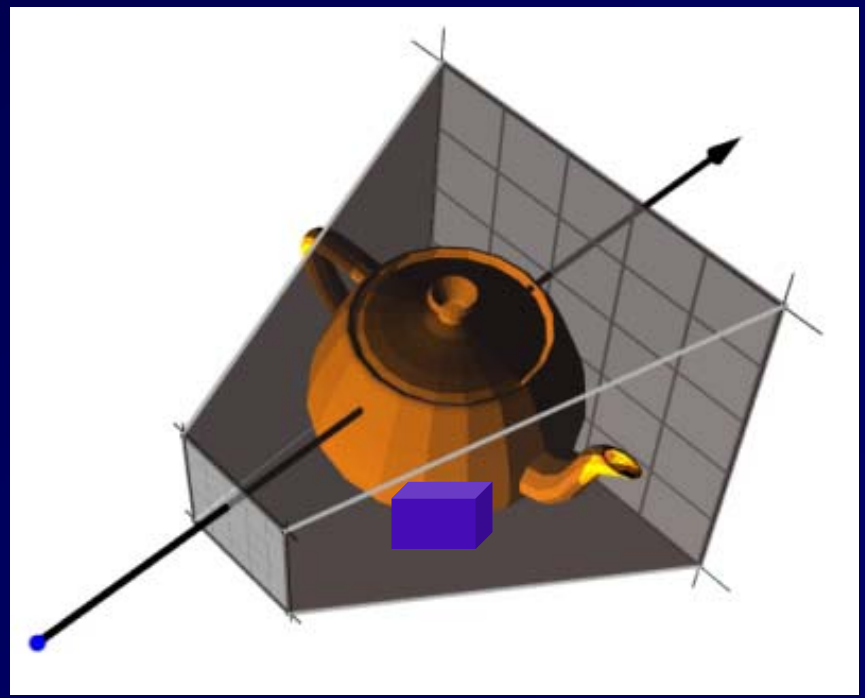
CSC418 Computer Graphics

- Back Faces
- Visibility Algorithms

Visibility Problem

- What is NOT visible?



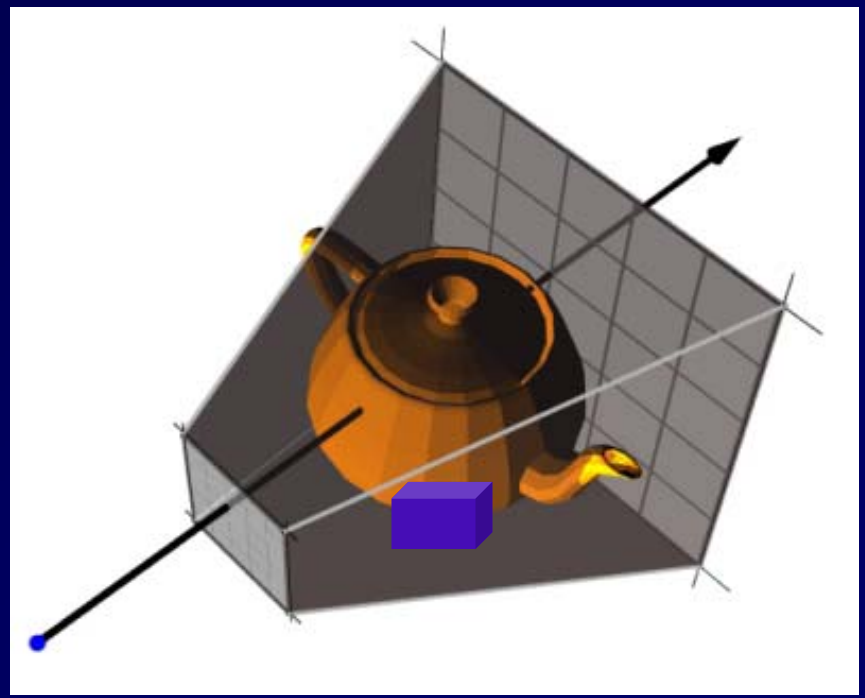
Visibility Problem

- What is NOT visible?

