Computer Graphics

Lecture 27:
Clipping
Announcements

• Please continue not talking about the exam through Wednesday 10pm

• Proposal feedback is out - revisions (if applicable) due Wednesday 10pm

• FP milestone 1 is one week from today!

• Line lab due Thursday 11/10 10pm (if not already completed)

• A3 due Wednesday 10pm
  • This is the last assignment where slip days can be used
Graphics Pipeline: Overview

- **APPLICATION**
- **COMMAND STREAM**
- **VERTEX PROCESSING**
- **TRANSFORMED GEOMETRY**
- **RASTERIZATION**
- **FRAGMENTS**
- **FRAGMENT PROCESSING**
- **FRAMEBUFFER IMAGE**

You are here

3D transformations; shading

Vertex shader

Conversion of primitives to pixels

In GL: magic; done for you

Blending, compositing, shading

Fragment shader

User sees this

Display
Rasterization: Overview

- 7(!?) weeks ago: rasterizing triangles
- 1 week ago: z buffering, backface culling
- Last time: rasterizing lines
- Today: clipping
Clipping

• Rasterizer tends to assume triangles are on screen
  – particularly problematic to have triangles crossing the plane $z = 0$

• After projection
  – clip against the planes $x, y, z = 1, -1$ (6 planes)
  – primitive operation: clip triangle against axis-aligned plane
Clipping a triangle against a plane

- 4 cases, based on sidedness of vertices
  - all in (keep)
  - all out (discard)
  - one in, two out (one clipped triangle)
  - two in, one out (two clipped triangles)
Exercise: Write pseudocode to do this.

- 4 cases, based on sidedness of vertices
  - all in (keep)
  - all out (discard)
  - one in, two out (one clipped triangle)
  - two in, one out (two clipped triangles)