Today

- Introduction and Course Overview
- Homworks #0 and #1
- Digital Images

The Subject: Computer Graphics

- Computer Graphics:
  Using computers to generate and display images

- Issues that arise:
  - Modeling
  - Rendering
  - Animation
  - Perception
  - Lots of details...

Computer Graphics

- Applications (in other words, why we care)
  - Movies
  - Video Games
  - Simulation
  - Analysis
  - Design
  - Others...
Applications (in other words, why we care)

- Movies
- Video Games
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From Star Wars Episode I, Lucasfilm Ltd.

From Finding Nemo, Pixar Animation Studios

From Halo 2, by Bungie Entertainment

From America's Army
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Course Topics

- Image representation and manipulation
- 2D and 3D drawing algorithms
- Object representations
- Rendering
- Animation
- Interaction techniques
People

Prof. James O’Brien
Email: job@eecs.berkeley.edu
Office hours: Fridays 2:00-4:00pm
Office location: 633 Soda Hall

Adam Kirk
Email: akirk@eecs.berkeley.edu
Office hours: Monday/Wednesday 2:30-3:30
Office hours location: 751 Soda Hall

TBA

Send class related email to cs184@mail.eecs.berkeley.edu

Contact Information

- Class web site:
  - http://inst.eecs.berkeley.edu/~cs184
  - Handouts assignments, etc. will be posted there
  - Lecture notes posted there (hopefully) before classes
- News group:
  - ucb.class.cs184
  - Not reading newsgroup... bad idea
- Email addresses on previous page...

Computing Resources

- Class accounts handed out next week
- New lab with Power Mac G5s
- Can also use other labs (Linux or Windows)

Text Book

- Fundamentals of Computer Graphics
  by Peter Shirley
  * Get the current version!
- Also handouts and other supplemental material will be provided
- See other books listed in course information handout
Grading

- Assignments: 30%
  - Mix of written and programming
  - Average 1 or 2 weeks to do them
- Final Project: 30%
- Midterm: 20%
- Final: 20%

- Dates in course handout
  - Check now for conflicts!

Prerequisites

- You must know how to program C or C++
  - Big final project, several programming assignments
  - No hand holding
- Data structures (CS60C)
- Math: linear algebra, calc, trig

Waitlist

- Relax for now...

Class Participation

- Reasons to participate
  - More fun for me and you
  - You learn more
  - I won’t give stupid little annoying quizzes in class
- How to participate
  - Ask questions
  - Make comments
- Stupid questions/comments
  - That’s okay
Homeworks #0 and #1

- Homework #0
  - Setup CS184 account and let us know who you are
  - Do this ASAP (after you get the account sheet)
- Homework #1
  - Due (see handout)
  - Tests math prerequisites

Academic Honesty

- If you use an external resource cite it clearly!
- Don’t do things that would be considered dishonest... if in doubt ask.
- Cheating earns you:
  - An ‘F’ in the class and
  - Getting reported to the University
  - No exceptions.

Questions?

Images

- Something that represents a pattern of light that will be perceived by something
- Computer representations
  - Sampled (pixel based)
  - Object based
  - Functional
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PS Type 1 font

- Vector- or stroke-based
Images

- Something that represents a *pattern of light* that will be *perceived* by something

- Computer representations
  - Sampled (pixel based)
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Well, this *used* to be in an object based representation...

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Storing Images

- Object and Function representations basically arbitrary  ...later...

- Raster Images
  - 2D array of memory
  - Pixels store different things
    - Intensity
    - RGB color
    - Depth
    - Others...
  - May be mapped to special HW

Function→Polygons→Pixels

Think about making edits...
Storing Images

- Object and Function representations basically arbitrary ...later...

- Raster Images
  - 2D array of memory
  - Pixels store different things
    - Intensity (scalar value, e.g. float, int)
    - RGB color (vector value)
    - Depth
    - Others...
  - May be mapped to special HW

Discretization

- Real world and “object” representations are continuous.
- Raster images have discrete pixel locations and discrete pixel values

High Dynamic Range Images

- Dynamic range of the human eye >> range of standard monitors
- Eye adjusts as we look around
**Perception**

- The eye does not see intensity values...

**Storing Images**

- Digital file formats
  - TIFF, JPEG, PNG, GIF, BMP, PPM, etc.
- Compression (lossless and lossy)
- Interlaced (e.g. NTSC television)
- Tend to be complex... use libraries
- Mapping to memory