The Graphics Process and the Graphics Pipeline

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Computer Graphics

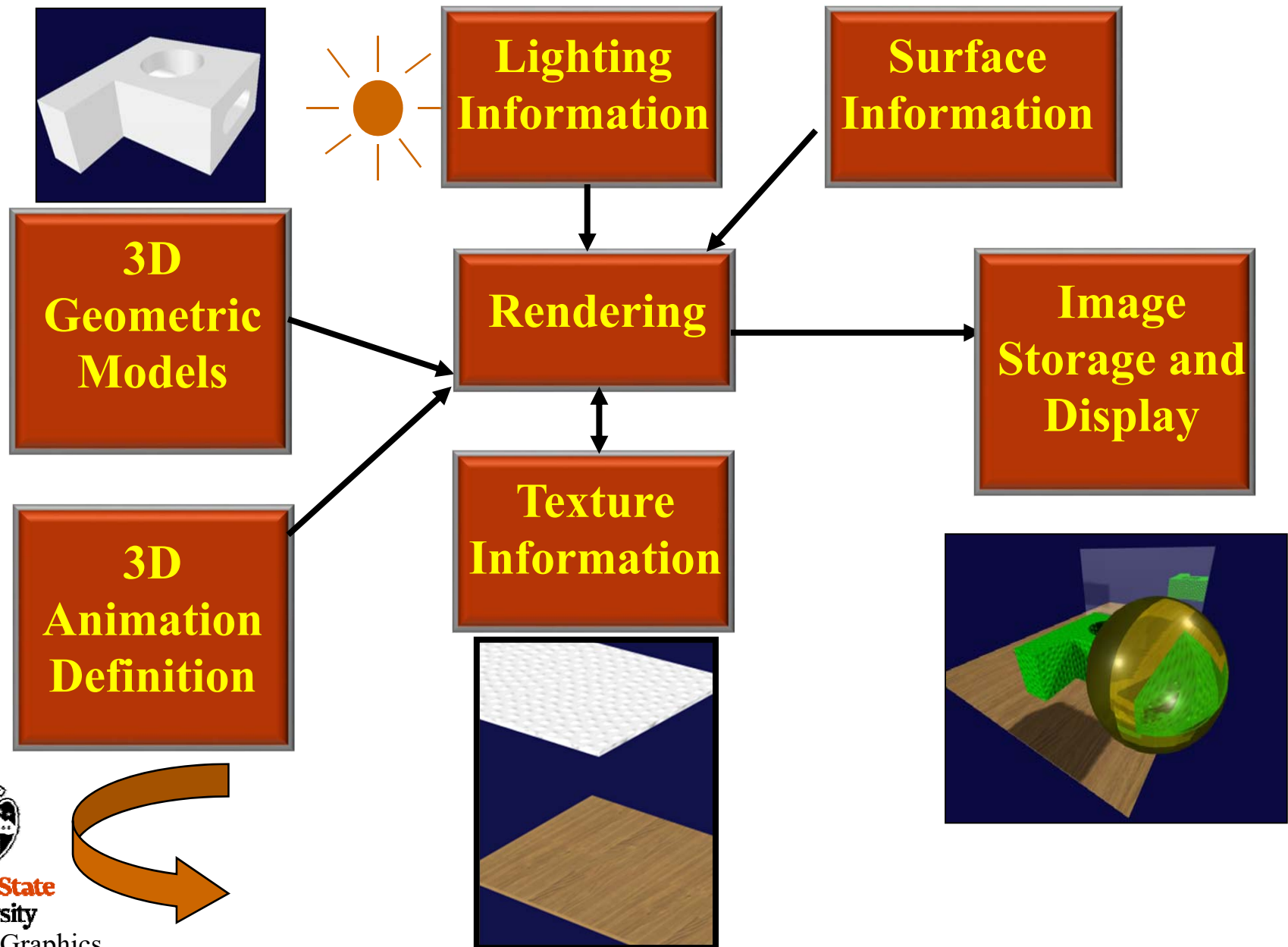# The Graphics Process

Lighting Information

Surface Information

3D Geometric Models

Rendering

Image Storage and Display

3D Animation Definition

Texture Information
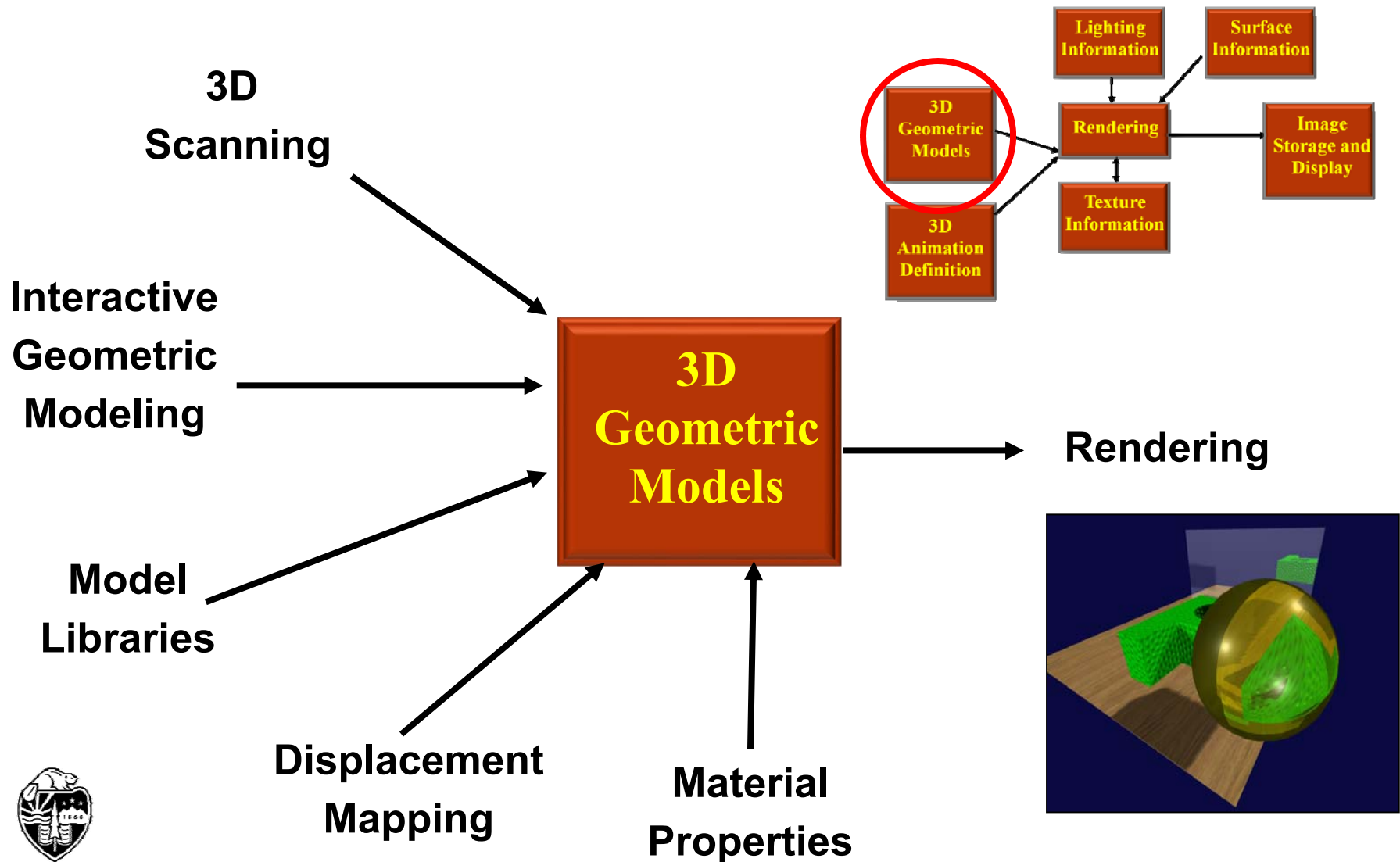
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The Graphics Process: Geometric Modeling

3D Scanning

Interactive Geometric Modeling

Model Libraries

Displacement Mapping

Material Properties

3D Geometric Models

Rendering

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The Graphics Process: 3D Animation

Motion Design

Motion Computation (physics)

