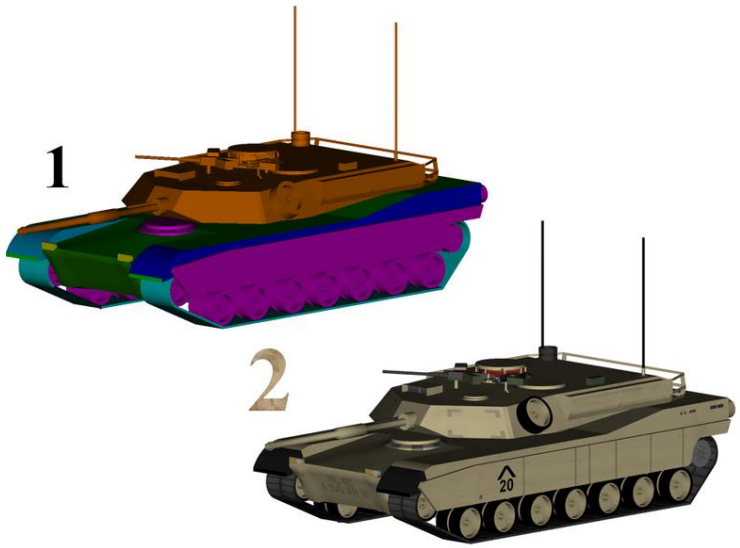
Texture Mapping

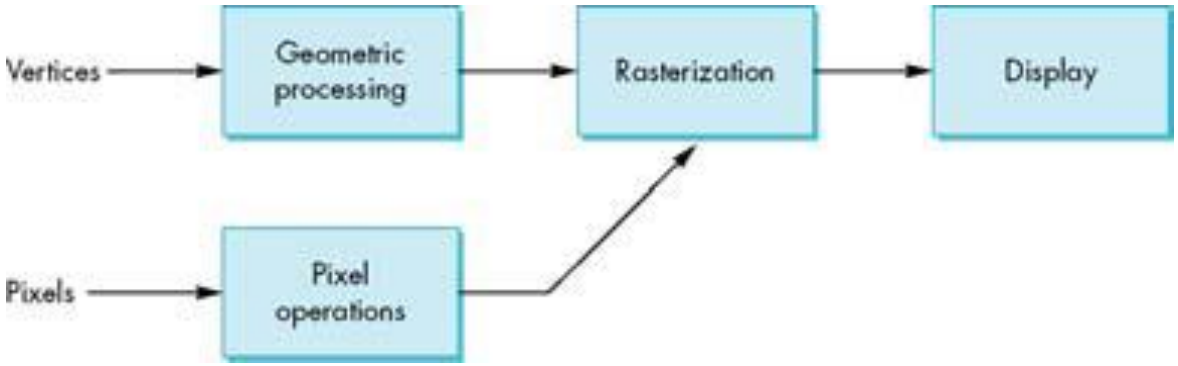
- A **texture map** is applied (mapped) to the surface of a shape or polygon. This process is akin to applying patterned paper to a plain white box.



1 = 3D model without textures
2 = 3D model with textures

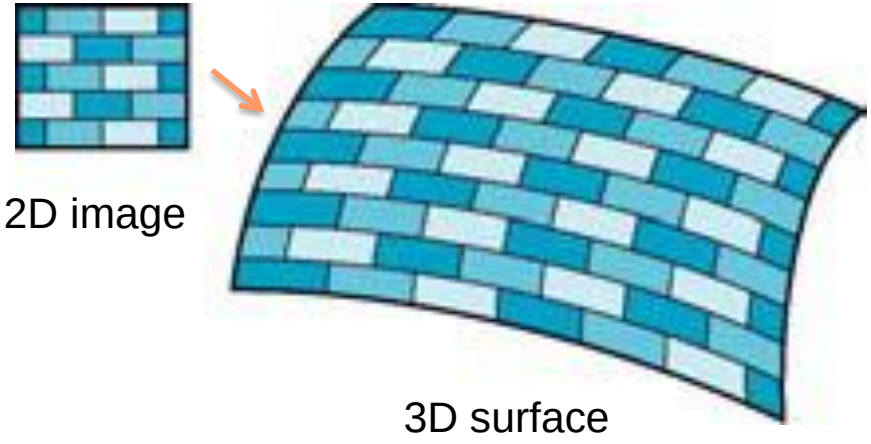
Texture Mapping

- Where does mapping take place?
  - Mapping techniques are implemented at the end of the rendering pipeline
  - Very efficient because few polygons pass down the geometric pipeline



