PROJECT 3: In addition to original project 2 below.

New Features:

Primarily the new features include the entire outdoor section. This includes the small pond and stream, tree, and campfire. For the campfire, as well as the old fireplace, there are now light sources defined in Model Coordinates within each one, to give a realistic feel.

New Interactive Controls:

Shift-l, or ‘L’ will enable the indoor lighting. While ‘D’ will disable it. This lighting has specific fragment shader support to clamp its effects to within the interior of the room, as if there were actually 4 walls, and they were blocking the light from escaping.

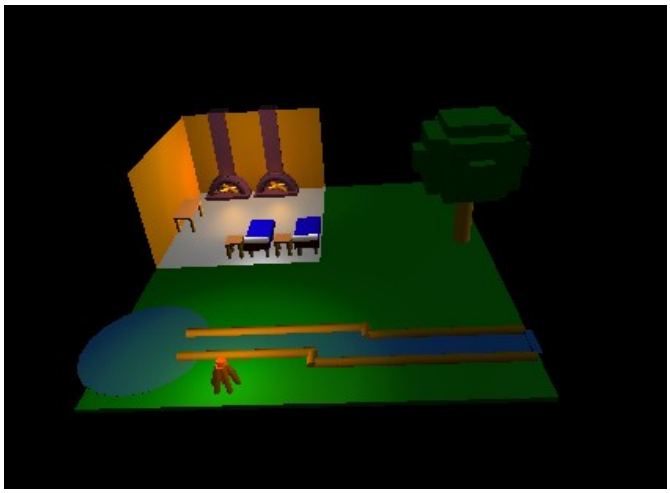
New Things that Caused You Difficulty

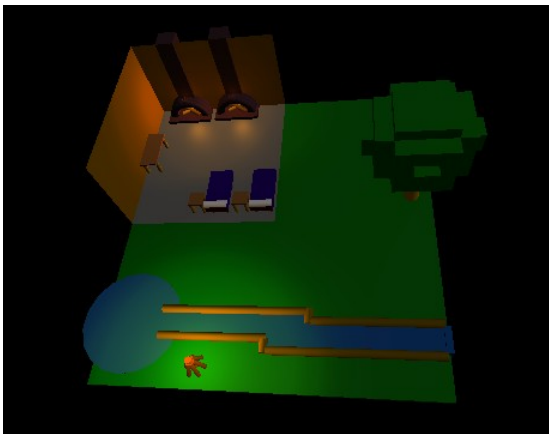
The primary issue I had was that my ModelView classes were implementing the handleChar methods, which was overriding/hiding the SceneElement’s implementation, and projection changes weren’t working.

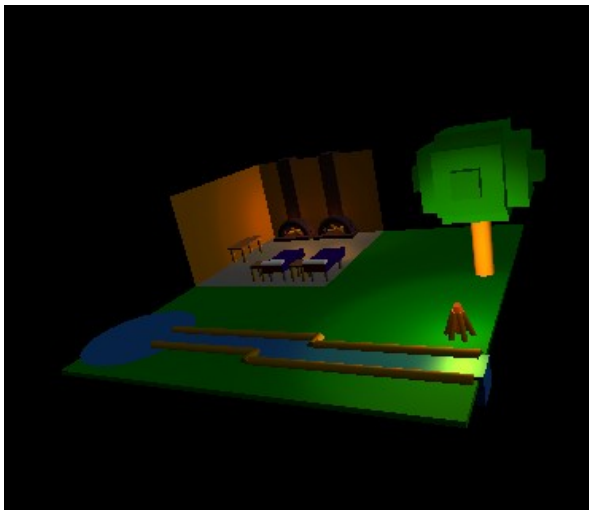
Anything Else New that You Want Me to Notice

