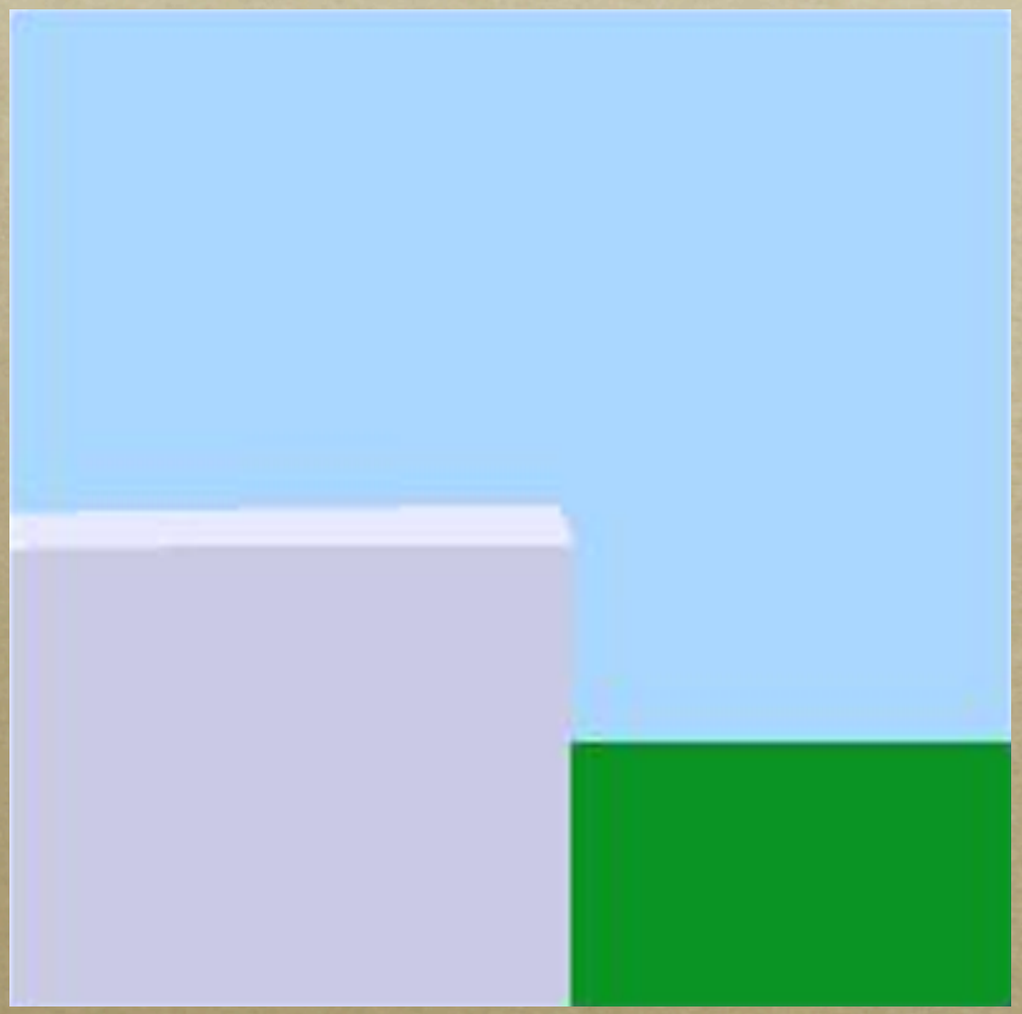
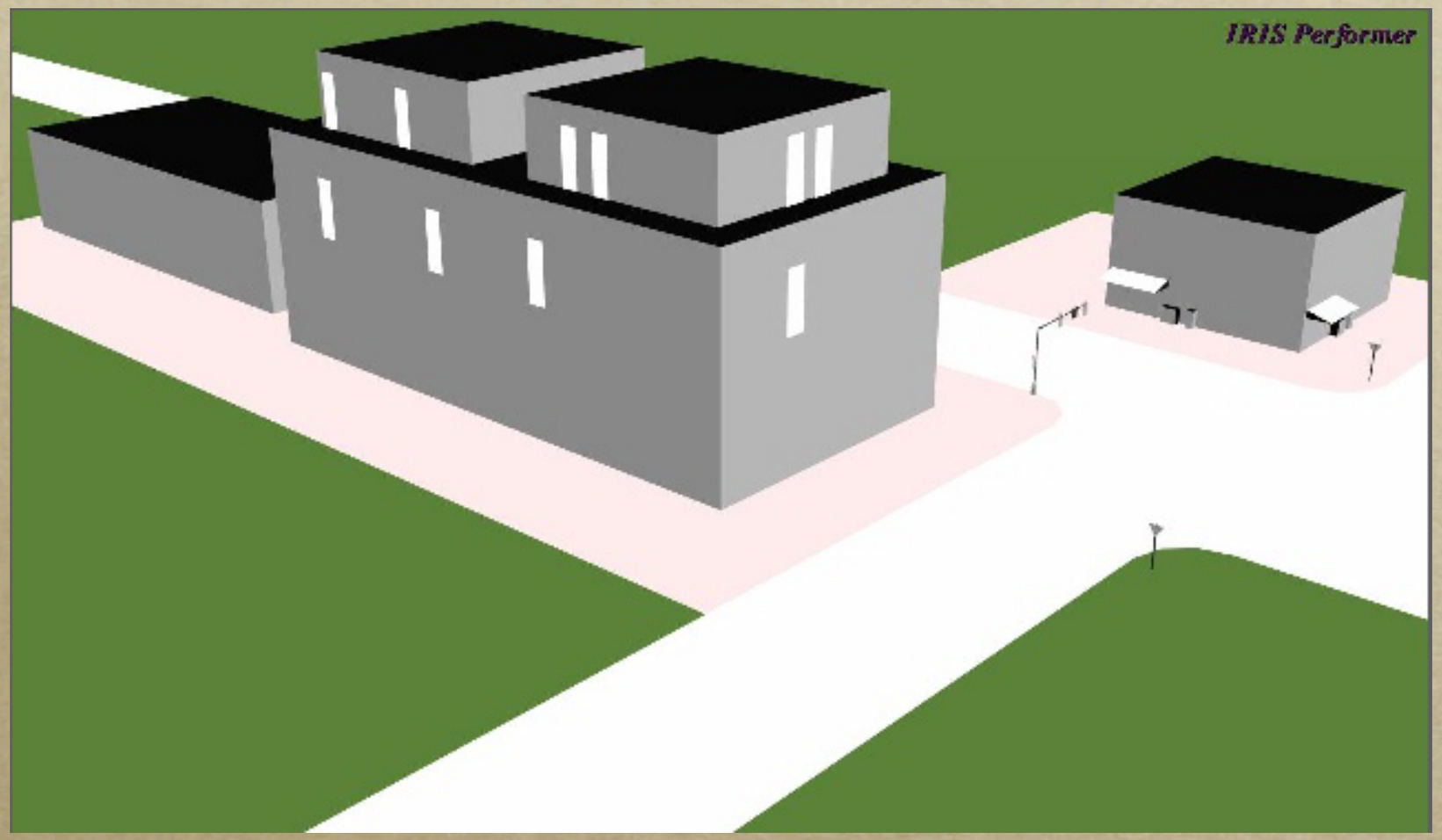
Texture Mapping



Why texture?

