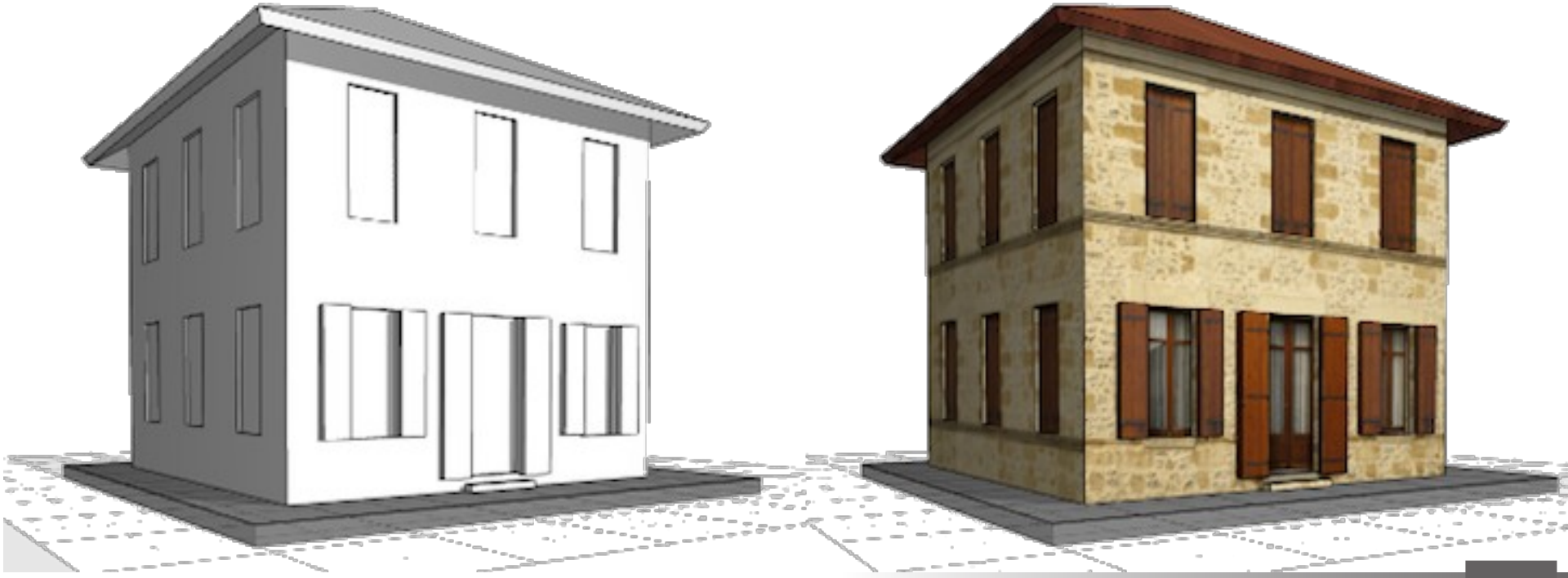
Unidad 7

Texturas

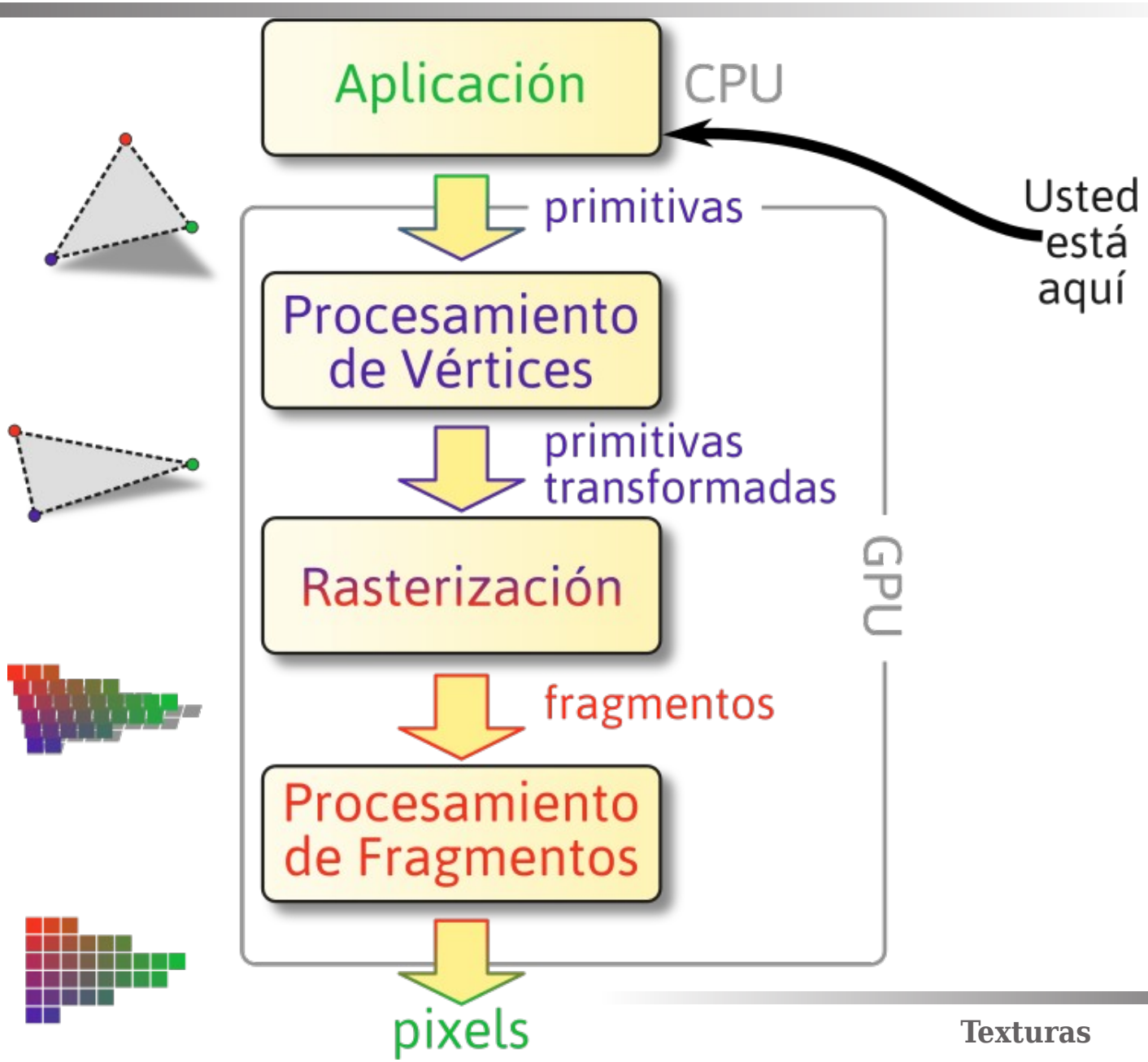
UNL FICH
Universidad Nacional del Litoral
Facultad de Ingeniería y Ciencias Hídricas

Introducción

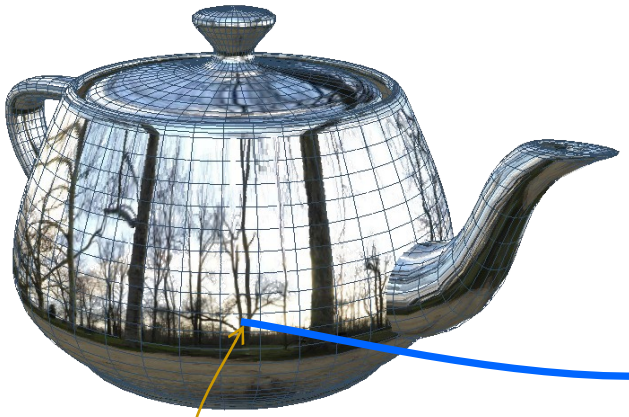
Con los modelos de sombreado se obtienen superficies iluminadas pero carentes de realismo.



