Introduction to Computer Graphics with WebGL

Ed Angel

Getting Started

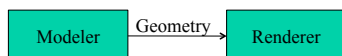Computer Graphics with WebGL © Ed Angel, 2014

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Getting Started

- Model graphics process
  - Synthetic Camera
  - Graphics System
- Graphics Software
  - OpenGL API
  - Shader-based OpenGL
  - WebGL
- Working in a browser
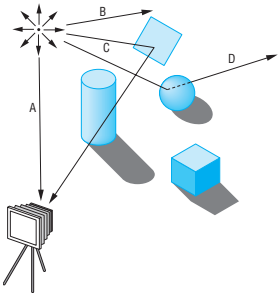 - HTML
  - JavaScript

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Modeling and Rendering

- The prime concern of computer graphics has been displaying geometry
- There are two primary parts
  - Building geometric models
  - Rendering (displaying the models)

Modeler → Geometry → Renderer

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Rendering

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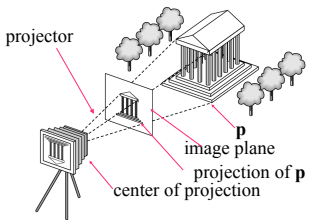# Building a Software Model

- Object oriented
  - shouldn't have to worry about details of output device
  - want to work in 3D
- Synthetic Camera Model
  - mimic image formation by optical devices
  - human visual system
  - camera

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Synthetic Camera Model

projector
p
image plane
projection of **p**
center of projection

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Software

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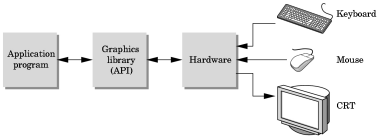
• Application must
  - describe geometry
  - describe camera

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Global vs Local Rendering

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• Ray Tracing
  - emulate the physics
  - can handle global effects such as shadows and reflections
  - need all objects available to render any object
  - not a real-time strategy yet
• Pipeline Model
  - render one object at a time
  - use tricks to get global effects
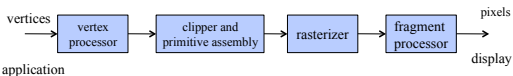 - leads to real-time rendering

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Pipeline Model

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• Application program (or a higher level package) produces geometry
• Geometry in the form of vertices
  • two vertices: line
  • three vertices: triangle
• Clipping: decide what can be seen
• Rasterizer: produces potential pixels (fragments)

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