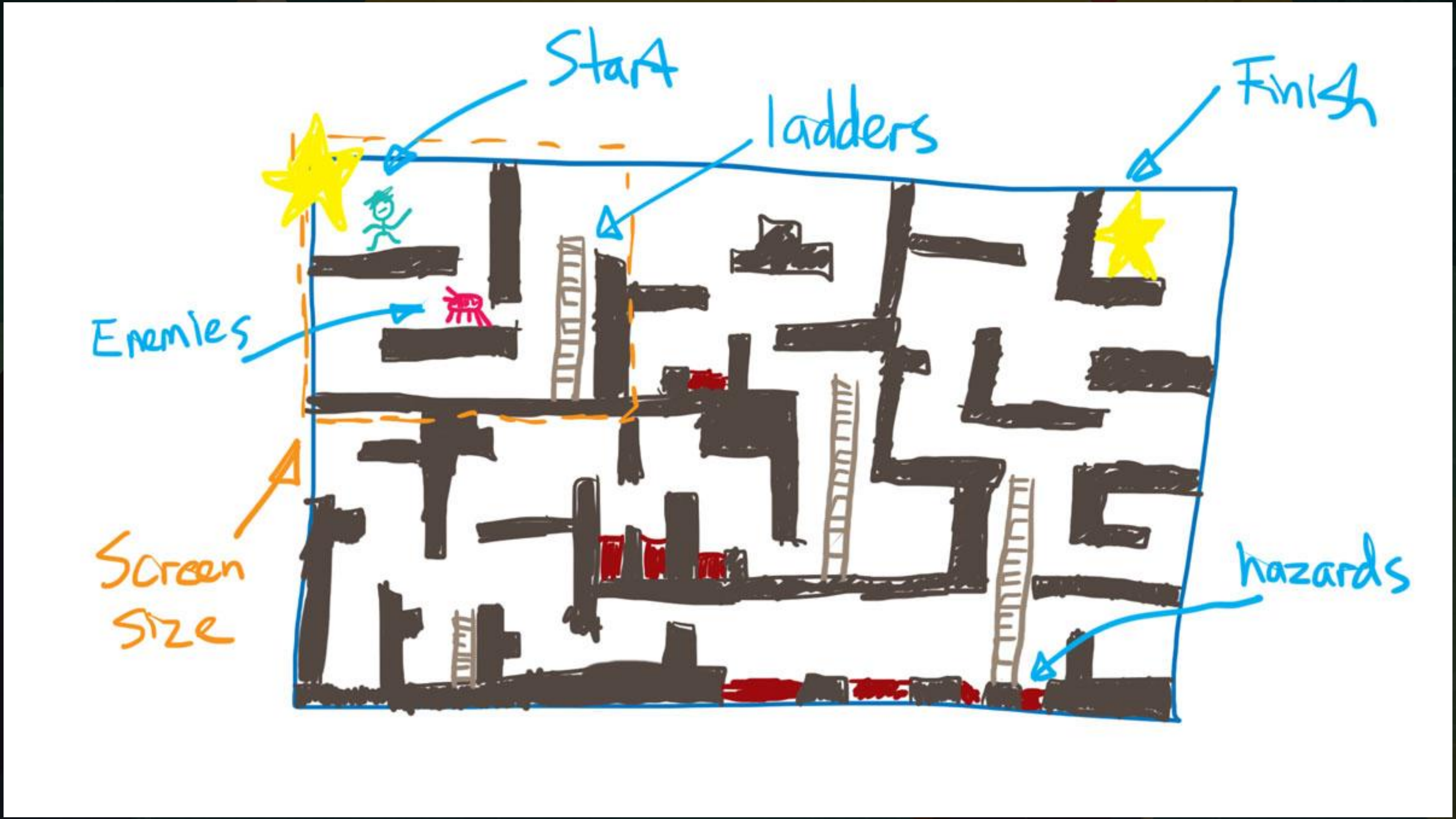
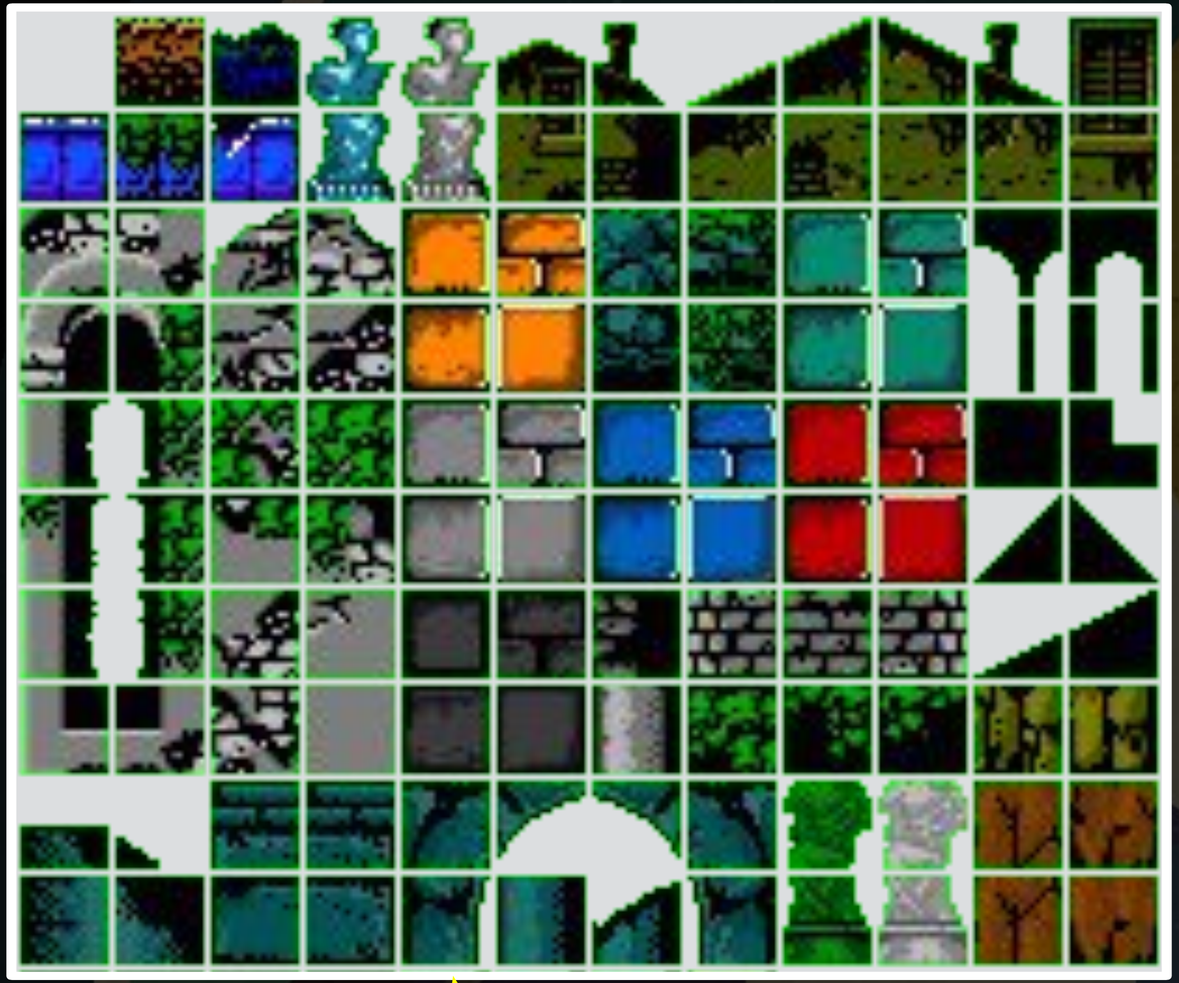
Game Design - TileVania

