

COL781 A3 Report

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1 Introduction

These are the results for the A3 : Path Tracing that we obtained.

2 Part 1

2.1 Sample test scene

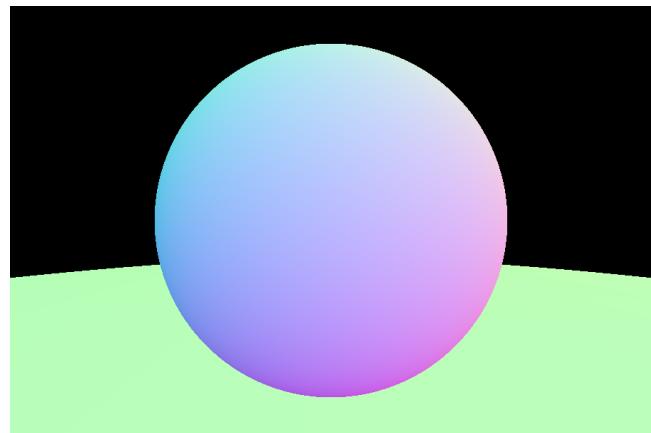


Figure 1: Test Scene in Normals Visualization mode

2.2 Sample Test Scene with some shapes

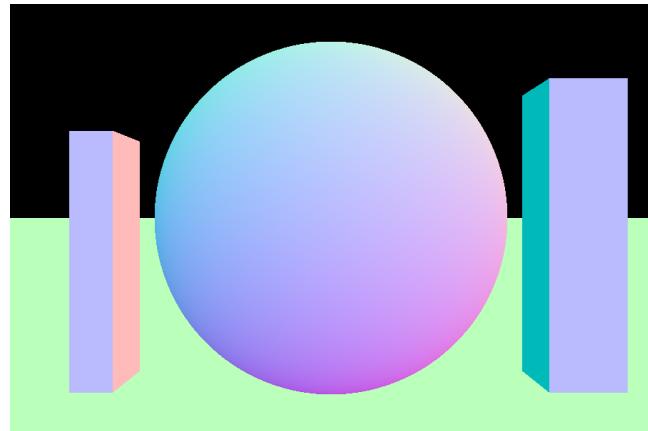


Figure 2: Test Scene with ground plane and some boxes

2.3 Sample Test Scene with shapes and lights

The first light is directly above, and the second light is towards the right, thereby approximating a diagonal light source.

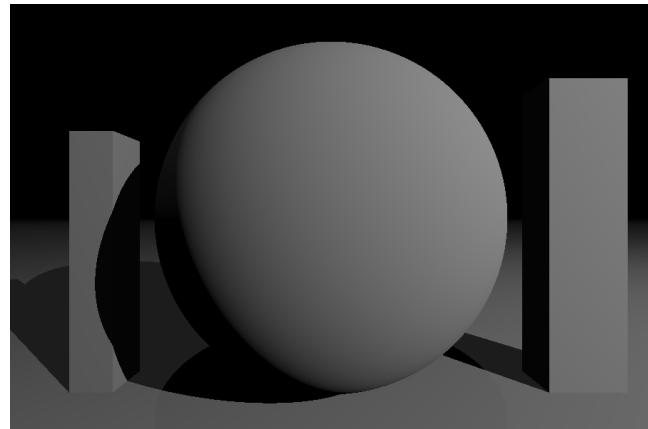


Figure 3: Test Scene with ground plane, some boxes and lights

2.4 Scene with Affine Transformations

A scene with several rotated boxes and stretched spheres in different directions.

