ECE/CS 433

Introduction to Computer Graphics

Class 10
September 20, 2007

Pradeep Sen
Advanced Graphics Lab

Tom Anderson, Novint Technologies

Friday, September 21, 2007
ECE 118 at noon

Announcements

- For problem 2, you only need to reduce the size of the image. You don't need to enlarge it (that's extra credit). However, the number of seams to be removed can be different in the horizontal and vertical directions.
- Database of images will be up soon. In the meantime, experiment with the images you submitted for the mini-hw.
- Ask for help!

Last time

- Geometry data structures

Today

- More on Geometry
- Intro to OpenGL

First the geometry

OpenGL

- OpenGL is an API for 3-D graphics
- It gives us a language to “talk” to the hardware and tell it what we want it to do

OpenGL State Machine

- Programming OpenGL is like programming a state machine

Building primitives

- Use glBegin() to tell it what sort of primitive to build
- E.g.
  - glBegin(GL_POLYGON);
  - glBegin(GL_TRIANGLES);
  - glBegin(GL_LINES);

Immediate mode vertices

- glVertex*() – Issues a vertex to the hardware
- glColor*() – Issues a color that will be bound to that vertex

Information at each vertex

- Position
- Color
- Texture coordinates
- Normals
- etc.

Example

```
void drawPolygon(void) {
   glBegin(GL_POLYGON);
   glVertex2f(0.0, 0.0);
   glVertex2f(0.0, 3.0);
   glVertex2f(4.0, 2.0);
   glVertex2f(-1.0, 1.0);
   glEnd();
}
```

Example

```
void drawPolygon2(void) {
   glBegin(GL_POLYGON);
   glColor3f(1.0, 0.0, 0.0);
   glVertex2f(0.0, 0.0);

   glColor3f(0.0, 1.0, 0.0);
   glVertex2f(0.0, 3.0);

   glColor3f(1.0, 0.0, 1.0);
   glVertex2f(4.0, 2.0);

   glColor3f(1.0, 1.0, 0.0);
   glVertex2f(-1.0, 1.0);
   glEnd();
}
```


Vertex arrays

- Instead of specifying the data in immediate mode (each vertex one at a time), you can specify them more quickly using vertex arrays
  - `glVertexArrayPointer()`
  - `glColorPointer()`
  - `glTexCoordPointer()`
- etc

Reading

- RedBook, Ch 1 & 2