- *Detail is expensive to model*
- *Often the surface of an object is viewed only from a distance*
- *We can 'paint' the detail on the object instead of increasing the complexity of the object*


IRIS Performer

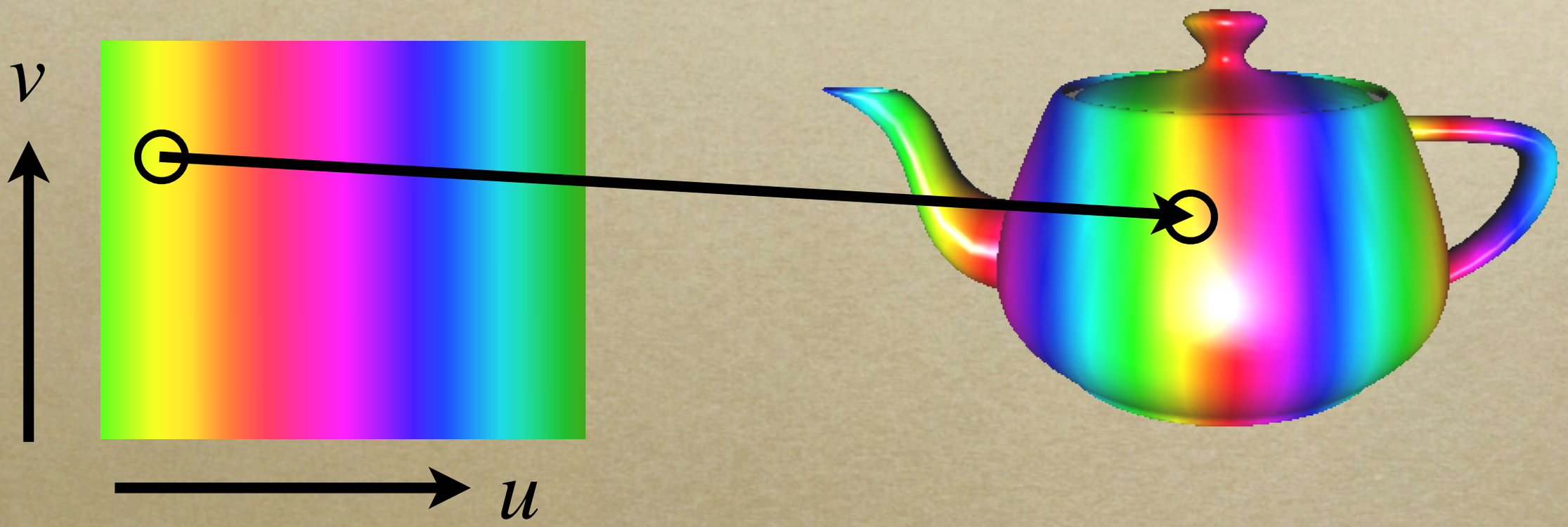

IRIS Performer

How is it done?

- *As we draw each pixel of a surface, we get the local colour from the texture image.*
- *So we need a coordinate system on the surface to find the right part of the texture.*

Just use x, y?

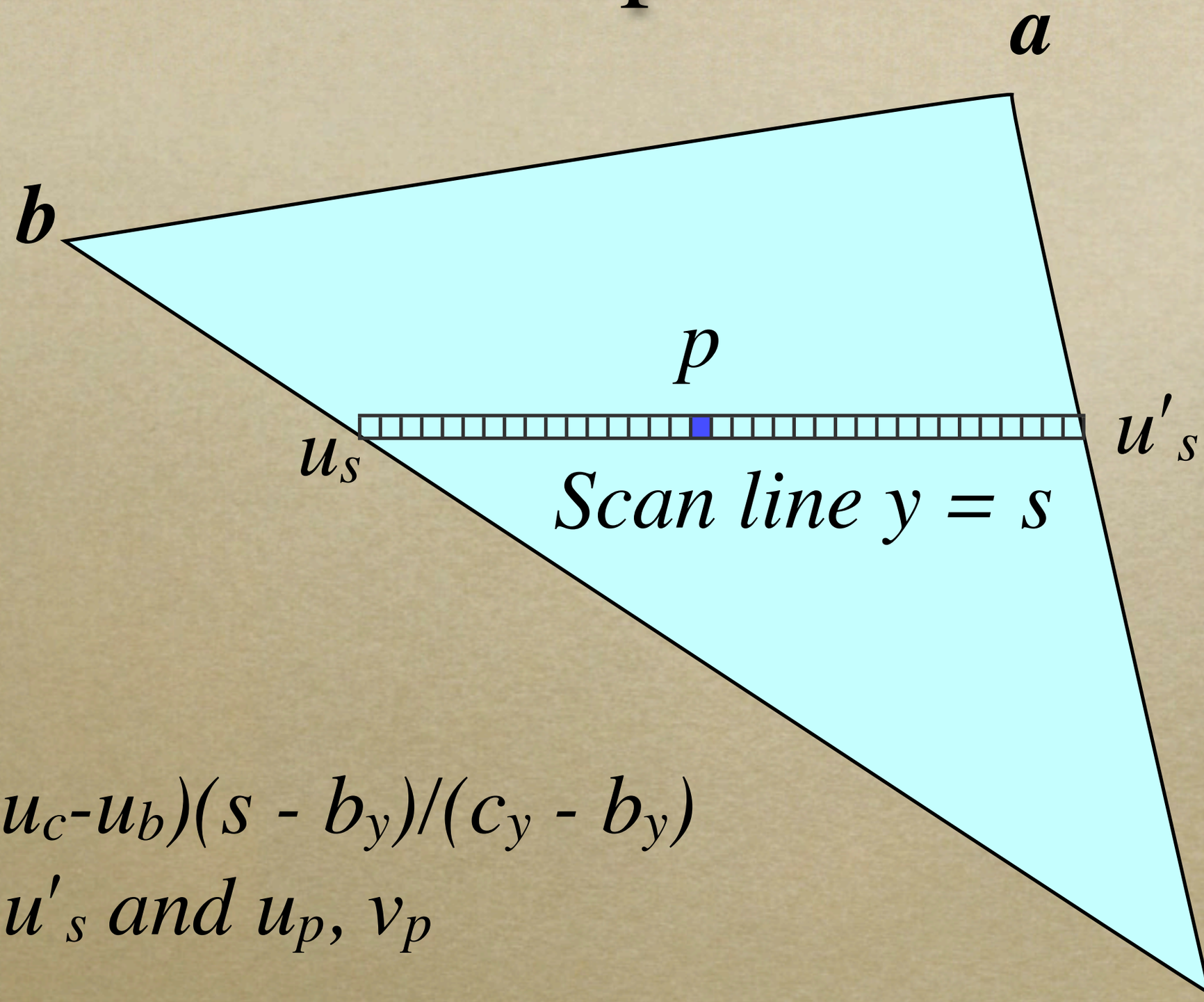
u, v Mapping



Remember shading and normals?

