


**Lecture 5**

**Introduction to 3D Viewing,  
Projections, and Clipping**

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Readings:  
Chapters 4, 6, Foley *et al*  
Chapter 1, Sections 5.1-5.4, Angel  
Slide Set 4, VanDam

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**Lecture Outline**

- **3D Viewing (Continued)**
  - Specifying arbitrary 3D views
    - Projection
    - View volume for clipping projected scene
  - Applying planar-geometric-projection concepts
- **Projections (Continued)**
  - General concepts
    - View plane
    - View reference point (VRP), view-plane normal (VPN), view up vector (VUP)
  - Specifying "eye"
    - Projection reference point (PRP), projection type
    - Center of projection (COP), direction of projection (DOP)
    - Viewing-reference coordinate (VRC) system
- **Implementing Projections**
- **Next Lecture: Projections and Clipping Concluded, Intro to OpenGL**

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**Terminology**

- **Projections**
  - General concepts
    - View plane
    - View reference point (VRP)
    - View-plane normal (VPN)
    - View up vector (VUP)
    - World coordinates: (x, y, z) system
    - Viewing reference coordinate (VRC) system: (u, v, n)
  - Specifying "eye"
    - Projection reference point (PRP)
    - Projection type
    - Center of projection (COP), direction of projection (DOP)
    - Viewing-reference coordinate (VRC) system
- **Implementing Projections and Clipping**
  - Truncated view volume (cuboid or frustum)
  - Front, back clipping planes

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**Summary Points**

- **3D Viewing (Continued)**
  - Specifying arbitrary 3D views (Section 6.2, FVD)
    - Projection
    - View volume for clipping projected scene
  - Applying planar-geometric-projection concepts (Sections 6.1, 6.4-6.5)
    - Examples (Section 6.3)
- **Projections (Continued)**
  - General concepts: VRP, VPN, VUP (Section 6.2)
  - Specifying "eye": PRP, projection type ⇒ COP, DOP
    - Viewing-reference coordinate (VRC) system
    - Result: truncated view volume
- **Implementing Projections**
  - Pipeline (Figure 6.46, Section 6.5)
  - Case studies (Section 6.3)
- **Next Lecture: Projections and Clipping Concluded, Intro to OpenGL**

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