Drake Seifert
seifertd@oregonstate.edu

CS450 Final Project
Binary Star System

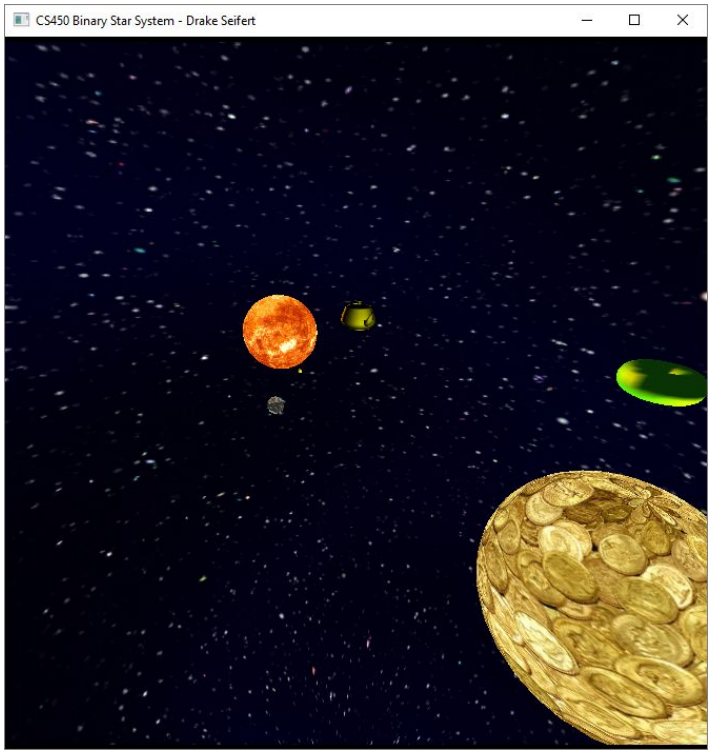
Project Proposal

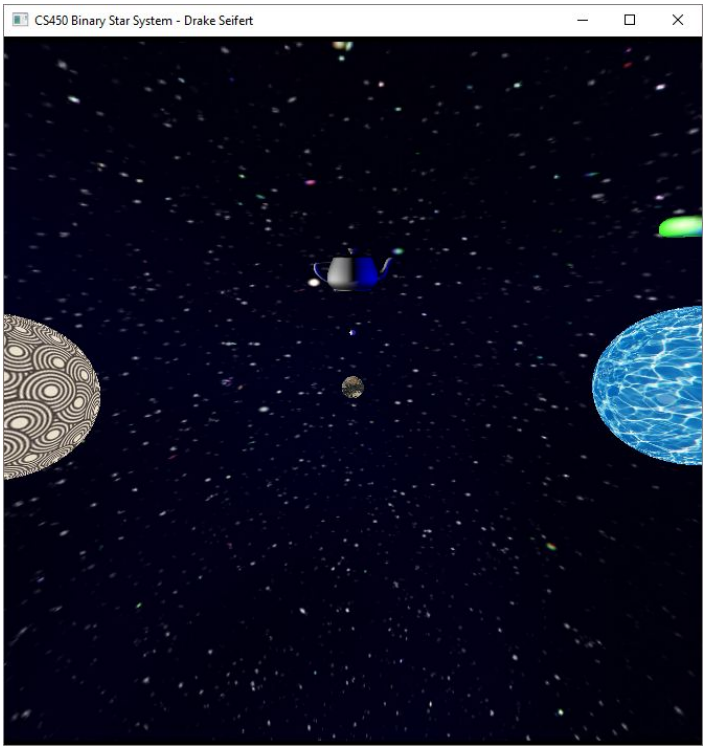
The general scope of my project is a different take on the solar system theme; particularly a binary star system. The specs of my project are as follows:

