

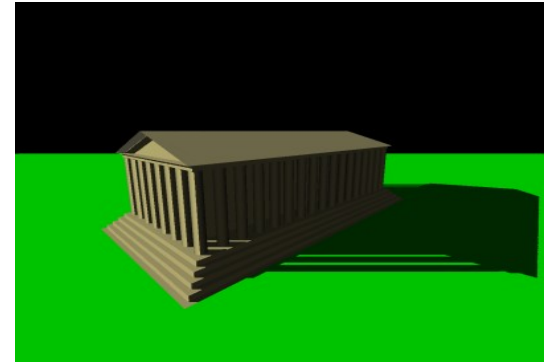
**Shadow  
Mapping  
CSCI 4229/5229  
Computer Graphics  
Summer 2026**

# Shader based shadows

- Shadow volume requires major code refactoring to implement shadows
  - Requires hardware stencil buffer
- Shadow Mapping
  - Requires no code refactoring
  - Implemented using per pixel lighting shader
  - Depth texture tied generated with framebuffer
    - Provides second Z-buffer
  - Use in *Toy Story* and many games

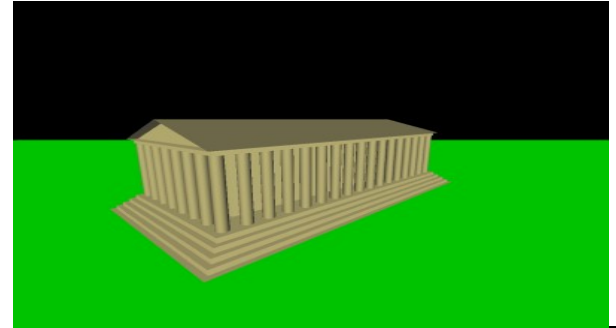
# Shadow Mapping

- Project with light as viewpoint
- Depth buffer from light
- Light/shadow determined just like visibility
  - Objects in light foremost in depth buffer
  - Objects in shadow depth obscured
- Requires second depth buffer
  - Write depth to texture
  - Compare R to texture
- Used in *Toy Story* etc.

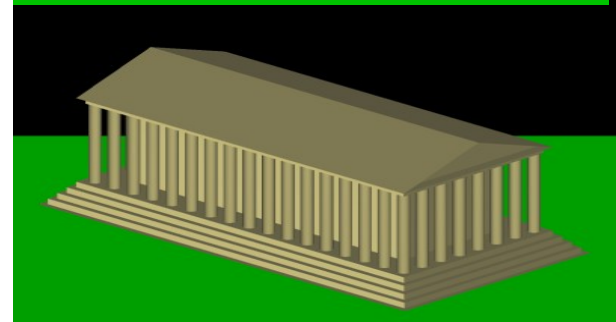


# Shadow Map Example

No Shadows



Light View



Light View Depth