Mapeo de Texturas



Mapeo de Textura



(0,0)

s

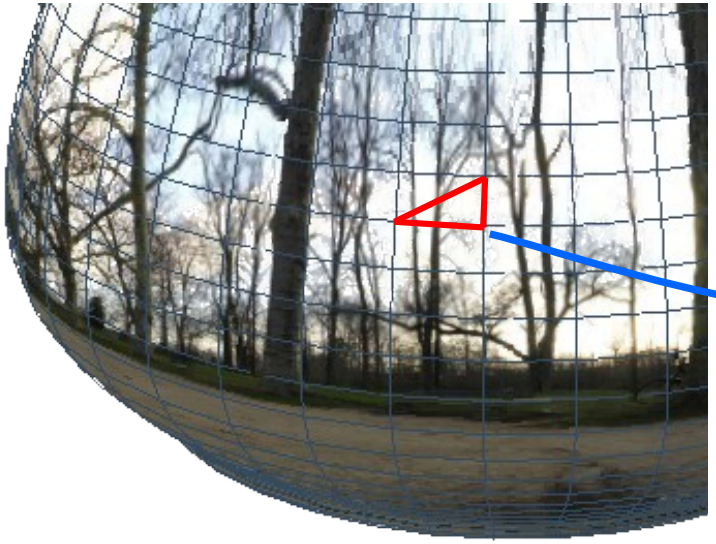
(1,1)

t

$(s,t) = f(x,y,z)$

punto del modelo (x,y,z,w)

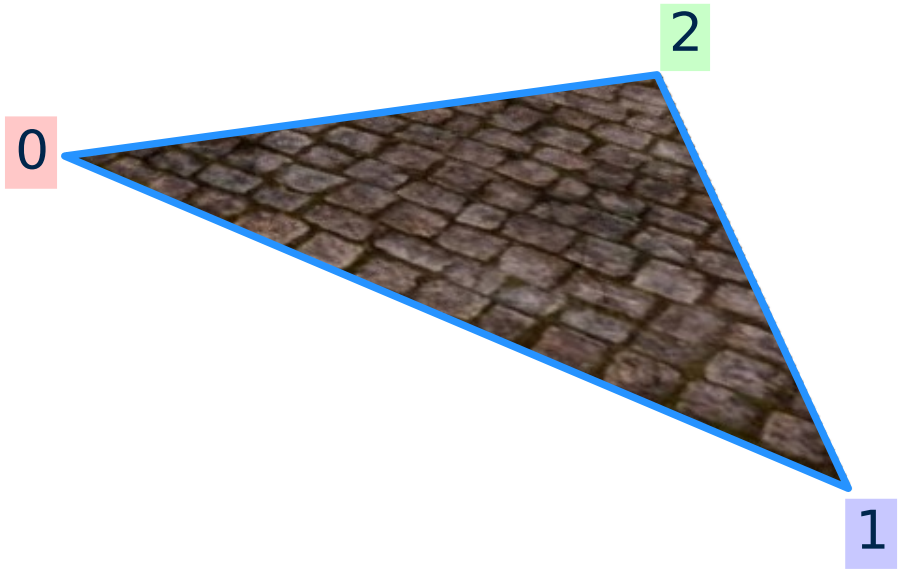
punto de la textura (s,t)



Mapeo Manual de Textura

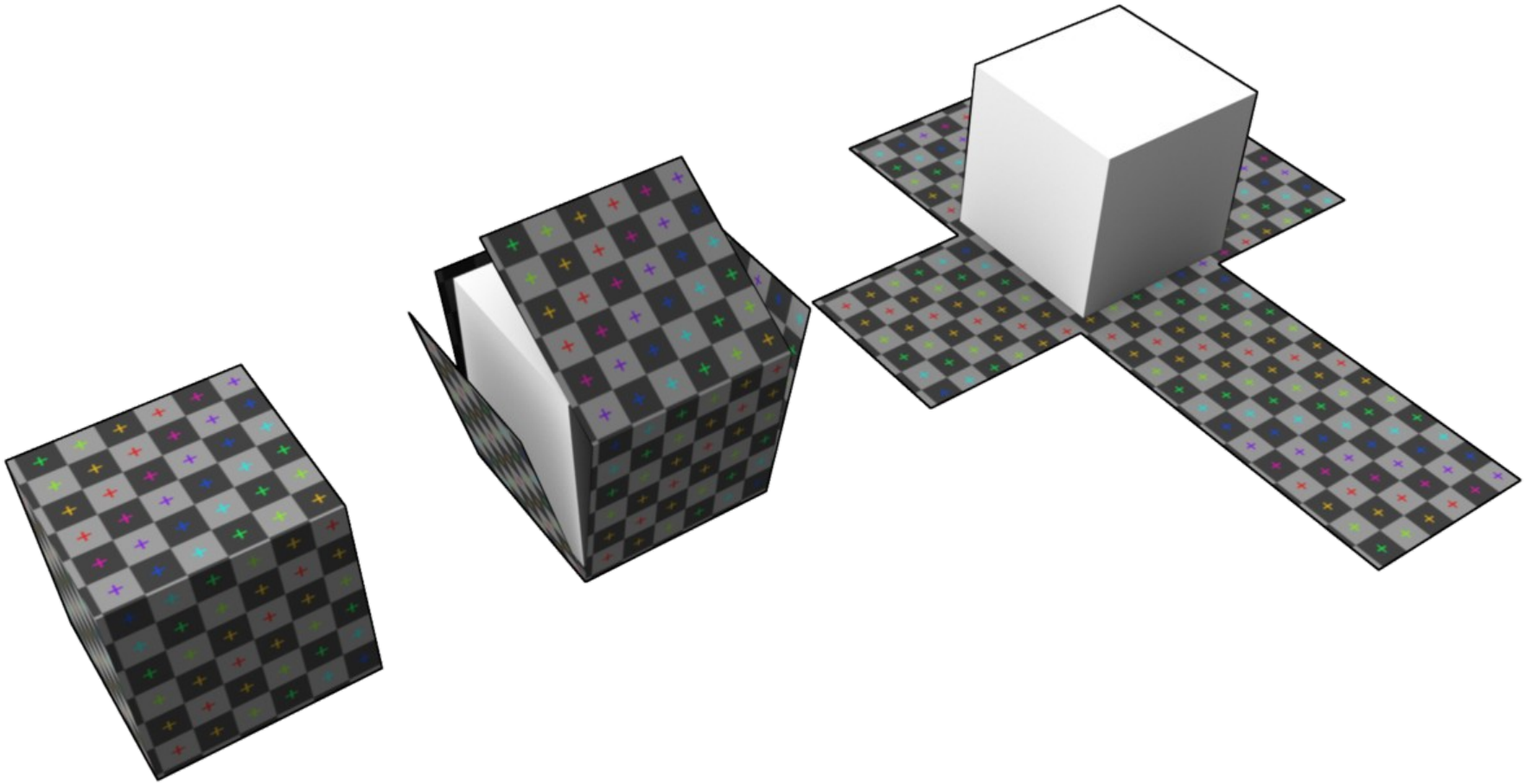
Las coordenadas de textura se asignan manualmente a **cada vértice** de la primitiva y se interpolan automáticamente en cada fragmento.

```
glBegin(GL_TRIANGLES);
  glColor3f(r0, g0, b0);
  glNormal3f(u0, v0, w0);
  glTexCoord2f(s0, t0);
  glVertex3f(x0, y0, z0);
  glColor3f(r1, g1, b1);
  glNormal3f(u1, v1, w1);
  glTexCoord2f(s1, t1);
  glVertex3f(x1, y1, z1);
  glColor3f(r2, g2, b2);
  glNormal3f(u2, v2, w2);
  glTexCoord2f(s2, t2);
  glVertex3f(x2, y2, z1);
  ...
  ...
glEnd();
```

