

OpenGL Basics



What is OpenGL?

- OpenGL is a software specification. It acts as a layer between our program and graphics driver.
- OpenGL is implemented as a software interface that allows the programmer to create 2D and 3D graphics images.

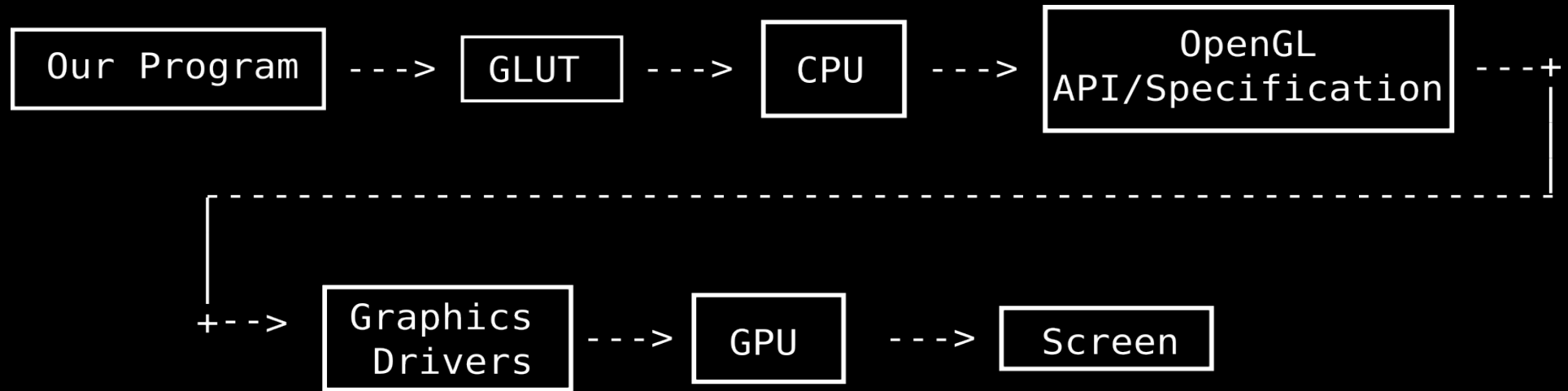
Why OpenGL?

- Device independence
- Platform independence
 - SGI Irix, Linux, Windows
- Abstractions (GL, GLU, GLUT)
- Open source
- Hardware-independent software interface
- Support of client-server protocol
- Other APIs
 - OpenInventor (object-oriented toolkit)
 - DirectX (Microsoft)
 - Java3D (Sun)

Modes of operation/design:

- Immediate mode: draw calls directly render to screen.
- Retained mode: draw calls fill a buffer(abstract data model) and OpenGL decide when to render.
- We'll be dealing with immediate mode.

Immediate mode pipeline:

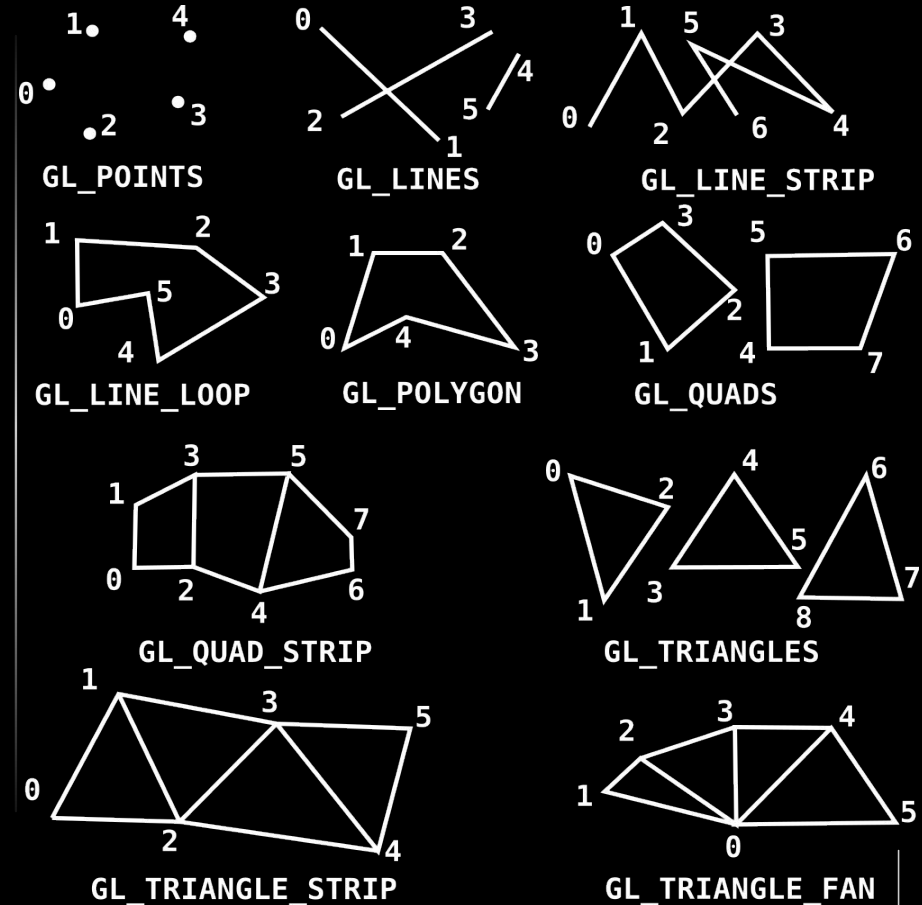


Primitives

- Supports several basic primitives such as points, lines, triangles, quadrilaterals and general polygons.
- Primitives are specified using a sequence of vertices.
- Syntax:
glBegin(<primitive type>;
 glVertex2f(x0,y0);
 glVertex2f(x1,y1);
 .
 .
glEnd();
- Where x0, y0, x1, y1 are variables of GLfloat type.

Primitive types:

- The numbers indicate the order in which the vertices have been specified.



Colors in OpenGL

- Colors are specified in RGB/RGBA mode. Values of [0..1] or [0..225] are acceptable depending on the function called.
- Function used: `glColor()`;
- Function format: `glColor[data type nemonic]()`;
- `glColor()` has different forms depending upon the color values you want to specify.
 - For eg.:
 - `glColor3f(0.0f, 1.0f, 0.0f);` // sets green color using GLfloat.
 - `glColor3ui(255,0,0);` // sets color to red using GLuint.
 - `glColor4f(1.0f, 0.0f, 0.0f, 1.0f);` // sets color to red using GLfloat and sets alpha value to max.
 - `glColor3fv(cv);` // sets color based on cv of type GLfloat *.

Coordinate system in OpenGL

The slide features a black background. A thin white horizontal line spans the width of the slide, positioned just below the title. At the right end of this line, there is a small white L-shaped corner marker. A second, shorter thin white horizontal line is located near the bottom of the slide, also with a small white L-shaped corner marker at its right end.

