CITA 312 Final Project

By Max Valle

Game Overview

- Title: Racing Game!
- Storyline? Nope!
- Concept and Objectives: to build a smooth 3D racing game complete with car physics.

Development Highlights

Scripts: Movement, CreateTrack, RaceManager, UI Manager, and Checkpoint.

Assets: I built my own racetrack pieces some of the vfx; car asset was imported.

Mechanics: Drive a randomly generated track as fast as you can without flipping, falling off, or missing a checkpoint. Driving is (sort of) more realistic than other car movement we've created.

UI: Three primary "screens": Main Menu, Fail, and Win, with additional UI timers while driving.

Special Features: Random map generation!

Project Progress and Verification

Original Timeline:

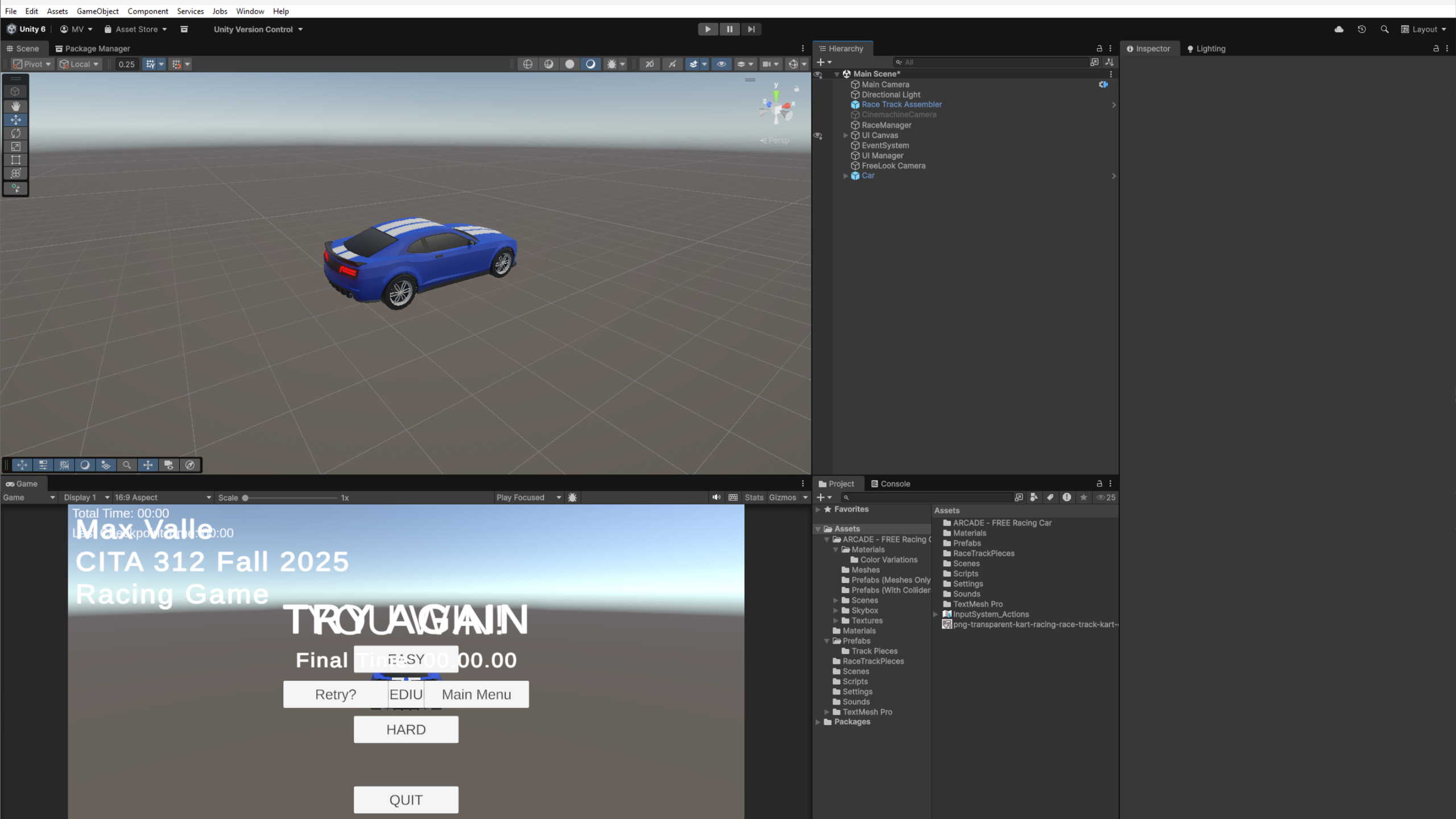
- Week 1 – Player Movement, Modular Racetrack Tile Creation (Blender?)
- Week 2 – Procedural level design, *Obstacles*, Checkpoints, Race Timer
- Week 3 – Game Polish (Visuals, Assets, UI), ***AI Implementation***

What didn’t get finished? Obstacles* and AI Implementation.