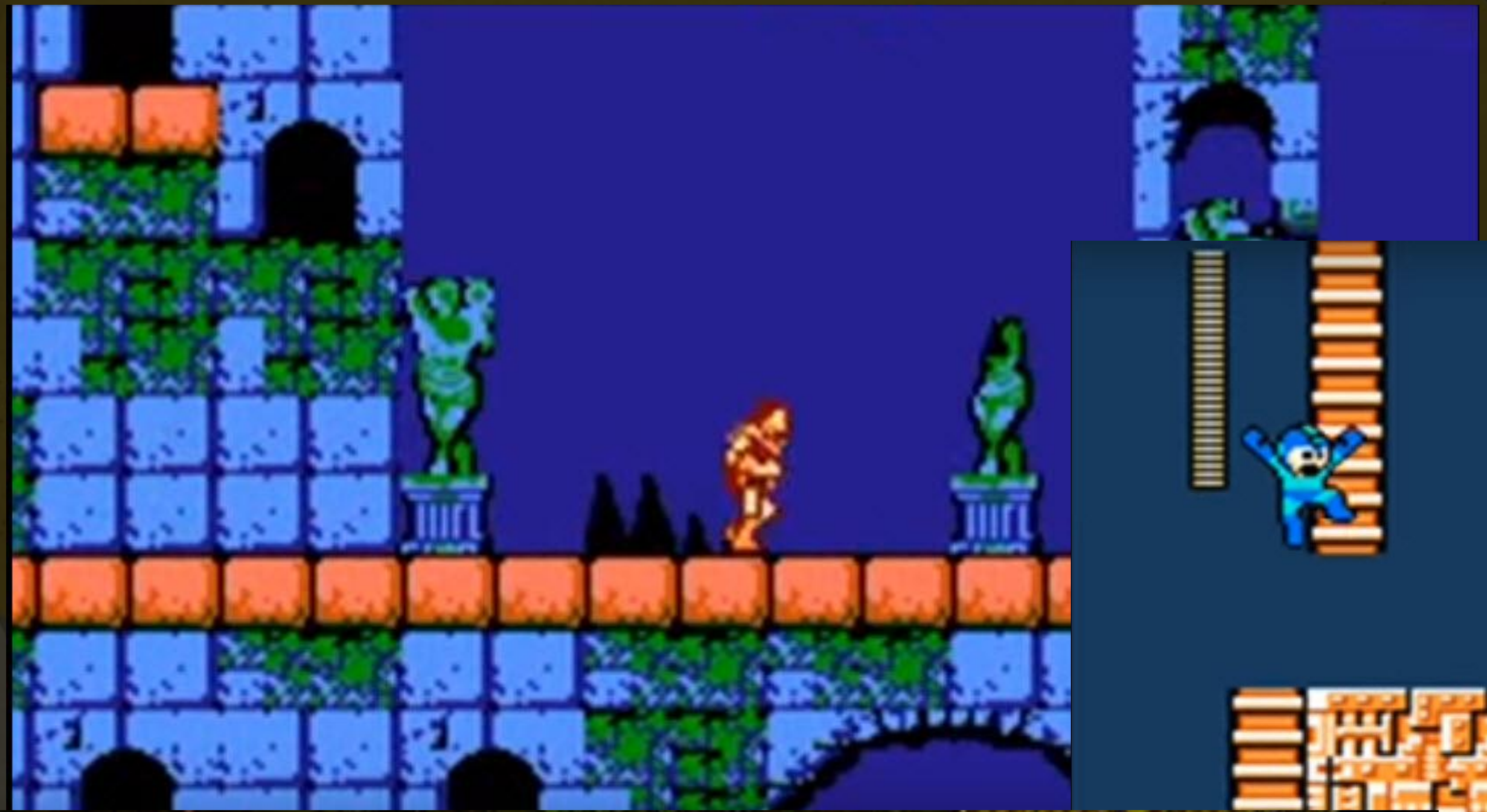
Rick Davidson

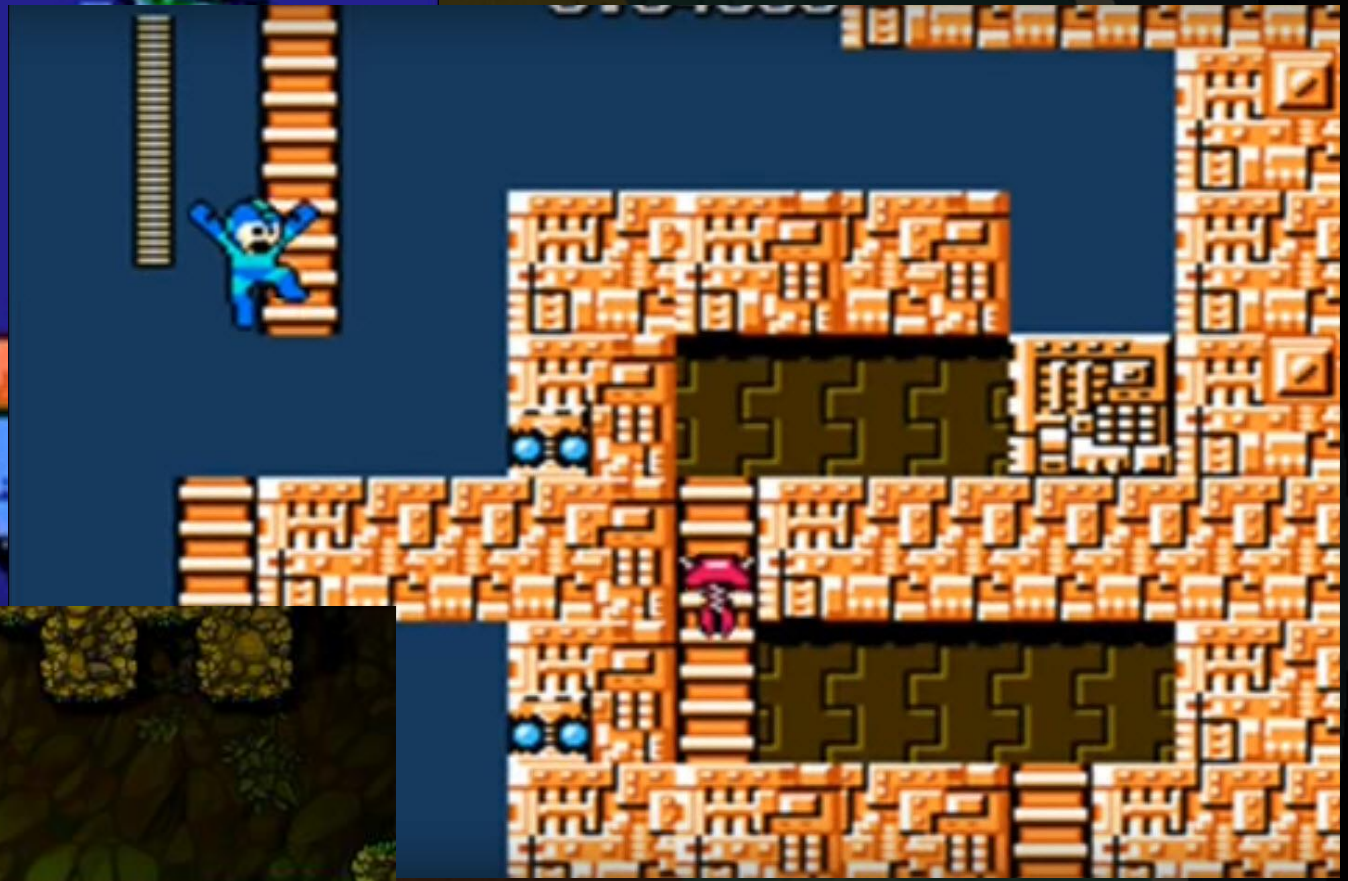
Core Gameplay Overview



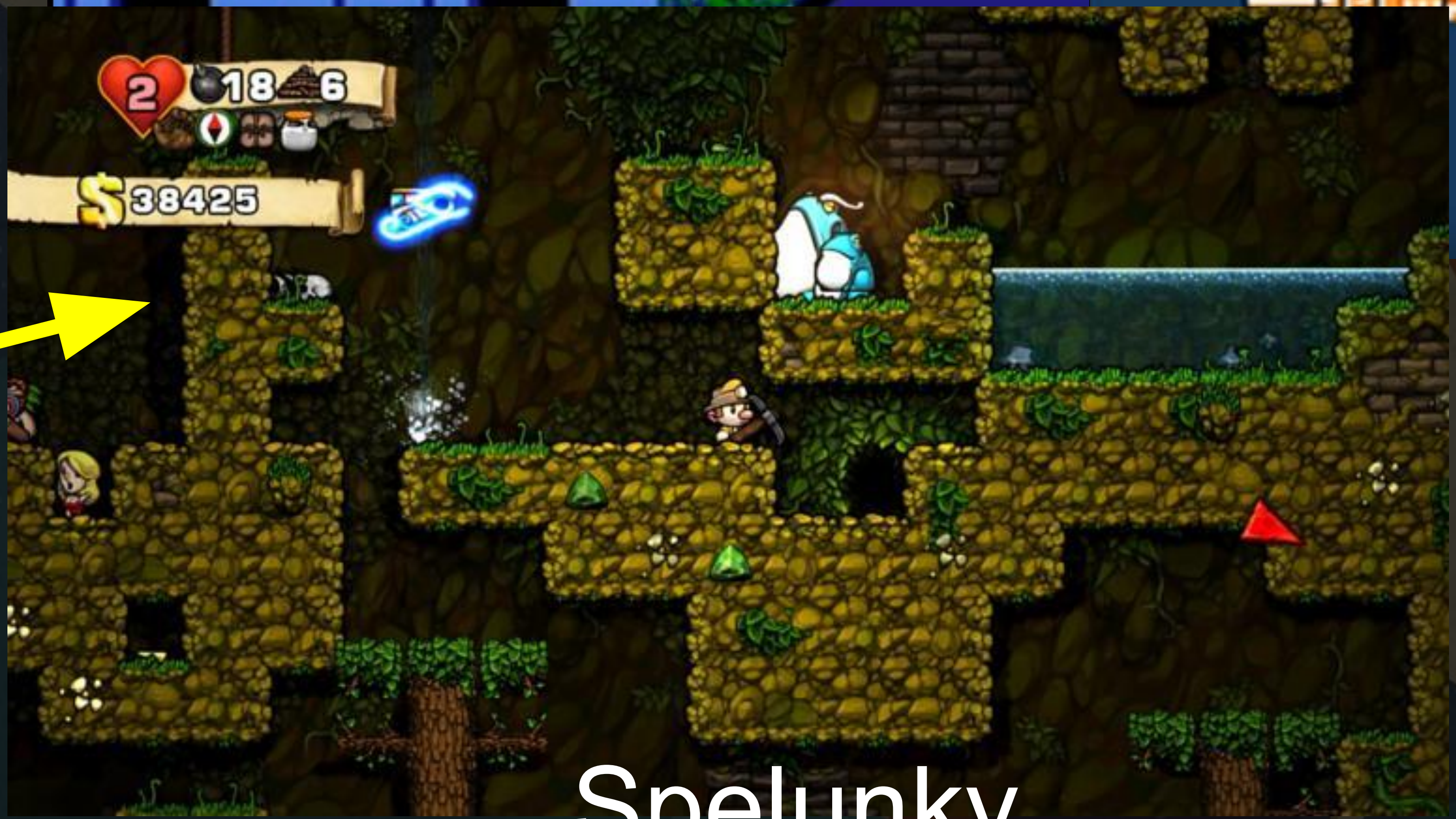


Castlevania





