Texture Mapping

15-462 Computer Graphics
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Overview

- Quick Reminders
- Texture Mapping
Reminders

- Homework 1 due Thursday
- Project 2 due Tuesday
- Get started
Texture Mapping
What is a Texture?

- A texture is just a bitmap image
- 2d array – texture[height][width][4]
- Pixels of the texture are called texels
- Texture coordinates are in 2D, in range [0,1]
Texture Mapping
Texture Mapping in OpenGL: Rendering

```c
glEnable(GL_TEXTURE_2D);

// Begin rendering a quad
glBegin(GL_QUADS);
    glTexCoord2f(0.0, 0.0); glVertex3f(0.0, 0.0, 0.0);
    glTexCoord2f(1.0, 0.0); glVertex3f(10.0, 0.0, 0.0);
    glTexCoord2f(1.0, 1.0); glVertex3f(12.0, 5.0, 0.0);
    glTexCoord2f(0.0, 1.0); glVertex3f(2.0, 5.0, 0.0);

// End rendering
glEnd();

// Disable texture mapping
glDisable(GL_TEXTURE_2D);
```
Texture Mapping in OpenGL

- `void glTexImage2D` – defines the texture being used
- `glTexParameter{if} {v}` – specifies certain parameters
- `glGenTexture` – creates a Texture Object
- `glBindTexture` – binds a texture object
Color Blending

- Final pixel color : (texture color, object color) → color
  - GL_REPLACE – use texture color
  - GL_BLEND – linear combination of both
  - Etc.

- glTexEnv{if}{v} – specifies method
Interpolating Color

• We lookup texel (s,t) for the color to use.
• What if (s,t) isn’t a proper texel?
• Use glGetUniformLocation with GL_TEXTURE_MIN_FILTER
  • GL_NEAREST – use nearest texel
  • GL_LINEAR – use linear combination
Extrapolating Color

Use `glTexParameter` – `GL_CLAMP`, `GL_REPEAT`
Useful Resources: Texture Mapping

- OpenGL Programming Guide, Version 1.1