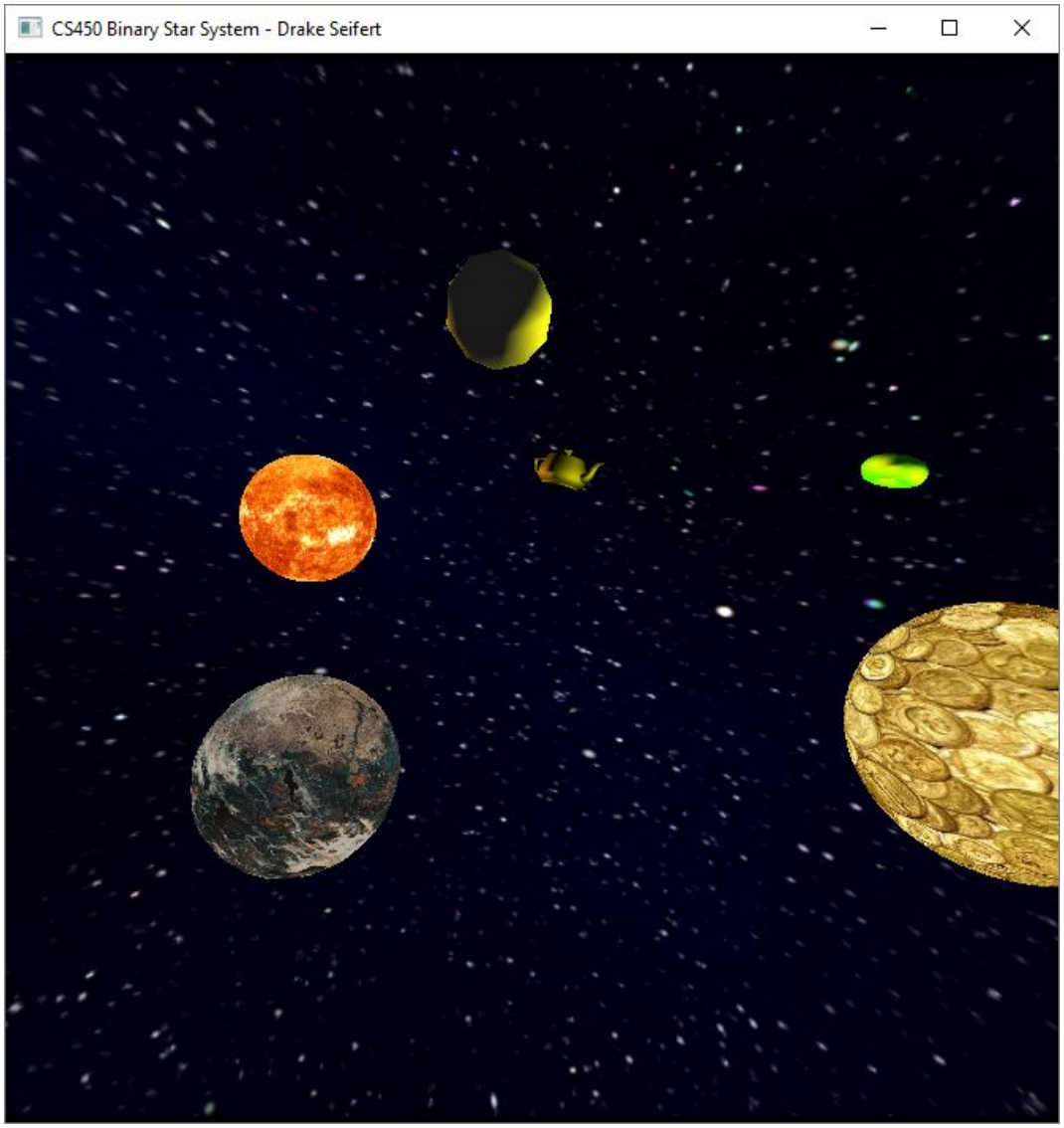
- There will be two stars, each with their own texture.
- There will be at least one planet (with its own texture) that performs a figure eight orbit around the two stars.
- This planet will have a moon that orbits it.
- The stars will emit light, each of their own color.
- The system will be surrounded by stars (another texture).
- Incorporate a UFO that flies around the system.
    - It will contain a spotlight.
    - The UFO will wreak havoc on some portion of the system, containing at least one of the following:
        - Manipulate one or more of the textures. ← *(I integrated this one)*
        - Manipulate the physics of some aspect of the system.
        - Abduct an item/creature from the planet.

What you actually did for your project, with images

As my proposal suggested, I created a binary star system. This system contains two stars with textures that each emit a point light, a planet with a texture that orbits around both of them in a figure eight pattern, a moon that orbits around the planet, a UFO that moves around and emits a downward spotlight that “changes” which texture is displayed on the stars, a teapot that helps verify the lighting, and a space texture image in which all parts are contained.


