Path Tracing

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Algorithmic Background

Pseudo code

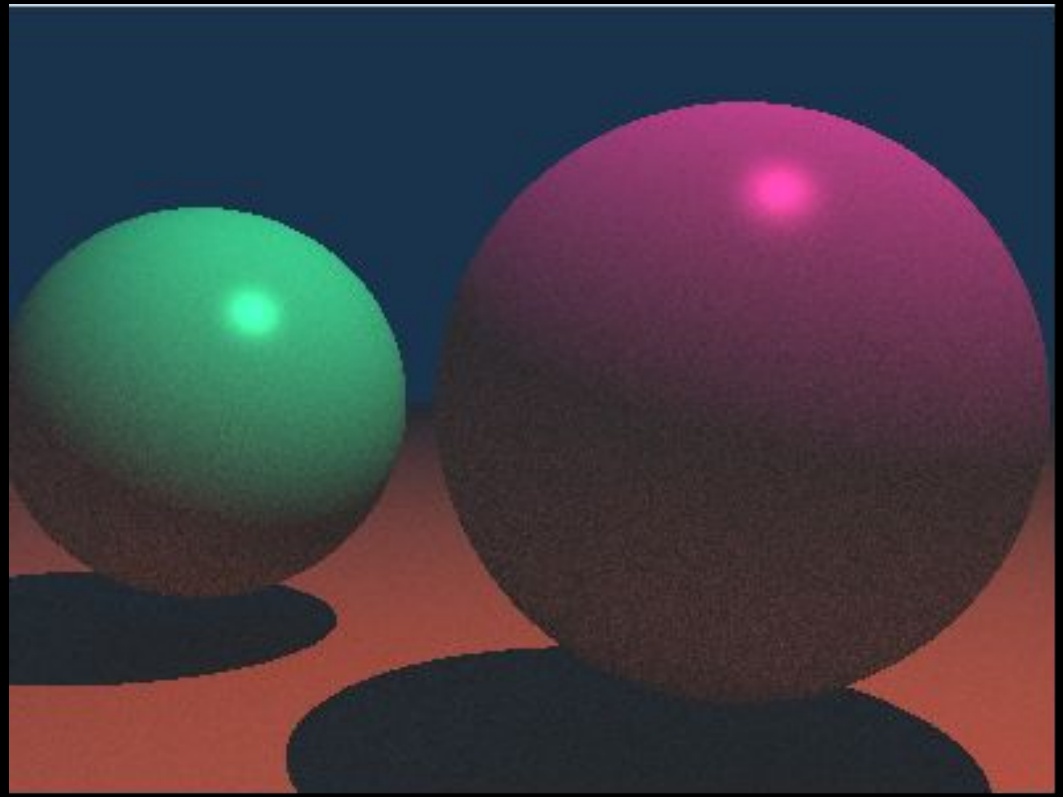
```
render_image():
  for each pixel:
    colour = 0
    for each sample:
      ray = camera_ray(pixel)
      colour += trace(ray)
    colour = colour / #samples
```

