

Project 1 Assignment Report

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For this assignment, I mainly implemented Intersection.h, Intersection.cpp, Ray.h, Interval.h, Interval.cpp, Shape.h, Shape.cpp, acceleration.h, and acceleration.cpp files.

Before starting ray casting, I removed all real-time codes because in this class we do not cover real-time ray casting so I removed all.

I used Intersections.pdf, Camera.pdf, and ArbitraryRotations.pdf files for implementing intersections for each shape.

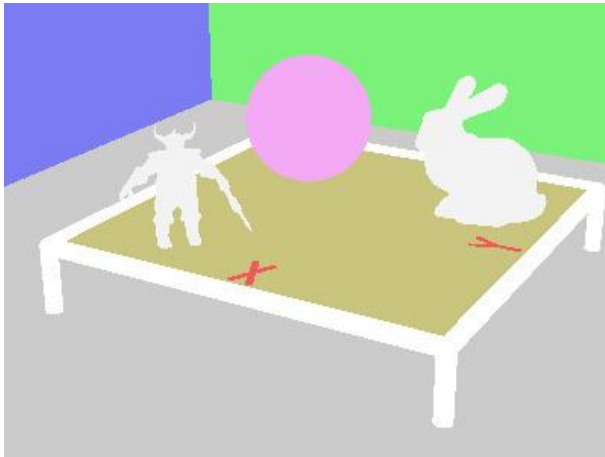
For each shape's intersection, I used Intersections.pdf.

For making a ray, I used Camera.pdf.

For making cylinder intersection, I used ArbitraryRotations.pdf.

These are results of different colors with ray-casting:

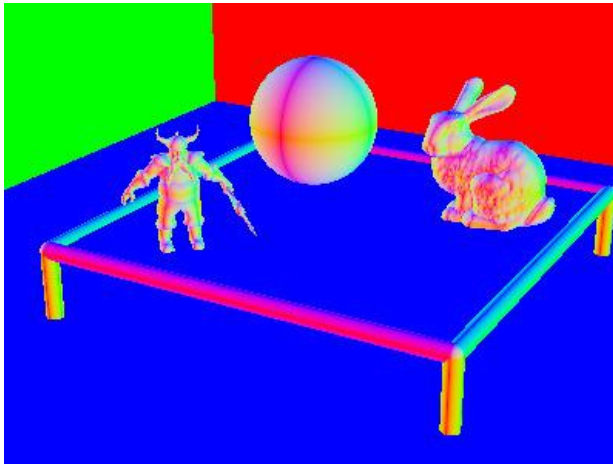
- Base Color



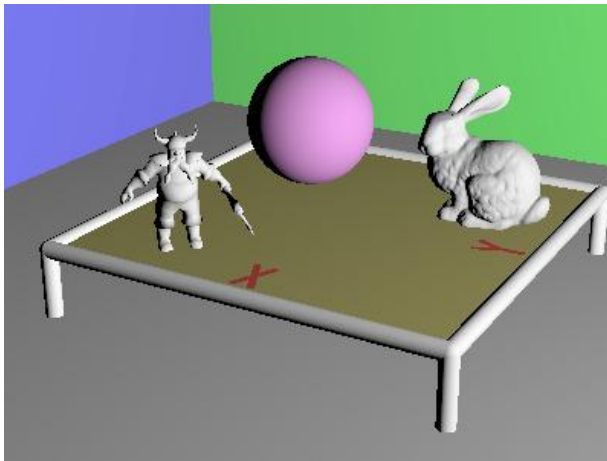
- T Value Color



- Surface Normal Color



- Diffuse Color



And I used spatial data structure to speed up calculating.
This is result of using spatial data and not using spatial data:

- using spatial data:

```

Assimp 3.1 Reading letterX.ply
mNumCameras: 0
mNumLights: 0
mNumMaterials: 1
mNumMeshes: 1
mNumTextures: 0
Assimp 3.1 Reading letterY.ply
mNumCameras: 0
mNumLights: 0
mNumMaterials: 1
mNumMeshes: 1
mNumTextures: 0
Assimp 3.1 Reading dwarf.x
mNumCameras: 0
mNumLights: 0
mNumMaterials: 3
mNumMeshes: 2
mNumTextures: 0
3 512 512 axe.jpg
3 512 512 dwarf.jpg
3 512 512 dwarf2.jpg
Assimp 3.1 Reading bunny.ply
mNumCameras: 0
mNumLights: 0
mNumMaterials: 1
mNumMeshes: 1
mNumTextures: 0
Rendering 299
-----
Taking Time: 3 Seconds

```

- not using spatial data:

```

Assimp 3.1 Reading letterX.ply
mNumCameras: 0
mNumLights: 0
mNumMaterials: 1
mNumMeshes: 1
mNumTextures: 0
Assimp 3.1 Reading letterY.ply
mNumCameras: 0
mNumLights: 0
mNumMaterials: 1
mNumMeshes: 1
mNumTextures: 0
Assimp 3.1 Reading dwarf.x
mNumCameras: 0
mNumLights: 0
mNumMaterials: 3
mNumMeshes: 2
mNumTextures: 0
3 512 512 axe.jpg
3 512 512 dwarf.jpg
3 512 512 dwarf2.jpg
Assimp 3.1 Reading bunny.ply
mNumCameras: 0
mNumLights: 0
mNumMaterials: 1
mNumMeshes: 1
mNumTextures: 0
Rendering 299
-----
Taking Time: 142 Seconds

```

3 sec vs 142 sec. Extremely different speed.