CSC418 Computer Graphics

- Back Faces
- Visibility Algorithms
Visibility Problem

- What is NOT visible?
Visibility Problem

- What is NOT visible?

  primitives outside of the field of view
  back-facing primitives
  primitives occluded by other objects closer to the camera
Backface culling
Backface culling
Backface culling
Backface culling

- N.V > 0 is a back face?
Backface culling

- \( \mathbf{N} \cdot (\mathbf{P} - \mathbf{E}) > 0 \)
Backface culling

Where in the graphics pipeline can we do backface culling?
Occluded faces

Does backface culling always determine visibility completely for a single object?
Occluded faces

- In typical scenes some polygons will overlap, we must determine which portion of each polygon is visible to eye!
Painters Algorithm

- Sort primitives in Z.
- Draw primitives back to front (CBA).
Painters Algorithm

- Problems
  - Large faces
  - Intersecting faces
  - Cycles
Visibility Problem

- **Image space algorithms**
  - Operate in display terms pixels, scanlines
  - Visibility resolved to display resolution
  - Examples: Z-buffer, ray-tracing
  - $O(n \times \text{resolution})$

- **Object Space algorithms**
  - Analytically compute visible fragments
  - Examples: painters algorithm, BSP
  - $O(n^2)$
Next Lecture
- BSP trees
- Depth sorting
- Z-buffer A-buffer