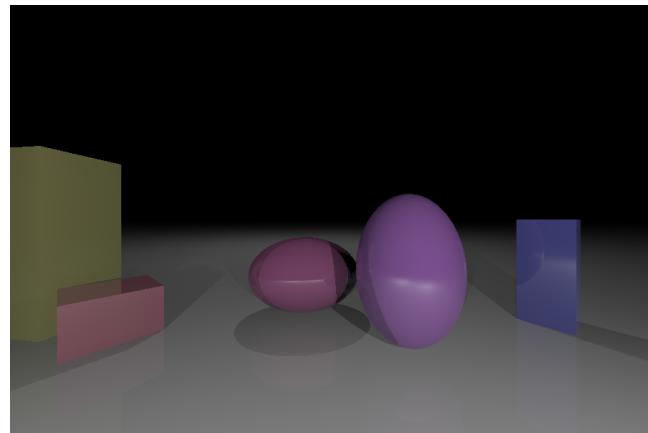


Figure 4: Scene with boxes, spheres and affine transformations

3 Part 2

3.1 Ray Tracing

A scene with white ground plane, a grey metallic sphere and a reddish diffuse box, and light coming from the right.

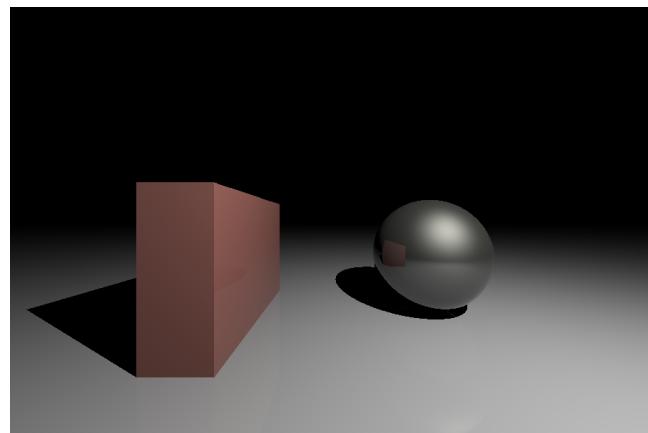


Figure 5: Ray Tracing Scene

3.2 Path Tracing

The same scene as Ray tracing, rendered with path tracing renderer. The scene was rendered at 300 sample rays per pixel, and an average reflection depth of 4 in the russian roulette.

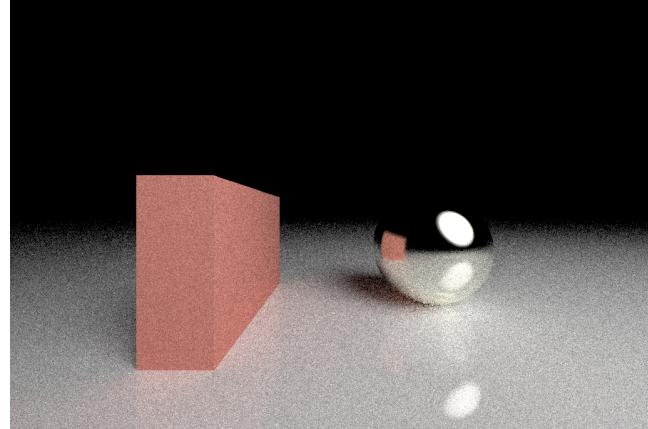


Figure 6: Path Tracing Scene

Note: The extra spots on the sphere and ground are caused by the large size of the light-emitting sphere.