Motion Capture

Dynamic Deformations

3D Animation Definition

Rendering
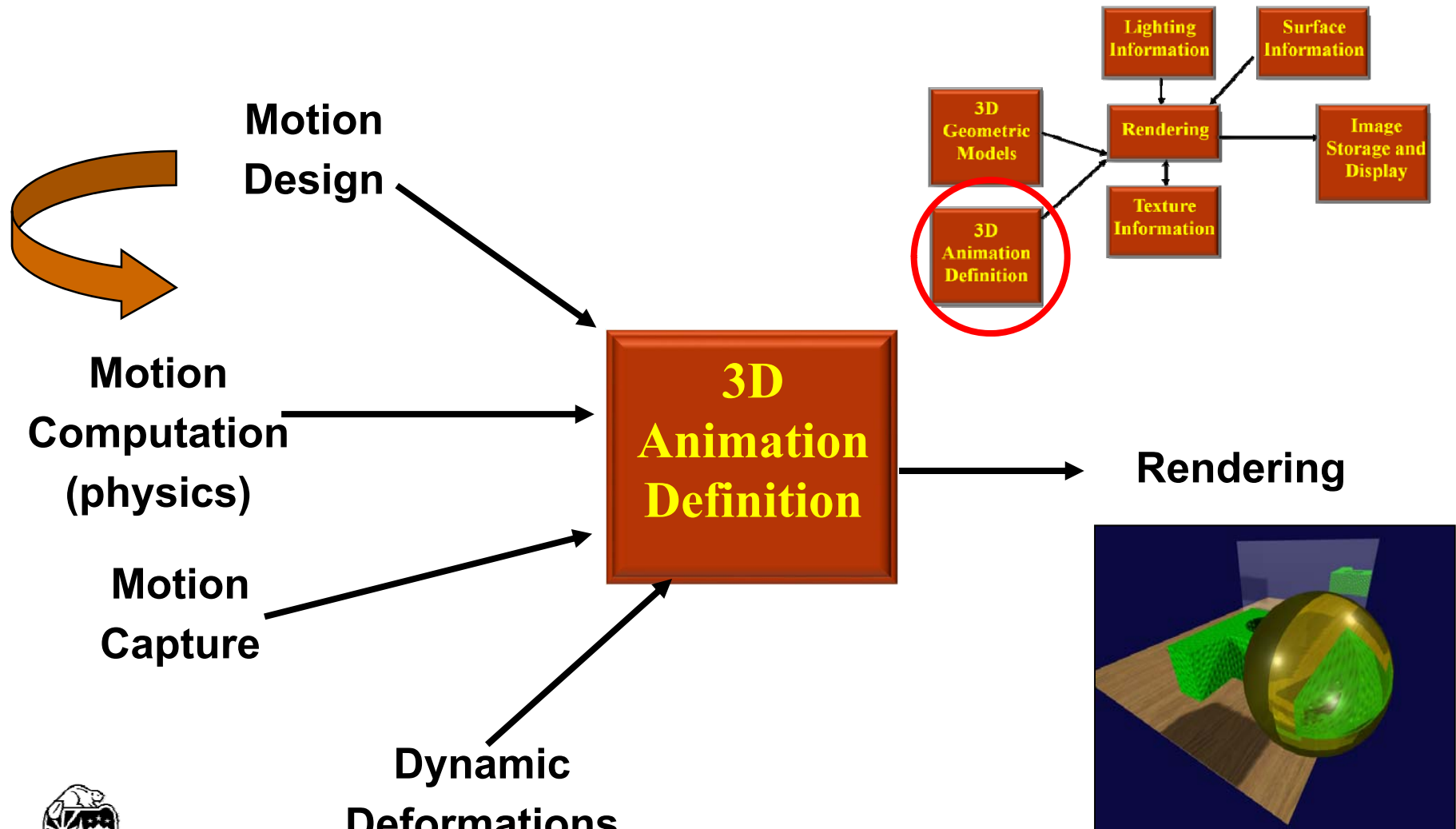
The Graphics Process: Texturing

Scanned Image Textures

Procedural (computed) Textures

Painted Textures

Texture Information

Rendering

Lighting Information · Surface Information · 3D Geometric Models · Rendering · Image Storage and Display · Texture Information · 3D Animation Definition

