### Southern New Hampshire University

### CS 330– Comp Graphic and Design

### 7-1: Final Project Design Decisions

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For the creation of my 3D scene, I chose to design a house using simple geometric shapes that are realistic yet not overly complicated. The main house structure was created using a combination of boxes and prisms. The walls were modeled as large rectangular boxes and the general shape of the house was enhanced with prisms to add depth and dimension. The garage door was created using a plane with a garage door texture. To model the front porch, I used a combination of boxes and cylinders. The vertical support beams were rectangular boxes for stability. The columns were made from cylinders to achieve a more realistic rounded appearance. The horizontal beam was also a rectangular box for consistency. The walkway was created using a long thin box with a concrete texture. Finally, the driveway and front yard were made using planes to help anchor the other objects and provide a grounded look to the scene. By applying a variety of textures, such as wood for the beams, green industrial metal and white stucco for the body of the house and black roofing material, I was able to give each object a realistic appearance.

To allow users to navigate the 3D scene easily, I implemented several control options. The Escape key allows users to exit the scene. The W and S keys control zooming in and out. The A and D keys are used to pan the view left and right. The Q and E keys allow the user to pan up and down. The P key switches the view to perspective mode. The O key toggles to orthographic view. The mouse cursor is used to change the camera’s orientation. The mouse scroll wheel adjusts the camera movement speed. Scrolling up increases the speed and scrolling down decreases it. The range of input options provides a flexible way for users to interact with the scene and explore it from different perspectives.

To keep my code modular and organized, I used several functions that simplified development and made my code reusable. First, I used the PrepareScene() method. This method was crucial for loading textures into the scene. It accepts a file path as an argument, allowing me to load any texture dynamically. This method makes it easy to efficiently apply textures to a variety of objects. Additionally, it loads mesh data once and reuses it multiple times during rendering. This reduces the redundancy of code and ensures that the texture loading is handled in one location. Furthermore, I used the RenderScene() method. This method gives a basic structure for rendering objects in the 3D environment. It handled the transformation and drawing of the shapes I used which include planes, boxes, tapered cylinders and prisms. This method allowed me to efficiently reuse the same code for various shapes without duplicating logic. I was also able to apply textures through this method which makes mapping textures to objects more manageable and organized. Adding new objects to my scene became easier over time because I was able to rely on the existing parts of the method for rendering.