Handouts: Smooth Shading

Advanced Illumination

- Texture Mapping
- Bump Mapping
- Shadows
- Transparency

Texture Mapping

- Adding fine detail
  - Surface polygons
  - Map an image: *texture*

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Textures

- 2d image: array of texels
  - (u,v) coordinates
- Texels define or modify surface color

General Mapping

- Pixel(x,y) -> surface(s,t) -> texture (u,v)
- (s,t) -> (u,v) = where texture is applied
  - What if (u,v) is too small?

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Polygon Mapping

- (x,y) -> (s,t) mapping can be complex
- Simplify for polygons
- Problems?

Improvements

- Support for arbitrary filters
  - pixel = center of some filter
  - filter table for texel centers based on filter
- MIP Mapping makes this fast (17.4.3)
  - Store subsampled textures

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OpenGL Texture Mapping

- glEnable(GL_TEXTURE_2D) or 1D
- Pick names for texture objects
  - glGenTextures to get free name
    - (analogous to glGenLists)
- glBindTexture creates, uses tex. objs.
  - Sets "current texture", create on first use

Texture Parameters

- specify 2D (or 1D) images
  - 2^n dimensions (plus borders, mipmaps)
- Specify how to apply it
  - DECAL, REPLACE, MODULATE, BLEND
- Wrap or Clamp
- Filtering
  - Min, Mag

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Supply Texture Coords (when drawing vertices)

- glTexCoord* (analogous to glVertex*)
  - (s,t,r,q) instead of (u,v)
  - go from 0..1
- Possible to have them generated
  - glTexGen