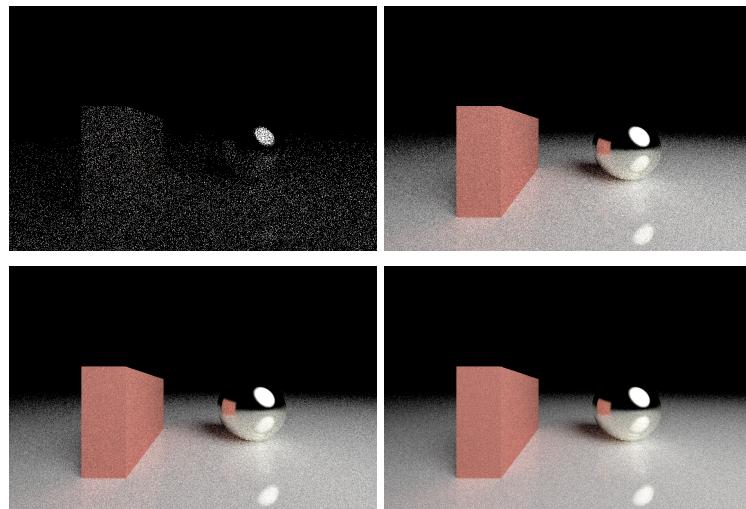


Figure 7: Path Tracing Intermediate Outputs

4 Scenes

4.1 Cornell Box

A scene similar to a cornell box with two diffuse coloured walls, two coloured metallic spheres, a light source at the top creating shadows with colours from walls bleeding into the shadows due to reflections bouncing off from the shadows. The scene was rendered at 1000 sample rays per pixel, and an average reflection depth of 5 in the russian roulette.

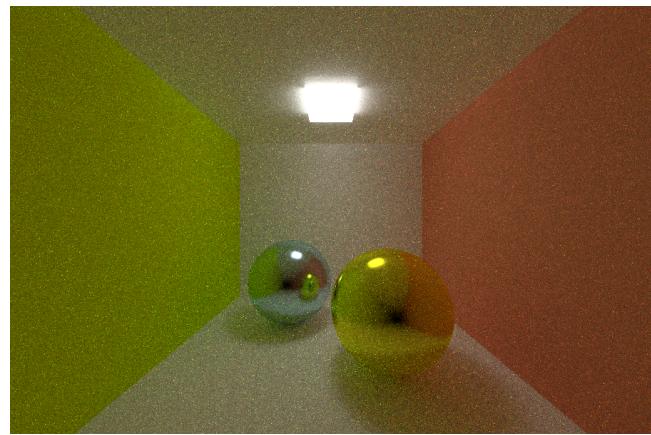


Figure 8: Cornell Box with Path Tracing

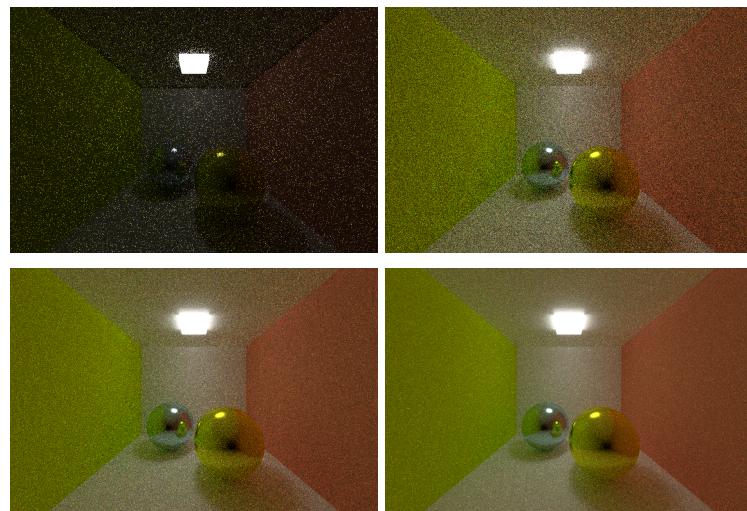


Figure 9: Path Tracing Intermediate Outputs

4.2 Point Lights with Path Tracing

A scene with some slightly rotated coloured cubes, and an adjacent metallic sphere and a point light source on the left illuminating the scene. The scene was rendered at 60 sample rays per pixel, and an average reflection depth of 10 in the russian roulette.