Mega Man



Spelunky

Using Sprite Sheets to make Tile-based levels

TileVania Game Design

Player Experience:

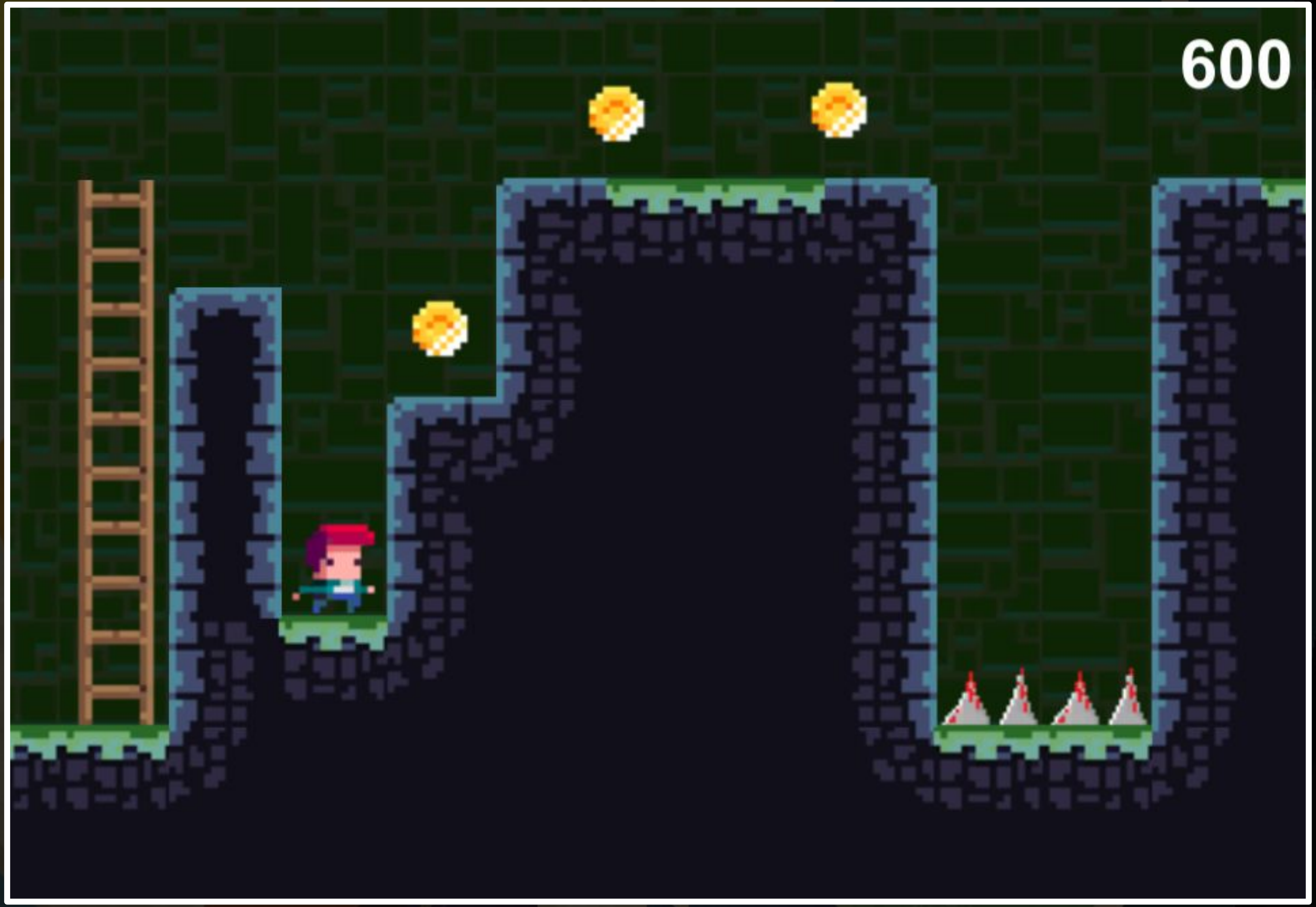
Under pressure

Core Mechanic:

