Assignment 6 – Brief Report

In this assignment, I implemented a fully controllable 3D FPS-style camera using OpenTK. The camera supports movement with the W, A, S, D keys, mouse look for pitch and yaw rotation and zoom in/out using the mouse scroll wheel. I used Matrix4.LookAt to generate the view matrix and Matrix4.CreatePerspectiveFieldOfView for the projection. Three cubes and a grid plane were added to the scene to test camera navigation and depth perception. Each cube rotates at a different speed and direction to create a more dynamic and realistic 3D environment.

One of the challenges I faced was handling smooth mouse input and preventing the camera from flipping when looking up or down. I solved this by clamping the pitch value and scaling the mouse sensitivity. Another challenge was ensuring the movement speed remained consistent regardless of frame rate, which I fixed by multiplying the velocity with delta time. Overall, this assignment helped me understand how view and projection matrices work together to simulate a real 3D camera system in OpenGL.