The Graphics Process and the Graphics Pipeline

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The Graphics Process

3D Geometric Models

3D Animation Definition

Lighting Information

Surface Information

Rendering

Texture Information

Image Storage and Display
The Graphics Process: Geometric Modeling

3D Scanning
Interactive Geometric Modeling
Model Libraries
Displacement Mapping
3D Geometric Models
Rendering

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

The Graphics Process: Surface Information

- Alpha-Blended Transparency
- Refractive Transparency
- Reflectivity
- Subsurface Scattering

Surface Information

Rendering
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

Lighting Information

Surface Information

3D Geometric Models

2D Computer Definitions
The Graphics Process: Rendering

3D Geometric Models

Lighting Information

Texture Information

Rendering

Image Storage and Display

Surface Information

3D Animation Definition

The Graphics Process: Image Storage and Display

Hardware Framebuffer

Disk File

Recording

Editing

Hardware Framebuffer

Disk File

Recording

Editing
The Graphics Process; Summary

3D Geometric Models

3D Animation Definition

Lighting Information

Surface Information

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Texture Information

Image Storage and Display

The Basic Computer Graphics Pipeline

Model Transform

View Transform

Per-vertex Lighting

Projection Transform

Homogeneous Division

Viewport Transform

NDC

Fragment Processing, Texturing, Per-fragment Lighting

Rasterization

Framebuffer

Raster Ops

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