

Learning Journal Unit 3

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CS 4406-01 Computer Graphics – AY2024-T3

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1. Discuss the week's activities and your observations.

- **Did anything surprise you?**

There wasn't a lot that surprised me this week as I already knew most of the content discussed. I, however, was surprised by two facts in particular. The first one was what the CMYK color scheme stood for and how the red, green and blue contribute differently to the perceived luminosity of a pixel. I was also surprised by how enjoyable it was to work with parametric functions.

- **Did you face any challenges in this Unit? If so, how did you overcome them?**

A challenge that I faced this week was that it took a little bit of time to figure out the boundaries of the frustum for the programming assignment (I am aware that it was expected for the students to hard code the boundaries, but I wanted it to be general). I made a function that calculated the rectangle size at a distance from the camera from the field of view angle and the aspect ratio, I then used this as the "walls" that the ball bounces off, however, for some reason, the shape seems to move a little bit bound the boundaries and until now I don't know why this happens. I made sure to account for the radius of the ball as well, I suspect that the screen view does not 100% correlate to the frustum which is very weird, but I will have to look into that a bit more.

2. Discuss how shadows or transparency are used in today's software applications to enhance visual perception.

Shadows are one of those things that are unappreciated until one sees a scene that does not contain them or has a bad implementation. A scene without shadows appears to lack depth, is uncanny, and is unnaturally illuminated. Shadows add great detail to scenes that could give a more realistic look to the scene or could be used unrealistically as a form of artistic expression. When it comes to depth shadows are used in ambient occlusion to fake depth in flat textures. Shadows are also used to highlight day and night cycles in games and animations. Shadows in animations could be used to trigger emotions such as when revealing a character as they step from the shadow in the light. Shadows provide a natural way to give a scene contrast improving its visual appeal.

Transparency allows for the addition of a new dimension to a scene. For example, in a 2D application, it could be used to show an object behind another object. I particularly like that in command-line terminals as it allows me to read a resource when I am writing on the terminal without having to move it around.

Transparency is also used to add some form of contrast that could be exploited in

artistic endeavors, like when having shapes combine to form some interesting color patterns. In 3D however, is where Transparency shines. It allows for enhanced observation at a distance such as looking from a window or through a glass cup. It also allows for the modeling of semi-transparent fluids such as water which is extremely important in making games and animations. Transparency is also important in physical simulations as it is an attempt at mimicking real-life physics. Transparency is also extremely useful when overlapping images as it allows for fine selections of the perceived boundaries of the added shapes. This is very important in Graphical User Interface as it means that UI components that have images drawn over them do not have to be rectangular but could take any shape.

References:

Marsic, I. (2012). *Introduction to Computer Graphics, v1.2*. Hobart and William Smith Colleges. Download the [PDF version](#).