CSE306 Report

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1 Introduction

Over the last four TDs, I have managed to implement the following features:

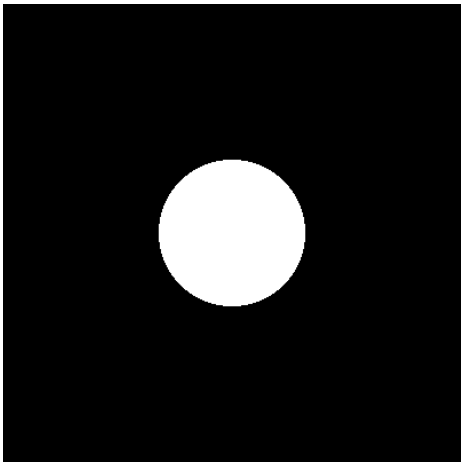
- Diffuse surfaces and direct lighting from point light sources
- Mirror and transparent surfaces
- Indirect lighting for point light sources
- Anti-aliasing
- Ray mesh intersections (naive-approach).

My code implementation is organized into the following majors files:

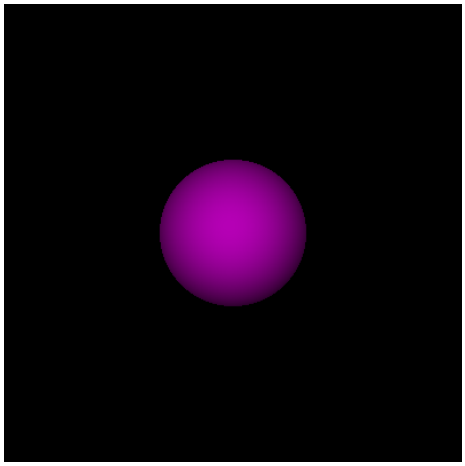
- main.cpp: Defining scene elements and path trace every ray.
- objects.cpp/h: Defining structs and classes (Gemetry, Ray, Sphere, Scene). Also defining auxiliary functions.
- mesh.cpp: Defining classes TrianglesIndices and TriangleMesh.
- monte_carlo.cpp: Side assignement of estimating integral using Gaussian pdf
- stb_image_write.h: Provided module to write array to image

Github link to project: https://github.com/GuillaumeLaine/CSE306

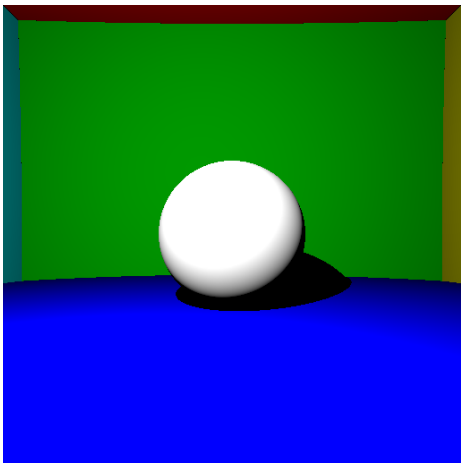
2 Diffuse surfaces and direct lighting from point light sources



(a) Ray-sphere intersection



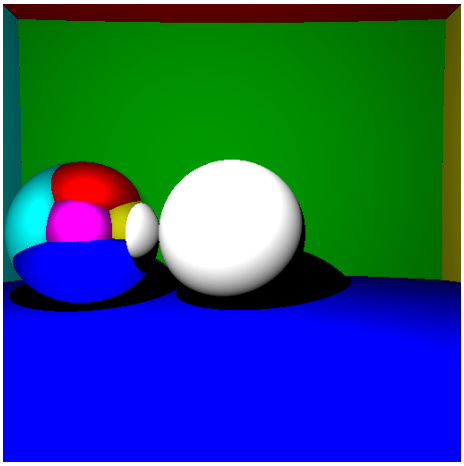
(b) Diffuse surface



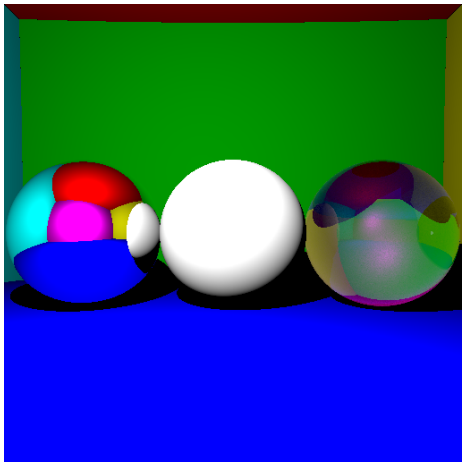
(c) Diffuse surface with direct lighting

