**CS4620/5620: Lecture 21**

Texture Mapping

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**Announcements**

- Extra office hours

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**Projector Function: Arbitrary Surfaces**

- Non-parametric surfaces: project to parametric surface

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**Projector Functions: User-Specified**

- Distortion in direction perpendicular to projection
- Approach
  - Unwrap mesh
    - Set of planar projections
    - Minimize the distortion
  - Smaller textures for each of the projections
  - Pack it into a larger texture

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**Perspective-Correct Texturing**

- In hardware rendering
  - Must be careful to interpolate texture coordinates correctly

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**Interpolating in projection**

- Linear interp. in screen space ≠ linear interp. in world (eye) space
Perspective-Correct Texturing

- Derivation

![Diagram of perspective-correct texturing](http://upload.wikimedia.org/wikipedia/commons/5/57/Perspective_correct_texture_mapping.jpg)

- See section 11.3.1 "Perspective Correct Textures"
- Linearly interpolate (u,v)/depth not just (u,v)

Demo: "UVMapper"

http://www.uvmapper.com

Projector Function: Arbitrary Surfaces

How does it work?

Texture Pipeline
Corresponder Function

• Why?
  – Flexibility

• Examples:
  – Select a subset of the image for texturing
  – Decide what happens at boundaries

Correspond function example

• Mapping from $S$ to $D$ can be many-to-one
  – that is, every surface point gets only one color assigned
  – but it is OK (and in fact useful) for multiple surface points to be
    mapped to the same texture point
  • e.g. repeating tiles

Correspond function example

• In OpenGL: wrapping mode
  
  ![WRAP](image)

  
  \[ (-1, -1), (2, 2) \]

  
  • Wrap: Repeats
  • Mirror
    – Repeats but mirrored every other time; continuity across edges
  • Clamp: Clamped to edge of texture
  • Border: Clamped to border color