Texture Mapping

- Is it simple?
  - Although the idea is simple---map an image to a surface---there are 3 or 4 coordinate systems involved

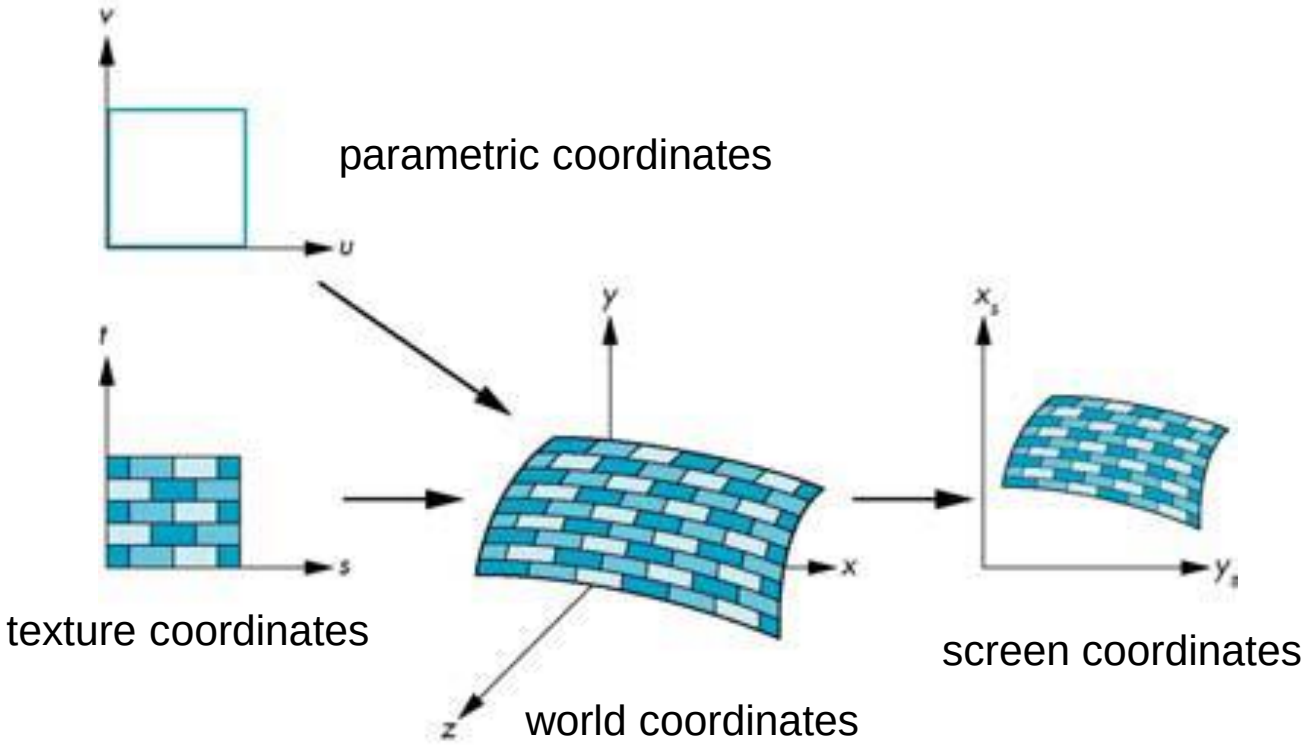


Texture Mapping

- Coordinate Systems
  - Parametric coordinates
    - May be used to model curved surfaces
  - Texture coordinates
    - Used to identify points in the image to be mapped
  - World Coordinates
    - Conceptually, where the mapping takes place
  - Screen Coordinates
    - Where the final image is really produced

Texture Mapping

- Texture Mapping



Texture Mapping

- Mapping Functions
  - Basic problem is how to find the maps
  - Consider mapping from texture coordinates to a point a surface
  - Appear to need three functions
    - x = x(s,t)
    - y = y(s,t)
    - z = z(s,t)
  - But we really want to go the other way