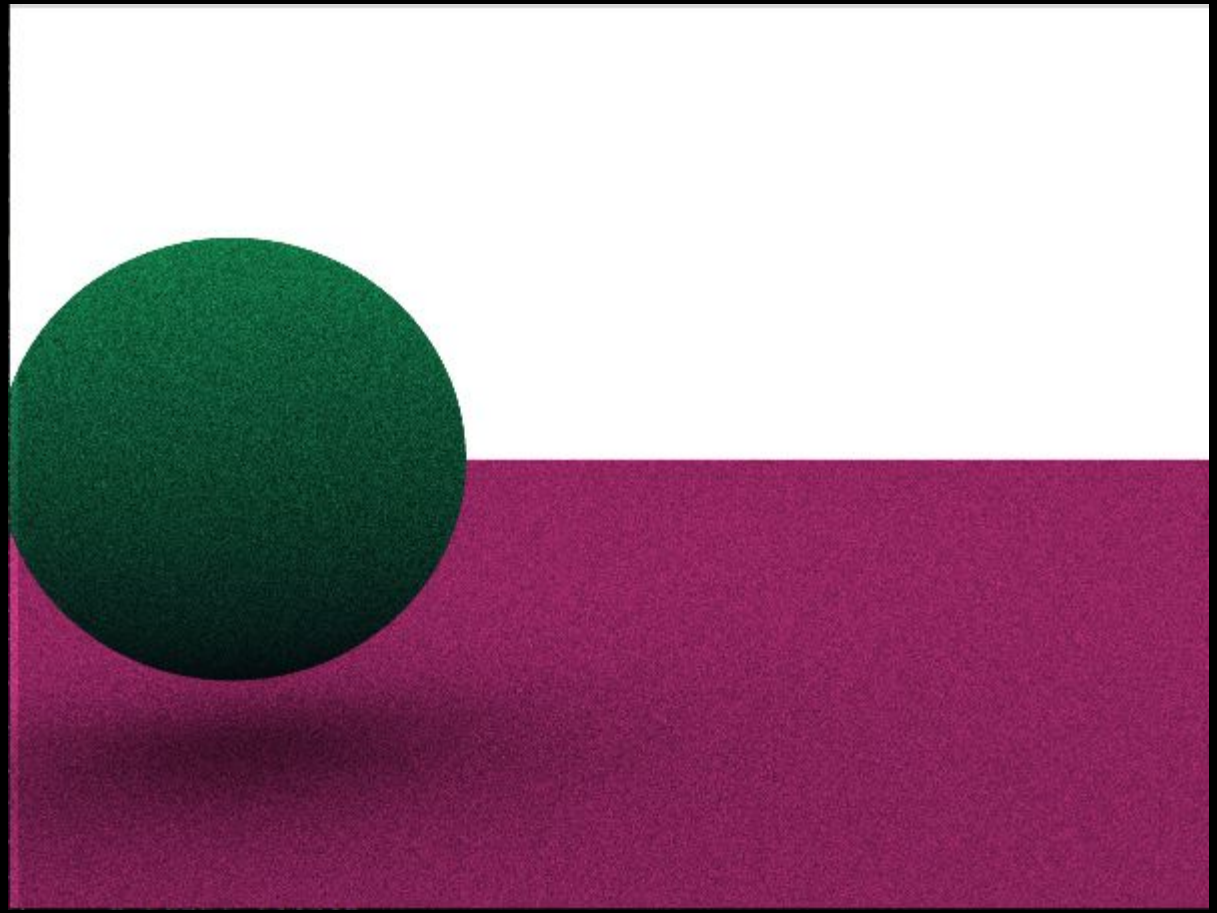
```
trace(ray):
  coeff  = 1
  colour = 0
  for i in 1...max_depth:
    hit = intersect(ray, scene)
    if hit light:
      colour = coeff * emission
      return
    else:
      ray, brdf, pdf = random_sample(hit)
      coeff *= brdf * dot(normal, ray) / pdf
  if reachable(light):
    colour = coeff * emission
```