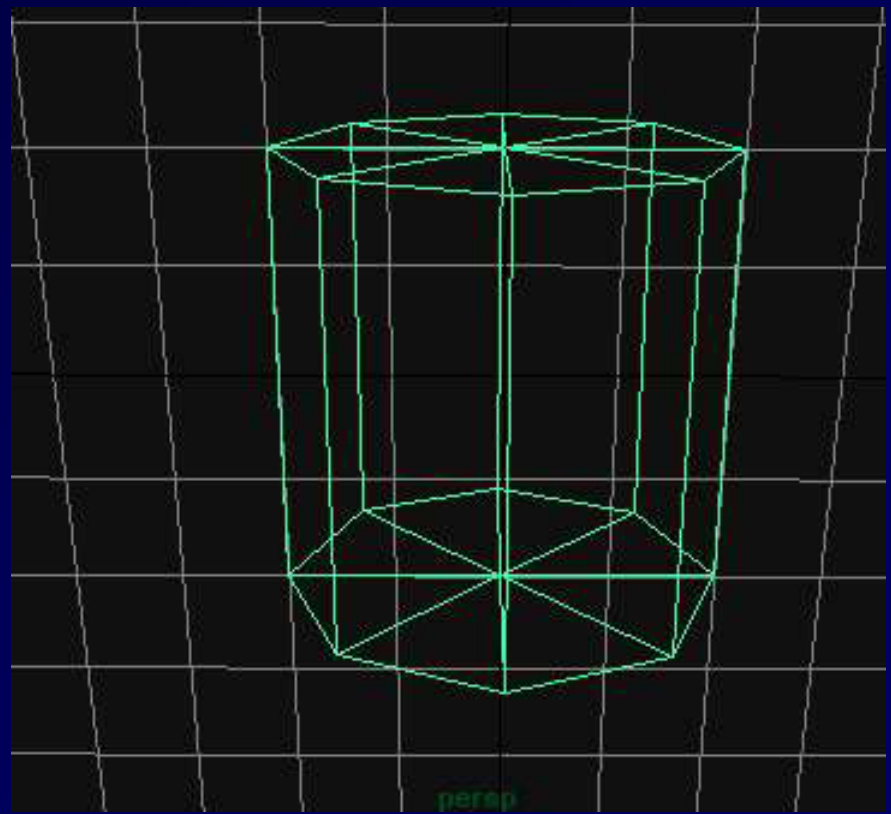
primitives outside of the field of view

back-facing primitives

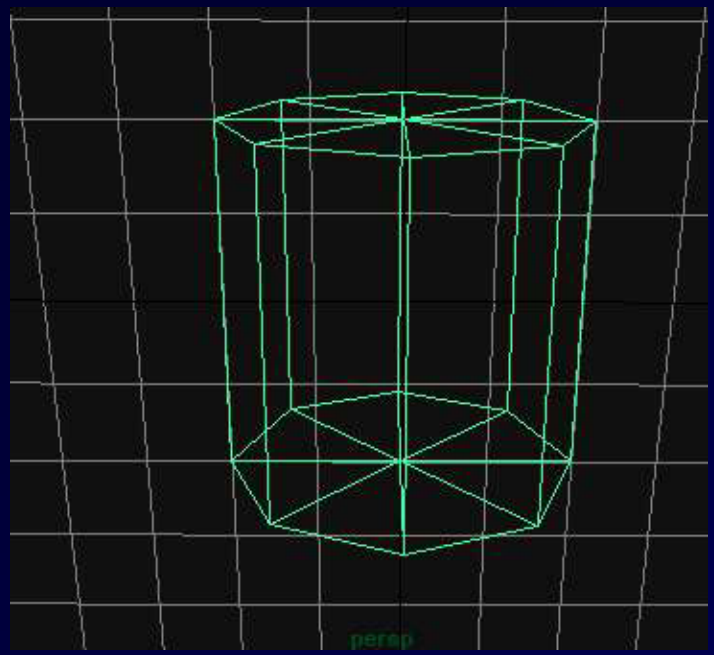
primitives occluded by other objects closer to the camera