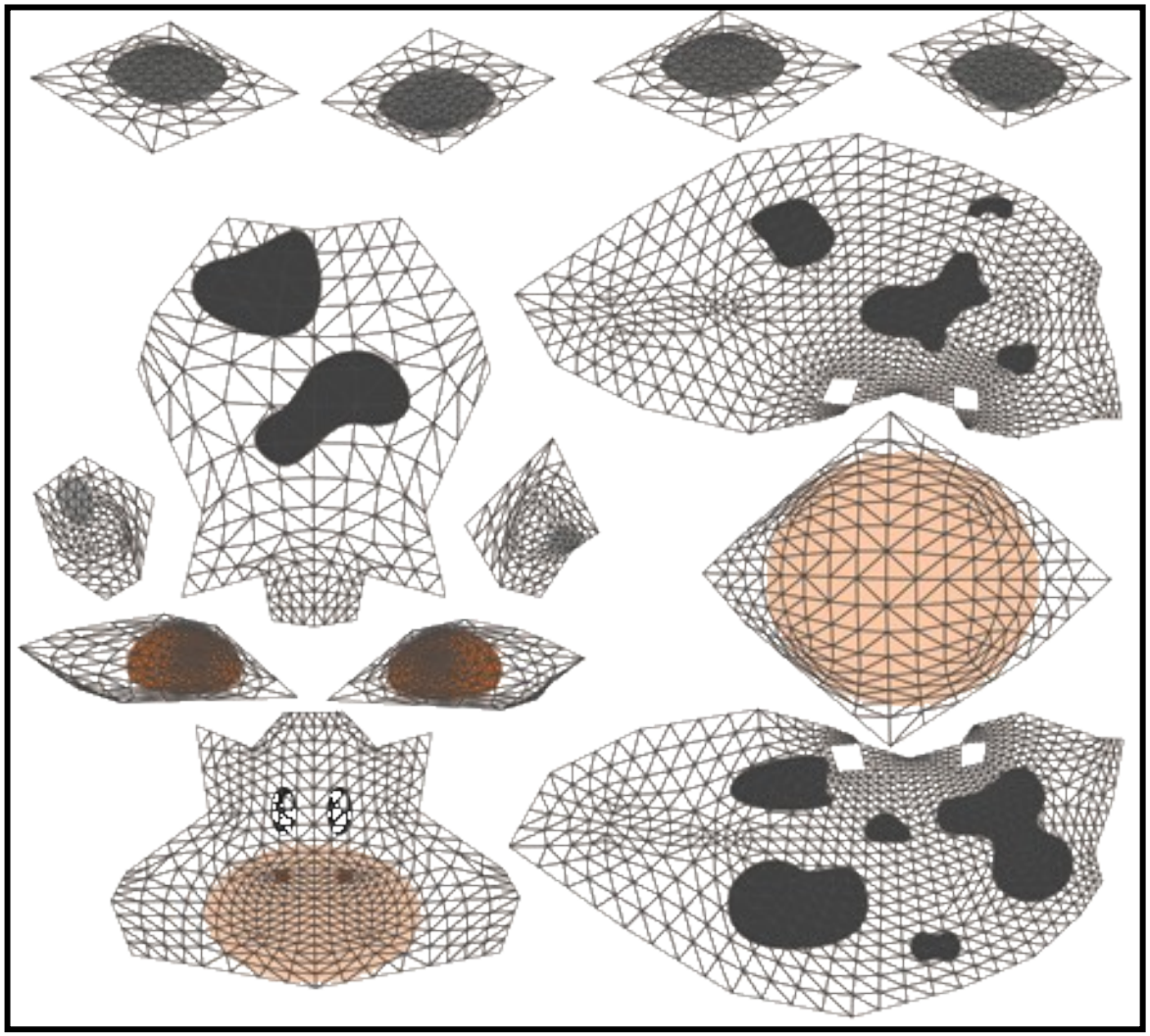


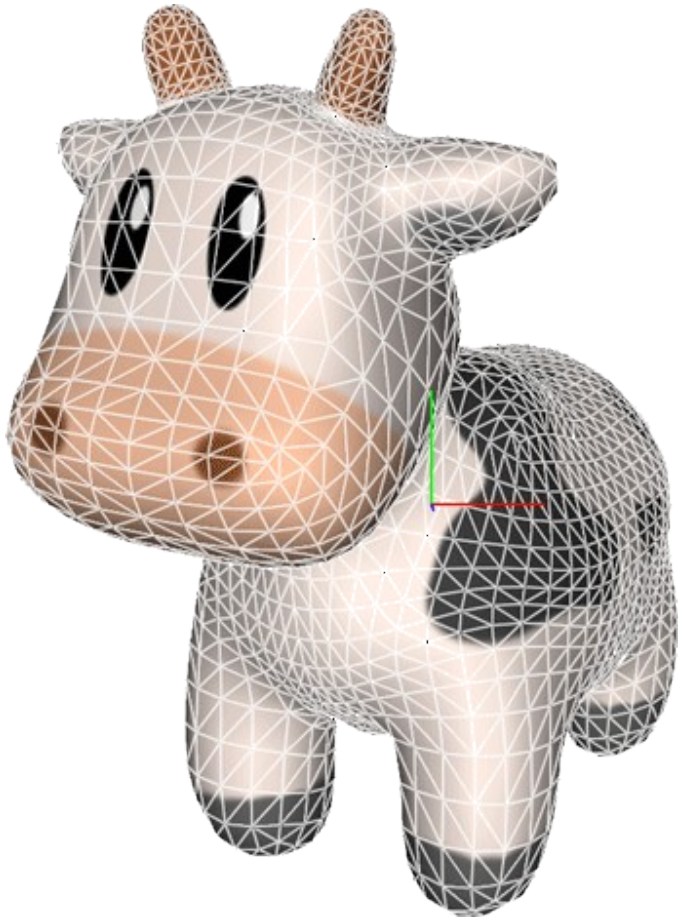
Texturas

Mapeo de Textura: Mapeo UV

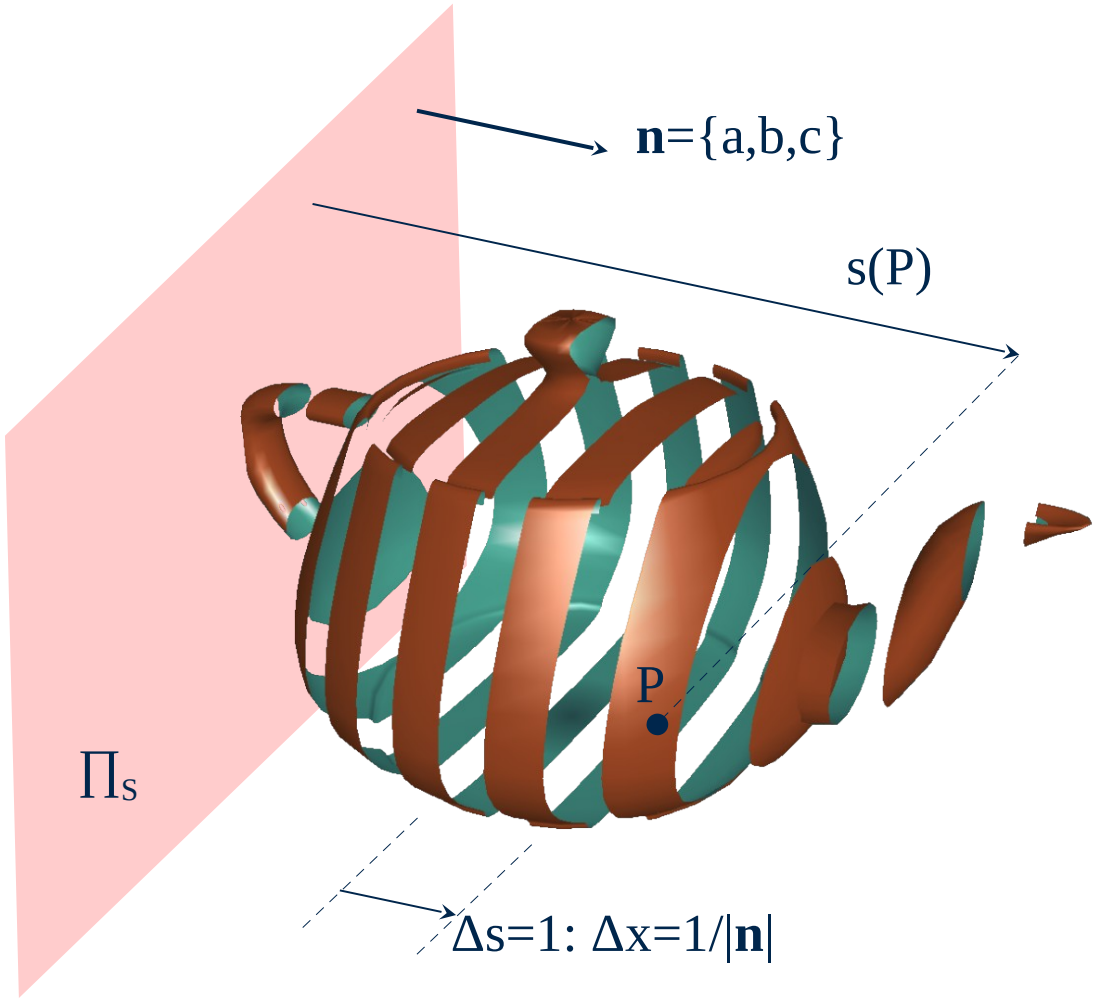


Mapeo de Textura: Mapeo UV

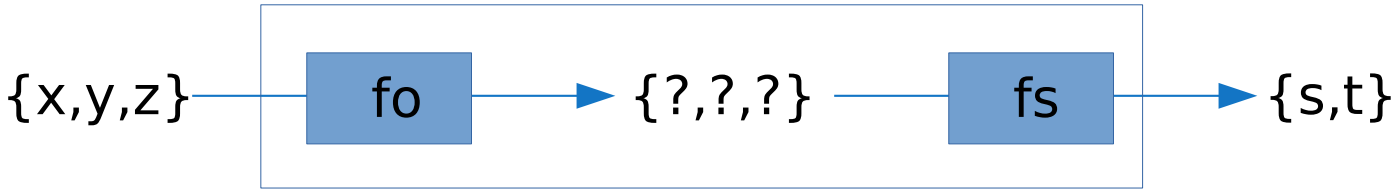