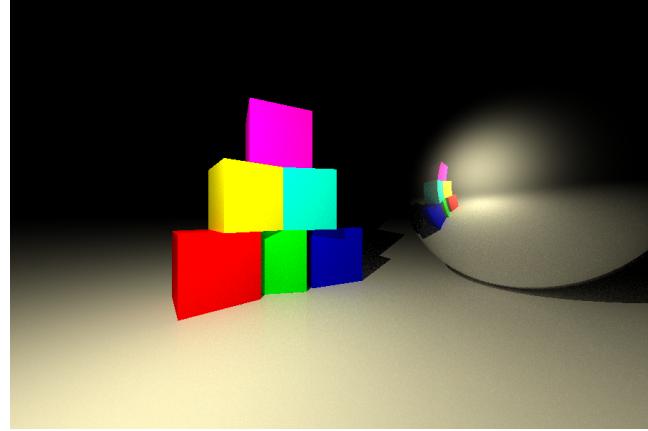


Figure 10: Point Lights with Path Tracing

Note: See below how the graininess due to light is very less compared to a finite sized light source like in Cornell Box.

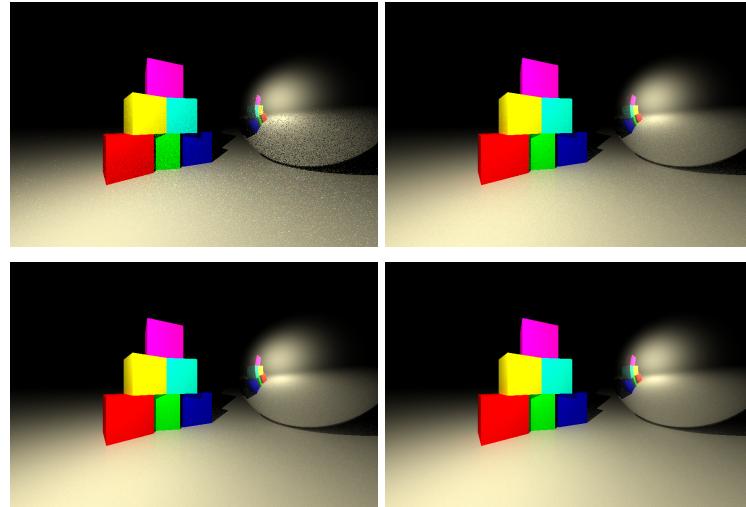


Figure 11: Path Tracing Intermediate Outputs

4.3 Mesh with Path Tracing

A scene with a pink bunny mesh loaded at origin and a point light source at some distance. The scene was rendered at 500 sample rays per pixel, and an average reflection depth of 5 in the russian roulette.

