Final Progress Report

Project Description:

For the final project, I decided to work on Physics-Based Rendering independently. Since this is my last semester, I recently found a few jobs related to computer graphics (game engine development mostly). In the interviews, PBR was frequently mentioned. After doing some research, I feel like that could be an interesting aspect to start my final project. In general, the core theory and rendering methods are composed of eight aspects: microfacet theory, energy conservation, Fresnel reflectance, linear-space& gamma correct, tone mapping, substance optical properties, the scope of PBR, and light interaction with non-optically-flat surfaces. I know I can't finish the whole PBR in two weeks, but I thought I could work on a few aspects of PBR and compared them with the normal rendering we learned in class. I plan to work on two aspects: energy conservation and Fresnel reflectance. If I still have extra time, I will work on the ray trace part.

Progress Plan:

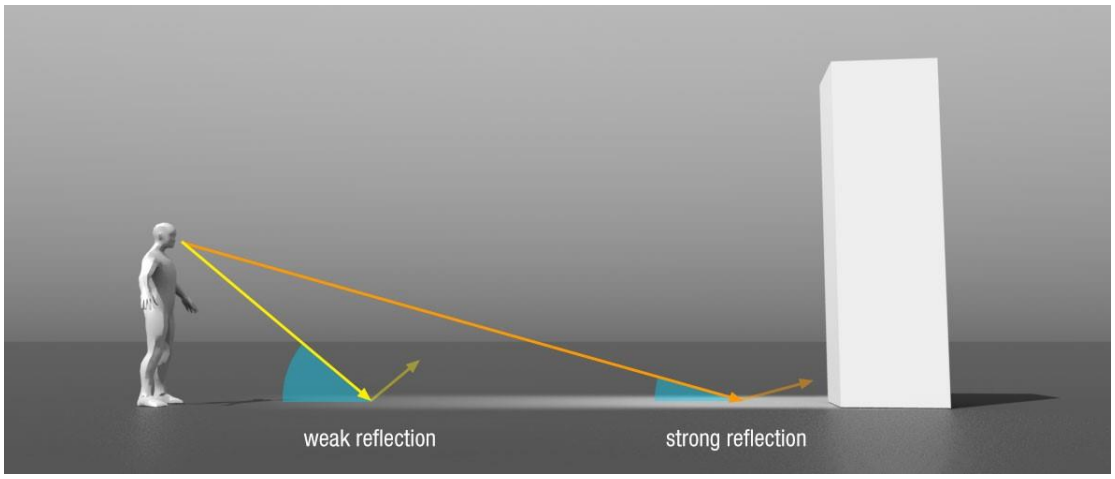
Milestone1 May 1st: Finish reading all the relevant reading materials (theory and equation)

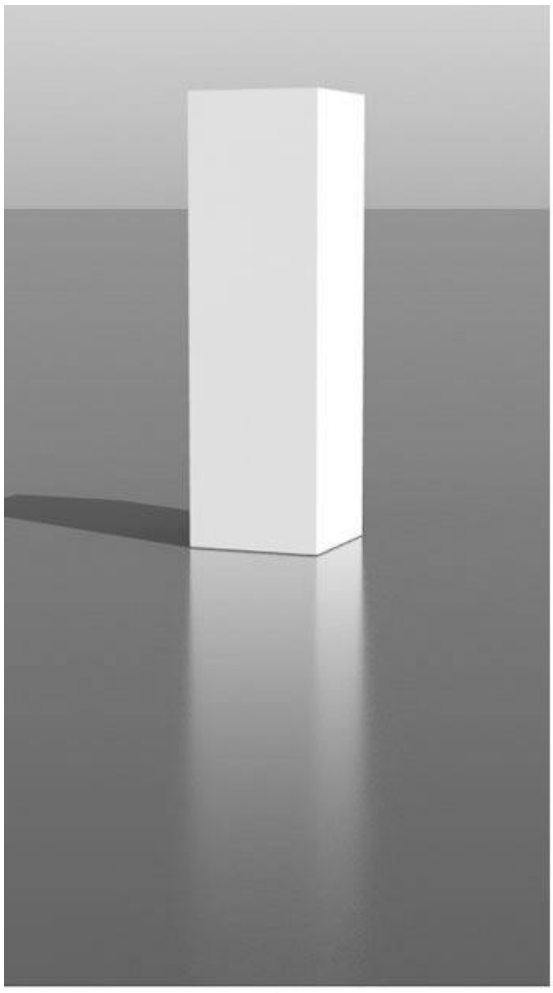
Milestone2 May 5th: Finishing the simple demo for Fresnel reflectance

Milestone3 May 8th: Finishing energy conservation part and the final write-up.

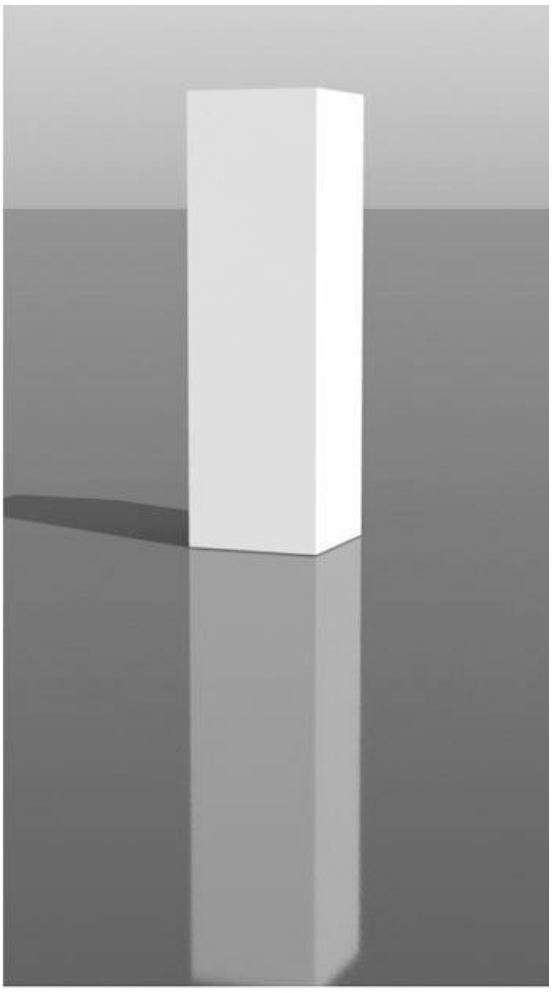
The biggest concern is timing. I read most material of PBR in a blog, which extracted key points from a book called Physics-Based Rendering. It seems impossible to read the book and understand all the materials in the book and presents a demo in two weeks. So, I prefer to read a few independent chapters and render a demo for those. Another concern is the difficulty of the project, initially, I planned to find a partner working on the project. But I live in a different time zone so that communication will be a big problem.

Expected Result:





with fresnel



without fresnel