

## Lighting and Shading

One of the first things that stood out to me was how lighting and its position drastically affected how an object is viewed. For example if an object has no light source from one angle the object disappears until the angle is changed. I also found it quite interesting how shading can vastly affect how an object appears. For example, flat shading the triangles that make up an object are still plainly visible. When Gouraud shading is applied these triangles are smoothed out but still noticeable. Then when the phong shading is applied the object appears smoother and glossier, which also results in a mirror-like reflection.

The second take away for me is how graphics have progressed to accommodate the hardware that was available at the time. With early vector arcade games like asteroids that implemented vector graphics it was the basic building block of what we have today. When technology advanced we began to use more and more vectors which lead to smoother and smoother images. I was surprised with all the memory available in modern video graphic electronics that it is still expensive to render large amounts of video data.

My final takeaway is how to save memory with creating colors, instead of using a bunch of vector lines to color an object a texture which is a wrapper of a 2d image is layered over it so the object appears to be 3 dimensional. When it came to applying these concepts in the homework we did face some challenges. The first was uncaught error messages because we forgot or misspelled a line of code somewhere. What gave me a good starting point was playing with the code to get a better understanding of how it functioned, which allowed me to work through and render other objects into the scene.

To get help with the assignment we referenced class materials and reviewed videos and slides. When we were extra stuck we reached out to Jaden who helped us work our way towards an answer, he explained the principles behind why we were doing what we were doing. I have felt like I have come a long way since I first began this course a few months ago, this last project really helped me gain a better understanding overall. I am a bit nervous about the solar system project but feel somewhat confident in my ability to get it complete.