Run and jump

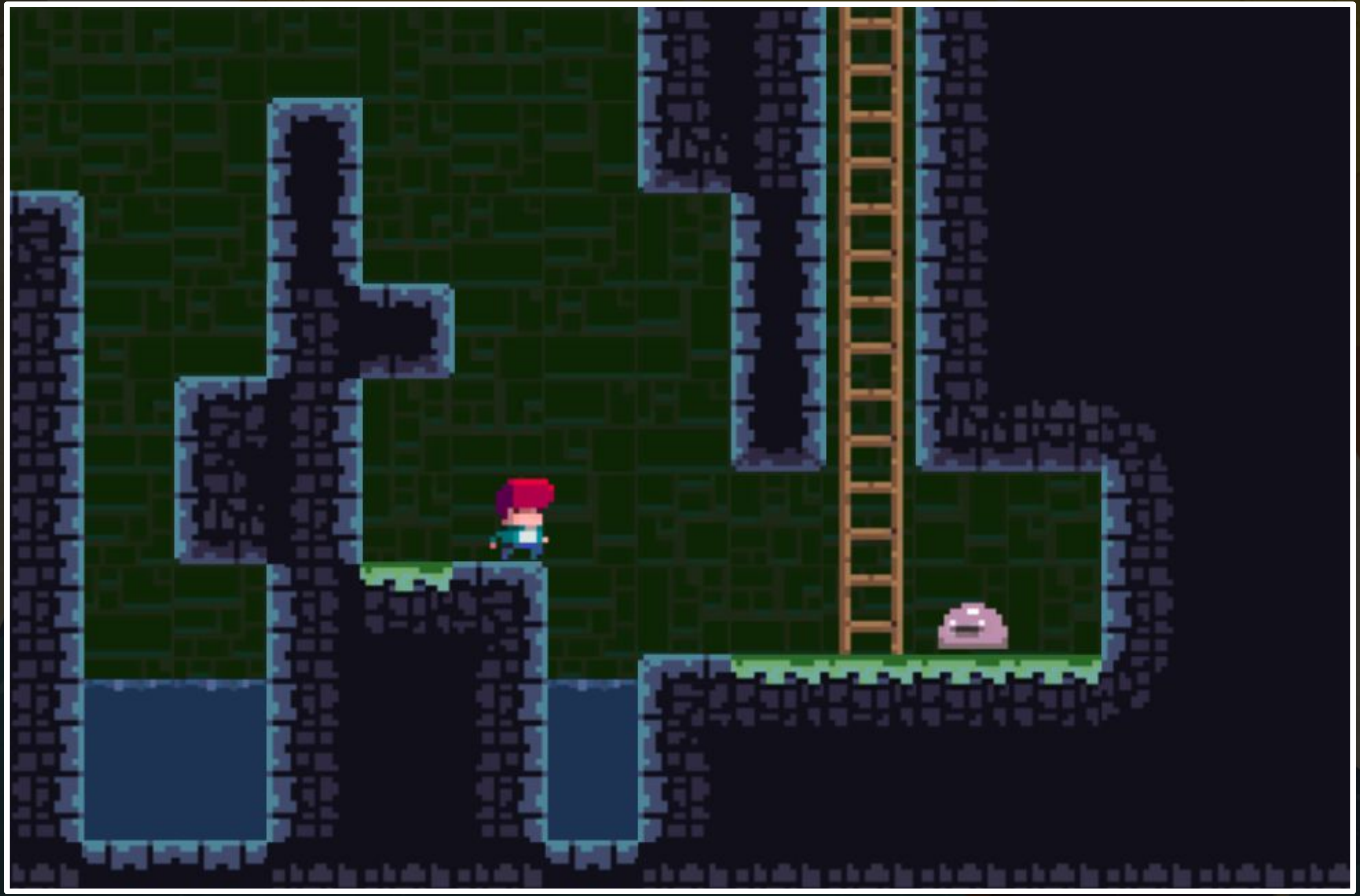
Core game loop:

Get from A to B by navigating platforms and avoiding traps and enemies



Game Theme

- Escape. You’re a prisoner. Clock is ticking.



MVP Gameplay Features

- **Character movement:** Player can run and jump
- **Traps / obstacles:** Instantly kill the player
- **Level loading:** A way to finish the level and start next level
- **Countdown timer:** Some system to create time urgency

Find Your Art Assets

- We will provide basic sprite sheet assets for world and character.
- Here is the time for you to flex your artistic muscles, or find an asset pack you like.
- You will need sprite sheets for:
  - World tiles
  - Character
  - Enemy

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How To Slice Sprite Sheets

Rick Davidson

Slice Those Sheets

- Slice up your sprite sheets so that we have clean, individual assets for:
  - Background tiles
  - Platforming tiles
  - Character animation
  - Enemy animation
  - Anything else you might have cooked up

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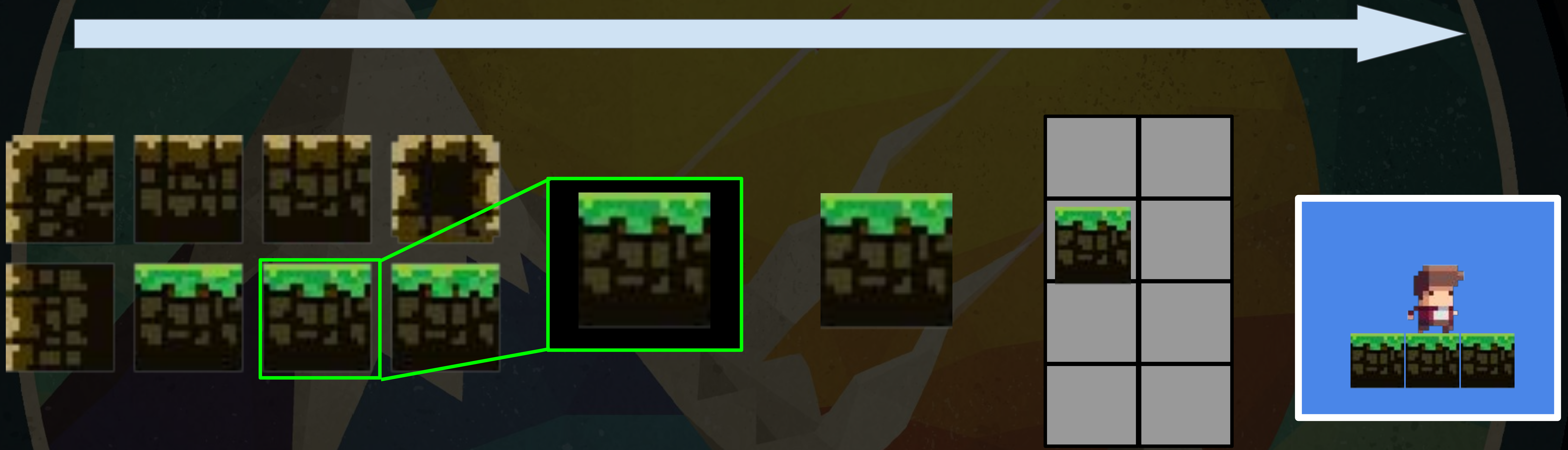
Introduction To Unity Tilemap

Rick Davidson

Tilemap Pipeline



Create A Simple Platform

- Create Plaftorms Tilemap
- Create Tile Palette
- Format Tile Palette (rearrange the tiles if need be)
- Paint a simple platformer layout

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Unity Tilemap With Layers

Rick Davidson

Do You Remember?

- Create a new tilemap, call it Background Tilemap
- Add our background tiles into the Palette
- Paint some background tiles
  - Don’t worry if the order sorting is wrong, we’ll be going through that together

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How To Use Unity Rule Tiles

Rick Davidson

Finish Your Rule Tiles

- Finish setting up your rule tile so that all shapes and positions work and look good
- Using your rule tile, create a couple of simple platformer layouts

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Create Player Idle Animation

Rick Davidson

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
- **Sprite Renderer** - displays the 2D sprite on screen

Set Up Your Character’s Idle

- Import spritesheet and slice
- Add sprite renderer to Player
- Create idle animation clip
- Create Character Animator Controller
- Add idle animation to Animator Controller
- Add Animator to Player
- Assign Character Animator Controller to Player

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Animation States & Transitions

