

15-462 Computer Graphics I

Lecture 18

Final Review

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Pre-midterm Material

- Not focus of final
- Some material will appear

Introduction to Animation

- Traditional Animation
- Keyframe Animation
- Interpolating Rotation, e.g., using quaternions

Particle Systems

- Differential equation basics
- How to simulate them
- Angel Ch. 11 (+ Baraff & Witkin notes)

Rasterization

- Scan Conversion of Lines
 - Bresenham's Algorithm
- Scan Conversion of Polygons
- Antialiasing
- Compositing
- [Angel, Ch. 7.9-7.11, 8.9-8.12]

Image Processing

- Blending
- Display Color Models
- Filters
- Dithering
- Image Compression

Overview of Physically Based Modeling

- Skip

Ray Tracing

- Ray Casting
- Ray-Surface Intersections
- Barycentric Coordinates
- Reflection and Transmission
- Optimizations (from notes)
- [Angel Ch. 13]

Spatial Data Structures

- Hierarchical Bounding Volumes
- Regular Grids
- Octrees
- BSP Trees
- Constructive Solid Geometry (CSG)
- [Angel 9.10]

Radiosity

- Measures of Illumination
- The Radiosity Equation
- Form Factors
- Radiosity Algorithms
- [Angel, Ch 13.4-13.5]

Global Illumination

- Substructuring
- Progressive Refinement
- Bidirectional Reflectance Dist. Fcn.
- Combining Radiosity and Ray Tracing
- [Angel, Ch 13.5]

Non-photorealistic Rendering

- Pen-and-Ink Illustrations
- Painterly Rendering
- Cartoon Shading
- Technical Illustrations

Visualization and Volume Rendering

- Height Fields and Contours
- Scalar Fields
 - Isosurfaces
 - Marching cubes
- Volume Rendering
 - Volume ray tracing
 - Splatting
 - 3D Textures
- Vector Fields
 - Hedgehogs
 - Animated and interactive visualization
- [Angel Ch. 12]