Challenges and Solutions

Do you really want to know? Ok, but don’t say I didn’t warn you.

- Input actions not firing even though they were mapped correctly.
- Player falling into the void because the track didn’t exist yet when the player spawned.
- Player needing to be frozen / made kinematic while in menus to avoid drifting into the abyss.*
- Controls not working after retrying because race state flags weren’t being reset consistently.
- Procedurally generated track pieces overlapping in ways that defied the laws of geometry.
- Raycasts checking *from* the wrong direction and mis-detecting valid placements as invalid (or vice versa).
- Track pieces rotating and translating in ways that accumulated floating-point drift over time.
- False positives on overlap detection caused by colliding with the *previous* piece (which needed to be ignored).
- Track generation breaking if you made too many turns in a row, causing “impossible placement” that needed undo logic.*
- The “10 seconds since last checkpoint” fail condition triggering constantly because checkpoint indexing jumped by 10s instead of 1s.
- Total time and checkpoint time getting tangled in each other before being handed off to the UIManager.
- The Booleans raceStarted, raceFinished, and failTriggered ending up in contradictory states because multiple scripts were controlling them.
- Menus activating in strange combinations because panels weren’t being disabled consistently.
- Timer UI starting before the race, after the race, or not at all.
- Win and Fail panels appearing correctly — but the underlying game logic not pausing correctly.
- Failing, retrying, and then losing player control because flags weren’t reset or the player wasn’t un-frozen.
- Procedural piece placement depending on object transforms that didn’t update until later in the frame.
- Definitely a few more I’ve banished from my brain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Unity 6
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Asset Store
Unity Version Control
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Hierarchy
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Main Scene*
Main Camera
Directional Light
Race Track Assembler
CinemachineCamera
RaceManager
UI Canvas
EventSystem
UI Manager
FreeLook Camera
Car
Inspector
Lighting
Game
Display 1
16:9 Aspect
Scale
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Play Focused
Stats
Gizmos