The Graphics Process: Surface Information

Alpha-Blended Transparency

Refractive Transparency

Reflectivity

Subsurface Scattering

Surface Information → Rendering

Lighting Information

Surface Information

3D Geometric Models

Rendering

Image Storage and Display

3D Animation Definition

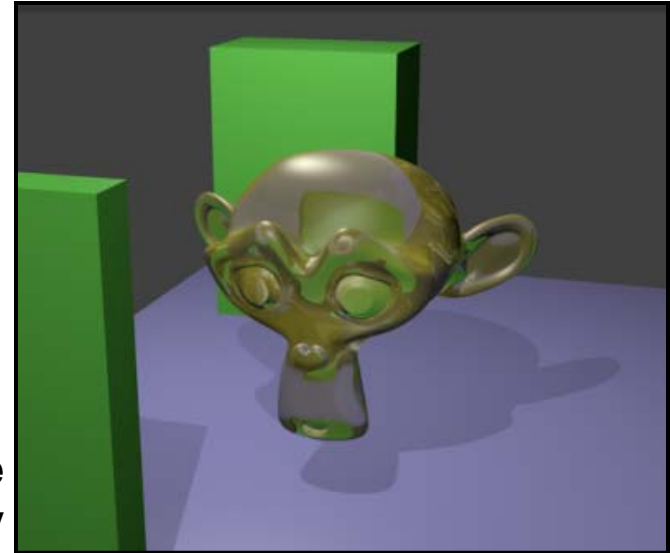Texture Information

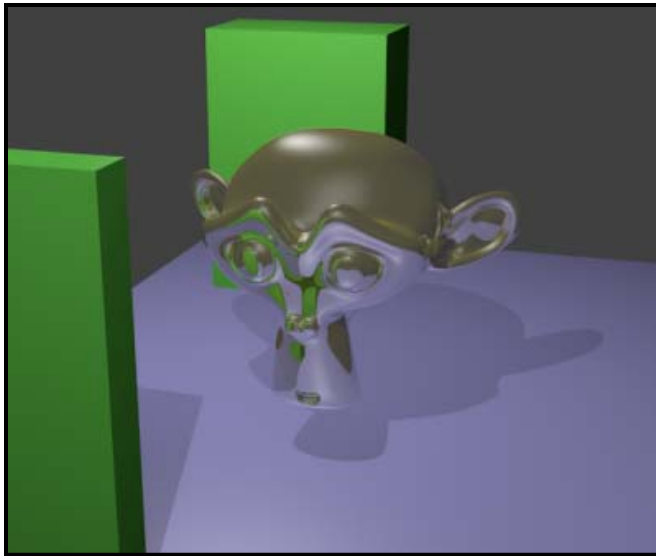# The Graphics Process: Surface Information
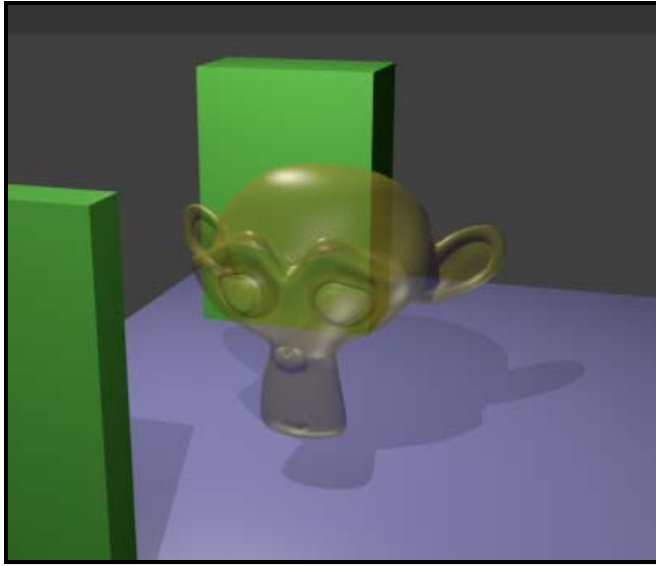
Alpha-Blended Transparency