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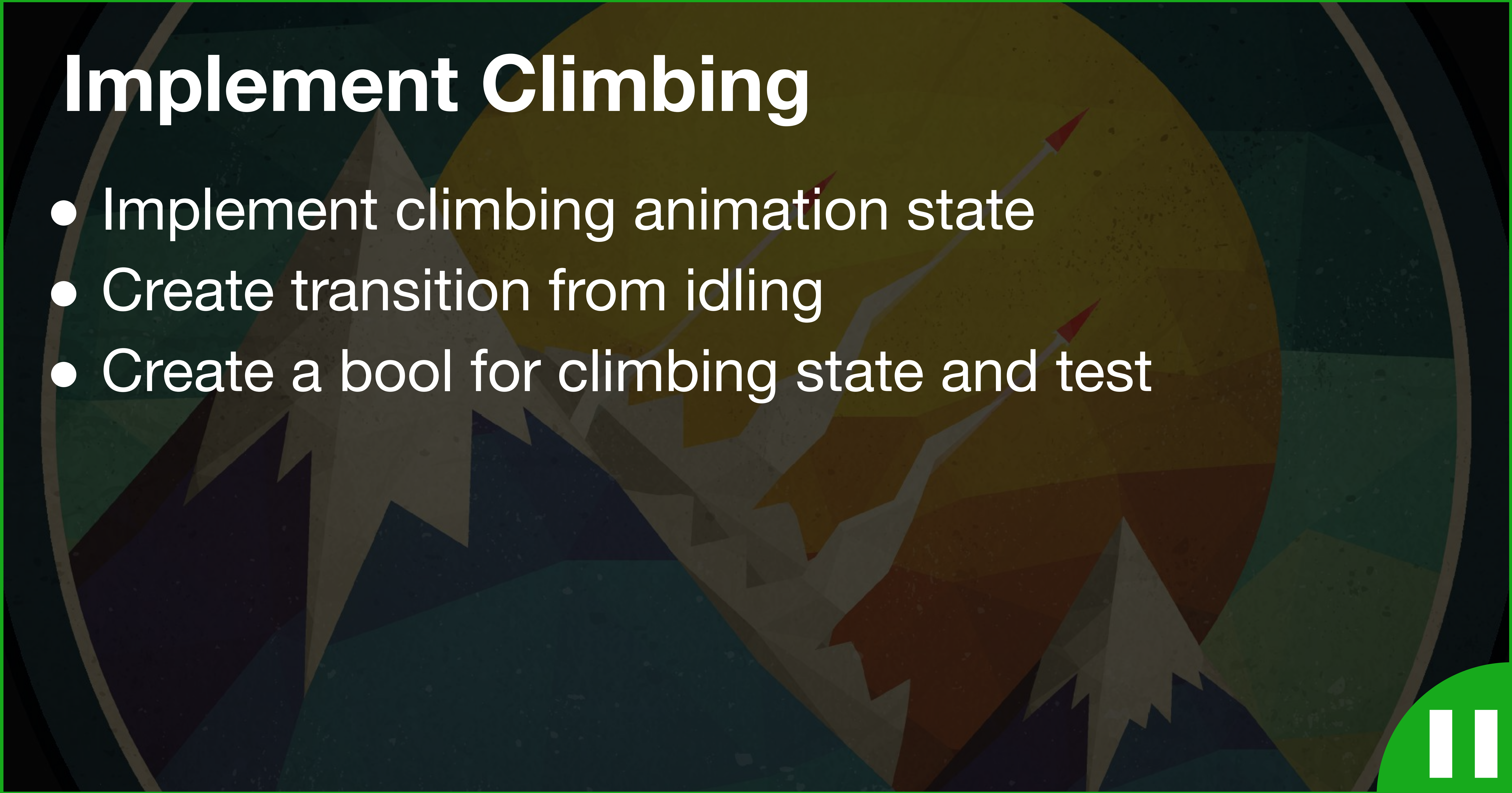

Implement Climbing

- Implement climbing animation state
- Create transition from idling
- Create a bool for climbing state and test

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Using Prefabs In Unity

Rick Davidson

What Are Prefabs

- Prefabs are game objects which we have turned into reusable templates
- The original template is called the **Prefab** and the copies we add into our scene are called **Instances**
- Turning a game object into a prefab means we can easily load it into any scene in our game

Experiment With Prefabs

- We won’t be saving our work in the lecture so be sure to have fun experimenting with prefabs as I’m explaining them

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Composite Collider For Tilemap

Rick Davidson

Make Your Player Fall And Land

- Figure out what components we need to add to the player so when we push play he falls and lands on the ground.
- Bonus points: figure out how to ensure the player doesn’t fall over

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Set Up Input System

Rick Davidson

Set Up New Input System

- Add Player Input Component
- Create settings asset
- Add a Jump action and bind it to space on keyboard and Button South on gamepad
- Create PlayerMovement.cs script and attach to player

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Horizontal Player Movement

Rick Davidson

One Simple, One Tricky

- Simple:
  - Add something to our script to give us control over how fast the player runs
- Tricky:
  - Try to figure out how to make the character behave normally on the y axis (ie. respond to gravity, not fly up and down in the air, not get stuck)

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Flip Player Sprite

Rick Davidson

Here’s Our Flippin’ Logic

- If the player is pushing right, the velocity will be positive. If left, then negative.
- If moving right, we should face right. If left, face left.
- We can change the facing direction (right or left) by changing the localscale using +ve or -ve value.
- Only change facing direction if moving, so weird things don’t happen when velocity is zero.

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Animation State In Code

Rick Davidson

Finish The Run State

- Make the isRunning bool true if running and false if not.
- HINT: Use the code we created for flipping our sprite

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Jumpy Jump

Rick Davidson

Tune Your Jump

- Using gravity and jump speed, tune your jump so it feels good.
- Decide on how many tiles you want your player to be able to jump up.
- Decide on how far you are okay with your player floating horizontally when jumping.

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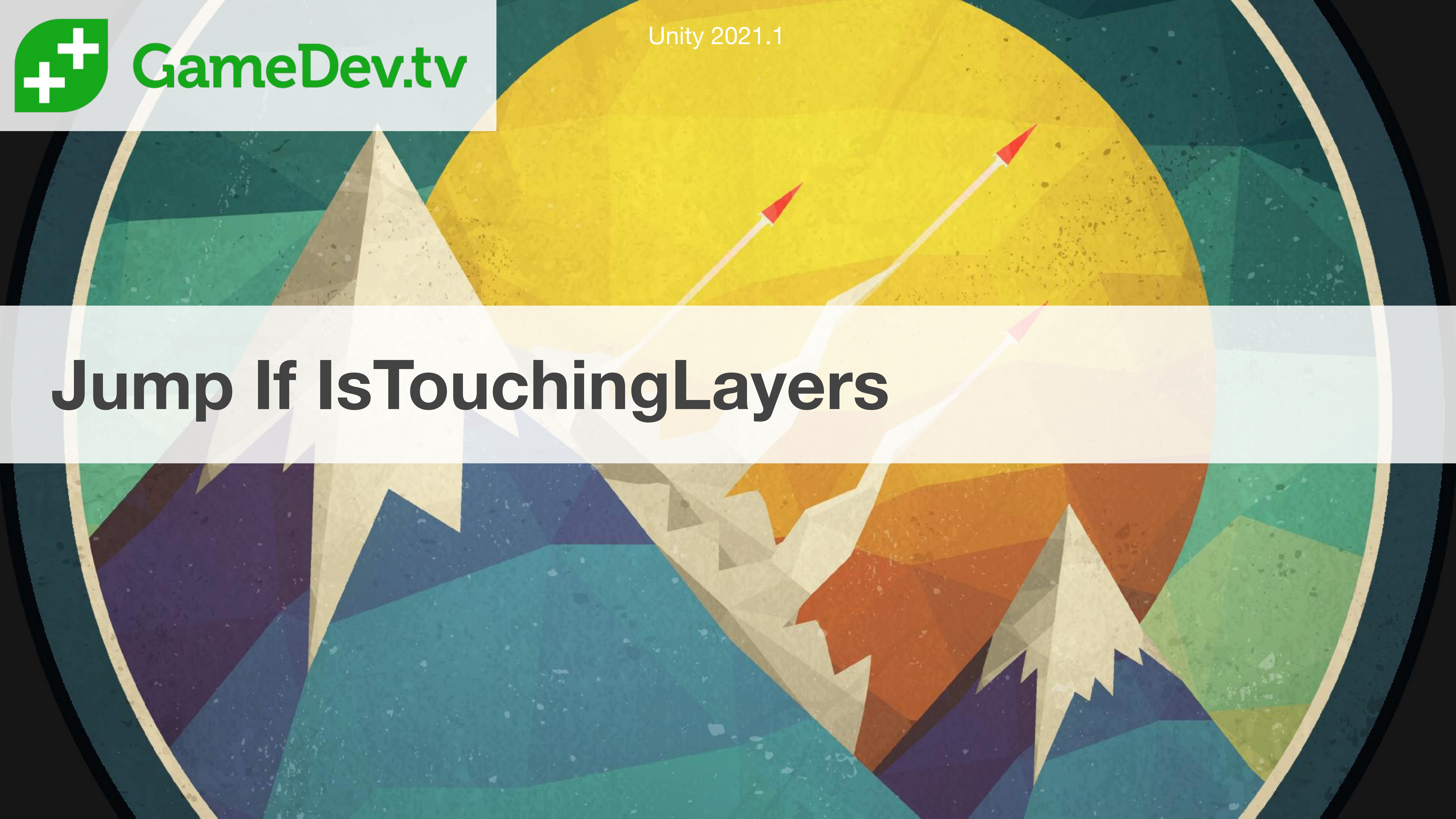
Jump If IsTouchingLayers