Total Time: 00:00
Max Valle
CITA 312 Fall 2025
Racing Game
TRY AGAIN
Final Time: 00:00.00
EASY
Retry?
Main Menu
HARD
QUIT
Project
Console
Favorites
Assets
ARCADE - FREE Racing Car
Materials
Prefabs
RaceTrackPieces
Scenes
Scripts
Settings
Sounds
TextMesh Pro
InputSystem_Actions
Color Variations
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Prefabs (Meshes Only
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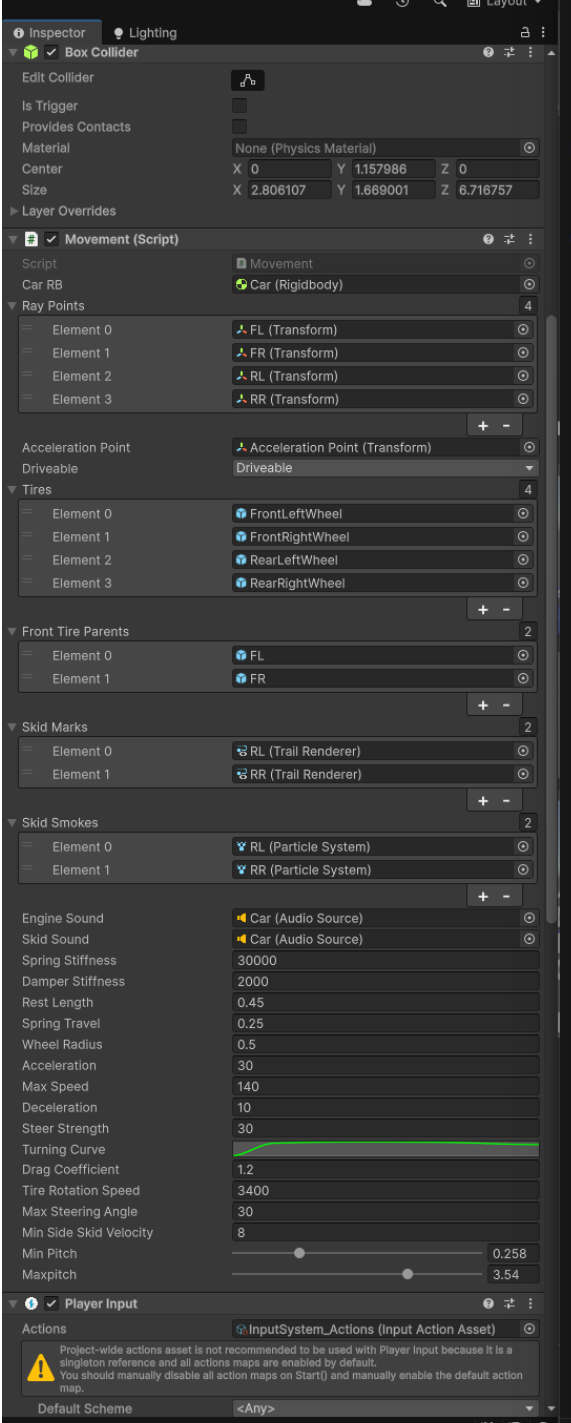
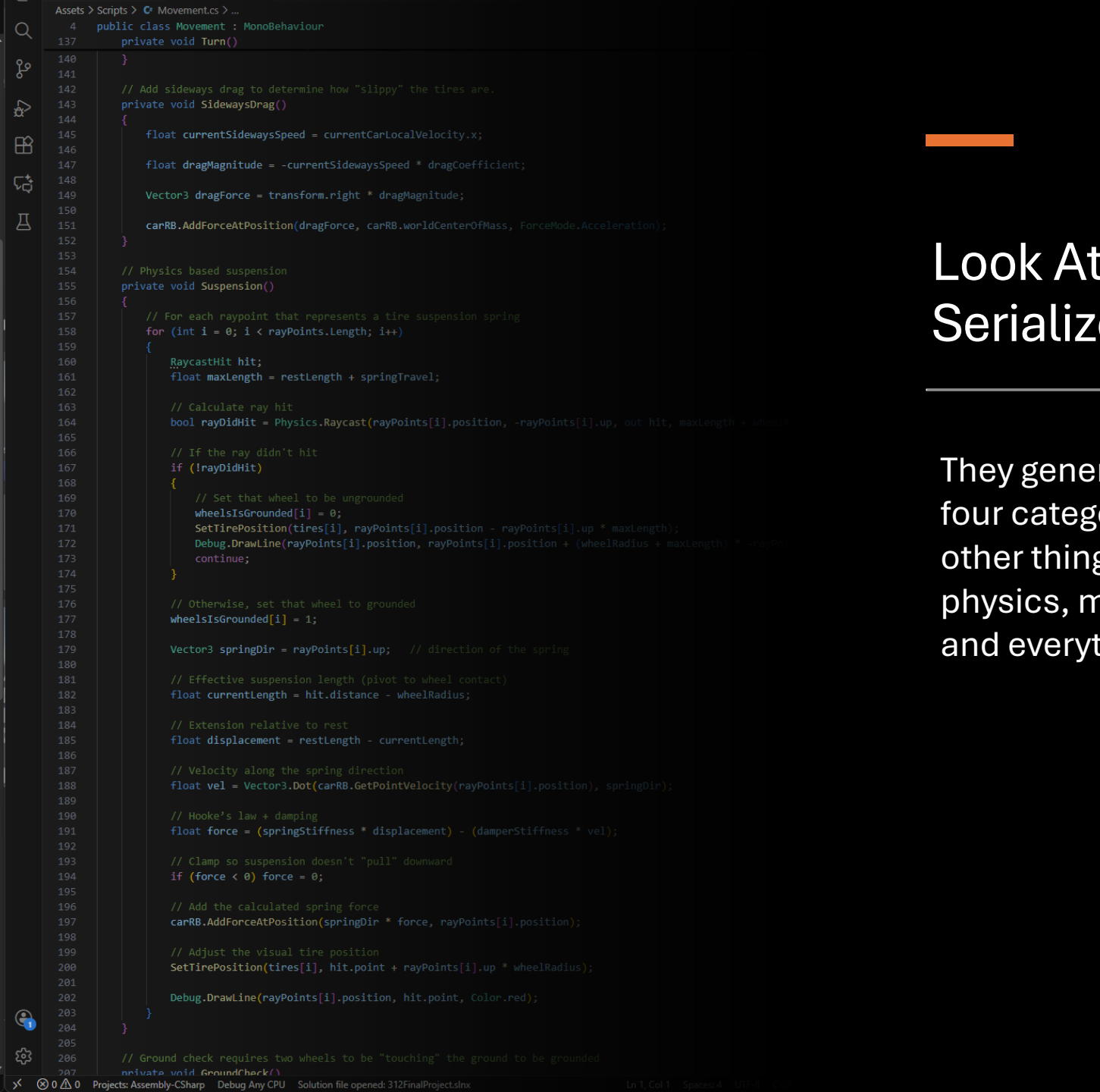
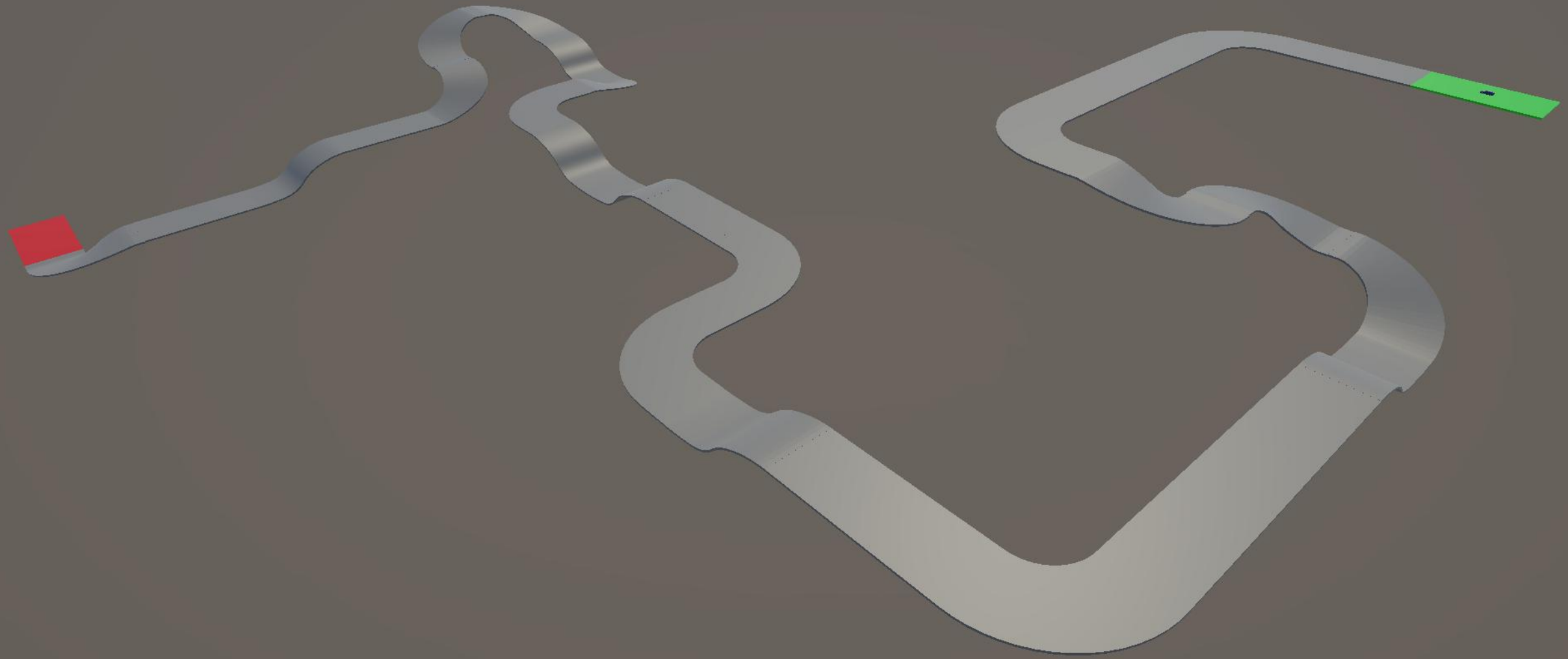
Skybox
Textures
Track Pieces
Packages





Look At All Those Serialized Fields!

They generally fall under 1 of four categories: References to other things, suspension physics, movement physics, and everything else.



Links

My Links:

- GitHub Link: https://github.com/Valle94/FinalProject
- Game Link: https://valle94.github.io/FinalProject/
- E-Portfolio: https://sites.google.com/view/mvalle-eportfolio/games/unity-3d-final-project

Car Physics Tutorials:

- https://www.youtube.com/playlist?list=PLtYhPiKW6dMUdJPfA1HH2HbPjp45PU9Tf
- https://www.youtube.com/watch?v=CdPYlj5uZeI

Assets:

- https://assetstore.unity.com/packages/3d/vehicles/land/arcade-free-racing-car-161085