Figure 1: Diffuse surfaces and direct lighting from point light sources

3 Mirror and transparent surfaces

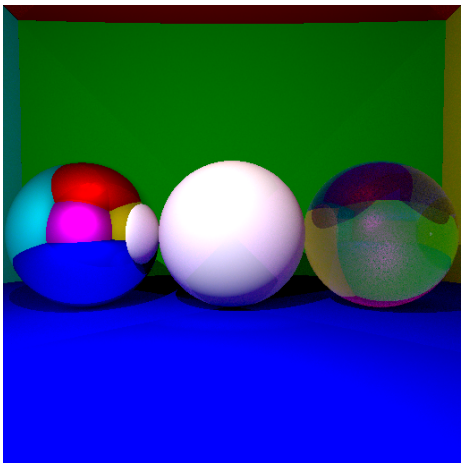


(a) Reflective surface

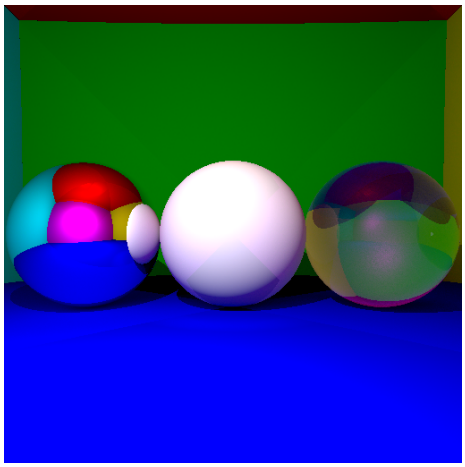


(b) Refractive surface, 1000rpp (14.7s in parallel)

4 Indirect lighting

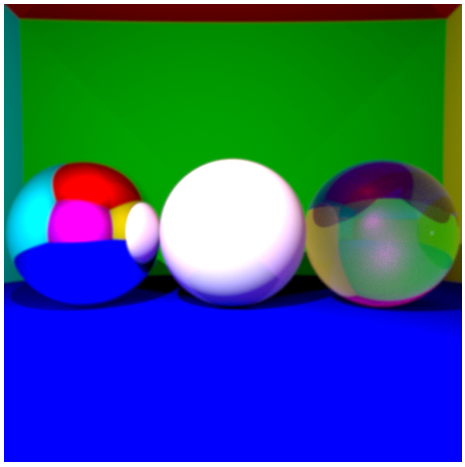


(a) Indirect lighting, 100rpp.

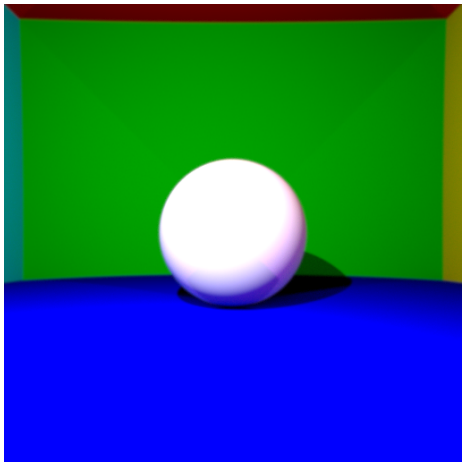


(b) Indirect lighting, 1000rpp (1min40 in parallel)

5 Anti-aliasing



(a) Anti-aliasing, 1000rpp (1min50 in parallel).



