

Global Illumination

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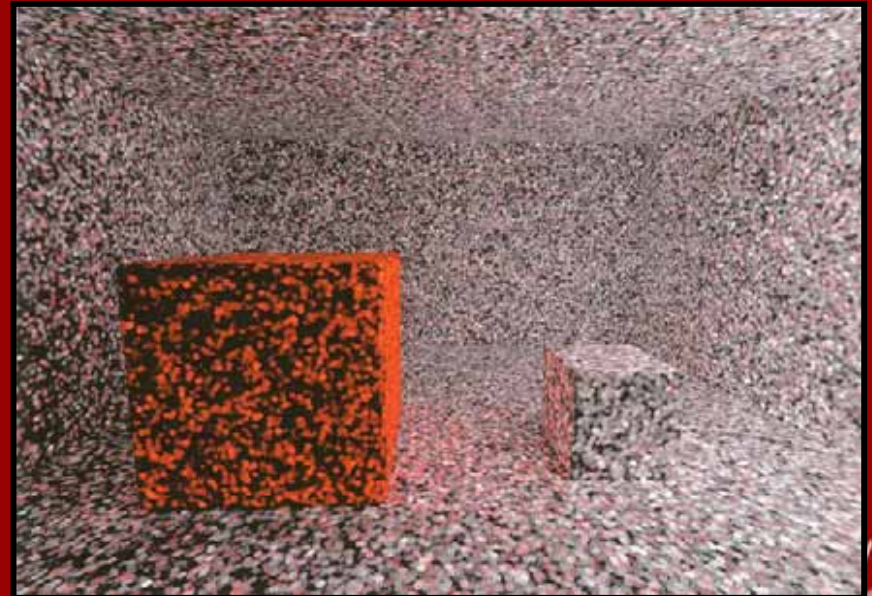
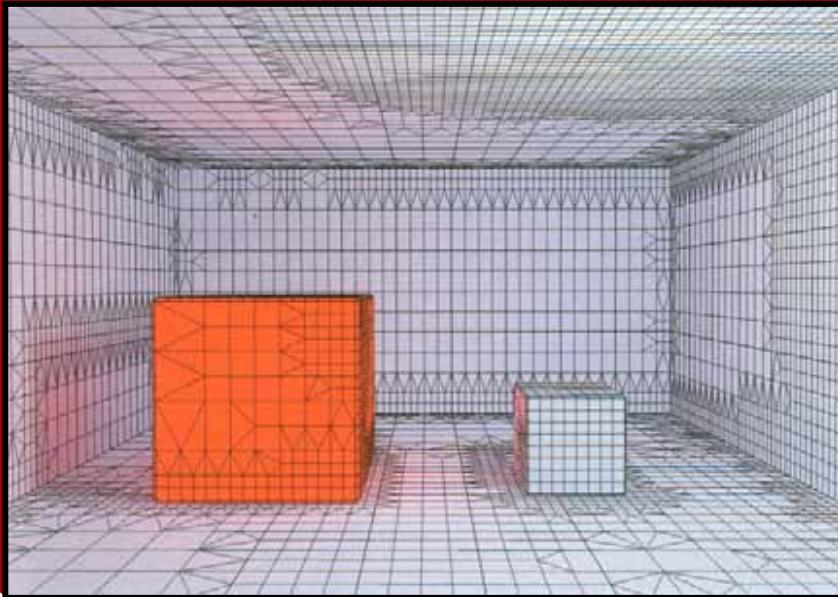
1. Global Illumination

- ❖ Direct Illumination :
- ❖ Indirect Illumination :



Global Illumination Technique

- ❖ Radiosity
- ❖ Photon Mapping



Radiosity



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, ,



(no specular)



