CS148 final review session

Autumn 2009

Today

Monday, December 7, 2009
Overview

- Final: Braunlec on Wed at 7p
  - Open book, open laptop (no Internet)
  - Covers mainly from “Light and Color” to “Rendering”
Office Hours

- Leslie -- Tuesday 10am - 12pm
- Pat -- Tuesday 2-3:30p / Wednesday 10-11a
Three colors are enough

Luminance ~ "intensity": 0.30 R + .59 G + .11 B

Different color spaces
Displays

- Gamut vs Gamma
- White point -- monitors need calibration
Programmable Graphics Pipeline

Command → Vertex → Assembly → Rasterization → Fragment → FB ops → Display

Transform

Lighting

Texture

Vertex

Shader

Program

Inputs

Outputs

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GPUs

• Limitations:
  • Memory: no access to neighboring fragments
  • Cannot read and write framebuffer
• Why?
Q: What’s the difference between bit depth and high dynamic range?
Q: What does it mean to say an image has high-dynamic range?

Assume you are looking at an image on (A) a printed page, (B) an image on a flat-panel monitor, and (C) a view of the outdoors through your window. What is image is likely to have the highest dynamic range? Which image will have the lowest dynamic range?
HDR

- Dynamic range := Maximum brightness : Minimum
- Outdoors > Monitor > Printed Page
- Note: bit-depth != dynamic range
Sampling

• To perform antialiasing, we filter the image before sampling. What is the purpose of the filter?
Suppose that we are generating a fragment for an opaque gray polygon being drawn over a square pixel. Here is a not-to-scale diagram:

Q: What, in general, determines the alpha value of a fragment?
Sampling

• To perform antialiasing, we filter the image before sampling. What is the purpose of the filter?

• The filter removes all frequencies greater than the Nyquist frequency (1/2 the sampling frequency) before sampling. These high frequencies cause aliasing, so removing them prevents aliasing.
Compression

- Haar wavelets
- Lossy vs Lossless
Subdivision

When might you want to use a Catmull-Clark subdivision rather than a Bezier spline? Vice versa?
Rendering

- Microfacet model
- Lambert’s law
Some concepts to review

- Homogeneous coordinates
- Aliasing
- Computing Normals
- Highlights & Light modeling
- Quantization vs Compression
GOOD LUCK!