Layers

- Layers are useful if we have the same functionality across multiple GameObjects.
  - Eg. Ignored by camera, not clickable, collision check

- To stop jumping anytime we use `Collider2D.IsTouchingLayers()`

Stop Your Player Multi-Jumping

- Finish the logic to stop our player multi-jumping.
- You will need to use:
  - `Collider2D.IsTouchingLayers`
  - `LayerMask.GetMask("layer")`

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Climb That Ladder

Mega Challenge

- Implement ladder climbing
- Remember:
  - Set up your Climbing tilemap and Climbing layer
  - Create `ClimbLadder()`method
  - Check for touching ladder
  - Apply climb velocity to y axis
- In next lecture we'll set animation and fix sliding

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Stop Sliding On Ladder

Stop The Player Sliding

- Set starting gravity on player RigidBody to the RigidBody's current gravity.
- Set gravity while on ladder to zero.

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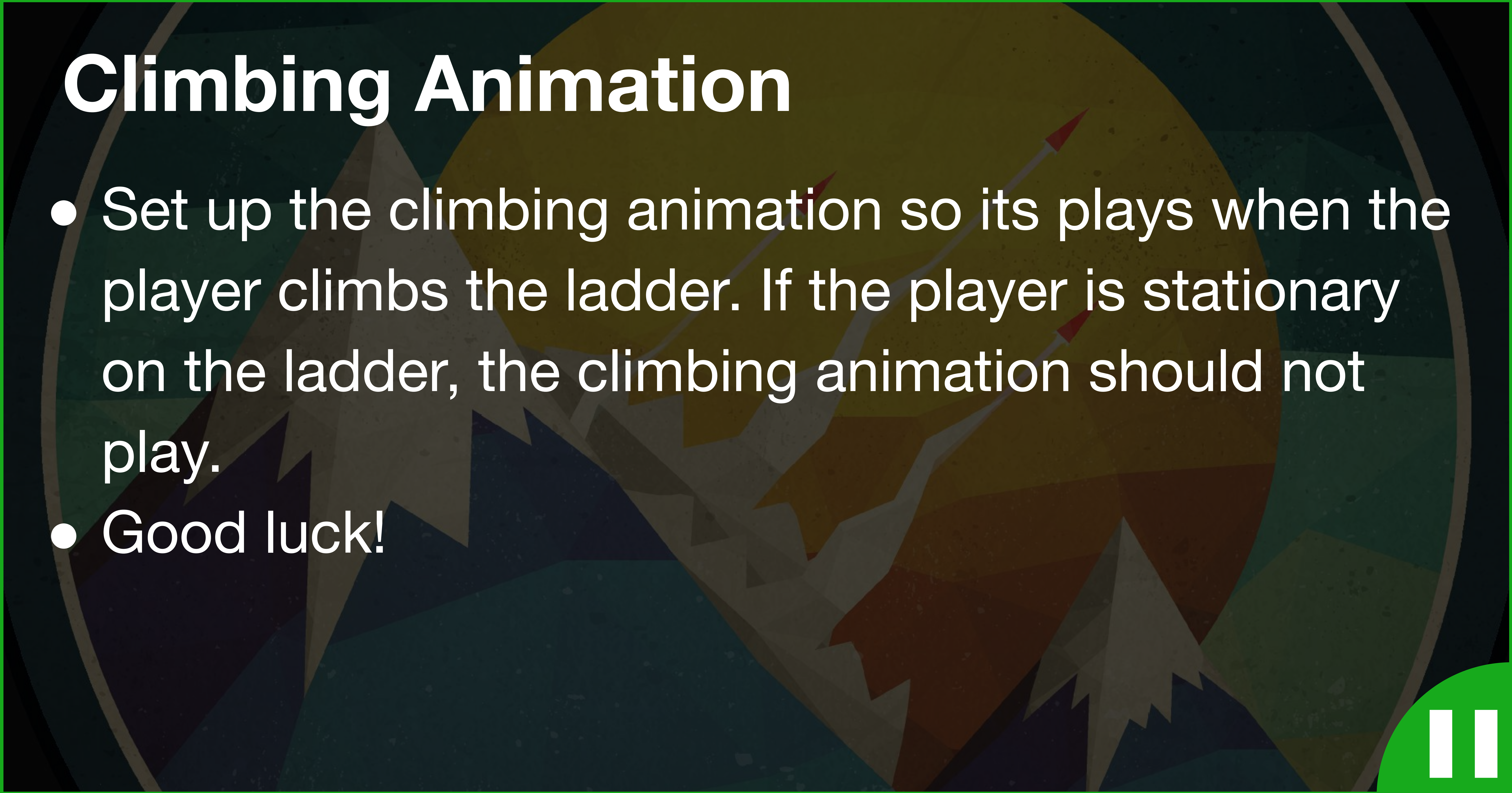
Ladder Climb Animation

Climbing Animation

- Set up the climbing animation so its plays when the player climbs the ladder. If the player is stationary on the ladder, the climbing animation should not play.
- Good luck!



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Cinemachine Follow Camera

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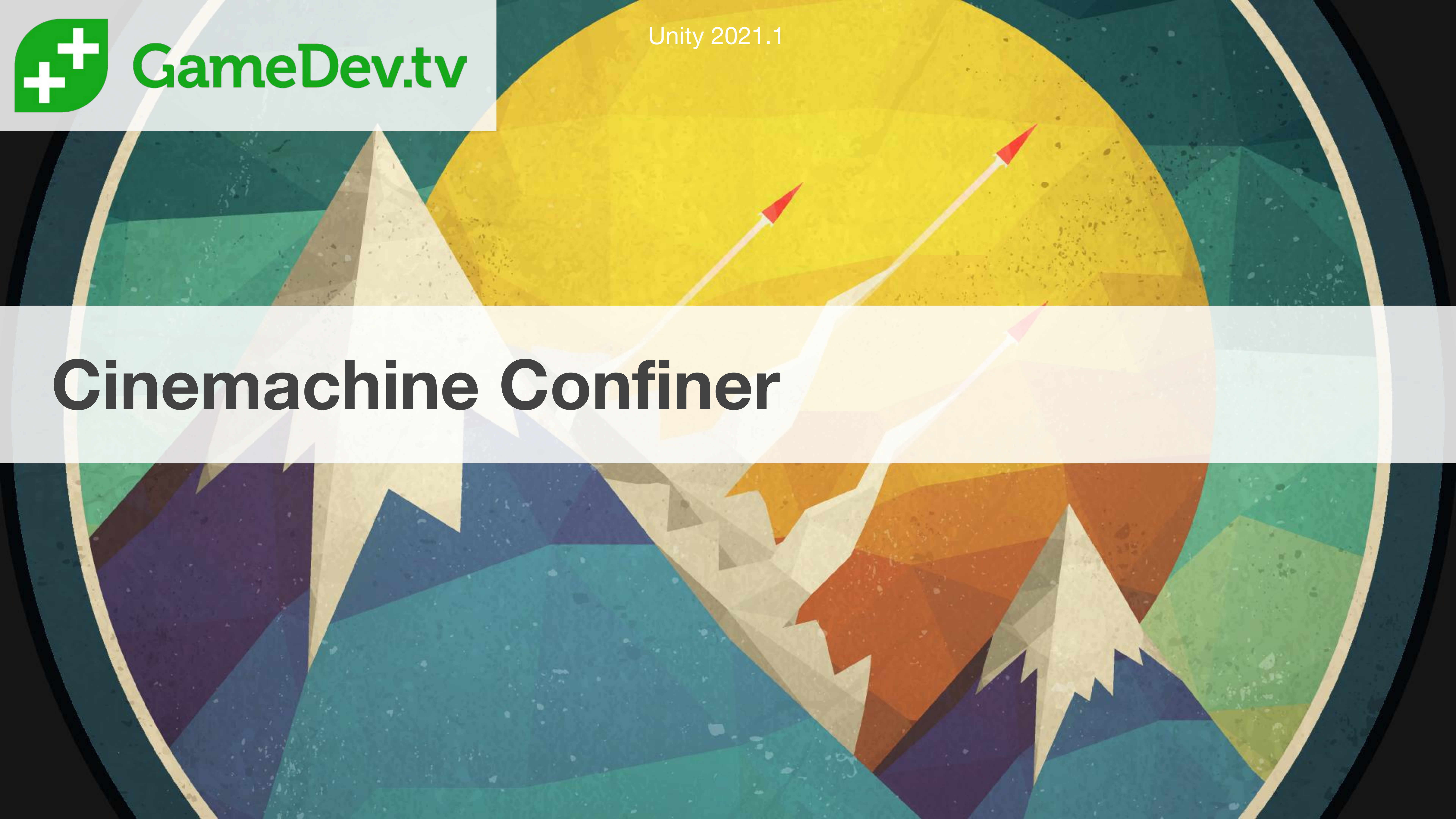
Cinemachine Confiner