- *Each vertex carries shading and/or normal vector values for interpolation.*
- *Give each vertex u, v values too.*
- *The interpolation can be done by software or hardware.*

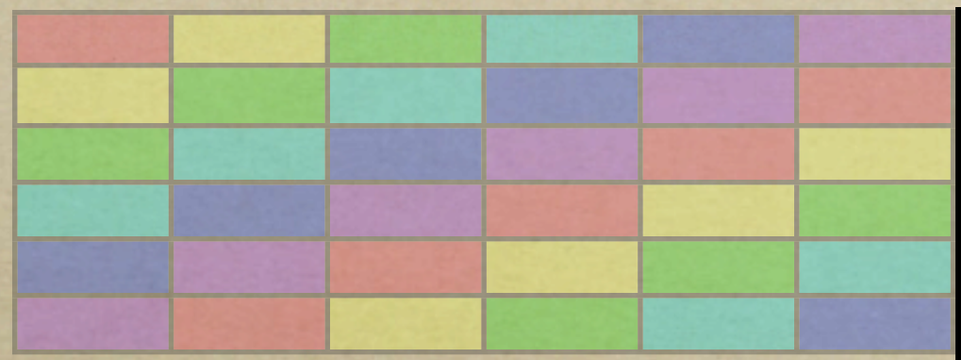
Scan-line interpolation

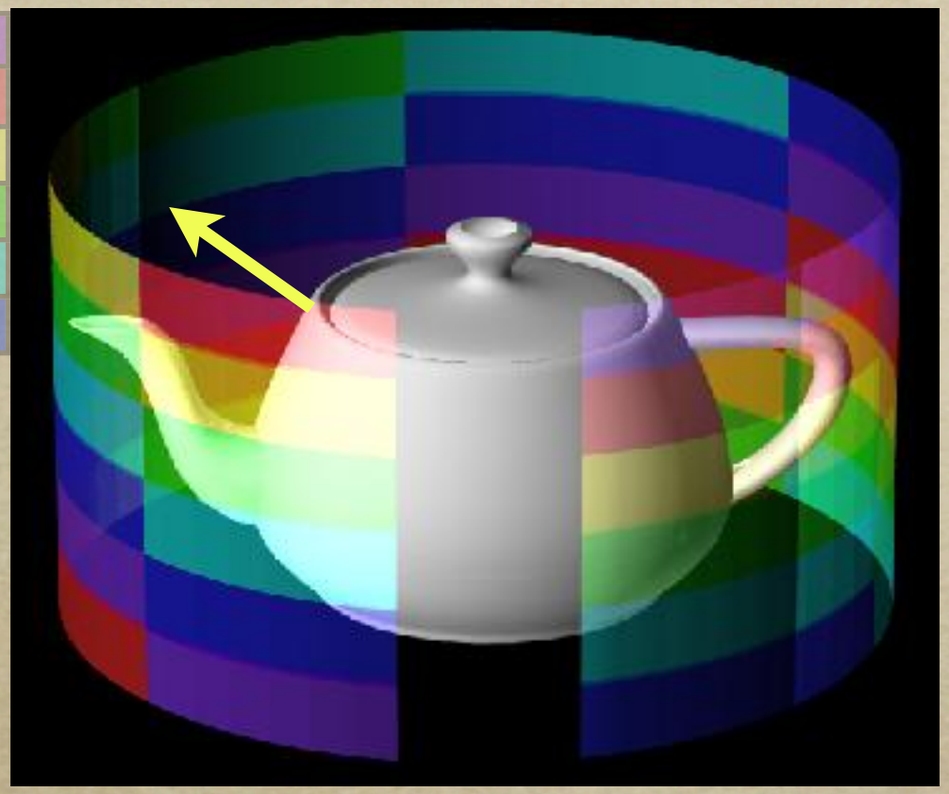


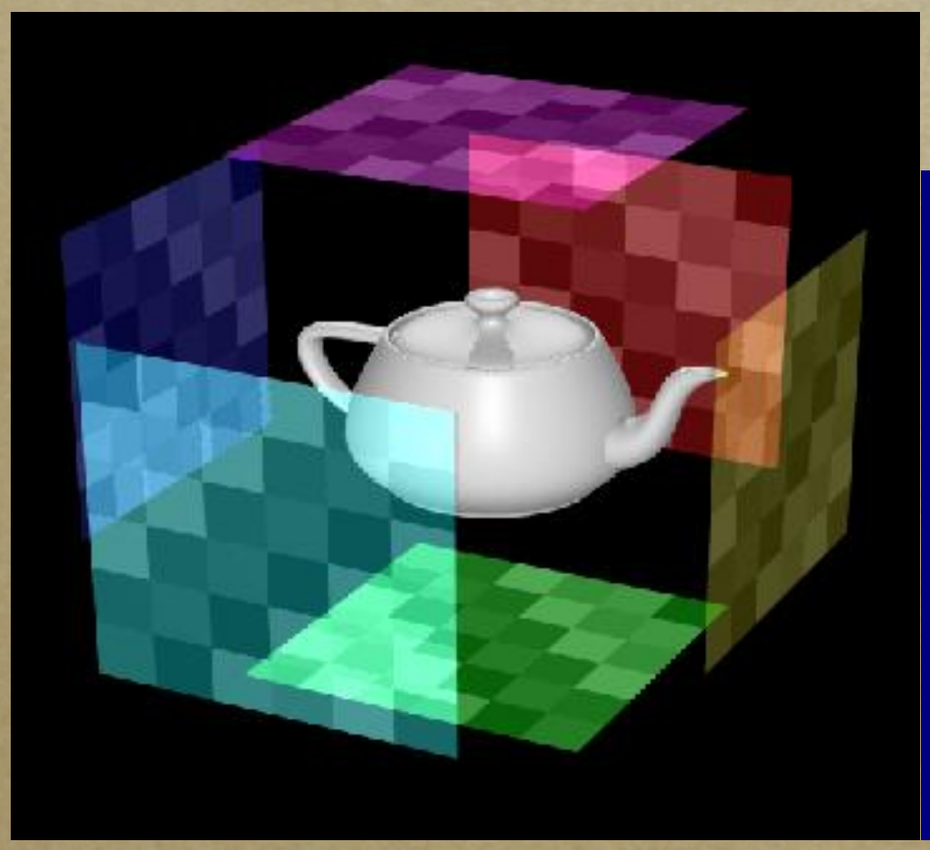
$u_s = u_b+(u_c-u_b)(s - b_y)/(c_y - b_y)$