(b) Anti-aliasing, 1000rpp

6 Ray-mesh intersections

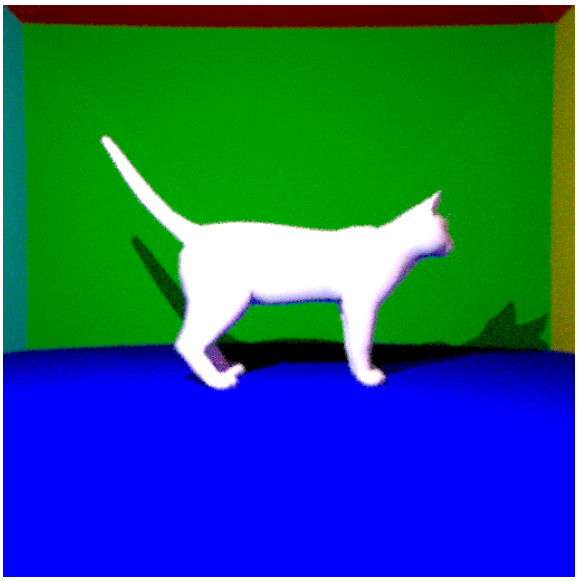
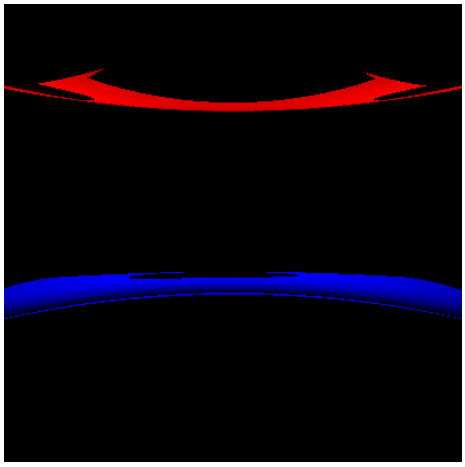
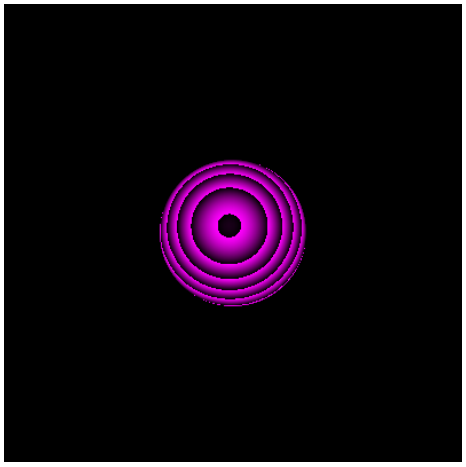


Figure 5: Cat model using Moller-Trumbore, 15rpp (15min in parallel)

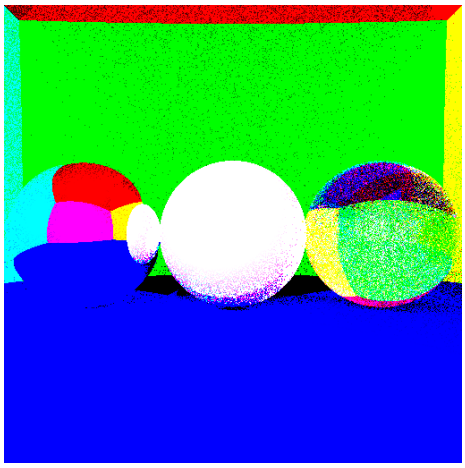
7 Notable results along the way



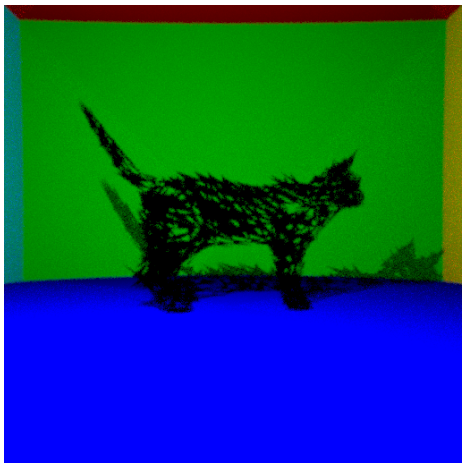
(a) Cause forgotten



(b) Forgetting to bound color values in 0..255



(c) Recursively multiplying color by 255



(d) Wrong gamma sign in ray-mesh intersection