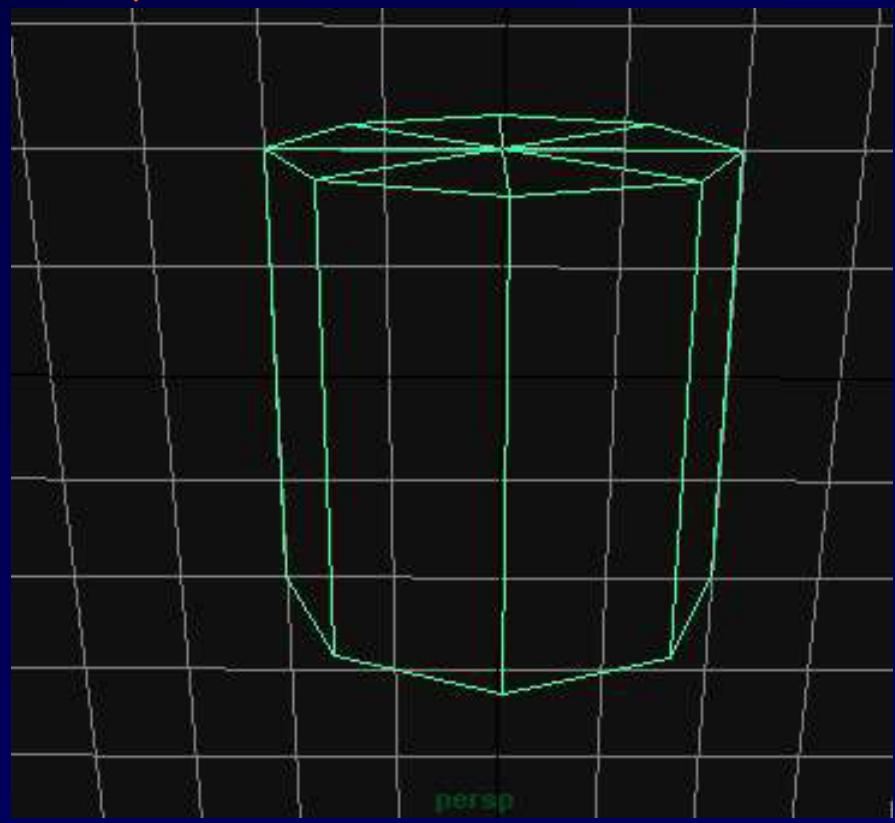


Backface culling

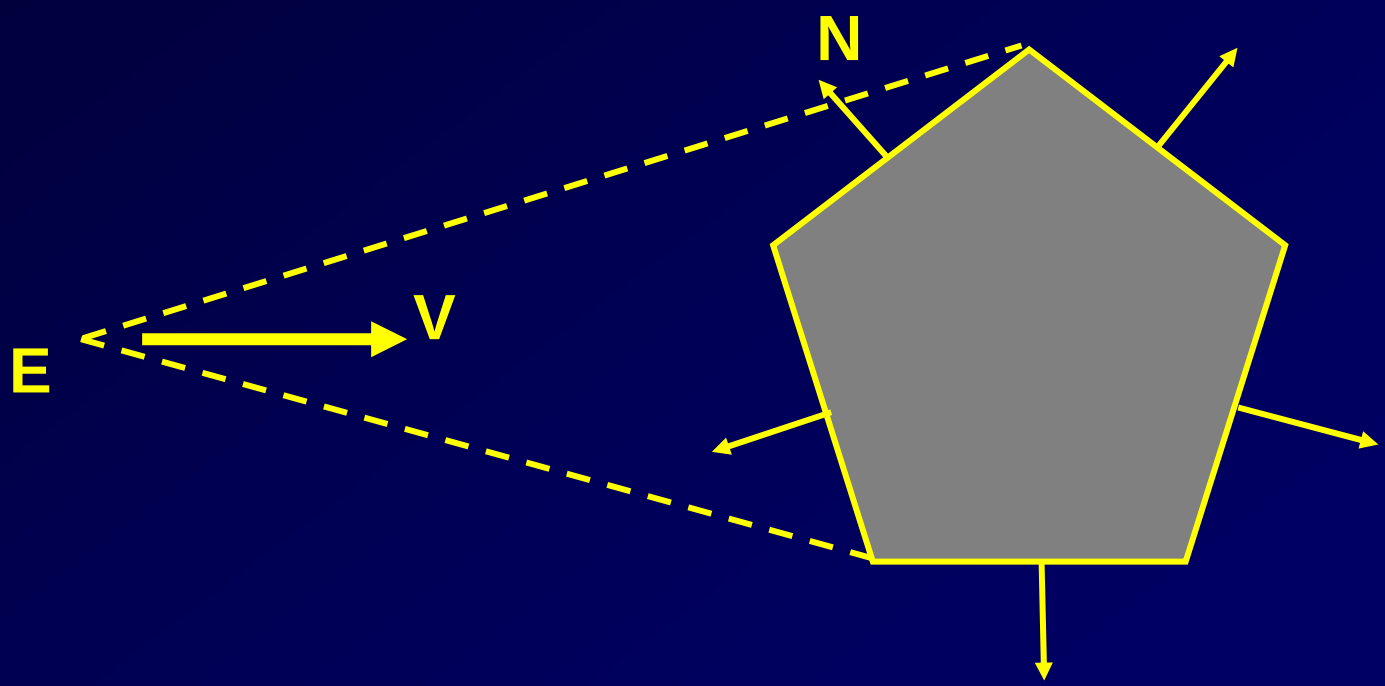