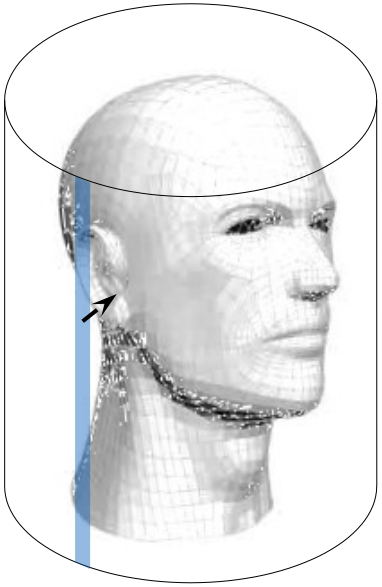
Mapeo Automático: Mapeo Plano



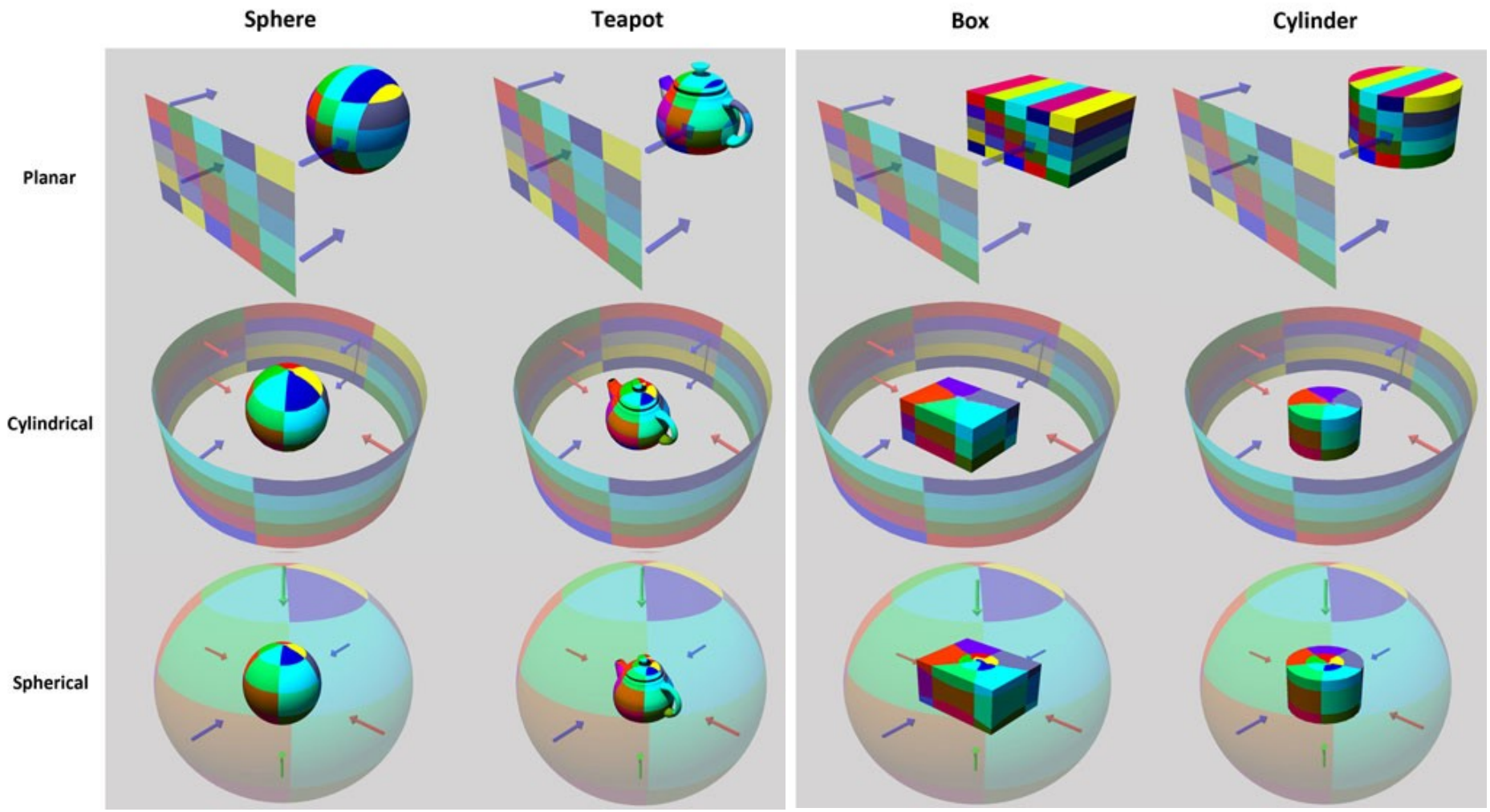
Mapeo Automático: Mapeo en Dos Partes



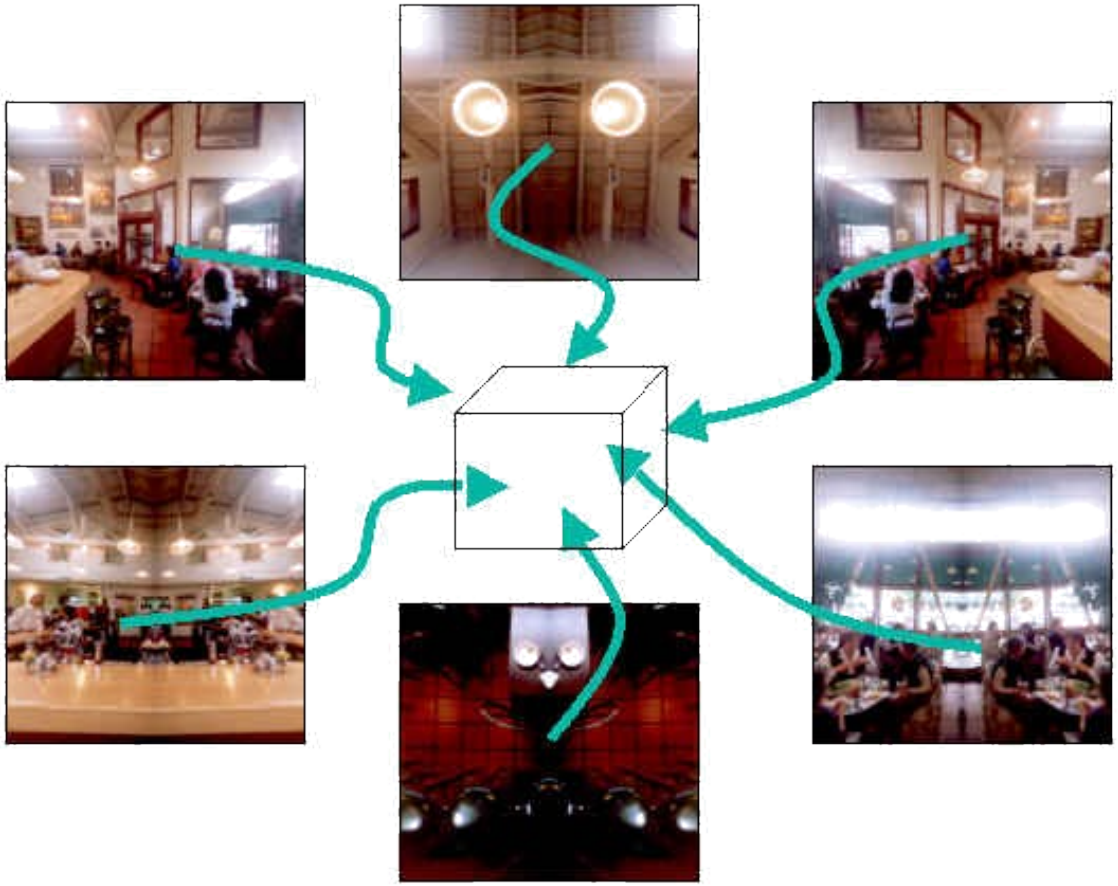
f(x,y,z) = fs(fo(x,y,z))

