

Distribution Ray Tracing

Last Time?

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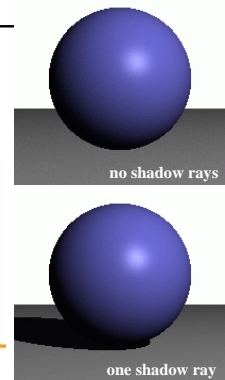
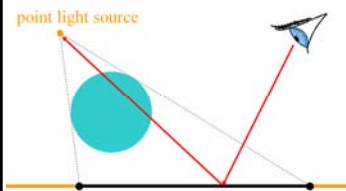
Today

- **Distribution Ray Tracing**
 - Soft shadows
 - Antialiasing (getting rid of jaggies)
 - Glossy reflection
 - Motion blur
 - Depth of field (focus)
- Monte-Carlo Integration
- Probabilities and variance
- Analysis of Monte-Carlo Integration

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Shadows

- one shadow ray per intersection per point light source



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Shadows & Light Sources



<http://www.davidfay.com/index.php>



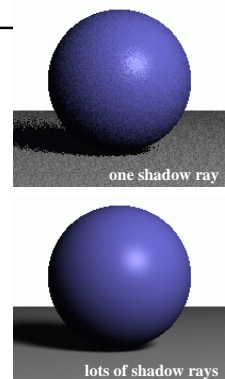
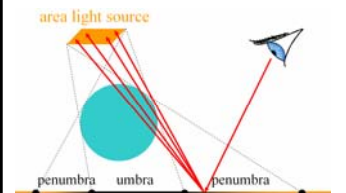
<http://www.pa.uky.edu/~scworks/light/preview/bulb2.htm>

http://3media.initialized.org/photos/2000-10-18/index_gall.htm

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Soft Shadows

- multiple shadow rays to sample area light source



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Antialiasing – Supersampling

- multiple rays per pixel

jaggies

w/ antialiasing

point light

area light

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Reflection

- one reflection ray per intersection

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Glossy Reflection

- multiple reflection rays

Justin Legakis

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Motion Blur

- Sample objects temporally

Rob Cook

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Depth of Field

- multiple rays per pixel

Justin Legakis

Ray Tracing Algorithm Analysis

- Ray casting
- Lots of primitives
- Recursive
- Distributed Ray Tracing Effects
 - Soft shadows
 - Anti-aliasing
 - Glossy reflection
 - Motion blur
 - Depth of field

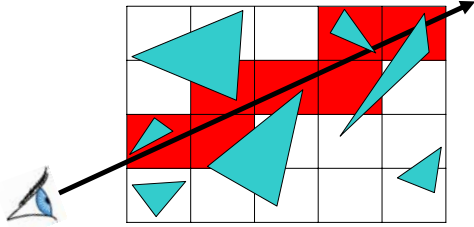
cost \approx height * width * num primitives * intersection cost * size of recursive ray tree * num shadow rays * num supersamples * num glossy rays * num temporal samples * num focal samples *

can we reduce this?

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Spatial Data Structures

- regular grid, nested grids, octree, kd tree, bsp tree, bounding volume hierarchy, etc.



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Questions?

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