The Computer 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
- Material Properties

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
- Rendering

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

Lighting Information
Rendering

3D Geometric Models
3D Animation
Reflection
Texture Information
Surface Information
Image Storage and Display
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

Compositing
The Graphics Process; Summary

3D Geometric Models

3D Animation Definition

Lighting Information

Surface Information

Rendering

Texture Information

Image Storage and Display

The Screen Display Consists of Pixels
The Basic Computer Graphics Pipeline

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