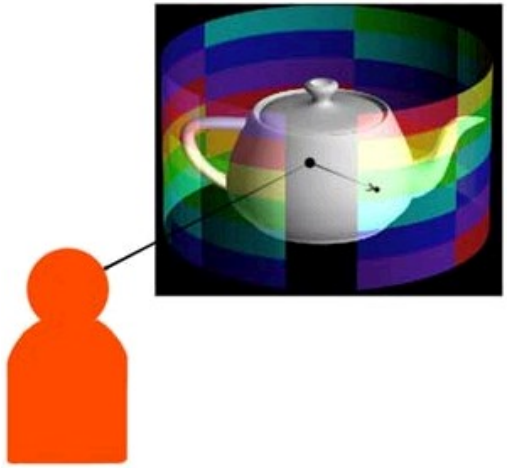


Mapeo Automático: Mapeo en Dos Partes

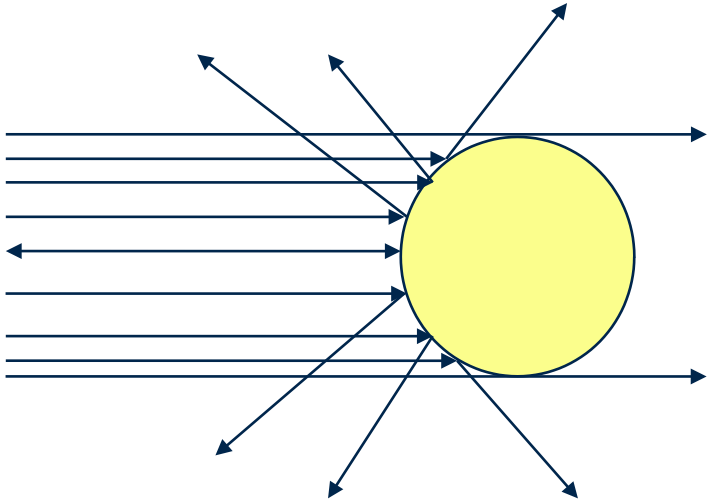


Environment Mapping: Cube Map





Environment Mapping: Sphere Map



Textura

Wrapping

Wrapping

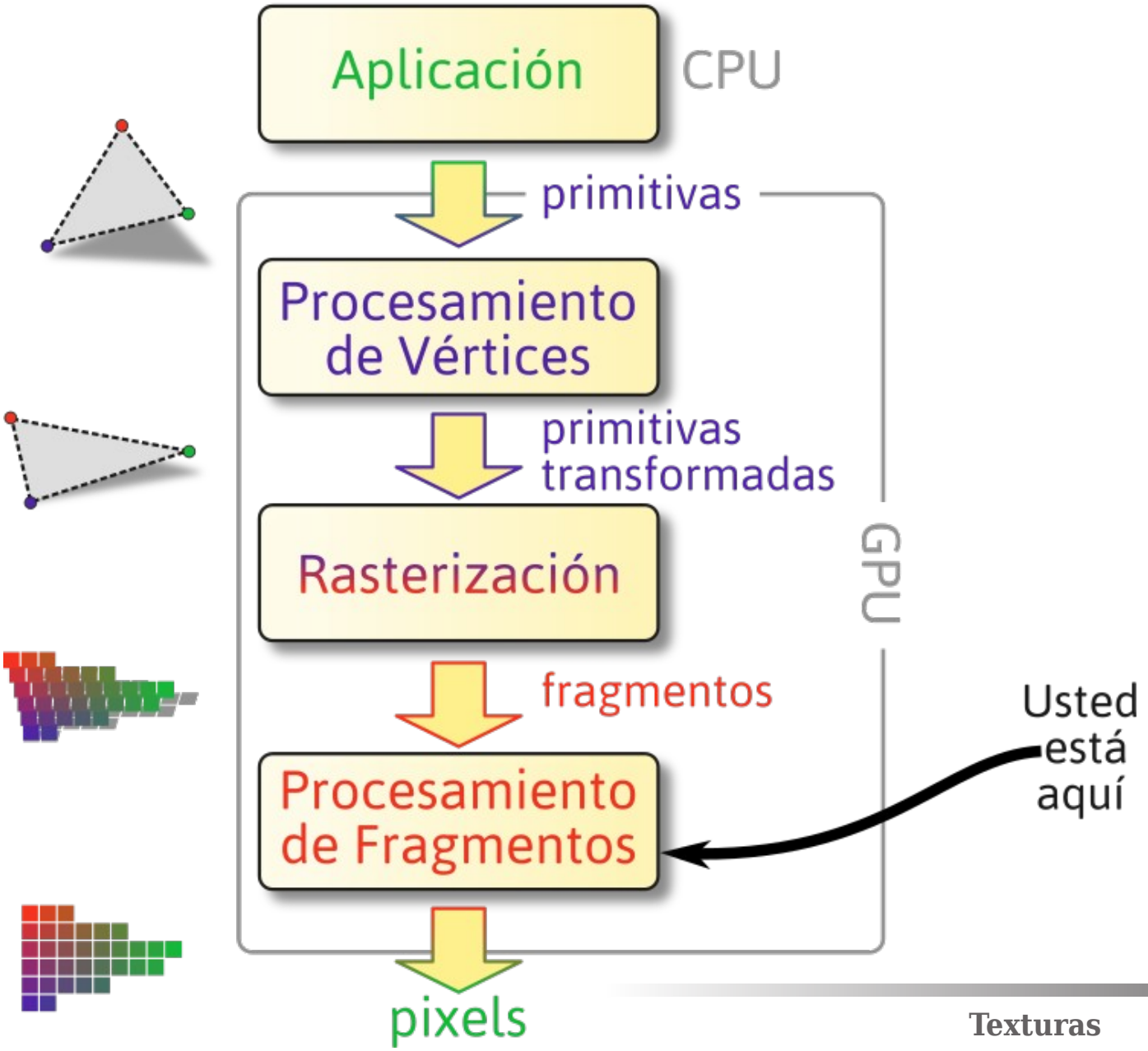
GL_REPEAT

GL_MIRRORED_REPEAT

GL_CLAMP_TO_EDGE

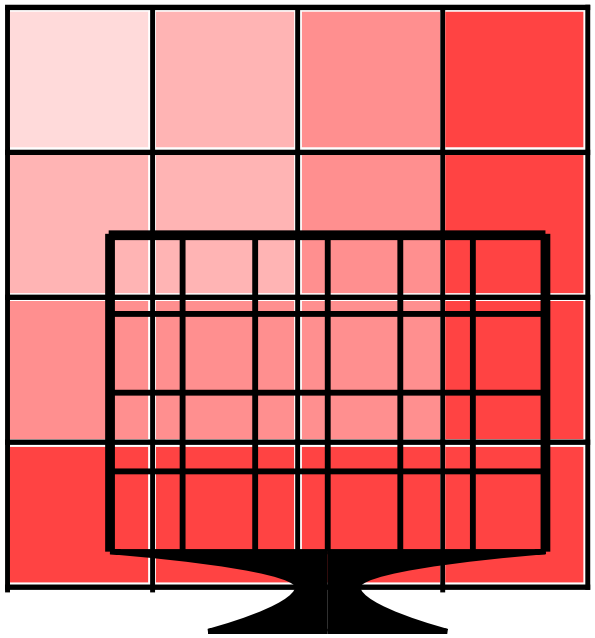
GL_CLAMP_TO_BORDER

Filtrado de texturas

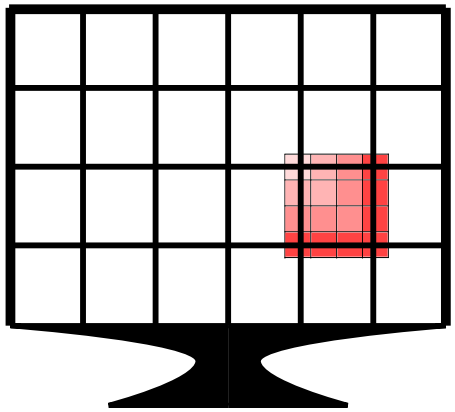


Filtrado

Los píxeles (fragmentos) y los téxeles tienen distinto "tamaño".