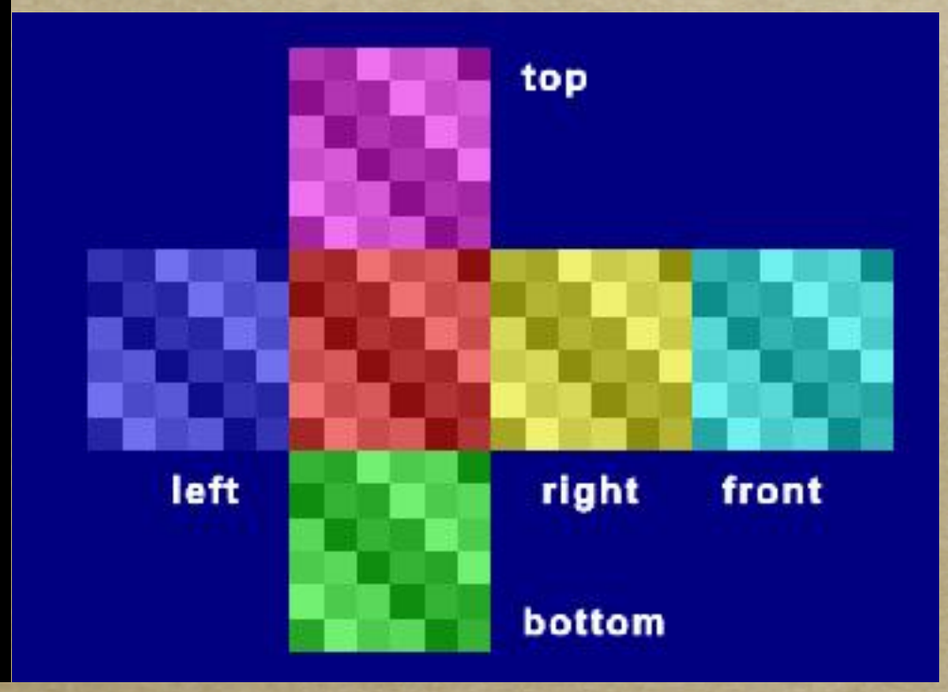
similarly u'_s *and* u_p, v_p

Ways to get u, v

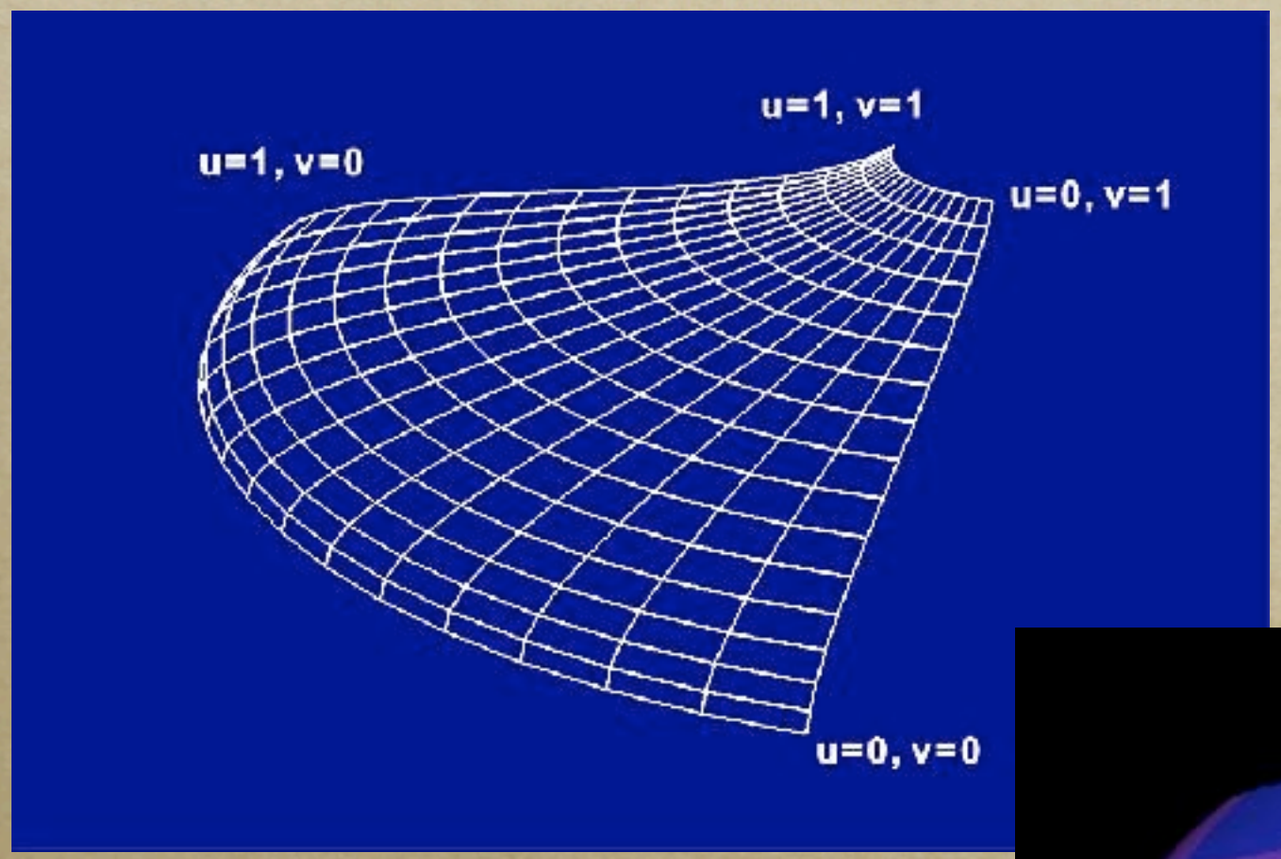