Backface culling



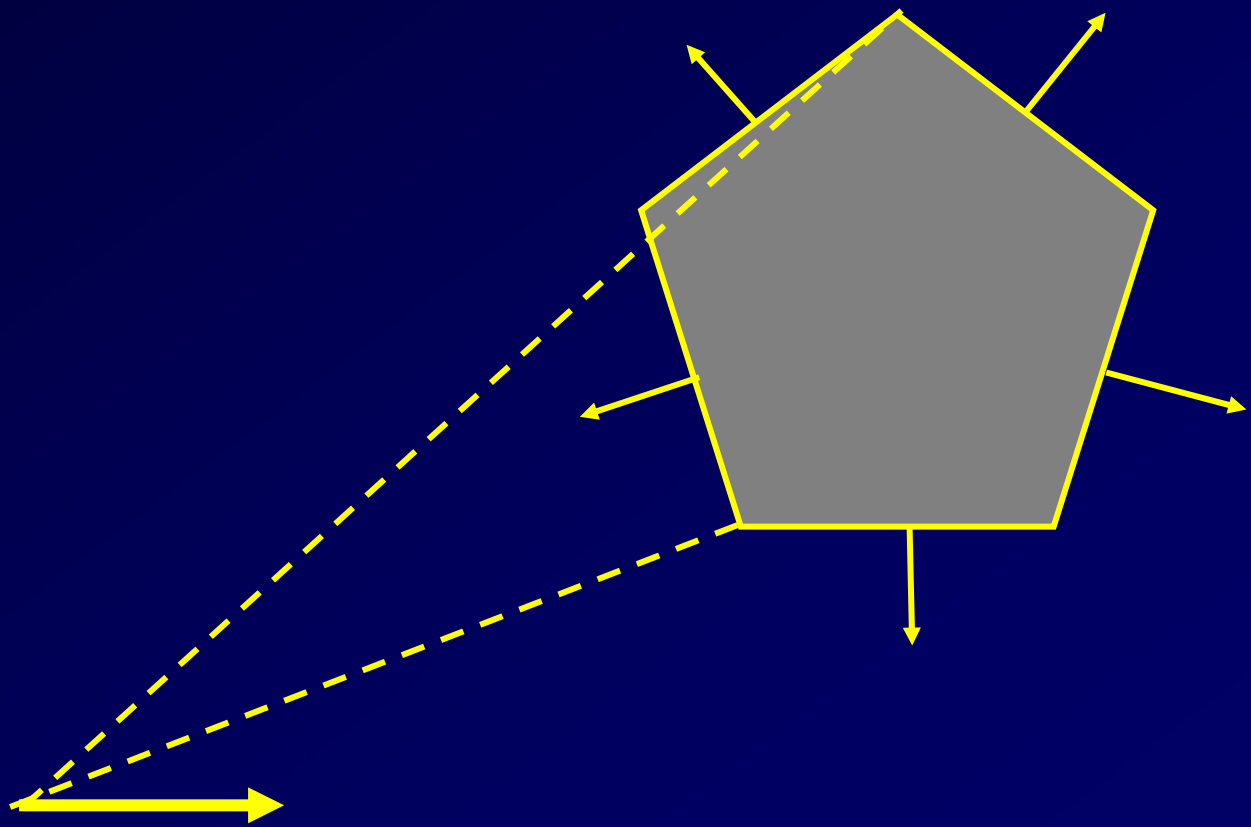


Backface culling



