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

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

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

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