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Project 3: The Summit

I did my 3D project based on a piece of the gym I attend called The Summit. I was working out one day and turned to see the monkey bars and weights behind me. That is when I thought that doing my project over that area would be something fun and manageable for my first 3D project. I love going to the gym and it was fun to create something based on a place I frequently go to.

The first thing I did when creating my model was start with the floor. This gave me a bases to start, as well as helped me get a good idea of how I wanted my line of sight to start at. From here I created the walls and then some of the design work on the floor like the stripes. I decided that this would be the easiest part to do and give me a since of how my room would fit into my line of sight. This also allowed me to physically see the coordinate planes on the screen to get a good idea of where to place objects.

Next I created a few basic shape classes to build my bigger objects off of. I created a block class that I called ‘Pole’ and a cylinder class. I called it Pole because I thought I would only use it for the poles in the monkey bars, but later made boxes and TVs with it. All objects I created I made in main and later created a class that created the object that could be made from a single function call in main. This was just easier for me to create pieces of the scene without having to do too much work. Once I got something working that I liked, I moved all the code into a working class.

My first big object I created was my monkey bars. I used my pole class to create all the poles in this object, including the ones connecting the upright poles to the wall and the upright poles to each other. I started this off with predetermined points to make sure that I could get the entire thing to work. After I was able to produce the object, I then changed it to take in parameters so that I could resize the object and place another one on the opposite side of the room. This was not too hard to do after I got the first couple of poles to work. The hardest part of this was setting the parameters for each individual pole given the basic data of how big the whole structure was to be. After some calculations and a few changes, I was able to get the monkey bars to work.

The next task I took on was the task of creating the weight lifting bars and the weights to go on them. I used the cylinder class a lot for this particular one. I created a class called ‘LiftingBar’ that was in charge of creating the bars, and just made individual weights to go on them afterwards. To create the whole objects, I made a class called ‘Weights’. This class made three lifting bars and put them in different heights on the monkey bars object. I put weights on the two end bars and left weights off of the middle ones. This was to just show what the bars looked like by themselves if one was interested. The hardest part about this part of the scene was trying to figure out how to make the cylinders look whole. The rendering of the cylinder produced the outside edgebut not the fill. After some research, I saw someone suggest creating a disk to cap the ends, thus giving the illusion that it was a solid cylinder.

I created a class called ‘Disk’ to create these end caps. The reason this was so tough to figure out was that I could not get the whole disk to render. After hours and messing with the code, I finally caved in and ask for help from Professor Miller. He was then able to point out the mistake I was making. My gldrawArrays function call was only giving out 4 points instead of the total amount I was using. After changing the draw mode to triangle fan and updating the points amount, I was finally able to render a

disk. The creation of a disk is not the hardest thing to do, but I feel like this was thehardest part of the project. I say this because I spent the most time on my project trying to figure out what was wrong and why I could not get a full disk to appear.
The last big object I created was my weight racks. I created a class called 'WeightHolder' to handle the making of the objects. Here I used a little of everything to make these. I used the pole class to create the base of the rack. I used the cylinder class to create the weights, as well as the disk class to make the ends of the weights. I also used the pole class to make the separating poles between the weights. After all the practice I had with the other classes, I was able to finish this with little problems. I made four of these and placed them in the outsides of the lifting areas. I organized the weights by height so that they could be seen better from the view point I have.
For a final touch I added a few objects around the scene to help fill in empty spaces and make a better visual presentation. I made some boxes that we have at my gym to use for various exercises. I placed some of these around the scene to look like they were possibly used or being used. I then added some yoga mats to hang in the back wall since those are at every gym I have ever been to. At The Summit we have a TV on the wall behind the monkey bars so I put two of them on the back wall about where it would be in my gym. The last thing I added was the symbol that The Summit uses for their website and their key cards. It was a great last thing to put to fill up the big empty space on the back wall. It stands out and should since this the place for the whole basis of my project design.
The thing that I feel like I did a great job on was the monkey bars and the lifting bars that go on them. I feel that I was able to remake this scene look as close to an actual one as I could. I tried to put more time into this area since it was the biggest part of the scene and the first thing that caught my eye when I decided to use this as my project idea. I am extremely happy with the way it came out and how it and the overall project looks.

For the third project I used the same scene I created in the second project. To the scene I added interactive viewing to the scene. The first thing I added was the ability to pan the scene. When the project is running, in the window if you hold down the shift key and drag the mouse, the scene will now pan to the direction that the mouse is moving. Since panning does not include the depth, it does not affect the distance the eye is from the scene and simply moves the scene up and down or side to side. The next thing I added was the zoom feature. Here is you scroll with the mouse, the scene will move closer or further away depending on which way you scroll. Scrolling up on the mouse moves the scene closer zooming in while scrolling down has the opposite effect. The last viewing element I added was the ability to rotate the scene. Here I used the center of the scene as the rotational axis. To rotate, one simply holds in the shift key and then drags the mouse while holding the left button down. You can rotate any direction you want, and already having panned or zoomed does not limit you to not rotating.

The second thing I did for the project was change the lighting views. I added two lights to the scene in the middle of the room hanging from the ceiling. This is the spot that I put my light sources to be coming from for my positional lights. I have two of them and I set the light strength to look like a yellowish light coming down from them. I picked this color because I wanted to replicate a night scene. I added one directional light set about the edge of the scene and have the lighting set for a light bluish color. This helped make it look like the gym scene was at night closed with two lights on in the inside. To do this I had to make some changes to my phong.fsh file to incorporate all the angles of the light coming from the lights. I also had to do a some computational work in the SceneElement class

file. Here I had to convert my model coordinates to eye coordinates before passing in the information to the shader.

Overall the project was fun and interesting. I learned how to add lights to a model scene and play with how that light reacts to the elements in the scene. The hardest part for this project was the phong.fsh file since there were many tedious things to do in it. The problems I encountered were hard to fix since there was no feedback as to what I was doing wrong, only that it just did not work. After some careful looking back and tinkering, I was able to finally get it to all work out.