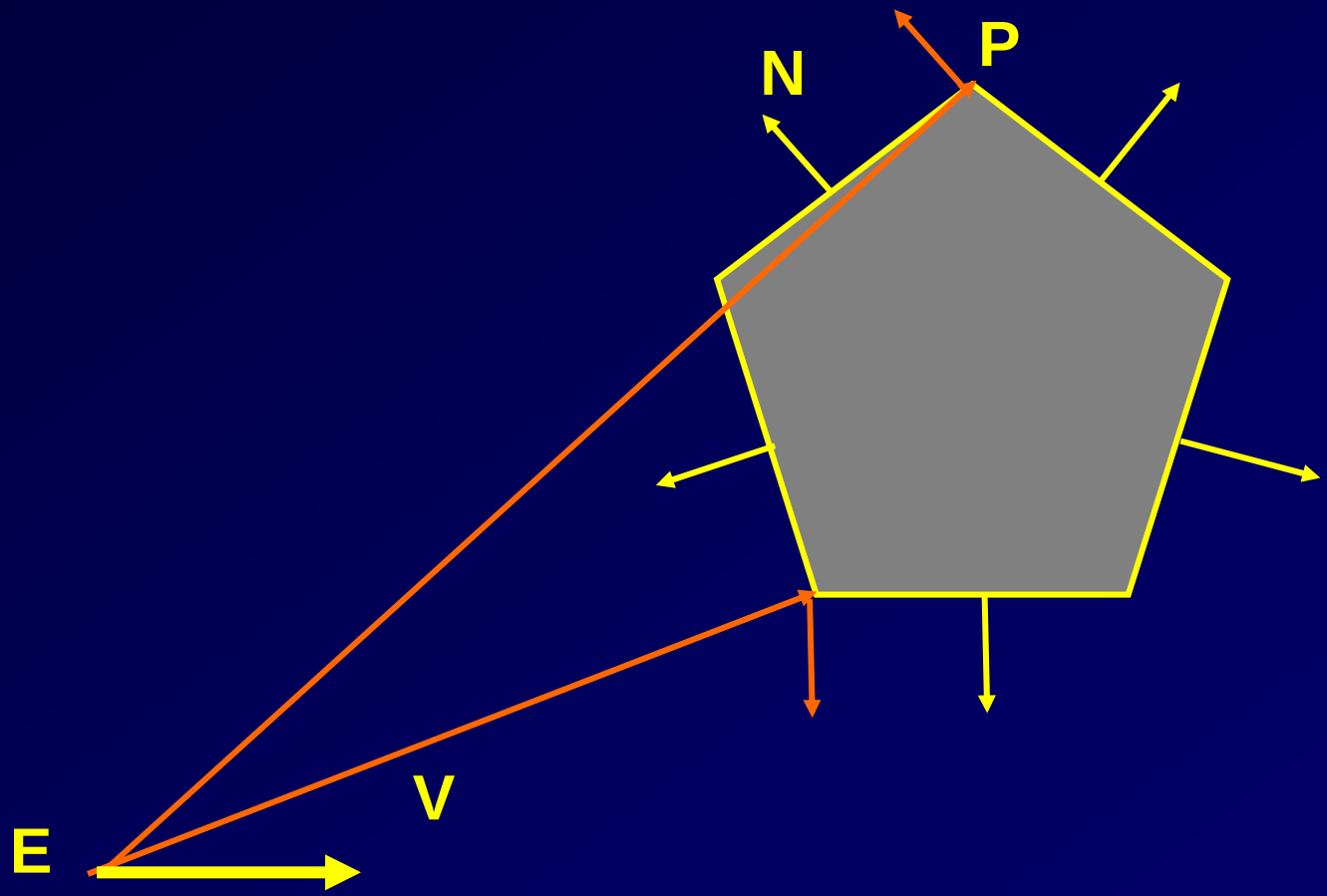
Backface culling

- N.V > 0 is a back face?



