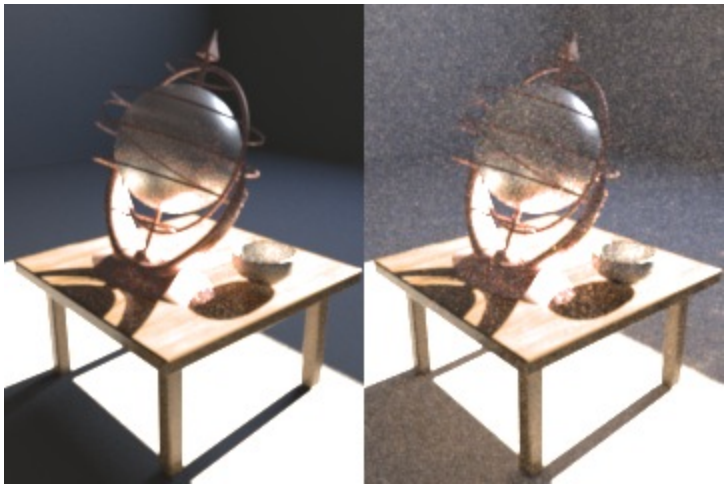
Photon Mapping



Both rendered in 3.5 minutes, left one with photon mapping, right one with bidirectional path tracing

Advantages over path tracing:

- More efficient
- Less noise (blur instead)
- Reusable illumination information (photon map)

Features:

- Two passes: one is constructing the photon maps, one is ray tracing
- Stackless KD trees: one for storing photons, one for storing geometry
- Russian roulette scheme for computing the probabilities for reflecting, refracting and absorbing
- BxDF models
- Texture mapping
- Subsurface scattering (stretch goal)
- Participating media (stretch goal)
- Optimization: progressive photon mapping(stretch goal)

References:

- Realistic Image Synthesis Using Photon Mapping - Jensen
- Physically Based Rendering - Pharr, Humphreys