Confine Your Camera

- Add enough sandbox game level for your camera
- Add collision to your background layer
- Update your physics layers

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State-Driven Cameras

Add A Ladder Camera

- Add an additional state camera for climbing ladders.
- Make sure the blending to and from the camera is how you like it to be.

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Using Physics Material 2D

Playing With Friction

- Stop the player from gripping to the walls by applying a new Physics Material 2D to the player.

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Prevent Wall Jump

Stop The Player Wall Jumping

- Prevent the player from multi-jumping when touching the wall.
- HINT: Add a second collider to represent feet.

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Set Up Our Enemy

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Move & Flip Enemy

Finish The Flippin’ Code

- Finish our code to make the enemy flip directions.
- HINT: Look at the player movement script for clues.

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Player Mortality

Enemies = Bad, Mmmkay

- When the player collides with an enemy, disable the player controls.
- My approach:
  - Using an `isAlive` bool
  - Creating a `Die()` method

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Player Death State

Do Something Nifty For Death State

- When the player collides with an enemy do something interesting such as:
  - Fling the player across the map
  - Change player colour
  - Add some screen shake
  - Or some other wacky thing
- Share in the discussions what you've come up with!

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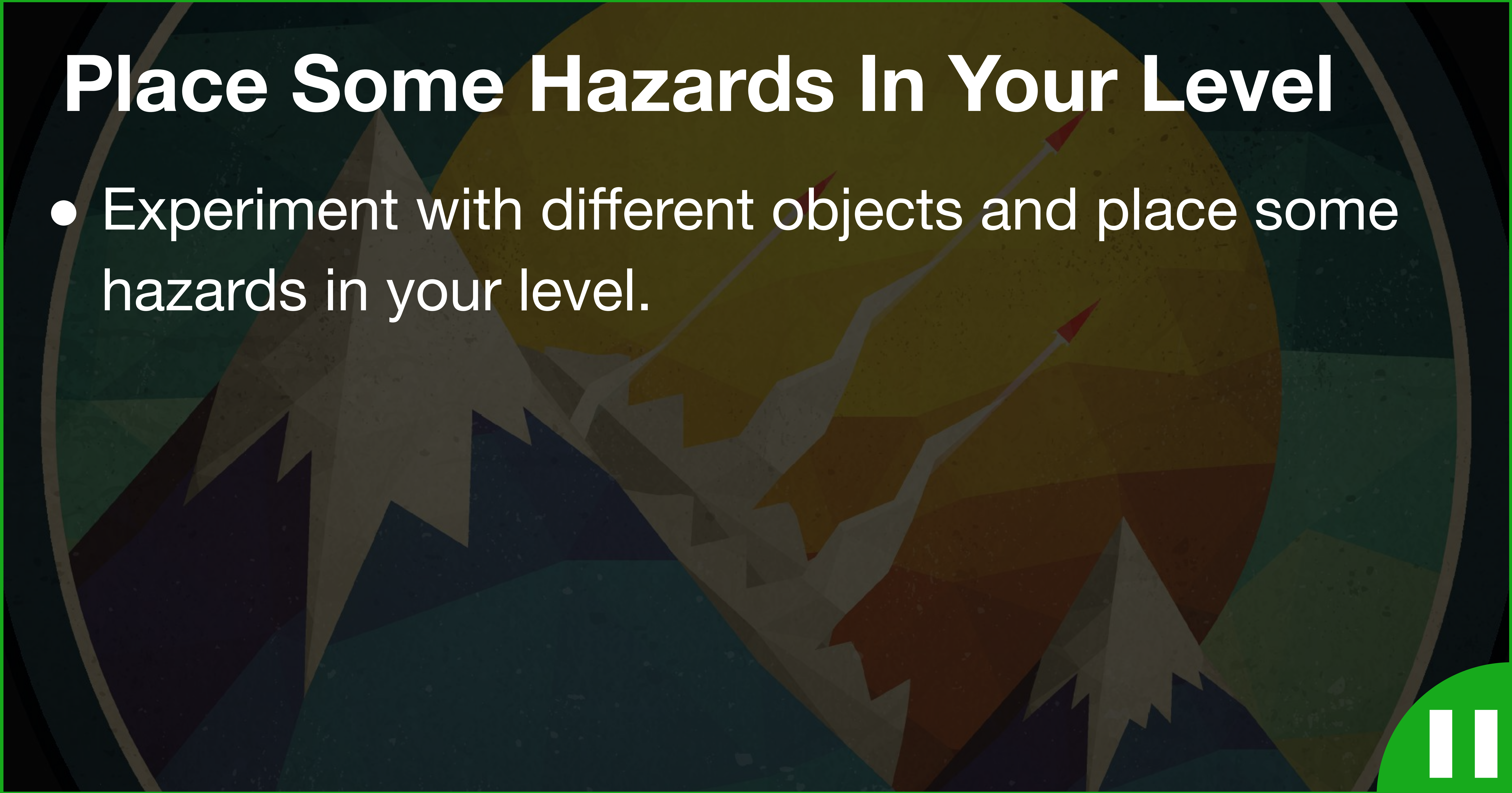
How To Create Hazards



Place Some Hazards In Your Level

- Experiment with different objects and place some hazards in your level.

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Instantiate Bullet From Gun

Spawn Our Bullet

- Use `Instantiate()` to spawn our bullet at our player's gun.

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Implement Bullet Behaviour

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Create Some Levels

We Need 3 Levels

- Make sure everything you need is prefabbed
- Duplicate your existing level so that you have 3 levels
    - Level 1: A single room with a jump over spikes
    - Level 2: A Triple room with ladders and enemies
    - Level 3: As big as you like, introducing bouncing and gaps to jump as well as ladders and enemies

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Level Exit Portal

Coroutines Explained

- Coroutines are another way for us to create a delay in our game.
- The core concept to understand is that we start a process (ie. Start Coroutine) and then go off and do other things (ie. Yield) until our condition (eg. we’ve waited 2 seconds) is met.

