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CSCI-711-01 Global Illumination
Weekly report for Week #2

Summary:
Light is electromagnetic radiation, and humans can only see a certain spectrum of it. There is a great involvement of the physiology and the psychology aspects of color generation for our mind.

Radiometry is the measuring of light in any portion of the electromagnetic spectrum. The theory of radiometry explores the how an object reacts with a ray of light, and the energy involved with it. Since the human visual system is so complex, it is impossible to completely copy it, but it is possible to mimic it. We can use radiometry to calculate illumination for a given area based on some calculations of the light being absorbed.

The two ideas -- emitting light from the source, and how much an object can absorb, radiate, are key parts in emulating light. An object's radiance can be calculated separately from the light source given information from the scene. The light source tells us how to shade the object in accordance to how the scene would be viewed in the real world. But just to have light from the source it not enough. We need a way to show the reflection of an object's color onto another one based on object properties, and how strong the light is.

Radiosity is the radiant flux emitted by a surface per area. The radiant flux tells us the amount of energy that is either arriving at the surface of an object, or leaving it.

Ideas for physical light measurement for a series of RGB values:

1. Measure the intensity of light on the vertex. 255 255 255 for the most intensity, and 0 0 0 for the least, combine this is properties of the object (color, reflectivity, surface, etc..)
2. Split the radiance exitance, and the Lambertian surface, equations into equal halves of the 0 - 255 values in combination with object properties. The values can be split how one feels fit -- if they object radiance exitance is more important, make it ⅔ of the 255.
3. Take a sample of all surrounding areas for an object and take a guess at what color would be absorbed from the surrounding objects based on the light measurement of different object's surrounding vertices. This would involve computing all of the objects light properties for a vertice, but do not follow the ray recursively. Then using the surrounding object vertices light values to compute what amount of color would be absorbed for an object.