CS148: Reading Guide, Thursday 3 July

Shirley Ch. 3 : Raster Images

This chapter provides the background you'll need for the lecture on displays; the information on rasterization will come in handy for HW3, in which you will be rasterizing 2D images.

1) The book doesn't do a very good job explaining polarization! Here is a little more information:

	compression wave, e.g., sound, slinky...	transverse wave, e.g. light, waves on the ocean...
medium in which the wave propagates	air, spring	electromagnetic field, ocean surface
how does the medium oscillate as the wave passes?	in the same direction as the wave is traveling	normal to the direction of travel

Now check out this nice video from YouTube: http://tinyurl.com/polarization-anim

The video shows that for a wave of light, oscillation of the magnetic field is confined to the plane perpendicular to the direction of propagation. What happens if you represent that complex oscillation by decomposing it into two orthogonal vectors, i.e. x and y? You'll see something special happens when the two waves are in phase (i.e., cross the origin at the same time.): the "complex" oscillation is actually confined to a single line on that transverse plane. That's linear polarization. Similarly, when when the two are out of phase by exactly $\pi/2$, the oscillation will be confined to a circle in the transverse plane; this is circular polarization.

As described in section 3, the light from your computer monitor is (linearly) polarized. Describe how to determine which direction the light is polarized using a pair of polarized sunglasses (try this at home!) (This also works on watch displays, cell phone screens, ...)*[1]

2) What is gamma? How does it relate to our reading on visual perception (Ch. 22)?

[1] Bonus: modern 3D cinema projection is based on this same concept. However, the polarized lenses used in 3D movies are circularly polarized rather than linearly polarized. Why do you think this is?