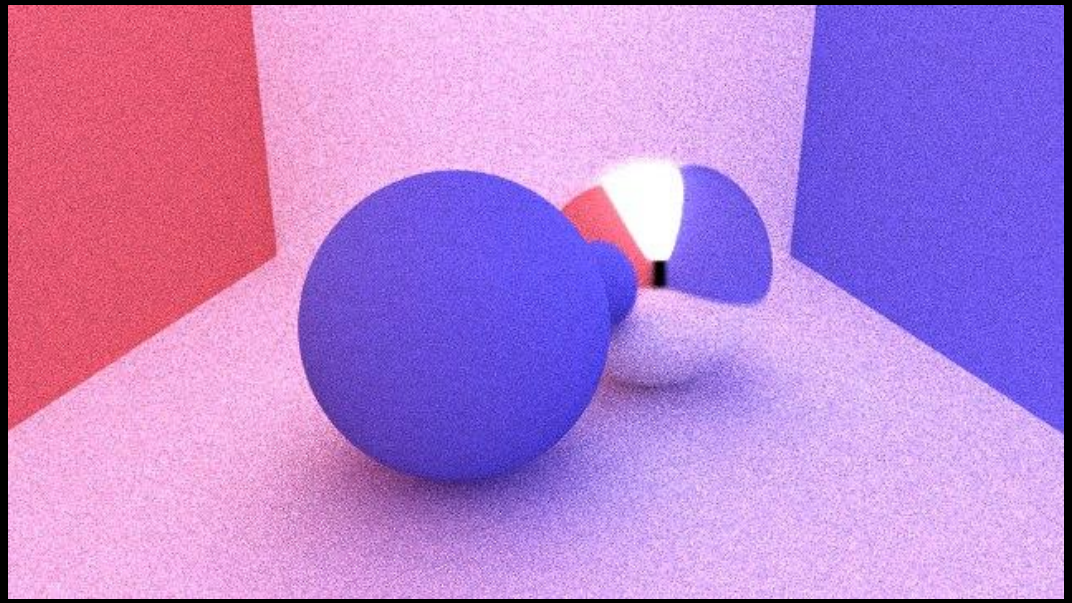
Limitations of Raytracing

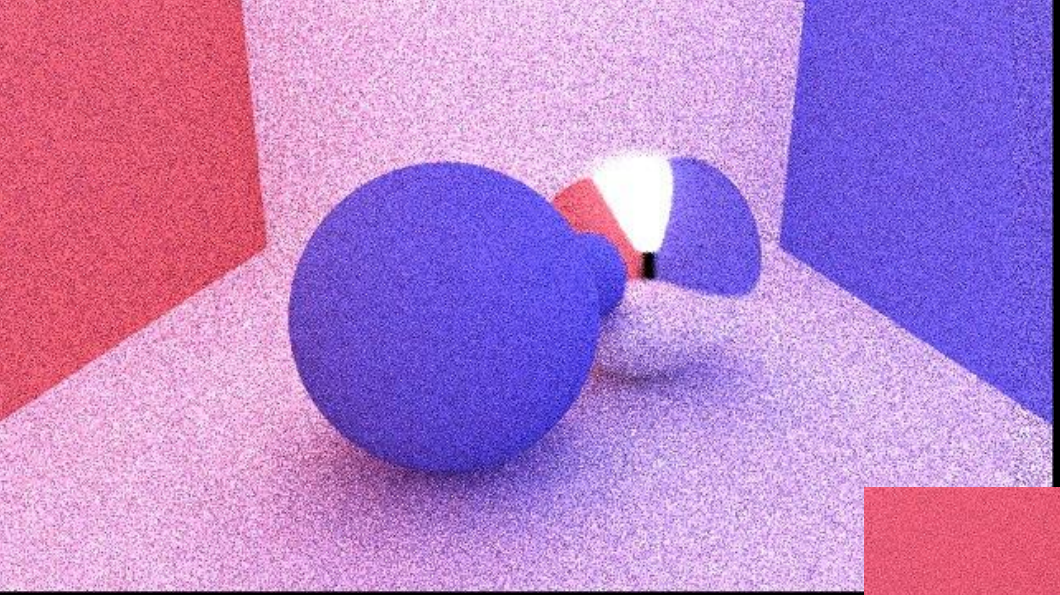
1. Does not compute indirect lighting.
2. Cannot render shadows
3. Need to explicitly factor in reflection and refraction

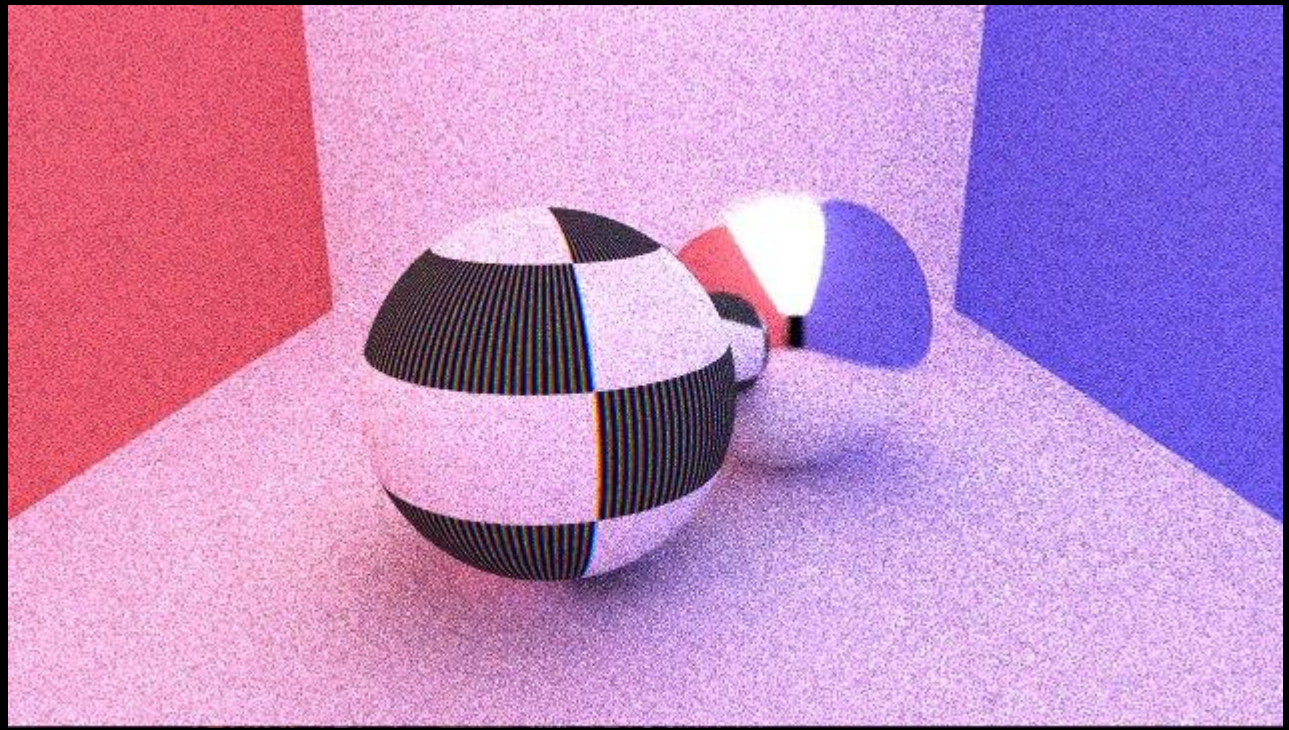
Results











Contribution

Siddharth Sundar Lambertian Surface, Texture

Y S Ramya Reflective Surface, Triangular Meshes

Timeline

Week 1: Literature Review and Implement Diffuse Materials 

Week 2: Reflective Materials and Textures 

Week 3: Triangle meshes, Report, Slides, Poster

Thank You