CS450 Binary Star System - Drake Seifert


CS450 Binary Star System - Drake Seifert



How your project differs from what you proposed, and why

In addition to manipulating both of the two stars' textures, the UFO also manipulates the stars' lights to match their current texture. I did this because I thought it would make the change seem more realistic; if the color of the texture changes so should the light emitting from the object.

I also added a mysterious floating teapot because I didn't account for the lack of objects to test the spotlight of the UFO. It also made verifying the color of light emitting from the stars much easier.

Any impressive cleverness you want us to know about

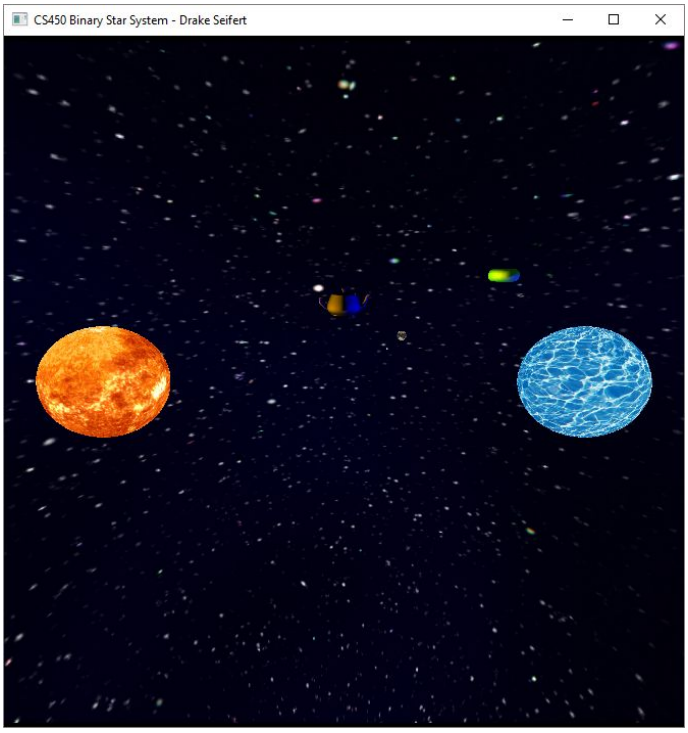
The planet manipulates the time variable to decide which rotation to use; if Time is less than 0.5, the ratio from 0 to 0.5 determines its rotation around the first sun. If Time is greater than 0.5, the ratio from 0.5 to 1 determines the location around the second sun.

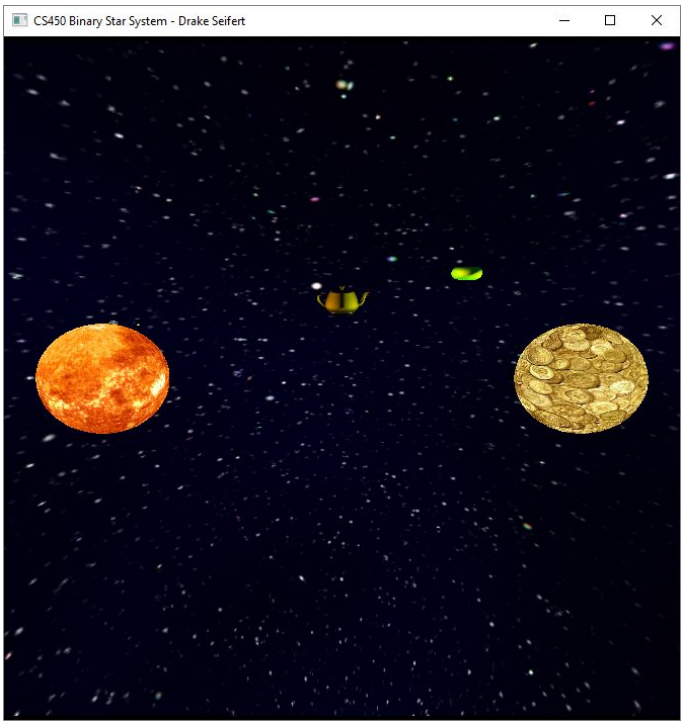
Getting the textures to switch properly was quite a challenge; there are four states to the texture system: 11, 10, 00, 01 where 1 represents the initial star texture and 0 represents the alternate texture. I had to find what the UFO time variable would be to begin switching the textures and have them switch specifically when the UFO hovers above a star. I found the UFO went through all four states in a manner of two seconds, switching at 0.25, 0.75, 1.25, and 1.75, respectively. Because the UFO time multiplier only goes from 0 to 1, and not 0 to 2, I ended up doubling the MS_PER_UFO_CYCLE variable and creating a custom variable to hold this ratio called Switch. I then determined the lighting and texture of the star based on which range the Switch variable fell into.

