Pd6 Final Project 2023-05-28 Petr Ermishkin

Worked with no one.

## Light Ray Simulator

### Description

The purpose of this project is to simulate light rays in different environments. Planned functionalities include light ray reflection and refraction with rectangular objects and lenses as well as presets to test different situations with user input. Additional functionality could include objects with more complex shapes, objects at different angles, the ability to draw virtual parts of a ray, and the ability to determine the location of an object’s image given two rays.

### List of Current Functionalities

0. Create a ray by clicking and dragging to specify start and heading.

1. Create a rectangle by clicking and dragging while holding shift to specify the top left and bottom right corners.

2. Rays reflect upon encountering rectangles, changing the direction of the photon and creating a new line (currently broken).

### List of Functionalities Planned to be Done by the Next Meeting

0. Fix reflection with rectangles.

1. Fix back-to-front rectangle creation (currently the rectangle breaks if not created with the starting point as the top left corner).

2. Allow the speed of the photons to be changed.

3. Create a bounding box type object which reflects rays inside of it.

4. Implement absorption.

### Problems / Concerns

0. Processing for some ungodly reason treats the origin as the top right corner (rather than the bottom right). So the entirety of trigonometry has to be adjusted to work upside down.

1. Collisions between rays and objects has been addressed, efficiency is still questionable.

2. I had a lot of trouble with finding the angle of a line given a heading but it turns out that atan2() is a built-in function that does exactly that.

### UML