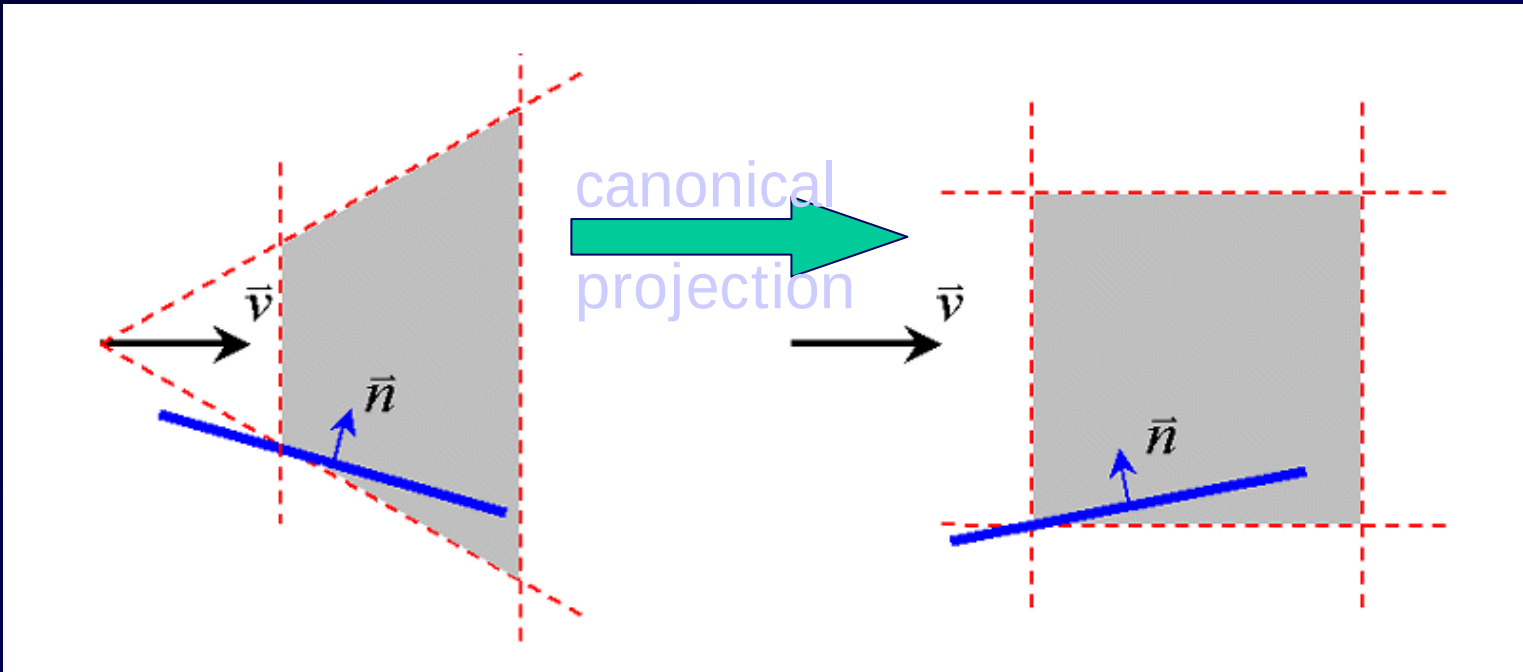
Backface culling

- N.(P-E) >0



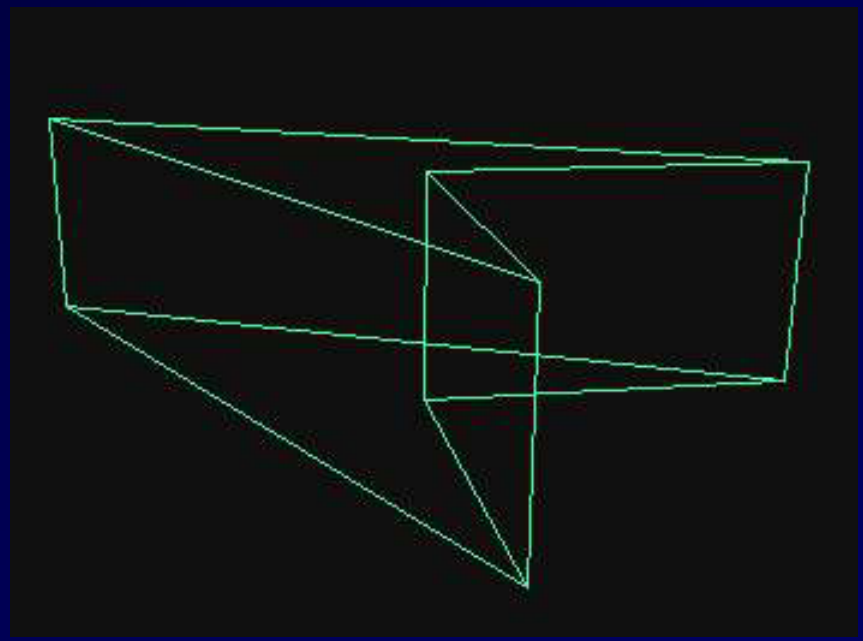
Backface culling

Where in the graphics pipeline can we do backface culling?



