Ray Tracing

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Recap

• Ray tracing
• Shoot rays in all directions from camera
  • If that ray intersects an object, shade the pixel!
  • Implementation-wise, we have to query all objects in the scene for intersection with the ray.
Algorithm Overview

• Create the virtual scene
• Transform World coordinates with respect to the camera
• Setup projection plane
• Reverse ray Trace.
Virtual Scene

- Set of graphical primitives
- Set material properties of the graphics primitives.
- Assume uniform material property for each primitive
- Store light source(s) with primitives and separately.
Projection Plane

- Mesh Grid in front of a Camera
- Set Height and Width
- Set Distance From Camera (Affects Viewing angle)
Sequential Algorithm overview

```
createWorld();
.
for (row = 0; row < height < row ++) in Projection plane  \leftarrow Parallelizable!
    for (col = 0; col < width; col ++) 
      
      findPixelRadiance(row, col);
    Add row pixel values to imageQueue()
Write Pixel values in image queue to png file  \leftarrow Parallelizable!
```
Parallel algorithm overview

createWorld();

parallelDo(Section () {

$parallelFor$ (row = 0; row < height < row + +)

for (col = 0; col < width; col + +)

    findPixelRadiance(row, col);

    Add row pixel values to imageQueue();

}, Section() {

Write Pixel values in image queue to png file

})
DEMO!
Thank You