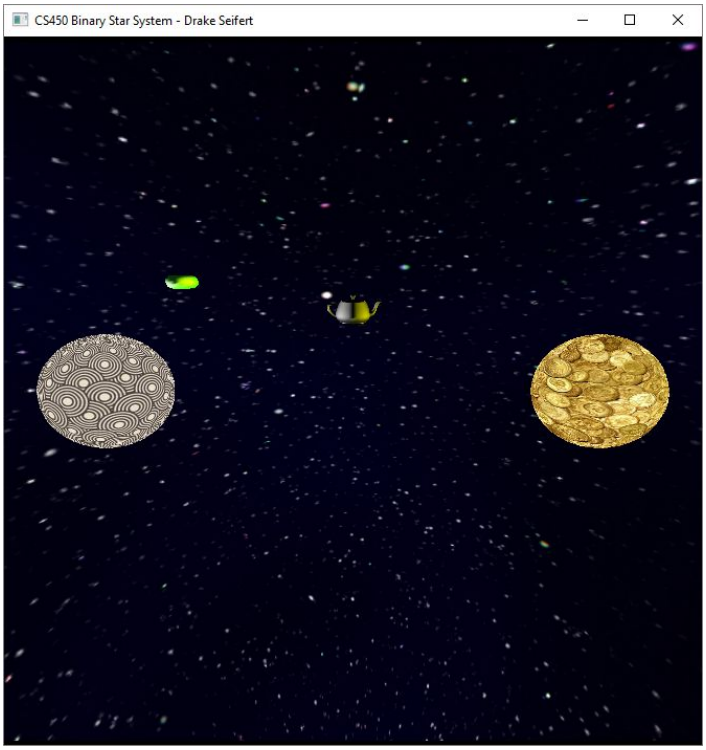
What you learned from doing this project (i.e., what you know now that you didn't know when you started)

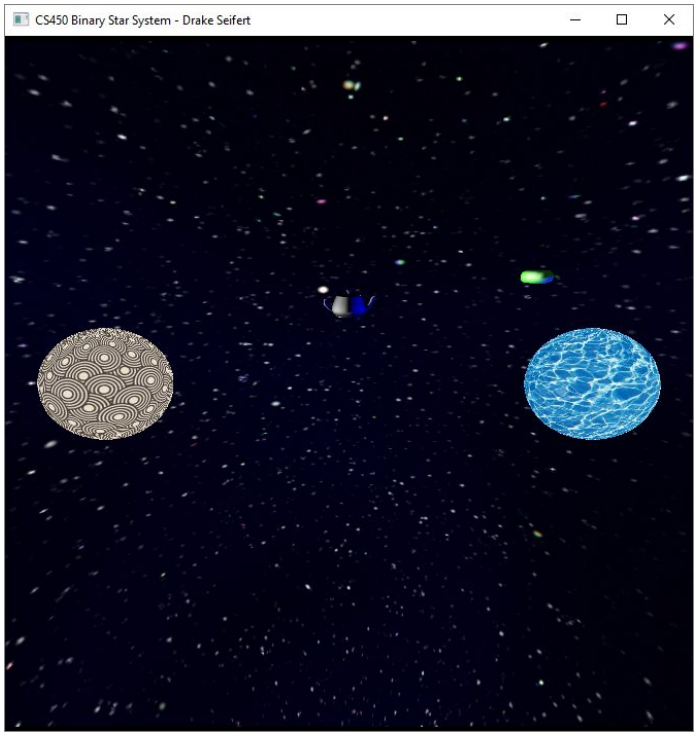
This project taught me how to bind textures, incorporate complex animated movements, and how to switch out lights and textures to be different from their initialized state. I also learned how to determine a ratio for the time variable for a period of time longer than a second. Lastly, I learned how much slower the system will run when it has to find texture images on the fly; I found my program ran much clunkier after I began to incorporate multiple textures, regardless of using the texture binding method.

Any images that are especially representative of what you did


CS450 Binary Star System - Drake Seifert


CS450 Binary Star System - Drake Seifert





A link to the video showing off your project.

Link: https://media.oregonstate.edu/media/t/0_nj0820hn