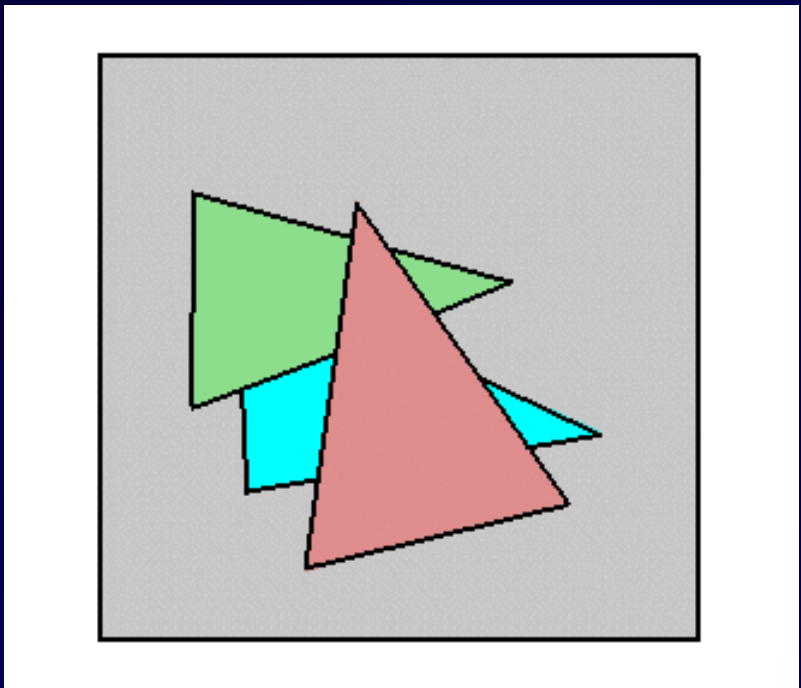
Occluded faces

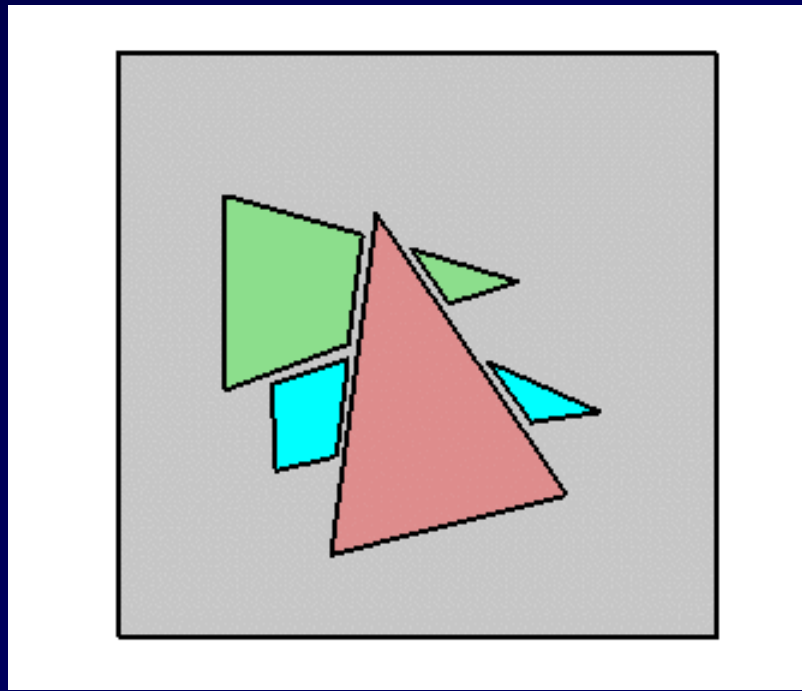
Does backface culling always determine visibility completely for a single object?



Occluded faces

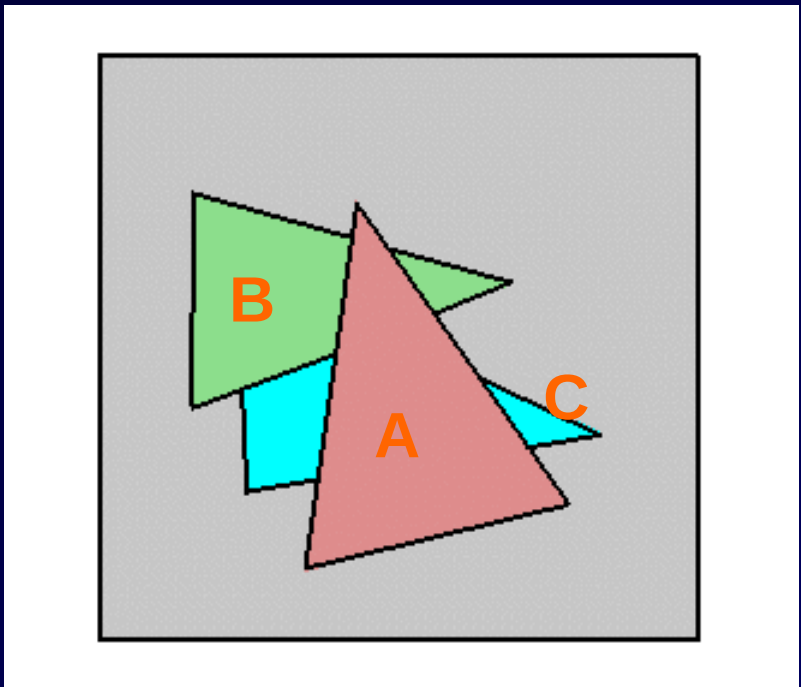
- **In typical scenes** some polygons will overlap, we must determine which portion of each polygon is visible to eye!

