Image Synthesis

Introduction

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Image synthesis

The course is divided in two parts:

- Modeling
  - The different ways of representing an object's geometry
- Rendering
  - The different techniques to visualize these objects

Rendering

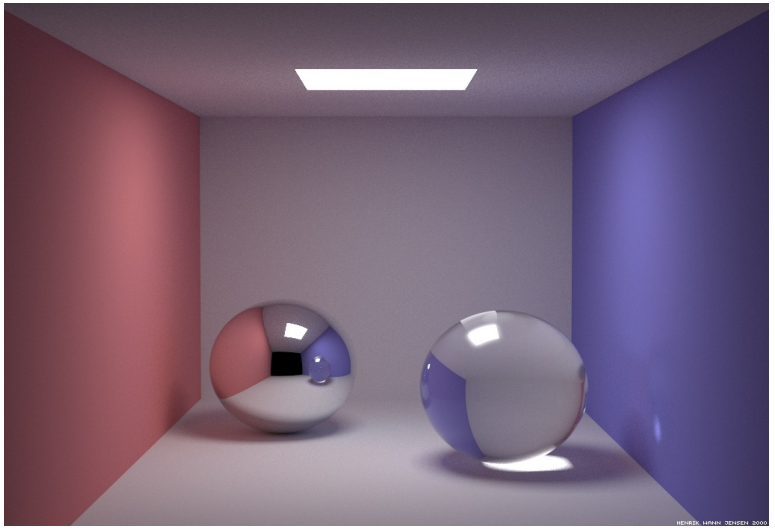
- Goal: generate realistic images
- Applications:
  - Movies
  - Video games
  - Medical imaging

The everyday world...

- Complex objects
- Complex light interactions

The virtual world

- Is it possible to achieve photorealistic quality ?
- Yes ! We have known how to do this for a long time:
  - The rendering equation: Kajiya 1986
  - Describes how light interacts with objects until it hits the eye / camera



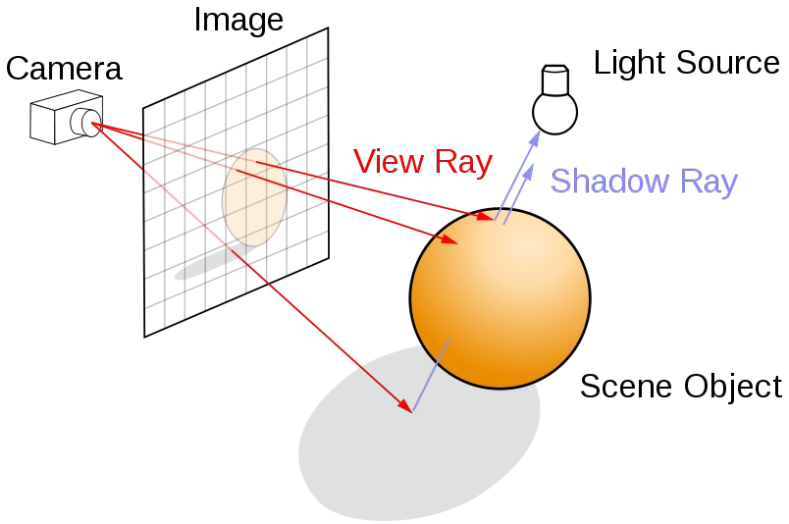
- Problem: these algorithms are slow
- Only suitable for non-realtime rendering (i.e. Offline rendering)

Offline rendering vs. Real time rendering

Rendering techniques

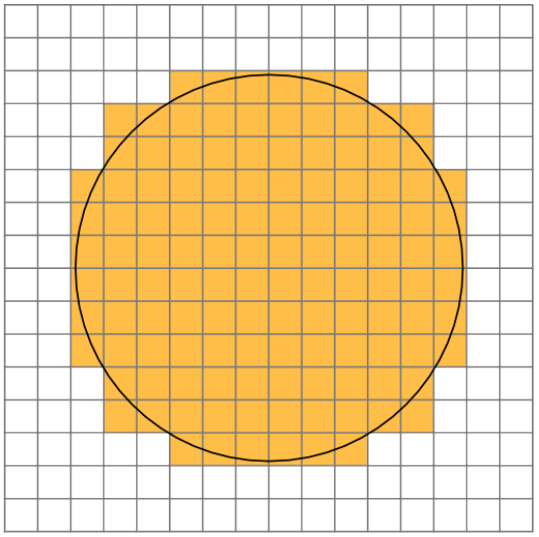
Ray tracing:

- Simulate the propagation of light through the scene, from the light sources to the camera
- Can achieve photorealistic quality



Rasterization:

- Project the geometry on the screen and fill the pixels covered by that geometry
- Usually much faster than raytracing
- More suitable for realtime rendering



Real time raytracing

- Very popular nowadays

- Yet not as fast as rasterization...