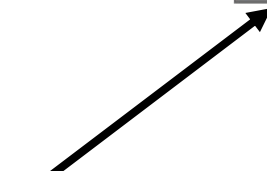**Refractive Transparency**

Reflectivity

Subsurface Scattering

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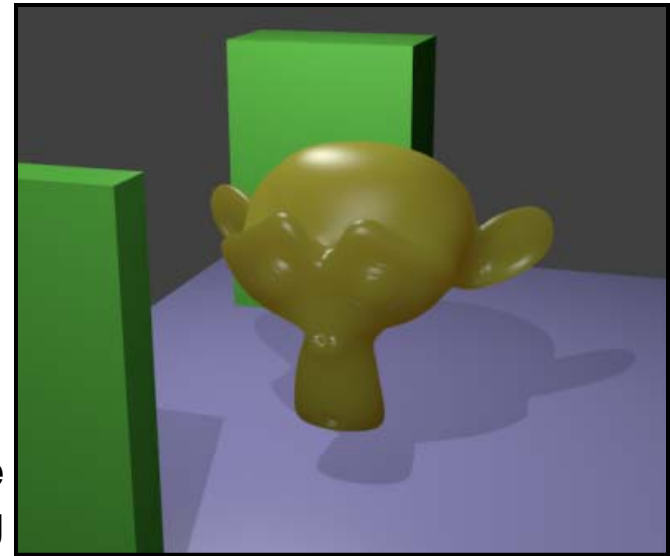
The Graphics Process: Lighting
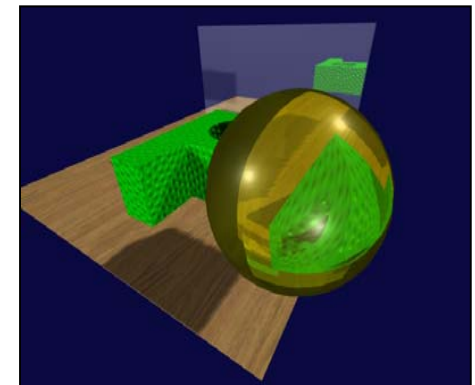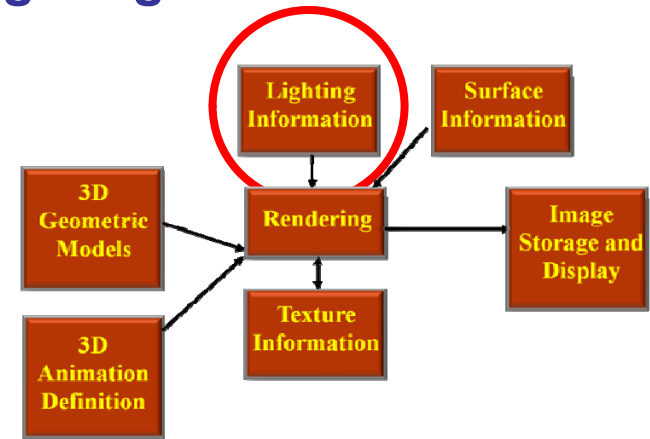
Lighting Types
(point, directional, spot, …)

