Last Class

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(601.457/657)
Overview

• Final Exam
• Summary of the Course
• Announcements
Final Exam

Content:

Everything that we have covered since the midterm:

- Subdivision surfaces
- Spline curves/surfaces
- Procedural models
- Solid models
- 3D scanning
- Surface reconstruction
- Animation
- Radiosity
- Image stitching
- Gradient domain image processing
- Shape matching
Final Exam

Format:

• Short answer questions only
• No essays
• No True/False
• No multiple choice
• Think: “second midterm”
Overview

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Syllabus

• Image Processing (2D)
• Rendering (3D)
• Modeling (3D)
• Animation (4D)
Syllabus: Image Processing

• Image Representation
  ○ Sampling
  ○ Reconstruction
  ○ Quantization & Aliasing
Syllabus: Image Processing

- Image Representation
  - Sampling
  - Reconstruction
  - Quantization & Aliasing

Original (8 bits)  Quantized (1 bit)  Random Dither (1 bit)  Ordered Dither (1 bit)  Floyd-Steinberg Dither (1 bit)
Syllabus: Image Processing

- Image Representation
  - Sampling
  - Reconstruction
  - Quantization & Aliasing

- Image Processing
  - Filtering
  - Warping
  - Morphing
  - Compositing
Syllabus: Image Processing

• Image Representation
  ○ Sampling
  ○ Reconstruction
  ○ Quantization & Aliasing

• Image Processing
  ○ Filtering
  ○ Warping
  ○ Morphing
  ○ Compositing
Syllabus: Rendering

• Global Illumination
  ◦ Ray tracing
    » Ray casting
    » Illumination equation
    » Modeling transformations
    » Hierarchical scene graphs
  ◦ Radiosity
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    - Hierarchical scene graphs
  - Radiosity

- 3D Rendering Pipeline
  - Modeling transformations
  - Viewing transformations
  - Hidden surface removal
  - Illumination, shading & textures
Syllabus: Modeling

• Representations of geometry
  ◦ **Curves (splines)**
  ◦ **Surfaces (meshes, splines, subdivisions)**
  ◦ **Solids (voxels, CSG)**
Syllabus: Modeling

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Iso-Value $= \delta_1$

Iso-Value $= \delta_2$
Syllabus: Animation

- Key framing
  - Kinematics
  - Articulated figures

- Transformation
  - Interpolation/Blending
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\[
\exp(I_d, A) = \exp(A) = I_d + A + \frac{1}{2!} A^2 + \frac{1}{3!} A^3 + \ldots + \frac{1}{n!} A^n
\]
What Else Have We Learned?

- CG is hard
  - Lots of programming
  - Lots of math

- Simple things often work quite well!
  - Example: Illumination equation
  - Example: Key-frame interpolation

- Some things which seem simple, aren’t
  - Creating cool models
  - Getting them to behave well

- Still a lot left to do!
Announcements

- Every semester there is a reading seminar in computer graphics
  - Informal
  - Read and discuss one paper a week
  - You are welcome to join