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CS-330

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7-1 Final Project Submission

For my final 3D scene, I chose a collection of everyday objects that evoke warmth, creativity, and intentional design: a wooden bowl filled with fruit, a ceramic mug, a glass vase with flowers, and a rustic cutting board. These choices were inspired by my interest in making organization and daily life feel visually uplifting. I wanted the scene to feel grounded and familiar, while also showcasing technical clarity through lighting, texture, and modular code structure.

Each object was selected not only for its aesthetic value but also for its geometric diversity. The bowl and mug use cylinder meshes, the fruit uses spheres and cones, and the vase uses a tapered cylinder. This allowed me to demonstrate proficiency with multiple mesh types while maintaining a cohesive visual theme. I scaled and positioned each object carefully to ensure balance and visibility, especially in relation to the bowl, which serves as the focal point.

One of the biggest challenges I faced during development was managing the camera view and object placement. Early on, several objects were hidden behind the bowl or appeared too small to be visually effective. The cutting board, mug, and vase in particular needed to be repositioned and scaled up to feel intentional and readable within the scene. I iterated multiple times on their placement, adjusting their coordinates and scale values to ensure they were clearly

visible and harmonized with the overall layout. I also had to refine the camera's orientation to better frame the scene, which required careful tuning of pitch, yaw, and movement speed.

To meet the required functionality, I implemented a fully interactive camera system. Users can navigate the scene using both keyboard and mouse input. The W, A, S, D keys allow forward, backward, and lateral movement, while Q and E enable vertical movement. Mouse movement controls the camera's pitch and yaw, allowing users to look around the scene without changing their position. I also added scroll wheel functionality to adjust movement speed, giving users more control over how quickly they explore the space.

One of the most important features I added was the ability to toggle between perspective and orthographic projection using the P and O keys. This allows users to switch between immersive 3D depth and flat 2D inspection, which is especially useful for evaluating object placement and proportions. The camera orientation remains consistent across both modes, preserving the user's point of view.

To keep my code modular and maintainable, I created custom functions that encapsulate key transformations and shader interactions. For example, SetTransformations() handles scaling, rotation, and positioning of objects, while SetShaderMaterial() and SetShaderTexture() apply the correct material and texture settings. These functions are reusable across all objects in the scene and help reduce redundancy. I also used PrepareScene() to load all meshes and textures in one place, making it easy to manage assets and ensure everything is initialized before rendering.

My ViewManager class handles all camera input and projection logic, while SceneManager focuses on object rendering and animation. This separation of concerns makes the

code easier to debug and extend. For instance, if I wanted to add shadows or reflections, I could do so within SceneManager without affecting camera controls.

Overall, my development choices reflect a balance between technical rigor and emotional resonance. I wanted the scene to feel calm, organized, and joyful, and I believe the final result achieves that. By combining thoughtful object selection with interactive controls and modular code, I created a 3D environment that's both visually engaging and technically sound.