3D Pipeline Overview

Geometry Data

- Vertices (x, y, z). Bytes/floats/doubles.
- Triangles = triples of vertices (points, lines, polygons). Indexing. Winding order.
- Color (RGB, RGBA).
- Textures.

Single (immediate mode), batched, serverside techniques. GPU memory, AGP.

Pipeline Stages

- Clipping (against view frustrum).
  - Triangle level (GPU).
  - Object level (CPU) using bounding volumes.
- Culling
  - Triangle level (GPU).
  - Object level (CPU) via object decomposition.
- Occlusion Testing
  - (z-buffer)
  - Hardware occlusion testing based on bounding volumes and z-buffer.
  - Specialized techniques (indoor, outdoor). Chapter 13 and 14.

Pipeline Stages, Cont.

- Level of detail
  - Discrete methods, alphablending
  - Continuous methods (complex, CPU intensitive).
- Transformations
  - Scaling
  - Rotation
  - Translation
- Lighting (Chapter 17).
  - Hardware, local (GPU)
  - Software, global, raytracing (CPU).
- Rasterization into 2D screen picture (GPU).