COSC3072|COSC3073 - GAME STUDIO 1

Individual Report

Assignment 3: Implementing a 3D Clone of Marble Madness

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Group Name: Project Groups 2_SGS

Tasks I Was Responsible For

For this assignment, I was primarily responsible for the **player controls and physics system**. My contributions included:

- **Player movement system:** Implemented the core character controller using `CharacterBody3D`. This included horizontal movement, slope handling, and air control.

- **Jumping and gravity logic:** Scripted custom functions (`apply_gravity()`, `handle_jump()`) to simulate gravity and manage jump input in a consistent way.

- **Collision and stability:** Integrated the physics with Godot's Jolt backend by using `move_and_slide()` for stable collision detection, while handling platform offsets and surface checks in code.

Challenges and How I Overcame Them

One of the main challenges was finding the right balance between relying on **Godot's new Jolt physics engine** and implementing **custom scripted movement**. While Jolt provided accurate collision detection, leaving too much control to the physics engine created problems such as sliding, jitter on moving platforms, and unpredictable jump heights.

To overcome this, I simulated most gameplay physics in code while still using Jolt for collision stability. Functions like `apply_gravity()` and `handle_jump()` gave us precise control over character feel, while `move_and_slide()` ensured reliable collision response.

Another challenge came from my **inexperience with 3D asset creation and texturing**. Specifically, I struggled to figure out what textures were appropriate for the player's ball — where to find usable materials, what types of textures (diffuse, normal maps, etc.) were needed, and how to properly apply them in Godot. At first, the ball either looked flat, stretched, or unrealistic. I solved this by experimenting with free texture libraries, learning about tiling and UV settings, and testing different materials until I achieved a look that matched the game's style.

Finally, **tuning jump height and gravity** required multiple iterations. If gravity was too strong, jumps felt unfair; if too weak, the game became trivial. I addressed this by

playtesting with different obstacle configurations, adjusting until the controls felt fair across both introductory and advanced levels.

Estimated Contribution

I estimate that I contributed around **30–35%** of the overall workload for this assignment. My focus was on the **core movement and physics system**, which is central to the game's feel and playability. While other team members concentrated on obstacles, checkpoints, and level design, my work formed the backbone that made the gameplay functional and consistent.

Team Dynamics

Our team continued the approach from the previous assignment, mainly meeting **face-to-face on weekends** since that was the only time everyone was available. These sessions were productive for syncing progress, integrating code, and testing levels together.

Collaboration went smoothly — each member took clear responsibility for a part of the game (controls/physics, systems, level design, obstacles), and we integrated our work during weekend sessions. Although we still had occasional scheduling conflicts during the week, the routine of in-person meetings helped us stay aligned.

I feel that the experience of this project further strengthened our teamwork: we trusted each other's areas of responsibility, while still giving feedback during playtests to refine the overall design.