
Introduction to Modern OpenGL

Based on OpenGL 4.5 / OpenGL ES 3.1, created on January 30, 2018

The logo for KDAB, featuring a stylized white lightning bolt icon to the left of the text 'KDAB' in white, all on a blue background.

KDAB

The Qt, OpenGL and C++ Experts

Core Concepts

- Introduction to Modern OpenGL with Qt
 - What is OpenGL?
 - Terminology
- OpenGL Windows and Contexts
- The (basic) OpenGL pipeline
- Introduction to shader programs
- Vertex Buffer Objects
- Basic drawing calls and primitives
- Making life easier with Vertex Array Objects
- Configurable shader programs
- Module Summary

Transformations

- Introduction to Transformations
- Basic Transformations
- Combining Transformations
- Coordinate Systems
- View and Projection Transformations
- Module Summary

Lighting

- Physics of Light
- Diffuse Lighting
- Phong Lighting
- Flat Shading
- Per-fragment Phong Lighting
- Improving the Phong Model
- Directional Lighting
- Multiple Lights
- Simple Toon/Cell Shading
- Spotlights
- Fog
- Module Summary

Texturing

- Texturing Basics
- Texturing Geometry
- Texture Sampling
- OpenGL Extensions
- Using Multiple Textures
- Specular Maps
- Baked Ambient Occlusion
- Normal Mapping
- Parallax Mapping
- Alpha Maps
- Module Summary

Image-Based Techniques

- Rendering to a Texture
- Reading back
- Post-Processing Effects

Reading List

- Recommended Books