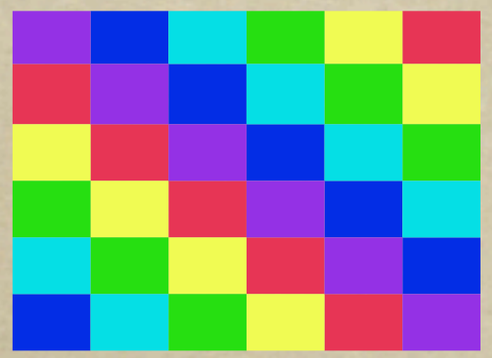


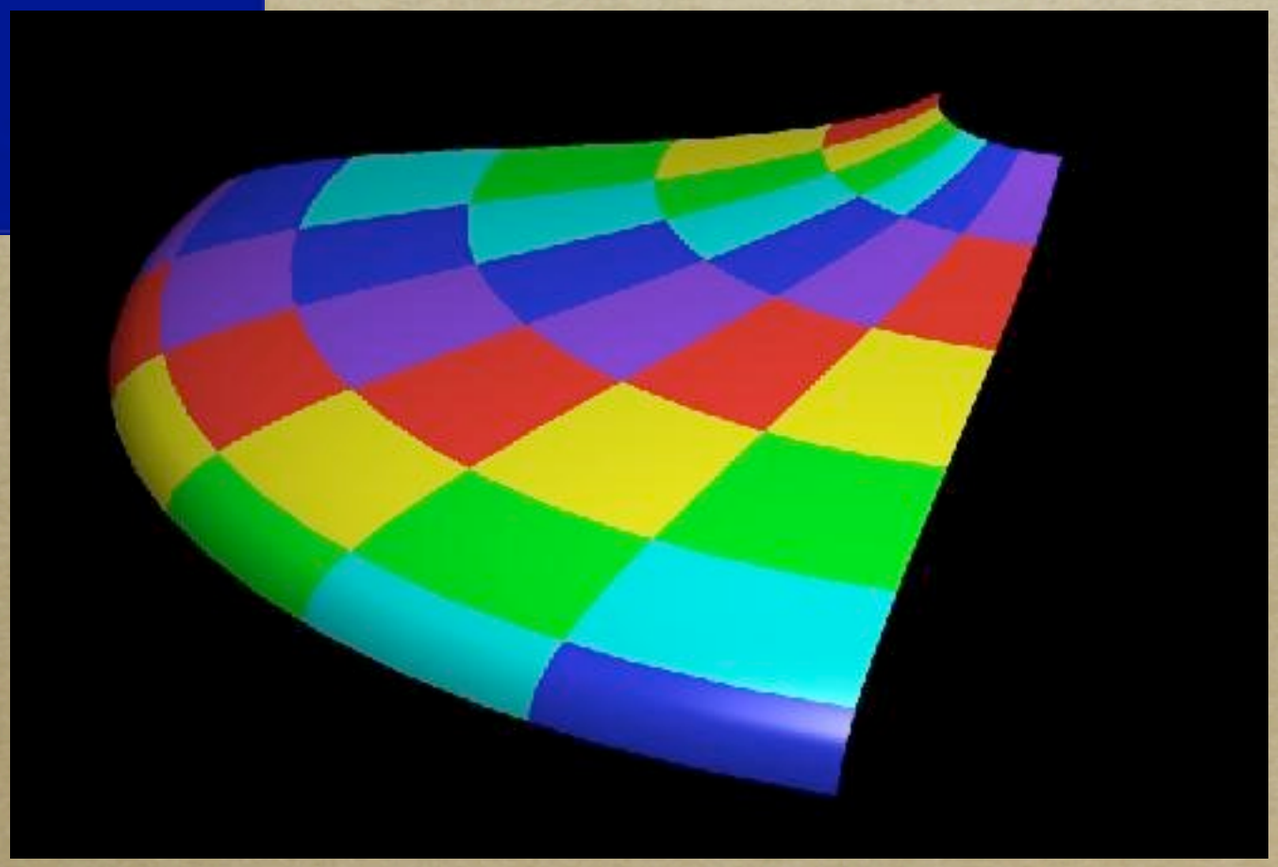




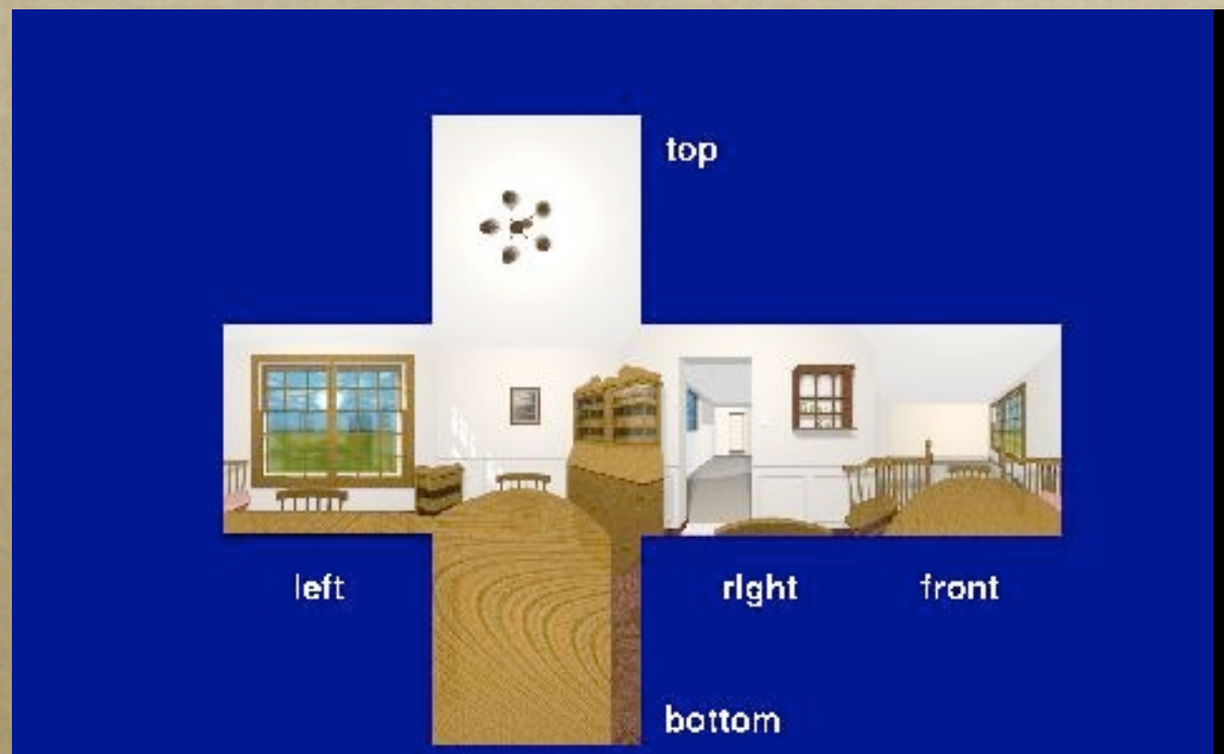
Parametric surfaces