1984

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Radiosity Process

❖ Surface Substructuring Scene Patch

patch



Radiosity Process



$$L_i = L_{ei} + \sum_j BRDF(j) * Irradiance(L_j)$$

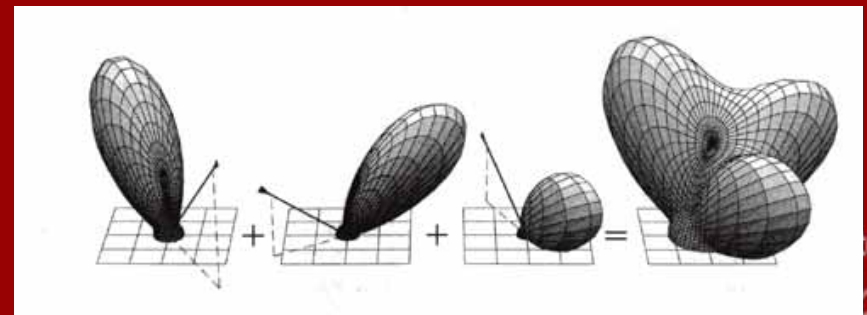
L_i

L_{ei}

$BRDF(j)$ j

L_j j

❖ **BRDF** : Bidirectional Reflectance Distribution Function



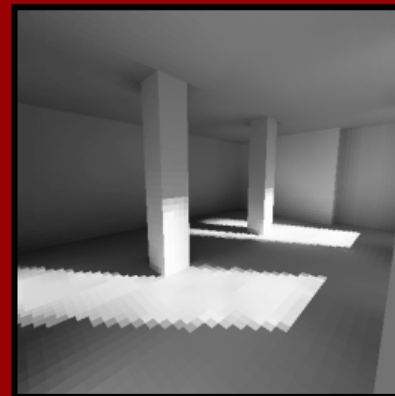
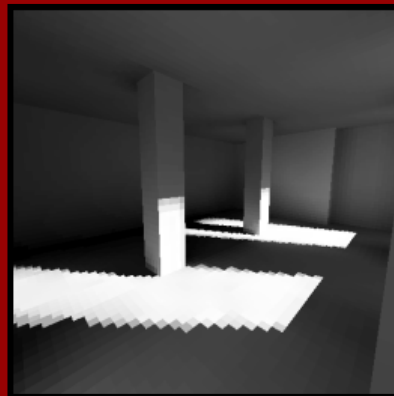
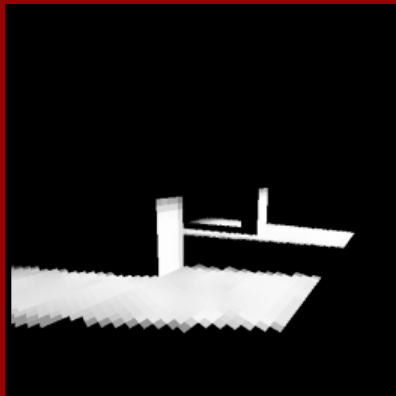
Radiosity Process

❖ Multi PASS Rendering

ray

. (1st pass)

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Radiosity



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..)

patch

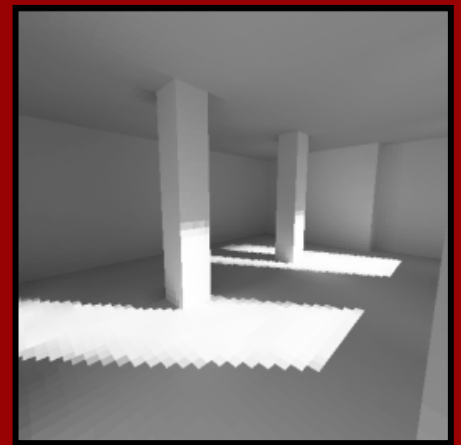
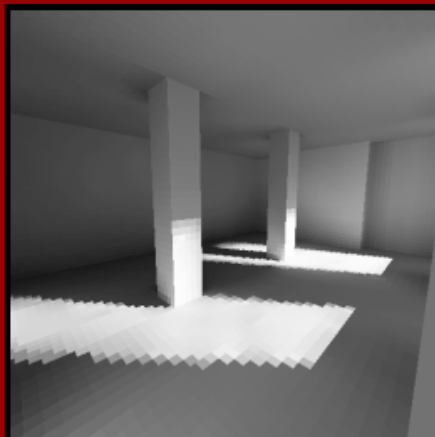
가

hemisphere



가

가



3 pass vs 16 pass
Kasa

Photon Mapping

❖ Photon :