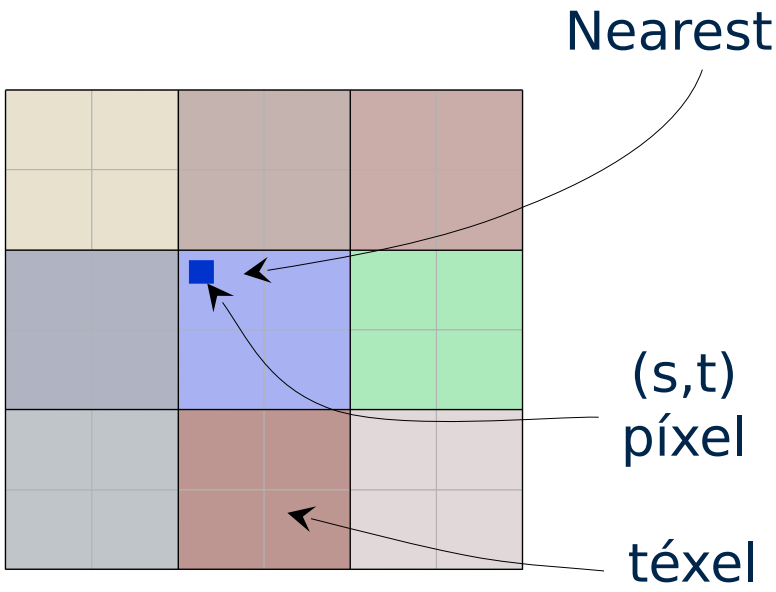


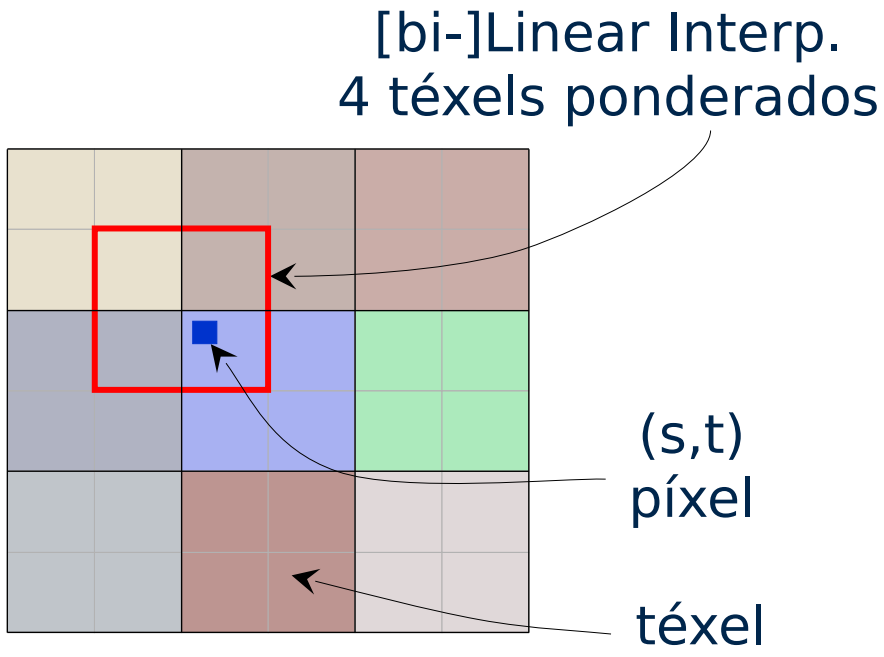
Magnification



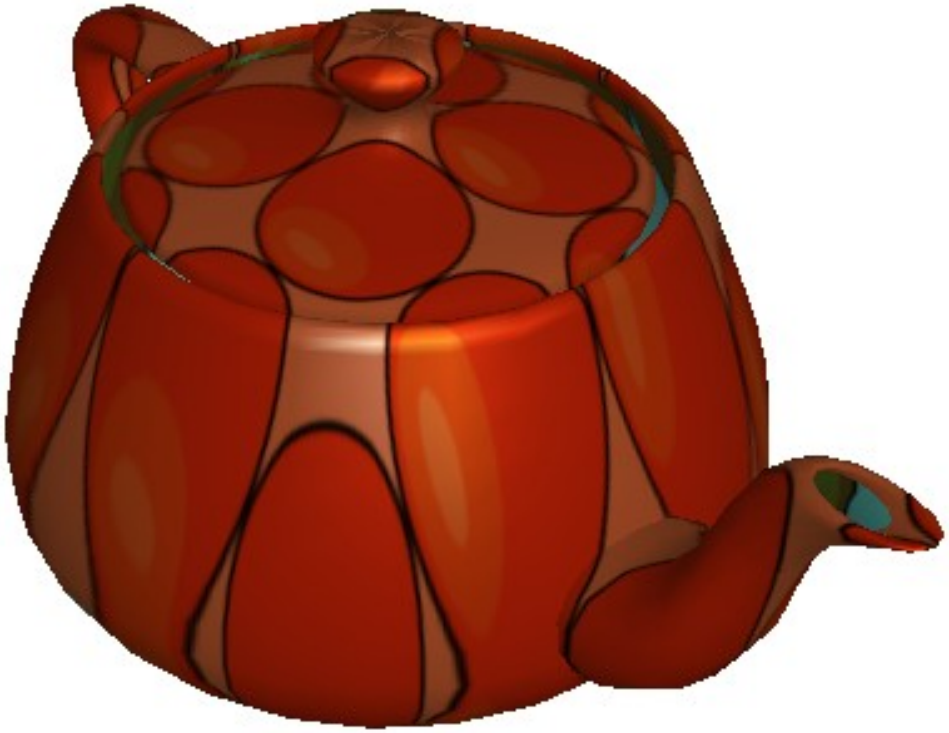
Minification

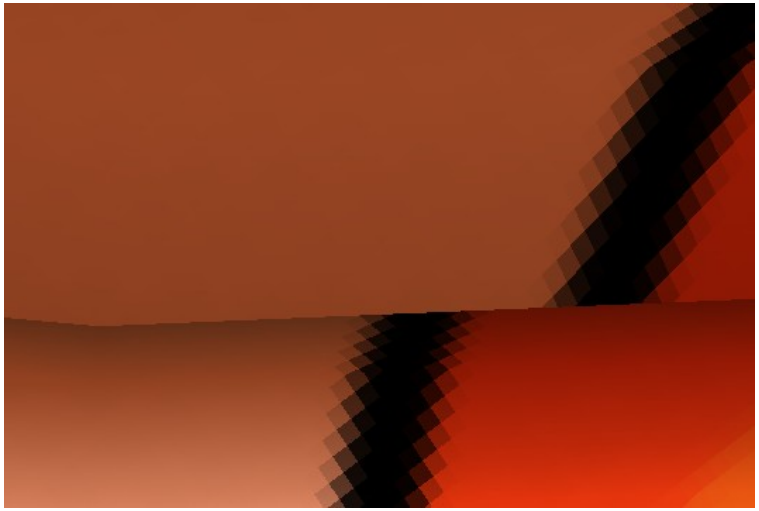
Filtrado: ampliación o magnification



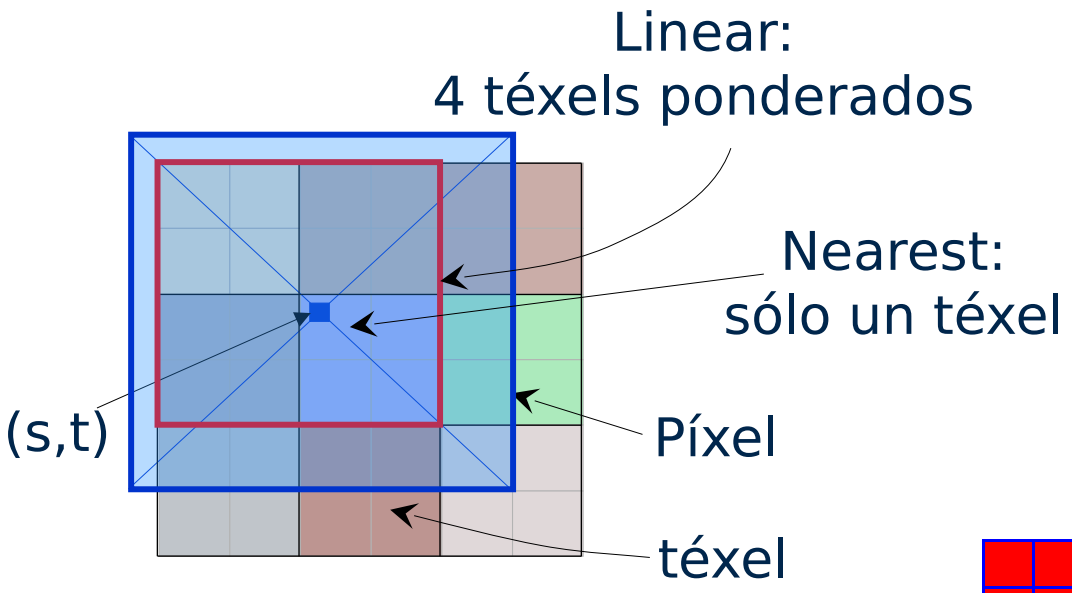


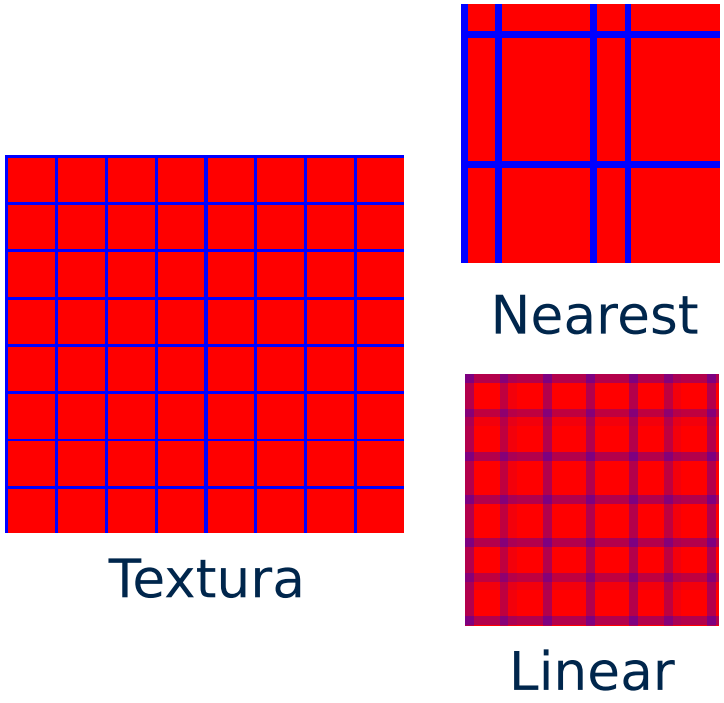
