The Graphics Process and the Graphics Pipeline

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The Graphics Process

3D Geometric Models

Lighting Information

Surface Information

Rendering

3D Animation Definition

Texture Information

Image Storage and Display
The Graphics Process: Geometric Modeling

3D Scanning

Interactive Geometric Modeling

Model Libraries

Displacement Mapping

Material Properties

3D Geometric Models

Rendering

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Image Storage and Display

3D Animation Definition
The Graphics Process: 3D Animation

- Motion Design
- Motion Computation (physics)
- Motion Capture
- Dynamic Deformations

3D Animation Definition

- Rendering
- 3D Geometric Models
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- Texture Information
- Image Storage and Display
The Graphics Process: Texturing

- Scanned Image Textures
- Procedural (computed) Textures
- Painted Textures

Texture Information → Rendering

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

Oregon State University
Computer Graphics
The Graphics Process: Surface Information

- Alpha-Blended Transparency
- Refractive Transparency
- Reflectivity
- Subsurface Scattering
The Graphics Process: Surface Information

- Alpha-Blended Transparency
- Refractive Transparency
- Reflectivity
- Subsurface Scattering
The Graphics Process: Lighting

Lighting Types
(point, directional, spot, ...)

Light Positions

Light Colors

Light Intensities

Rendering
The Graphics Process: Rendering

- 3D Geometric Models
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Diagram:
- Rendering
- 3D Geometric Models
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The Graphics Process:
Image Storage and Display

Hardware
Framebuffer

Rendering

Disk File

Recording

Editing

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mjb – September 6, 2017
The Graphics Process; Summary

- 3D Geometric Models
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(mjb – September 6, 2017)
The Basic Computer Graphics Pipeline

MC → WC → EC → EC → CC → NDC

- Model Transform
- View Transform
- Per-vertex Lighting
- Projection Transform
- Homogeneous Division
- Viewport Transform
- Fragment Processing, Texturing, Per-fragment Lighting
- Rasterization
- Raster Ops
- Framebuffer

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