CAS 741: Problem Statement
Library of Lighting Models

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Table 1: Revision History

Date	Developer(s)	Change
September 17, 2019	Sasha Soraine	Initial draft.

Geometrical optics (the study of light as rays) is a well understood physical domain that explains how light interacts with objects (through reflection and refraction). This phenomena is important to understand as it is the mechanism that allows us (humans) to visually interact with the world around us.

Understanding how to capture geometrical optics principles to emulate realistic lighting in an efficient manner has become a concern for many who deal with computer graphics in the domains of interactive digital media (video games), visual media (movies), and simulations. To efficiently model these problems requires abstracting these principles. Geometrical optics is already an abstraction used to understand how light travels; capturing this problem for efficient use in computer graphics requires further abstraction without losing the essence of the problem.

In this project, I aim to understand the phenomena of light interaction with a three-dimensional object through the principles of reflection and refraction. To study this, I propose looking at existing lighting models for computer graphics to understand the current types of abstractions made for this problem. I look to separate the common elements which will relate directly to the physical domain, from implementation specific decisions. By capturing the commonalities and differences between these implementations in documentation I look to lay the groundwork for developing a family of lighting models to be implemented as a library.