Filtrado: ampliación o magnification





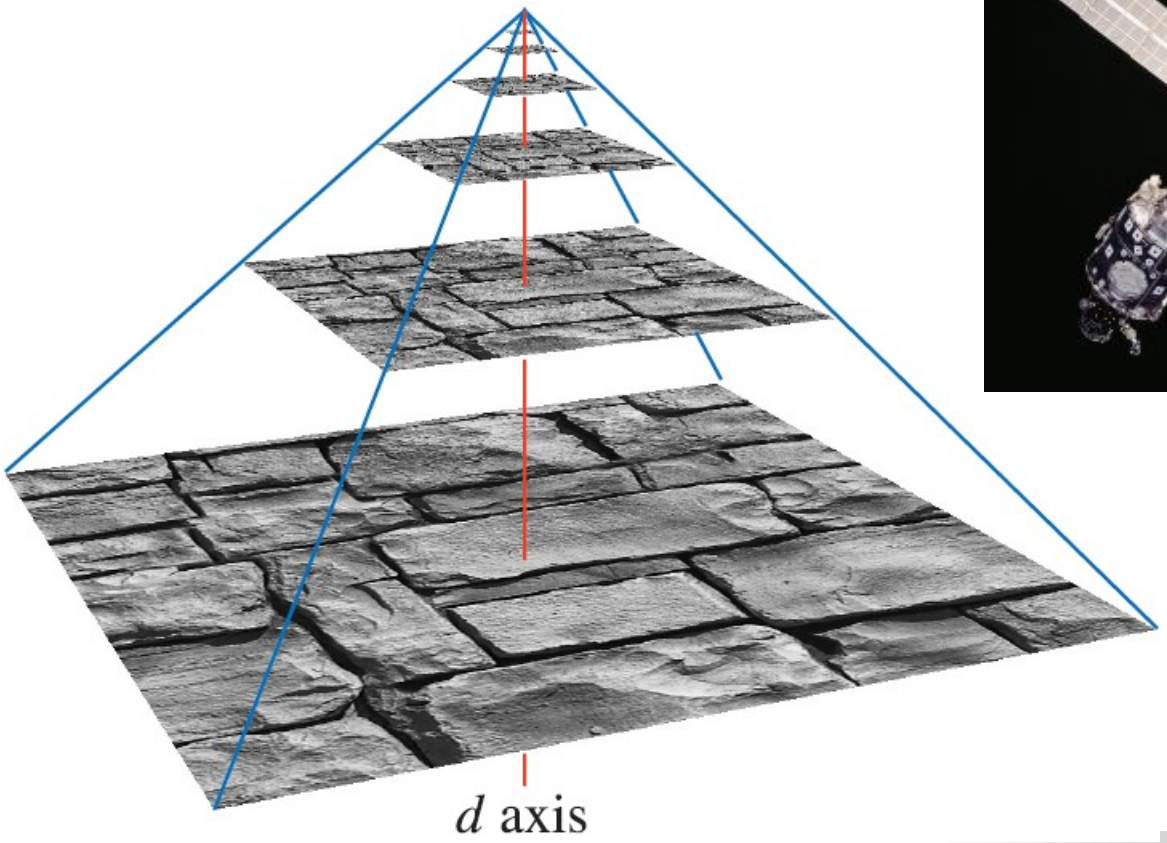
Filtrado: reducción o minification

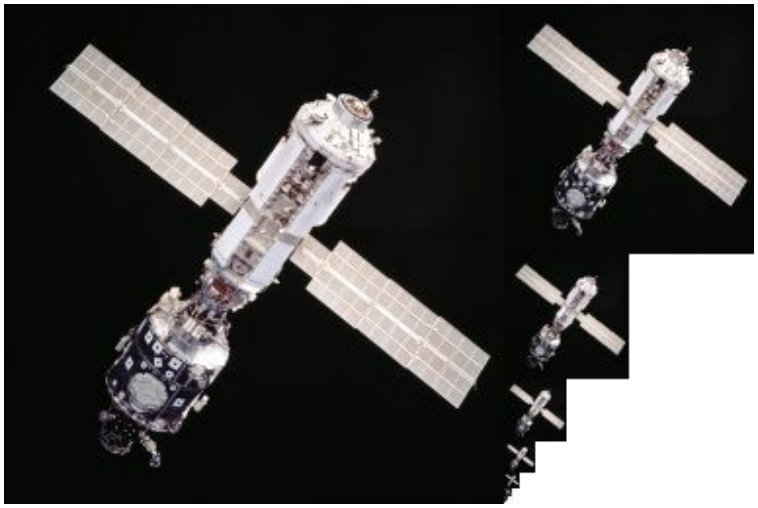




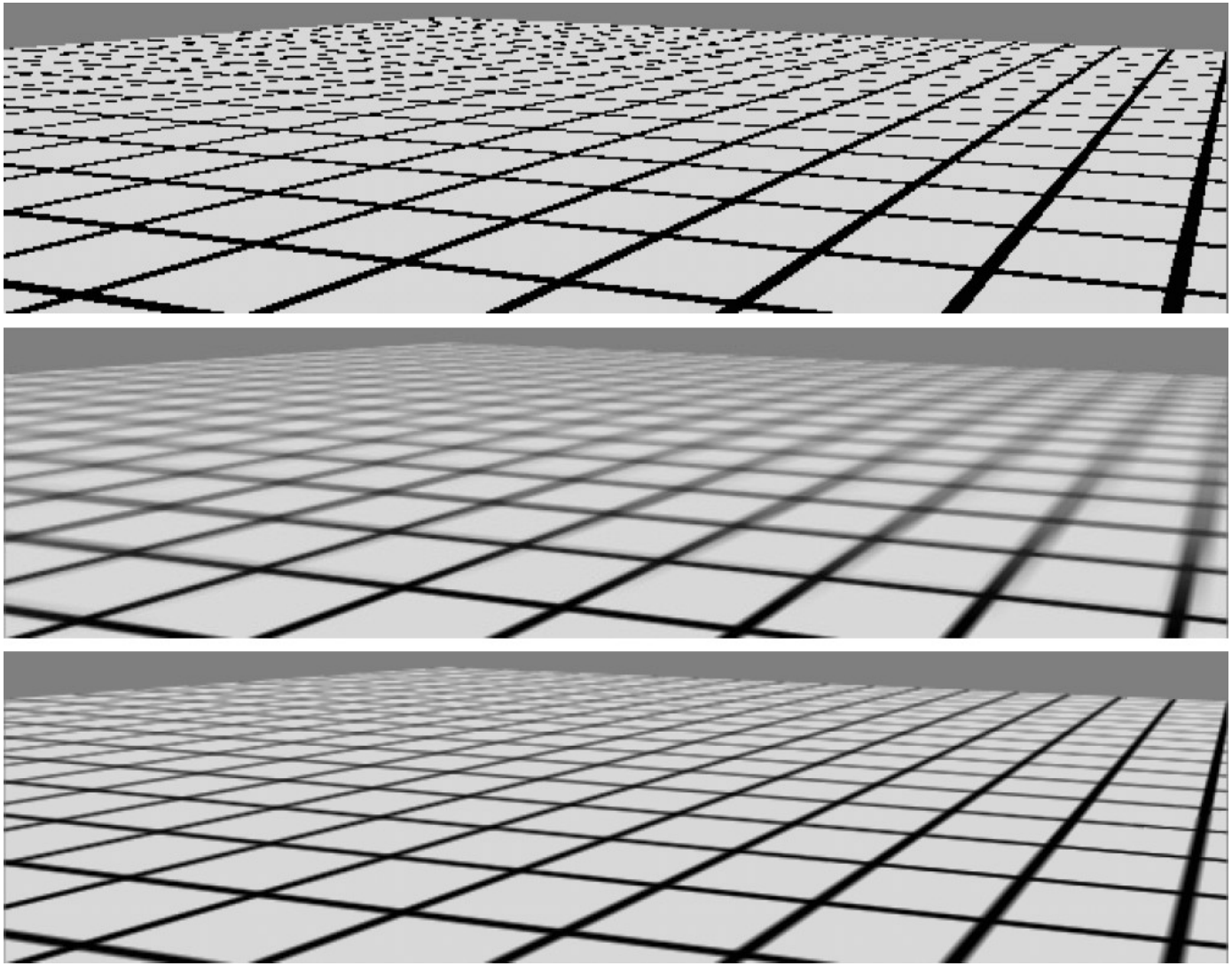
Filtrado: reducción o minification: Mipmaps

- Para interpolar más píxeles se utilizan los **Mipmaps:**