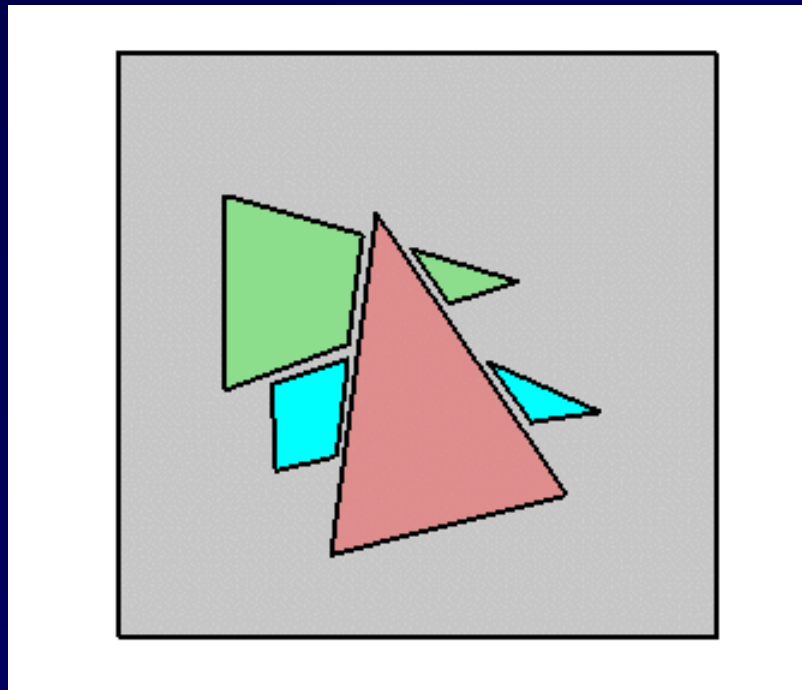




Painters Algorithm

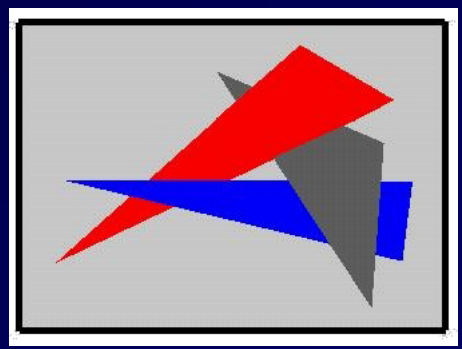
- Sort primitives in Z.
- Draw primitives back to front (CBA).

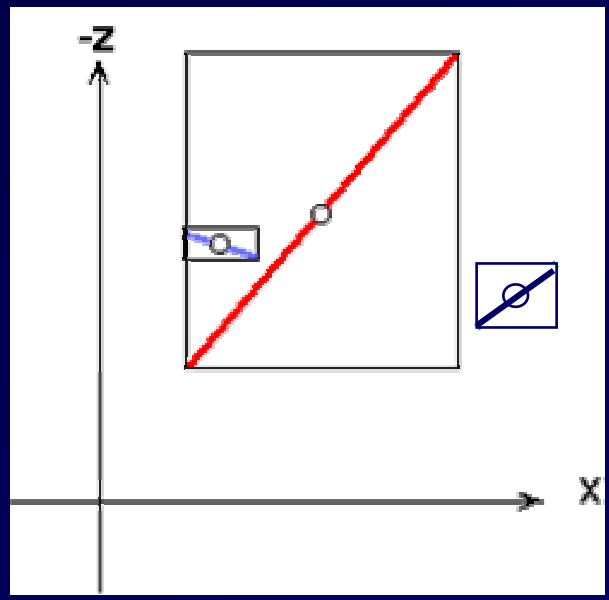


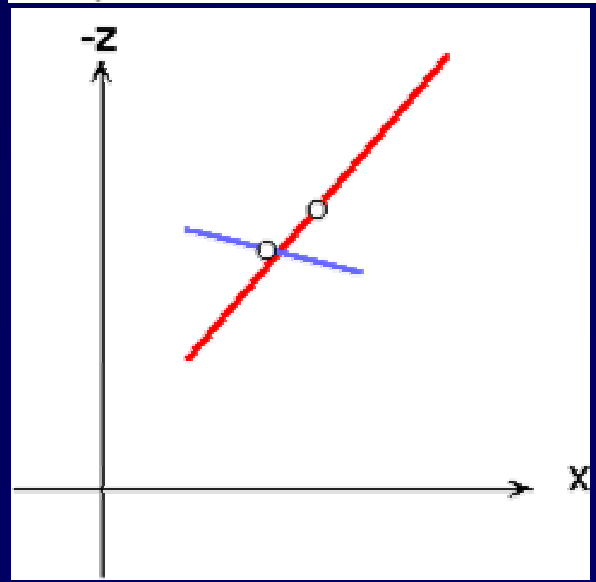


Painters Algorithm

- Problems
  - Large faces
  - Intersecting faces
  - Cycles



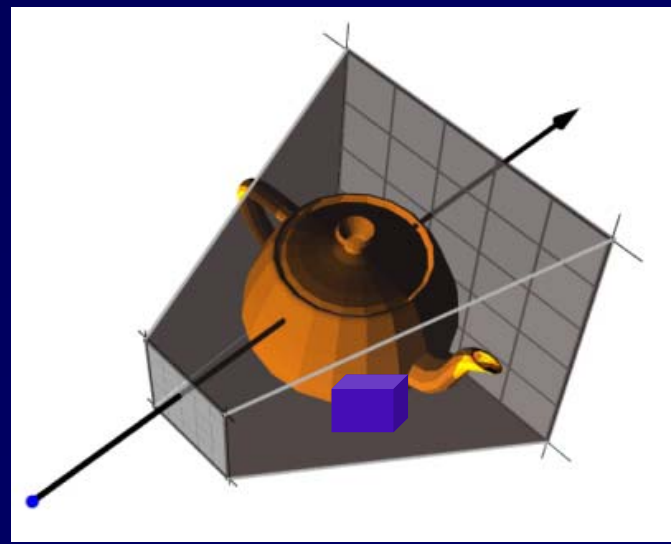




Visibility Problem

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

- **Object Space algorithms**
  - Analytically compute visible fragments
  - Examples: painters algorithm, BSP
  - $O(n^2)$



CSC418 Computer Graphics

- **Next Lecture**
  - **BSP trees**
  - **Depth sorting**
  - **Z-buffer A-buffer**