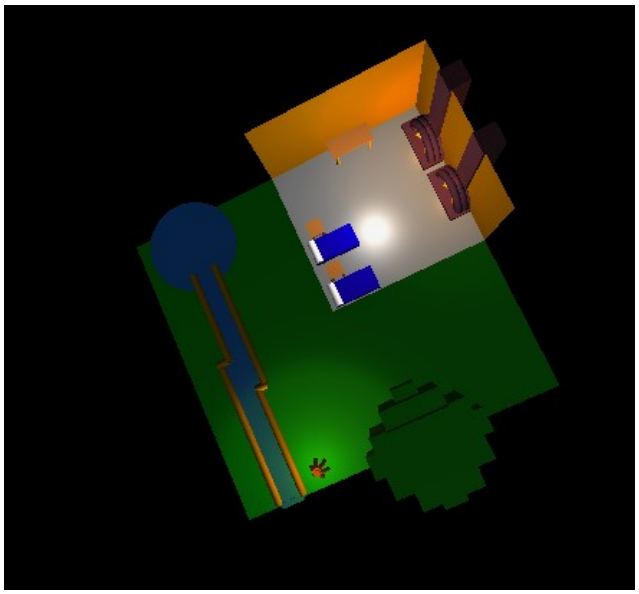
Nothing particular. The fragment shader will handle fire source attenuation differently, while physically unrealistic it creates a better looking scene. Reflecting the fire off of the water looks rather pleasant. Table legs are also reflective brass, but only a few angles will show it.

The vector-based light is coming from over the tree and into the cabin.









PROJECT 2:

Project Origin:

This simply started as me needing something to model, and so I began with my bedroom starting with a bed and bedside table. It then extended to trying to think of other features to add, so for some reason what came to mind was a fireplace/brick oven. So it is no longer a bedroom model, but just a room with various household features.

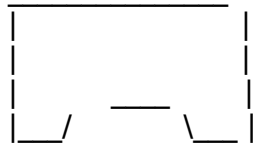
Model Generation:

For starters I created a model container for the bed, which would contain 4 vertical cylinders, 1 rectangular prism and 1 horizontal cylinder. The table just included 4 cylinders and a prism. To properly make the pillow, and aspects of the fireplace I needed to improve the cylinder class, allowing it to have the 2 end caps, and be arbitrarily placed and rotated, as well as scaled in radius and height. The fireplace contains a bottom and back panel and the chimney stack, which are prisms. The fireplace itself is made of 3 layers of cylinders, plotted over (50,y,z) where y and z are calculated to create a semicircle, the angle of these cylinders is a function of where they are on the semicircle. The logs are again cylinders, with an (x,y,z) rotation.

Components are broken into containers like the fireplace, and individual models like the cylinder. Inheriting from one of these classes extends a lot of the functionality over them. MyContainer extends features such as rendering, memory management, bounding box management, and dynamic rotation(which was unused). Container objects are passed to the controller as a ModelView instance, but upon calling render will pass the call onto all of the models in that container by iterating over the vector of components.

Meeting Project Specifications:

My 3 main features are found in Bed.c++ Table.c++ and Fireplace.++, which are all combinations of various geometric figures. The two walls are included in Fireplace.c++, as in order to avoid the wall clipping into the fireplace, the wall had to be rendered without including the semicircle that the fireplace takes, like the crude ascii art below.



Found in the scene are 3 tables, 2 beds, and 2 fireplaces. As well there are the walls and a floor panel.

Difficulties:

Primarily, the hardest part was using the basic geometry to generate more advanced models, having to deal with orientation, as well as location with respect to other components of the model.

Unique:

A minimal amount of this scene is hard coded coordinate data, the floor and walls are all I believe. Instead it is generated at runtime from a combination of class constants and provided parameters. Certain components have complete control of rotation, size, and position, and some can just be sized and moved. I attempted to abstract away a lot of common functionality, and as such, models like the fireplace only need a constructor to generate data as their sole function, as inherited methods will handle everything else. The simple components like the cylinder simply had the ability to change color properties pulled out into inheritable methods.

A few different lighting locations and perspectives:

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