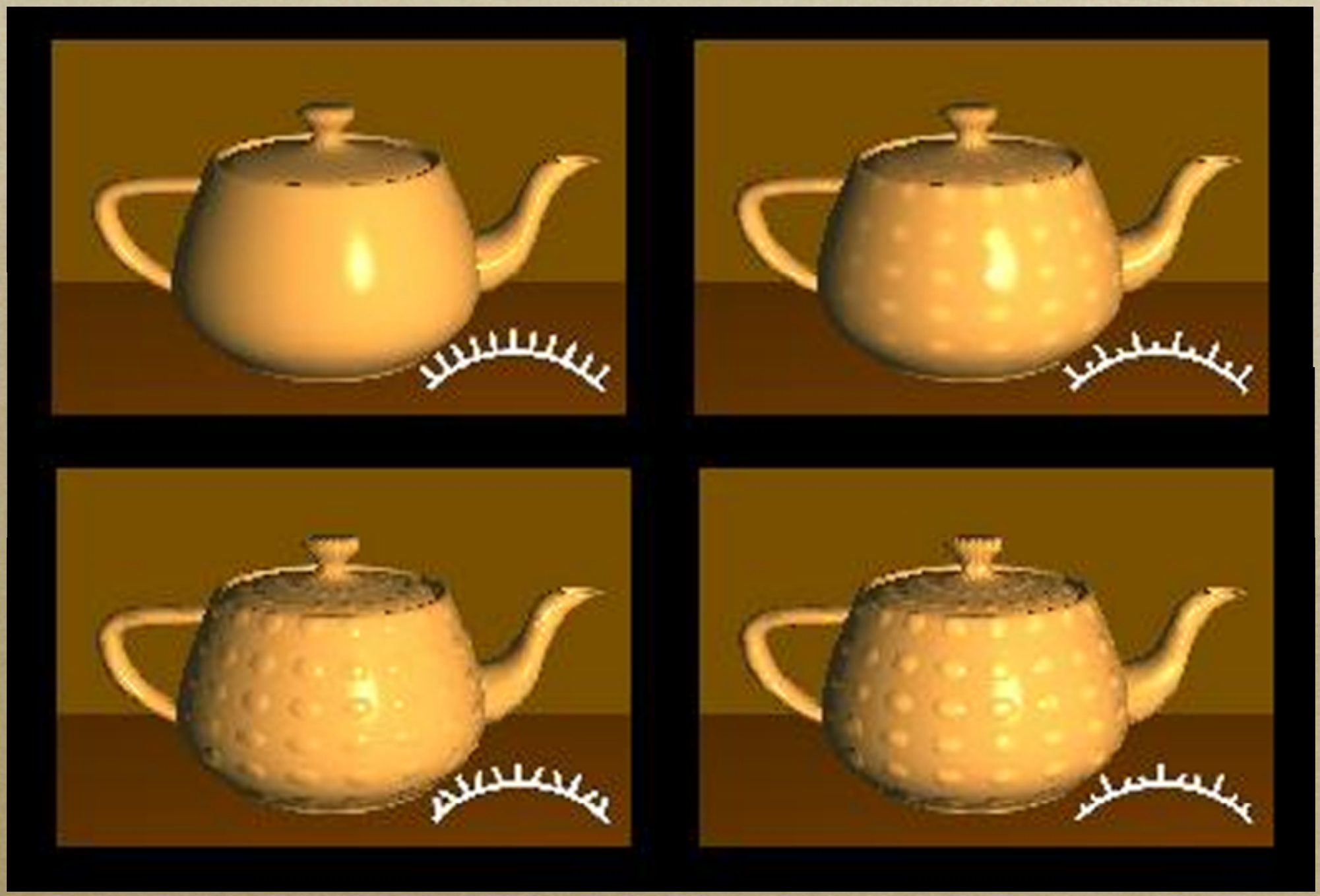


Different uses of texture

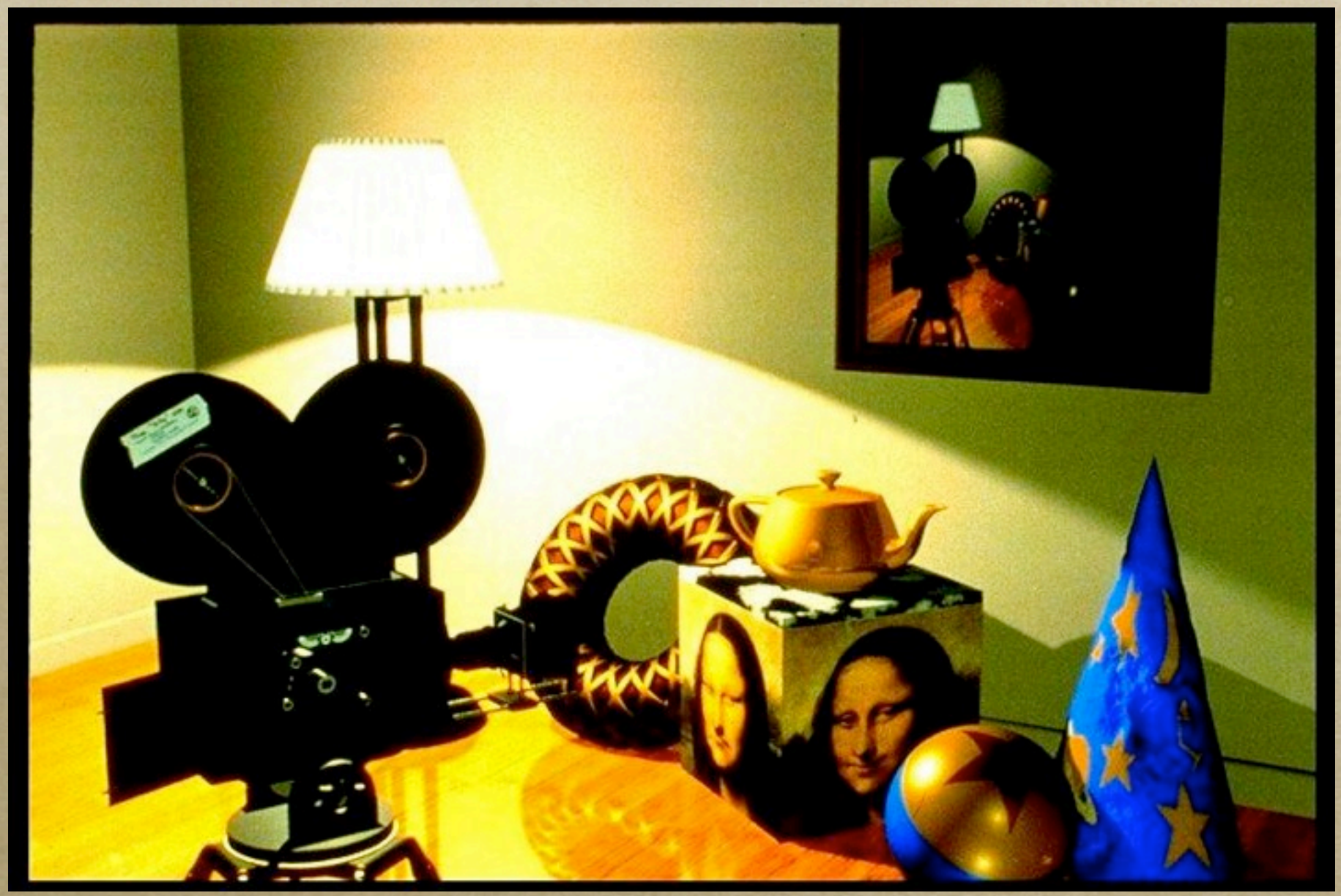


Ray traced?

