Design Decisions

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

In my 3D scene I selected the primitive objects of pyramid, cylinder, and cube as the main primitives for the objects which are the uno cards, the ring, the money wrapper and the pyramid object I had in my picture. The reason I choose these objects is because they had somewhat of a variety, and it were linked to the task that we had to accomplish in the milestones. The way that I was able to program the required functionality is by building these primitive shapes in the x,y and z axis for the 3D scene by holding it in a data array which will hold these coordinates as well as the texture of the object and the normals for light reflection. Other functionalities such as enabling the buffers and making the opengl speak with the GPU in order to illustrate the object through the shaders and finally applying the view, projection and positioning of the object in the space of the scene. Additionally, the other objects that I implemented were the lights which had its own shaders that allow to use this effect towards other objects and similar to the other objects I had to make an array of coordinates for the lights and the normal as well as texture if necessary to implement in the future but for now we had white lights with its color of affect towards the objects it interacted with.

**Explain how a user can navigate your 3D scene**

The 3D scene navigation was interesting because we applied inputs into the camera in order for it to move around the space of the scene and basically observe and navigate around the objects 3-dimensional perspective, the way I set up the controls for the virtual camera is to allow interactive movement in the x,y and z coordinates of the view point of the camera and in this way the camera had options to go around the scenario easily. We used the inputs W,A,S and D to allow users to move forward, back, left and right of the scene as well as implemented Q and E to make the users move up and down. Additionally, I implemented the SHIFT key in order to speed up the movements of forward and back so that the user can easily move around faster. Finally, I changed the option to change the perspective of the scene by having the key P change between a 3D scene into a 2D scene whenever the user will want to achieve this.

**Explain the custom functions in your program**

One of the custom functions that I applied into my code in order to make things more organized and modular was the function that allows inputs to be render into the system in order for the camera movements, mouse movement to be render into the scene as well as making it useful and reusable at any point during the scene which makes things more easier when trying to implemented new inputs. The texture function is another reliable function that makes it possible to be reused in order to achieve a new texture into a new object. The cylinder primitive object classes that were created allowed me to make as many cylinders as I wanted to render as long as I apply the necessary data. Furthermore, classes such as the camera and stb\_image classes are very helpful in reusing code that can allow me to upload as many pictures as I want with the help of stb\_image and the camera class makes it possible for me to adjust and reused all of the functionalities of camera movement. Other custom functions that I apply into the scene were minor but useful functionalities was the fact that I allow the light source to have movement and I did this manly because I wanted to see how my scene will look in every aspect and was trying to get the best lighting on the scene similar to the picture.