Light Positions

Light Colors

Light Intensities

Lighting Information

Rendering

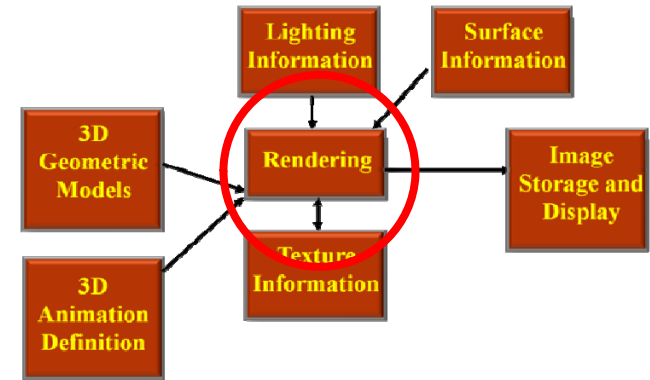# The Graphics Process: Rendering

3D Geometric Models

Surface Information

Lighting Information

Rendering

Image Storage and Display

Texture Information

3D Animation Definition

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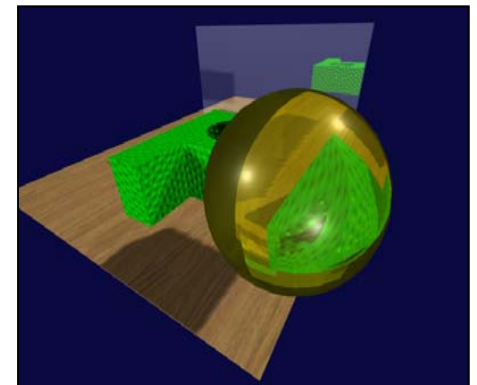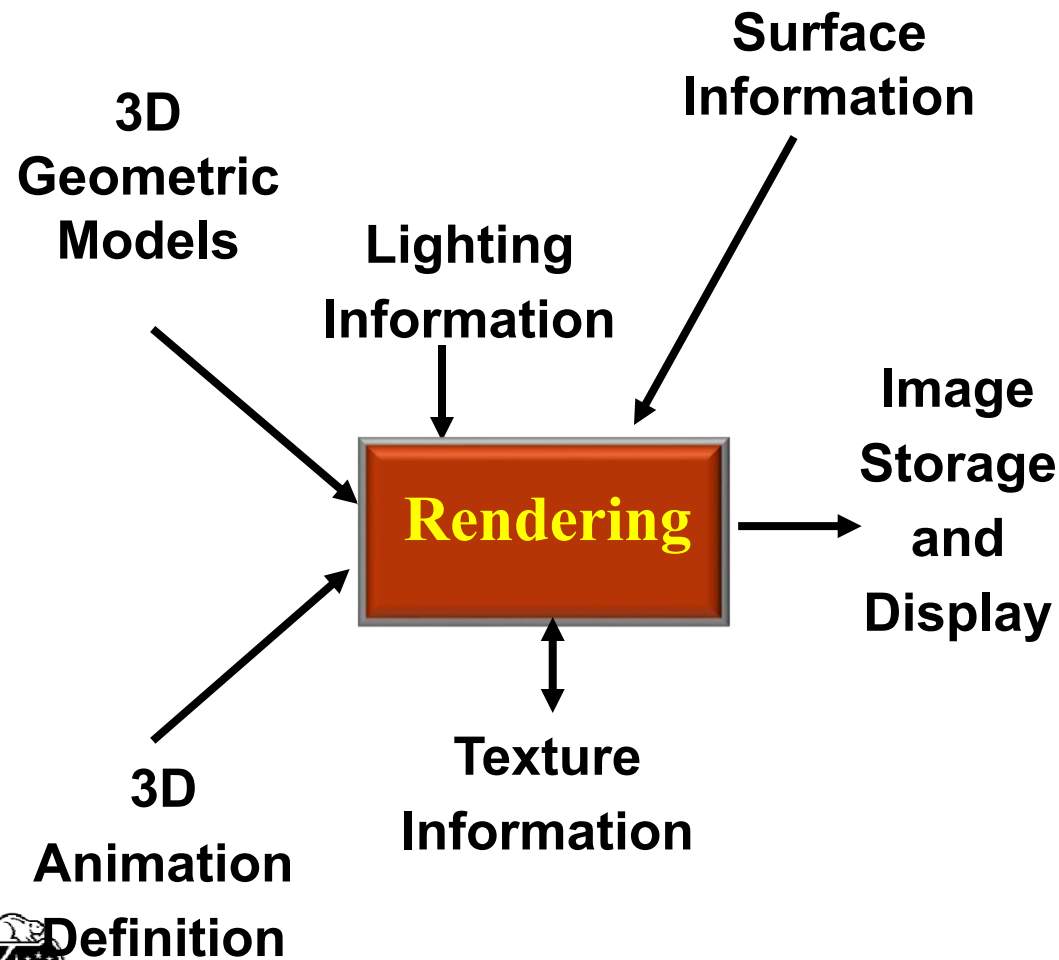
The Graphics Process:
Image Storage and Display

Lighting Information

Surface Information

3D Geometric Models

Rendering

Image Storage and Display

Texture Information

3D Animation Definition

Hardware Framebuffer

Rendering

Disk File

Recording

Editing

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The Graphics Process; Summary

Lighting Information

Surface Information

3D Geometric Models

Rendering

Image Storage and Display

3D Animation Definition

Texture Information

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The Basic Computer Graphics Pipeline

MC

| Model Transform | WC → | View Transform | EC → | Per-vertex Lighting | EC → | Projection Transform | CC → | Homogeneous Division |