Coroutines Code

We call:

```
StartCoroutine(NameOfMethod());
```

Our method:

```
IEnumerator NameOfMethod()
{
    yield return new WaitForSecondsRealtime(time);
    // Anything you want to do after waiting
}
```

Load The Next Level

- When the player touches the exit, load the next level
- For bonus points, wait for a second before loading the next level

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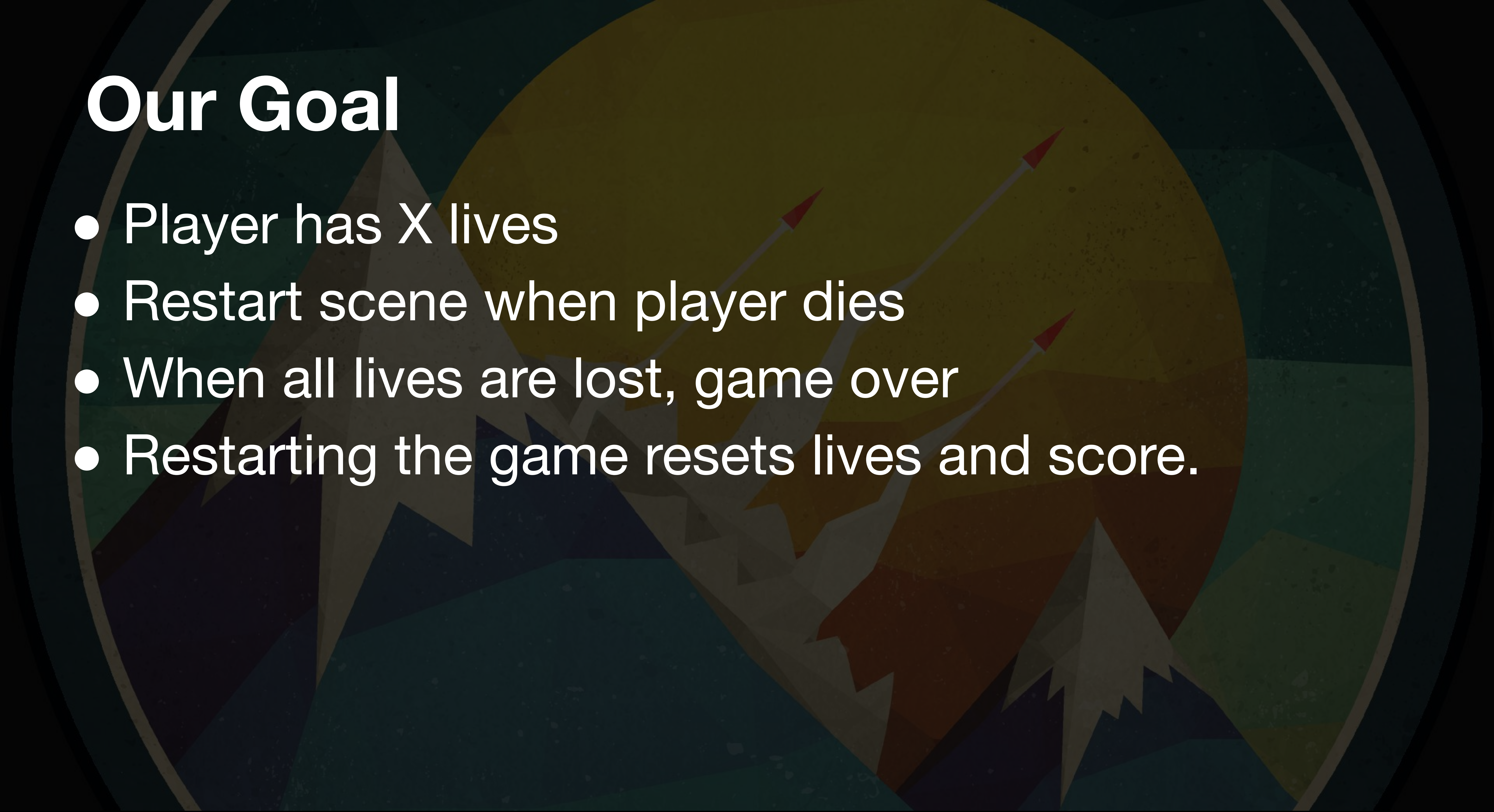
Game Session Controller

Our Goal

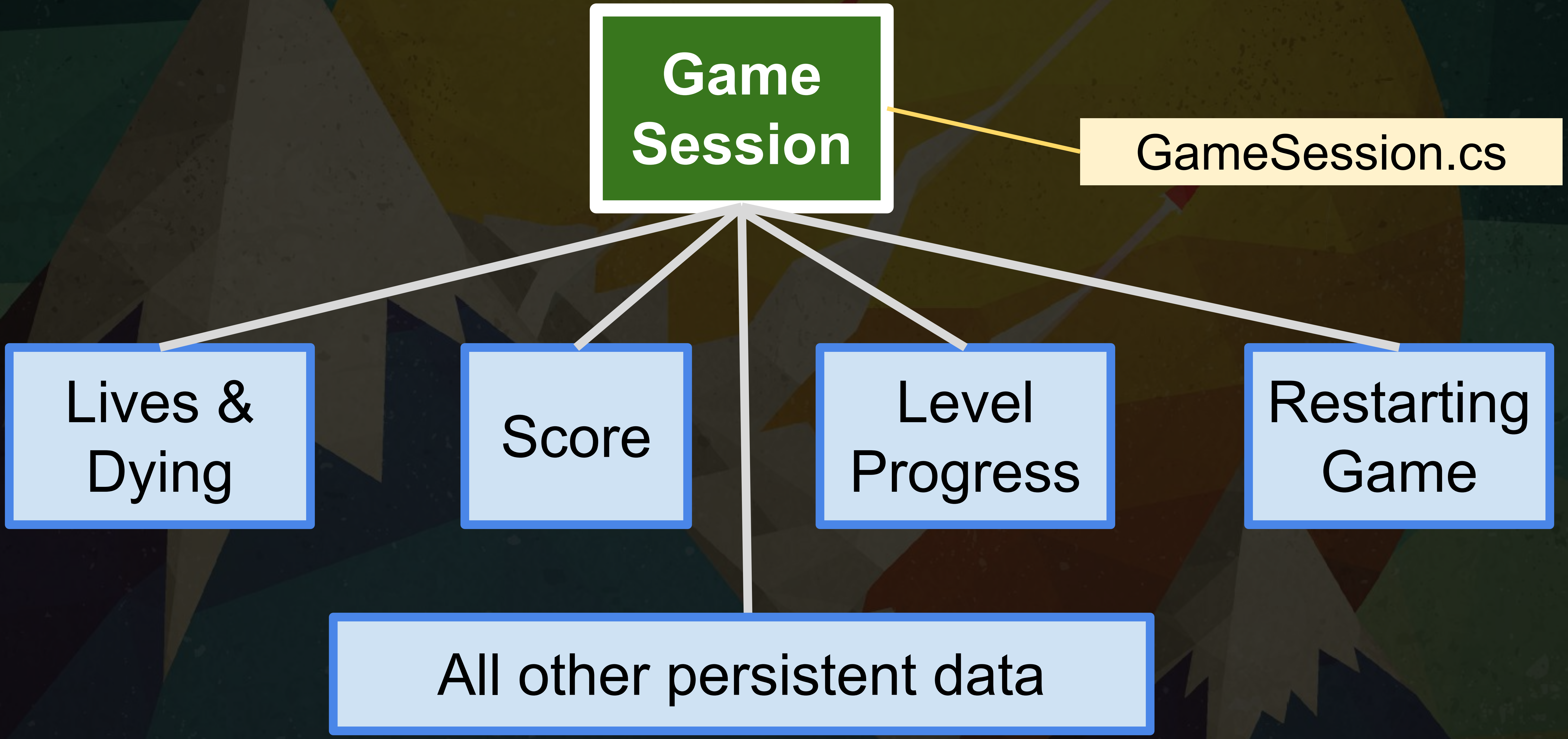
- Player has X lives
- Restart scene when player dies
- When all lives are lost, game over
- Restarting the game resets lives and score.



The Problem

- After death, reloading the scene re-instantiates the Player, and all other objects.
- Any progress with the player or scene is lost.

Game Session Object Is Responsible



Process Player Death

- Reduce number of lives
- Load current scene

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Make A Coin Pickup

“Pick Up” The Coin

- When the player touches the coin, destroy it so it disappears.

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Coin Sound Effect

Play Our Sound Effect

- Use `PlayClipAtPoint()` to play a sound effect when you pick up the coin.

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Persistent Score & Lives

Increase And Persist Our Score

- When we pick up a coin we want to increase our score by X amount (eg. 100 points)
- We want the ability to set different coins to different points value
- We want that to display on the screen
- We want it to persist when the player loses a life
- We want it to return to 0 when we start a new game

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Scene Persist

Create Scene Persistence

- Create a public method that we can call wherever we need to reset our scene persist
- Playtest to make sure there are no edge cases

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Prefab Variants

Create Some Prefab Variants

- Experiment with prefab variants
- Take one or more aspect of your game and create Prefab variants for them