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**Design Decision**

**Justify development choices for your 3D scene.**

For my scene I chose to use objects within my house. I had originally selected a pencil case, teapot, mouse, and Nintendo switch. These objects were chosen because each one posed a different challenge for the scene. Although, the teapot and mouse were not successfully created in this scene. The Nintendo switch was a mixture of complexity because in a 3D environment the system looks like a whole but the controllers can be unattached so I treated them as a separate object from the main console itself. The pencil case was pulled from the scene since it made it cluttered, although this was replaced with the speaker.

Unfortunately, I was unable to implement the mouse and the teapot. I attempted to use the gl/glut information to do so, but it resulted in the program crashing. I ran into a similar issue when attempting to implement more complex objects such as the cylinder. So, I settled for the base body of the speaker and the Nintendo switch. The last obstacle I ran into in terms of functionality was the textures. I couldn’t get the code to implement the second texture without it crashing or it not appearing in the scene. Ultimately, the code is functional and can be navigated, although it doesn’t fully match the scene I started out with since the beginning of this class seeing as the Nintendo switch and the speaker are the only objects in this scene.

**Navigation Instructions: Explain how a user can navigate your 3D scene:**

A user is able to use multiple keys on the keyboard and mouse to navigate this scene. When entering the environment. The user can choose basic movement options such as moving Forward (W: key), Backwards(S: key), Left(A), Right(D). Additionally, the user can move Upward (Q: key) or Downward(E:Key). The keyboard is primarily used to navigate around the environment. Camera movement is controlled by the user’s mouse and it gives the ability to look right, left, up, or down in the environment. The scroll wheel also controls additional movement options for the environment. If the user scrolls on the mouse the user can adjust the speed in which they move across the environment.

**Explain the custom functions in your program**

As for custom functions in my program, I utilized multiple to cut back on clustered code. Although I believe the main area in which I chose to use custom functions was GLfloat verts[]. This line was used to control the vertices in the environment and allow of the creation of textures, object positioning, and possible colors. I originally placed all the code for the objects within this function, but realized I could place custom headers into the function to call when the function executes. Doing this cut back on editing the wrong object or texturing the wrong set of vertices in the scene. This function included #include plane.h (the foundation of the scene or the table), #include controllers.h (controllers for the switch which can be treated as separate objects), #include body.h (console), and lastly #include speaker.h. Setting up the code in such a manner allowed me to turn off and on objects to focus on one object at a time. It also allowed me to adjust the objects so that the objects didn’t collide with each other in the scene. Verts could later then be called upon so that the vertex information could then be sent to the GPU.