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가

❖ 1995



Photon Mapping

❖ Monte-Carlo Method

, N

❖ 2 pass

, Photon Map Photon
Photon Map

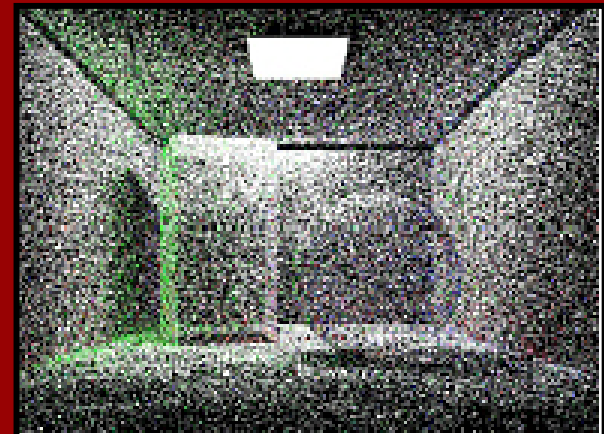
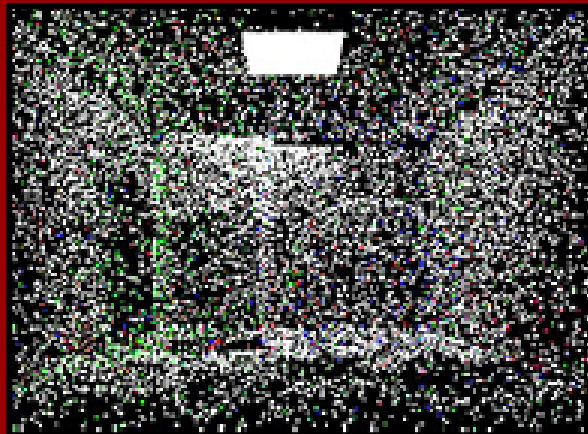
Photon Mapping Process

❖ 1

N Photon

Photon Map

❖ Photon



Photon Mapping Process

❖ Russian Roulette

0.5

50%

50%

100%

❖ (k-d Tree)



Photon Mapping Process

❖ 2

ray traicing
photon

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Global Illumination In Game



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GI

가

Radiosity



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ASE

(vertex

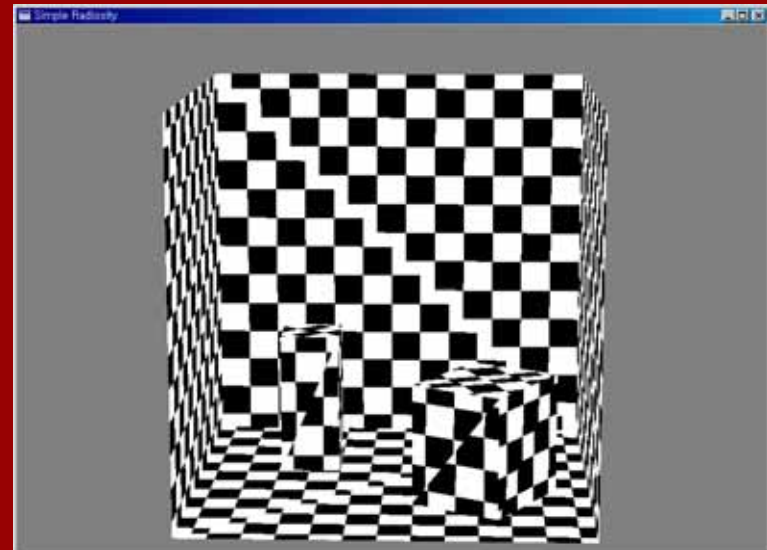
face

)