NDC ↓

Viewport Transform

SC ↓

Rasterization

SC ←

Fragment Processing, Texturing, Per-fragment Lighting

Raster Ops

Framebuffer
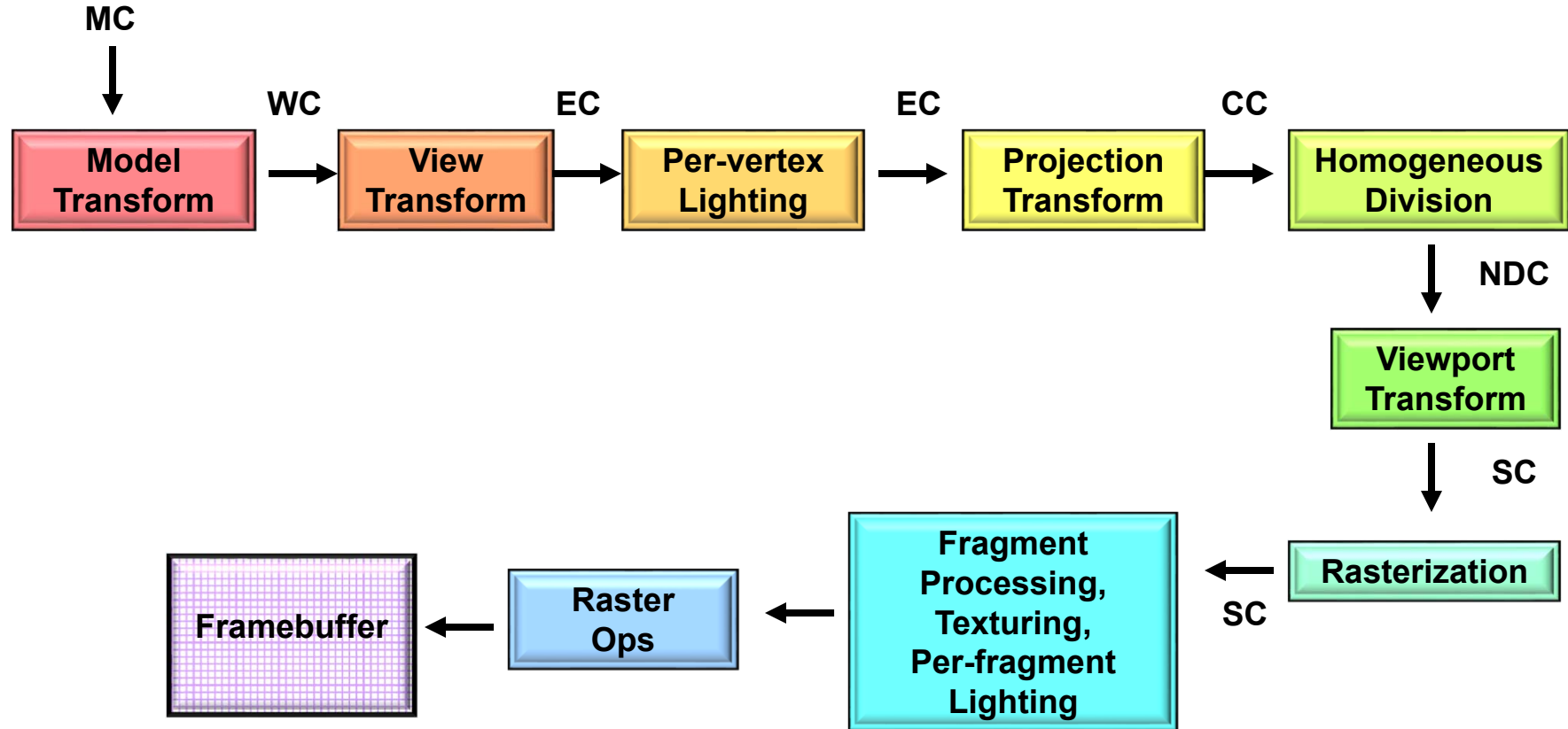
MC = Model Coordinates
WC = World Coordinates
EC = Eye Coordinates
CC = Clip Coordinates
NDC = Normalized Device Coordinates
SC = Screen Coordinates

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mjb – September 6, 2017