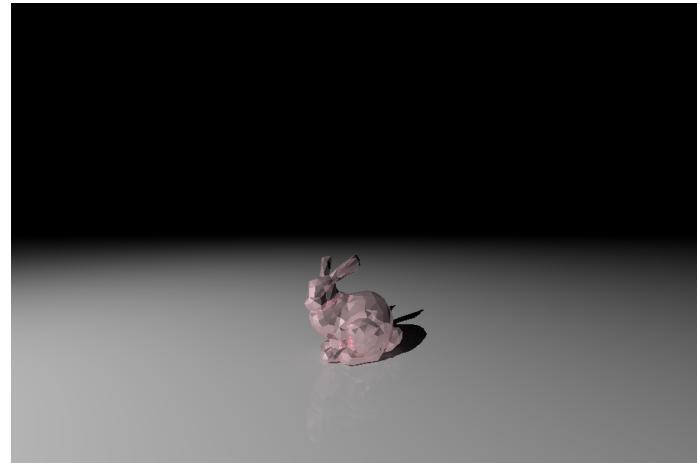


Figure 12: Bunny Mesh with Path Tracing

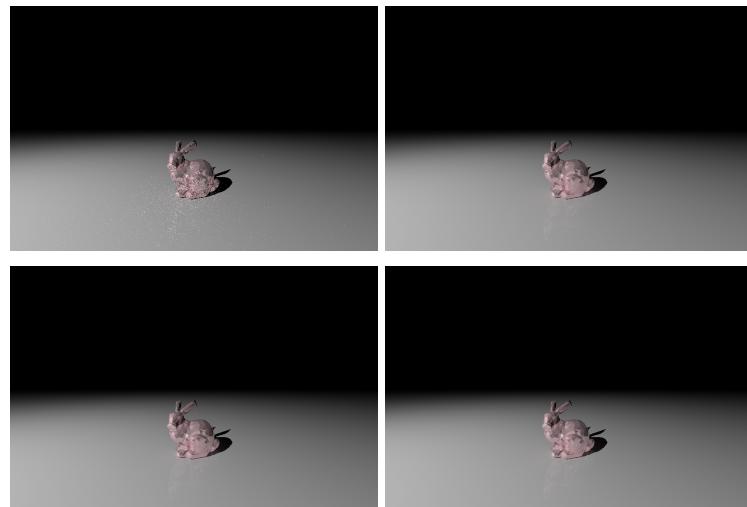


Figure 13: Path Tracing Intermediate Outputs

4.4 Creative Scene

A corner with coloured diffuse walls and a light source on the right out of the frame. A small bronze-copper metallic sphere near the corner, some mirrors on the walls. And RGB strip lighting on the left and front wall, also a yellow wall behind the camera, which is slightly visible in the mirror on the front wall. The scene was rendered at 250 sample rays per pixel and an average reflection depth of 5 in the Russian roulette.

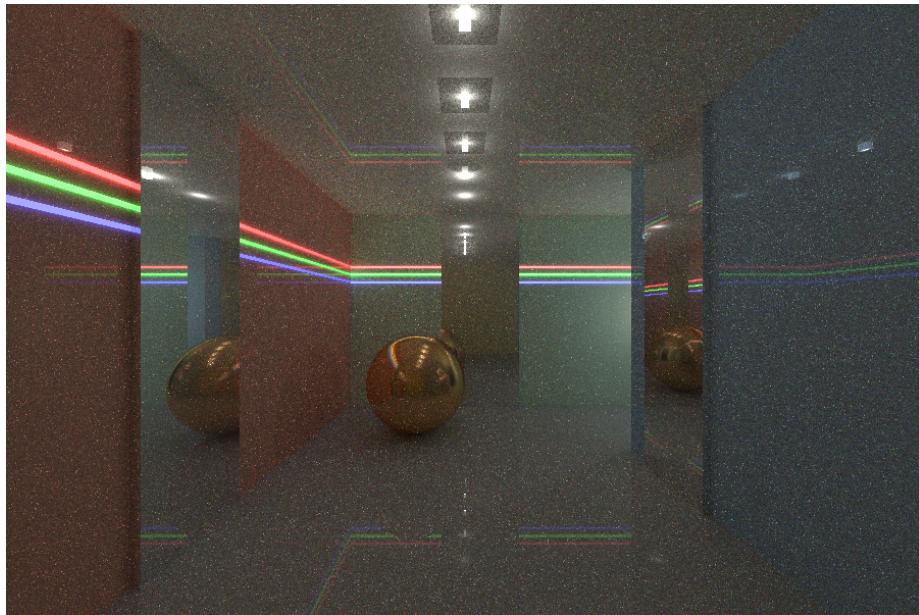


Figure 14: Bunny Mesh with Path Tracing

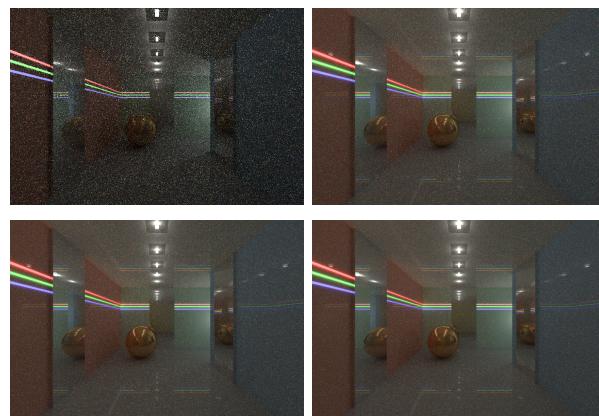


Figure 15: Path Tracing Intermediate Outputs