For my scene I decided to replicate a serving tray of food from my daughter's playset. This contained a serving platter, a can of juice, a pancake, a tomato and a doughnut. I started with a simple textured plane as the serving platter, this also gave me a point of reference to place the rest of the items on. I then decided to replace the can of juice with a juice filled cup to give that a more interesting look instead of just a can. To make this I used a function to create a cylinder that could also create a second cylinder with a top cap that would be slightly smaller than the original. Both cylinders would be wrapped with unique textures to give them the combined look of a glass filled with juice. To create the pancake, I combined a cylinder and a cube both with unique textures to give the appearance of a pancake with butter on the top. To create the doughnut I used a torus with a colorful texture to give the appearance of a colorfully glazed and sprinkle covered doughnut. For the tomato I used a sphere wrapped in a red tomato like texture.

Using the keyCallback function I set up the W, A, S, D keys to move the camera forward, left, backward and left respectively. This function also set up the Q and E keys to move the camera up and down. The last two parts of this function was to assign the P key to switch the camera’s view from perspective and orthographic view, and to set the escape key to close the window. While using these keys to navigate the camera will move relative to its current orientation so the keys will always move in the direction that you would expect given your current view of the scene. The mouseCallback function gives the user the ability to move the camera view with the mouse. This uses the mouse movement to change the direction that the camera is facing without moving the location of the camera. The final function for navigation is scrollCallback. This function tracks the mouse scroll wheel to allow the user to speed up or slow down the movement of the camera while using the W, A, S, D, Q, and E keys. This lets the user either move farther distances quickly or move slowly to more accurately move about the scene. The combined setup of these functions allows for a flexible and intuitive first-person style camera, where the keyboard is used for movement and the mouse is used for looking around.

To make this code more modular I set up individual functions for each of the objects that I needed to create. For the glass of juice I created a function that would create the shape that I needed for the glass giving it all the properties that it needed. This function was also set up to be able to be called with a bool that would then have it create another cylinder that was only slightly smaller and added the top cap. By doing this I was able to reuse some of the code from the first cylinder while creating another that had the different properties that I needed. By setting up functions to create the shapes that I needed in my scene I would be able to use those function multiple times and then modify their model matrices to scale or rotate them and give them different textures and location around the scene saving me writing more code to create all the objects individually. I also have functions to add, validate and compile my shaders. These functions let me take the different shaders that I needed for my scene, check them for compilation errors and attach them to a shader program. By pulling out as much of the code from the main loop as possible it makes the code easier to read and understand. It also allows the code to be more maintainable and adjustable because if something needs to be modified in the code you no longer have to find every instance that code is used you can just go to the function and modify the code there and every place that function is used will be modified at the same time.