Bump mapping



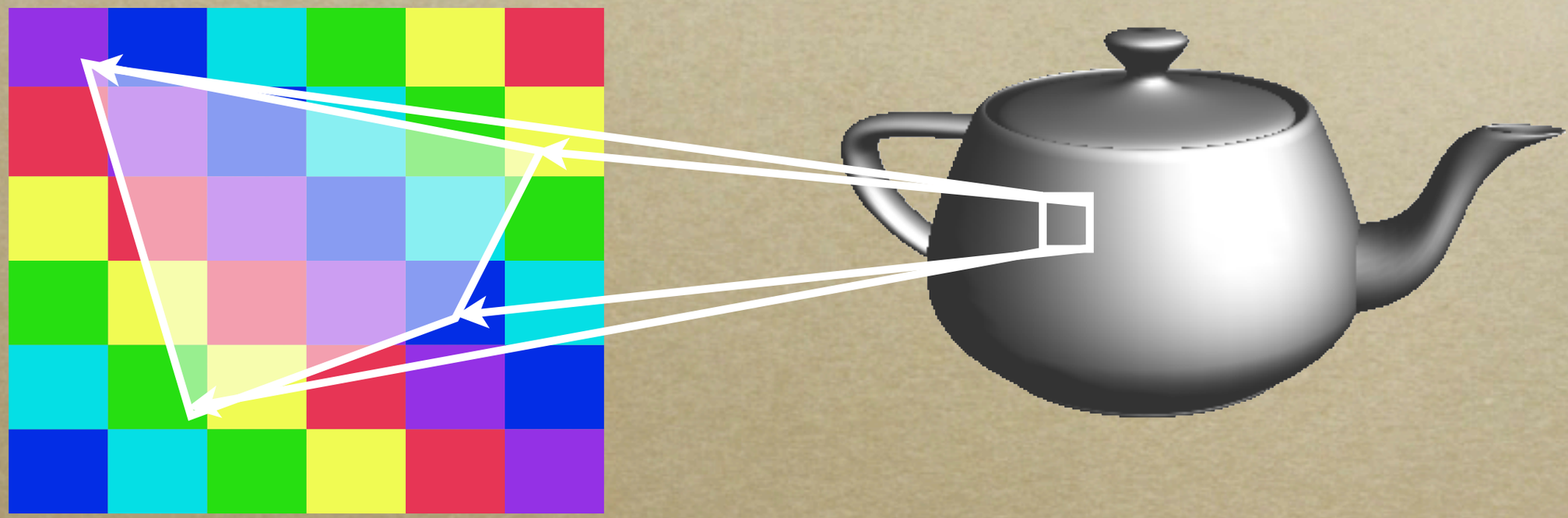
Bump Mapping Examples



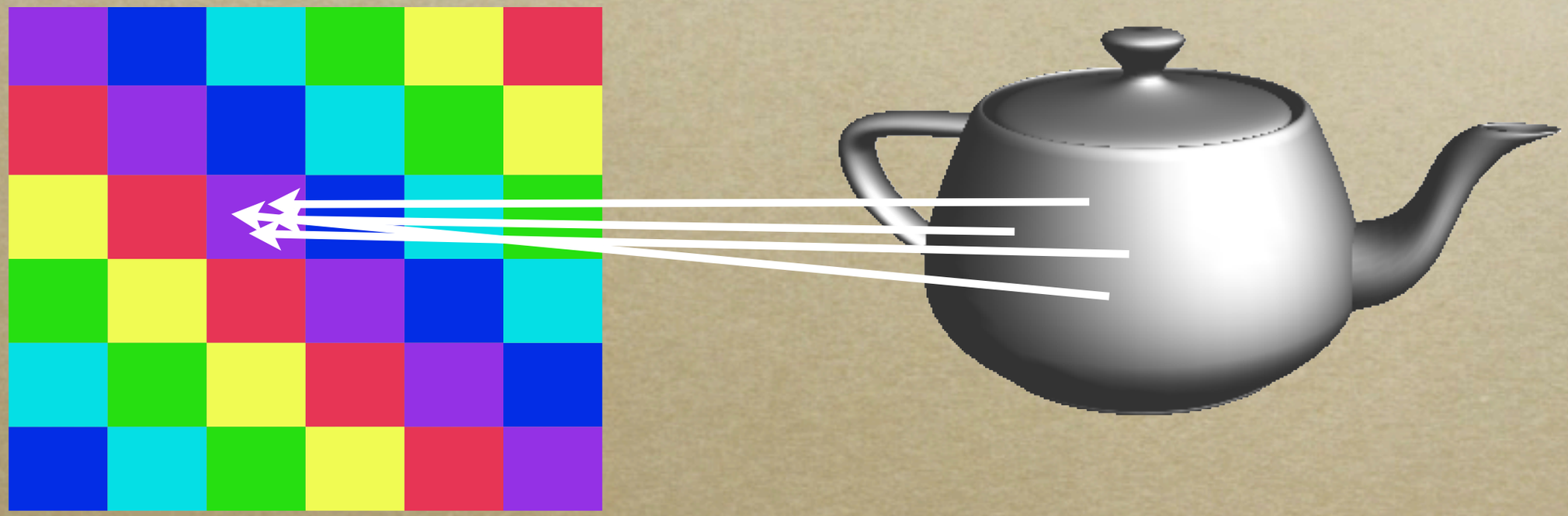
Problems

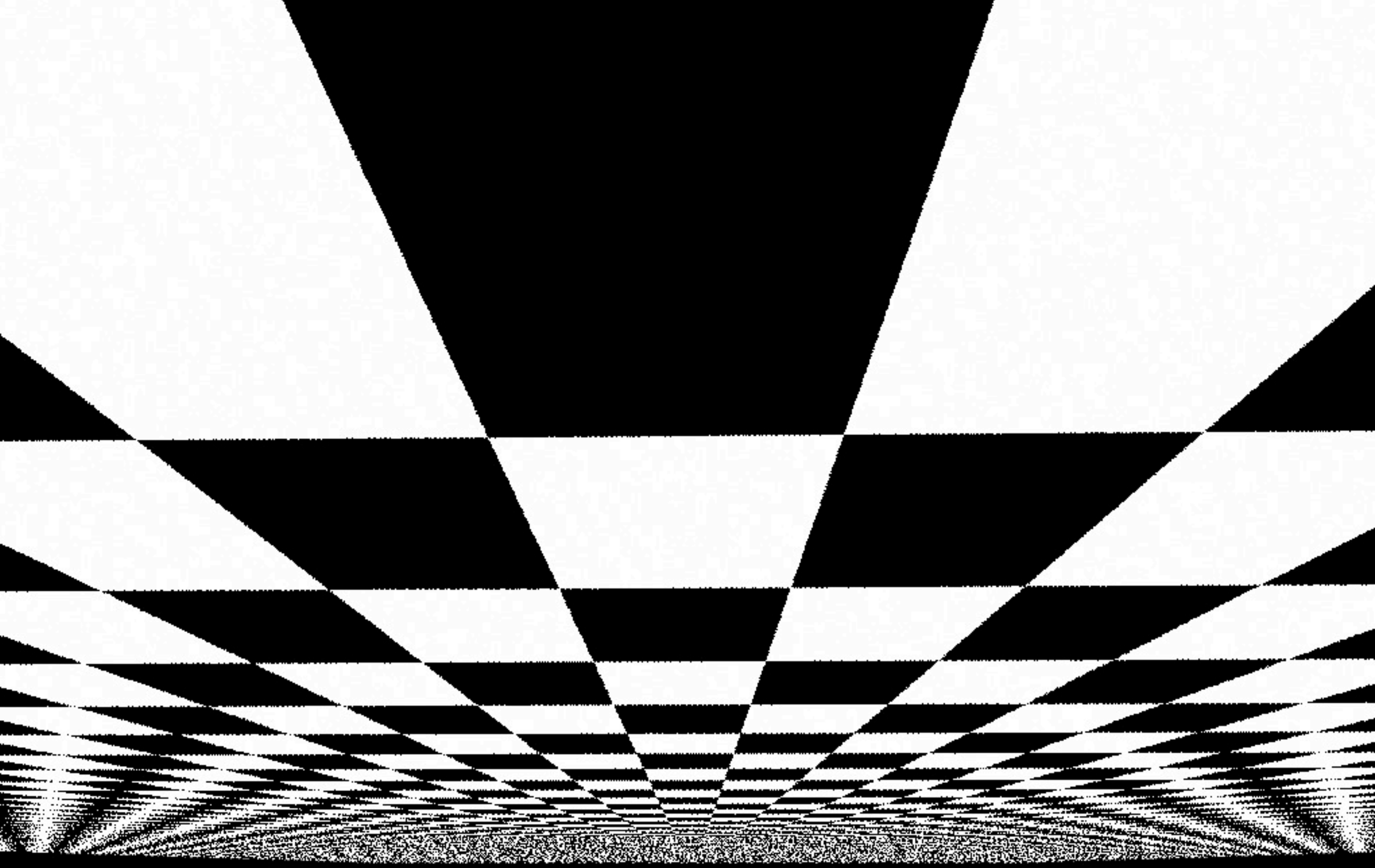
- *Undersampling: one pixel maps to an area covering many texture pixels (texels)*
