Outline

• Introduction
• Syllabus
• Coursework
• Miscellaneous
Introduction: What is CG?

• 2D image processing
• 3D object representation & manipulation
• Simulating physical processes & materials
• Animating any of the above
Introduction: What is CG?

2D image processing

- 3D object representation & manipulation
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Introduction: What is CG?

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“Ratatouille” Pixar/Disney
Introduction: What is CG?

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Procedural Shader from Pixar Studios
Introduction: What is CG?

• 2D image processing
• 3D object representation & manipulation
• Simulating physical processes & materials

Animating any of the above (4D)
Introduction: What is CG?

“You know it when you see it…”

Work by Jim Rygiel for “102 Dalmatians”
Introduction: What is CG?

“You know it when you see it… maybe.”

Work by Jim Rygiel for “102 Dalmatians”
Introduction: Applications

• Entertainment
• Computer Aided Design
• Scientific Visualization
• Training & Education
• Commerce
• Art
Introduction: Applications

Entertainment

• Computer Aided Design
• Scientific Visualization
• Training & Education
• Commerce
• Art

“El Laberinto del Fauno”

“Bioshock” 2K Games
Introduction: Applications

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Completely virtual model built in 3D:
- Shorten the development period
- Shorten the learning curve
Introduction: Applications

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Aspirin in RasMol
Courtesy of Michael Friendly

The Visible Human
Courtesy of NLM

Flow Visualization
Roettger et al.

Right Side
Introduction: Applications

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Microsoft Flight Simulator

Image courtesy of Agrawala et al.
Introduction: Applications

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http://www.miniusa.com/crm/mini_entrance.jsp
Introduction: Applications

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“Cyberflower Duet” by Roman Verostko

“Conflagration” by Diane Vetere
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Syllabus

- Image Processing (2D)
- Ray Tracing (3D)
- Rendering (3D)
- Modeling (3D)
- Animation (4D)
Syllabus:

• Image Processing
  ◦ Color Models
  ◦ Quantization and Dithering
  ◦ Sampling
  ◦ Filters
  ◦ Warping, Morphing, and Compositing
Syllabus:

• Ray Tracing
  ◦ Cameras
  ◦ Primitives
  ◦ Lights
  ◦ Spatial Data Structures
  ◦ Reflection, Transparency and Refraction

• Rendering
  ◦ Coordinate Systems and Modeling Transformations
  ◦ Viewing transformations
  ◦ Shading
  ◦ Textures
  ◦ Visibility
  ◦ OpenGL
Syllabus:

• Modeling
  ◦ Triangles
  ◦ Splines
  ◦ Subdivision Surfaces
  ◦ Procedural Models
  ◦ Point Based Models

• Animation
  ◦ Key-Framing
  ◦ Kinematics
  ◦ Dynamics
Outline

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Coursework

• Lots of work!
• Exams (30%)
• Programming assignments (60%)
• Class participation (10%)
Coursework

- Lots of work!

**Exams (30%)**
  - Two midterms
  - 10/27 and 12/16

- Programming assignments (60%)
- Class participation (10%)
Coursework

• Lots of work!

• Exams (30%)

Programming assignments (60%)
  ◦ Image Processing (15%)
  ◦ Ray Tracing (15%)
  ◦ OpenGL Rendering (15%)
  ◦ Animation (15%)

• Class participation (10%)
Coursework

• Lots of work!

• Exams (30%)

Programming assignments (60%)
  ◦ Knowledge of C/C++ assumed!
  ◦ Must be turned in by 23:55 on due date
  ◦ 5 (discrete!) late days

• Class participation (10%)
Coursework: Collaboration Policy

• You must write your own code
• You must reference sources of ideas/code

• It’s okay to:
  ◦ Discuss ideas with other students
  ◦ Get ideas from books, web sites, etc.
  ◦ Get “support code” from books, web, etc.
    » But reference it!

• It is not okay to:
  ◦ Share code with other students
  ◦ Copy code from other students
  ◦ Use ideas or code from other sources without attribution
Coursework

- Lots of work!
- Exams (30%)
- Programming assignments (60%)
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Bottom line:
If you don’t LOVE programming, don’t take this class!
Coursework

• Lots of work!
• Exams (30%)
• Programming assignments (60%)

Class participation (10%)
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Miscellaneous

• Course web page:
  ° www.cs.virginia.edu/~gfx/Courses/2008/IntroGraphics

• No required text book.

• Suggested reading (in bookstore):
Miscellaneous

- **TAs:**
  - Michael Skalak
  - Balaji Dhanasekaran

- **Office hours:**
  - Mine: MT 1:00 – 3:00 @ Olsson 212
  - Balaji: TBA
  - Michael: TBA
  - Or, by appointment

- **Keeping in touch:**
  - Email classmates: cs445-f2008@collab.itc.virginia.edu
Miscellaneous

• Submitting work:
  ◦ We will use UVa Collab
  ◦ http://collab.itc.virginia.edu
  ◦ Setup your workspace and find this course SOON!