triangle

Radiosity

가



Radiosity

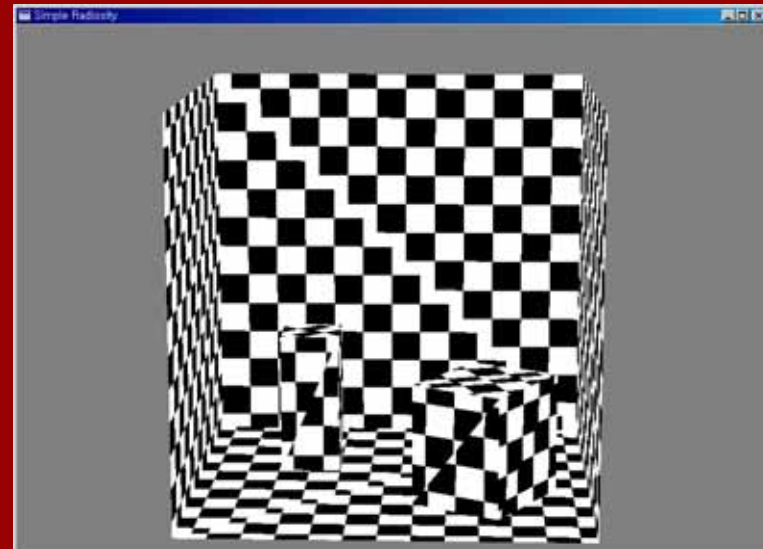


vector
basis vector

.

texture U,V

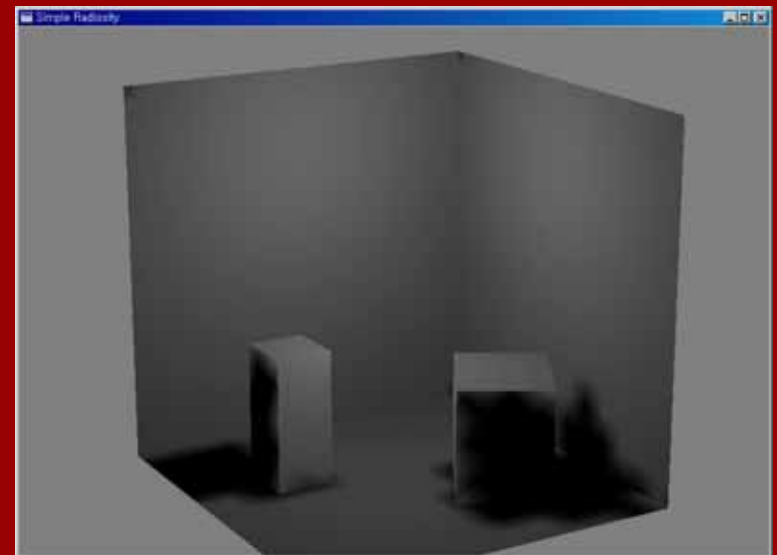
basis



Radiosity

❖ Direct Illumination

❖ Indirect Illumination



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http://digibath.com/repository/gi_demo.zip

❖ Radiosity Using Photon Maps

❖ http://www.cs.utah.edu/~bigler/research/photonmaps/photonmaps_g2.html

❖ Global Illumination

❖ http://atec.utdallas.edu/midori/Handouts/global_illumination.htm

❖ Overview of Photon Mapping

❖ <http://www.ypoart.com/tutorials/Photon-Overview.htm>

❖ Henrik Wann Jensen (photon mapping)

❖ <http://graphics.ucsd.edu/~henrik/>

20 ❖ Radiosity Texture Generator

❖ <http://www.dd.chalmers.se/~f97toed/radiosity/Report.htm>