- *Oversampling: many pixels map to an area contained by only one texel.*

Undersampling

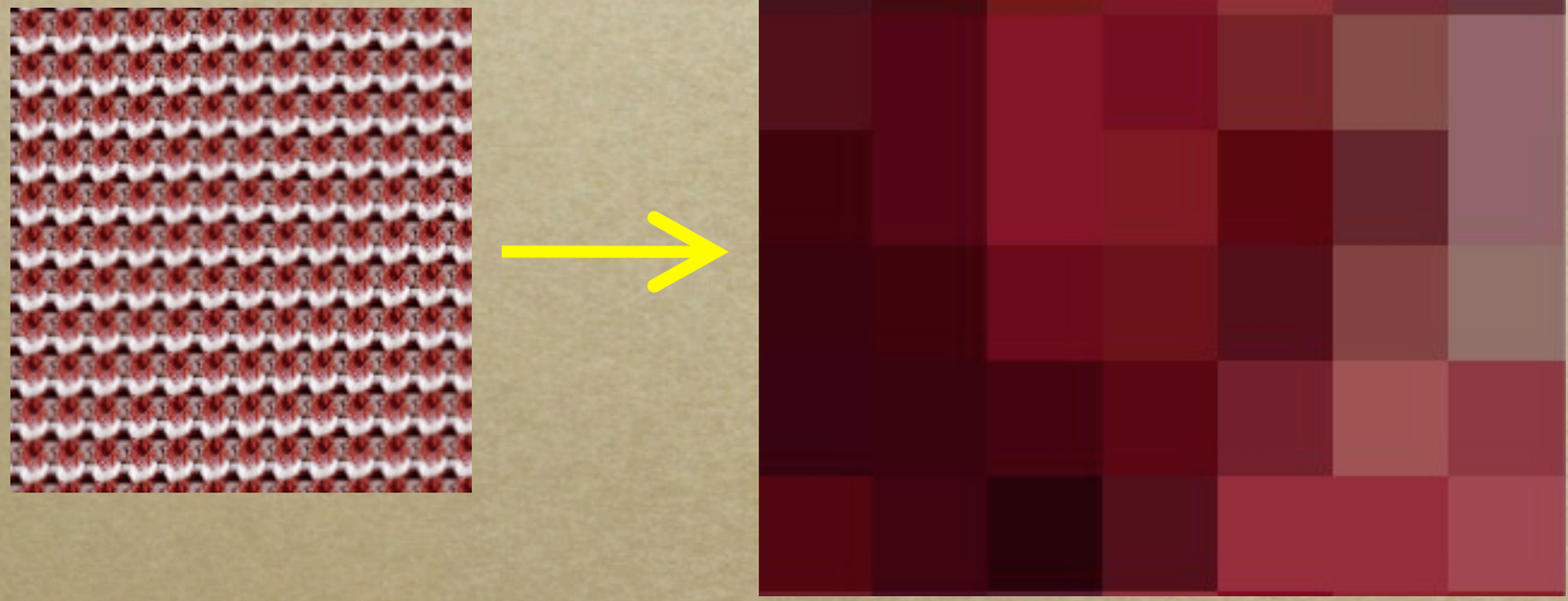


Oversampling





Oversampling



Surface and volume texture

2D *3D*

Functional Textures