  Versiones reducidas de la misma textura



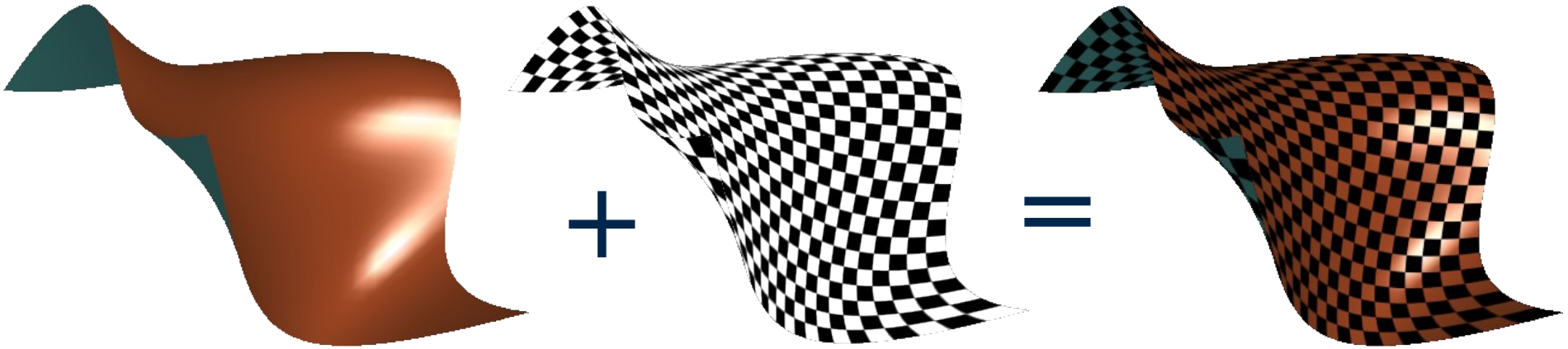


Filtrado: reducción o minification



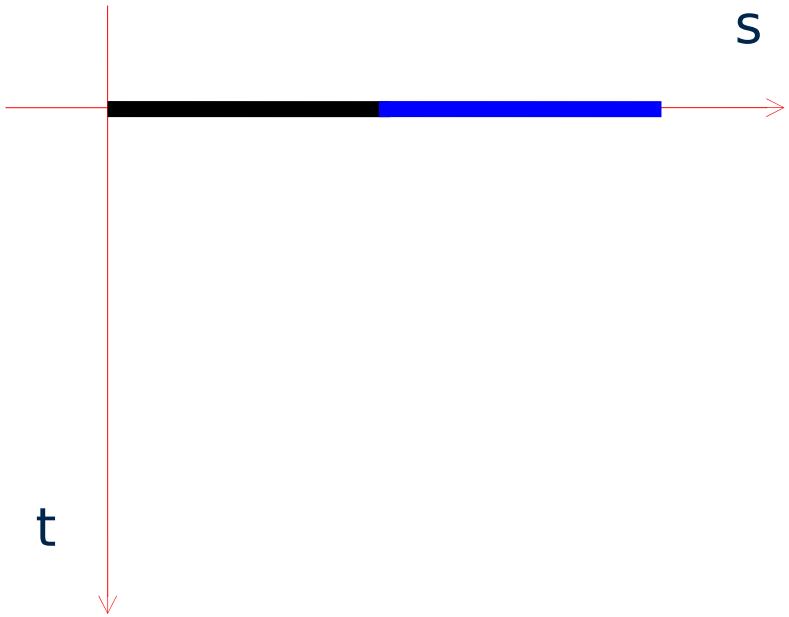
Modos de Mezcla

¿Que hacemos con el color que ya tenía el fragmento?

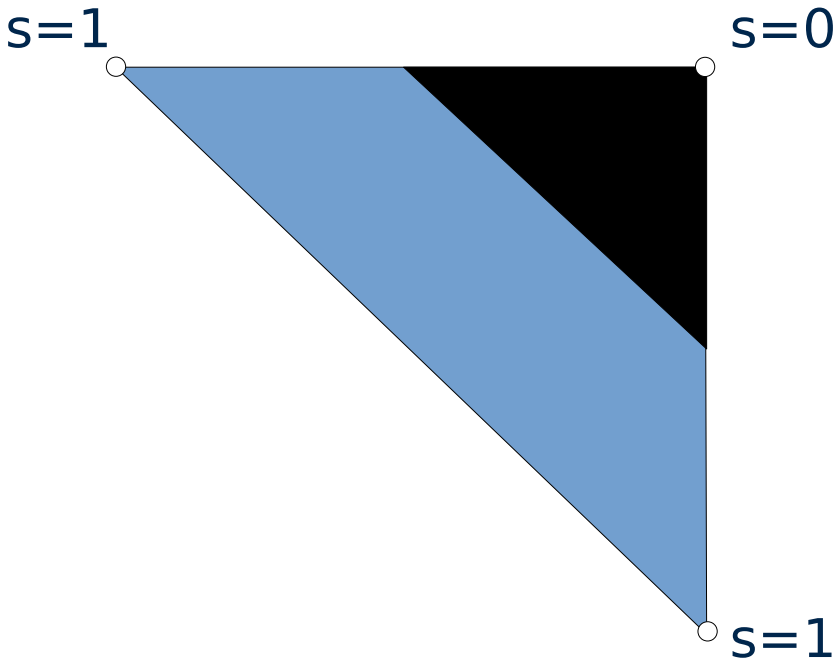


Texturas 1D

s = f(x,y,z,w): se puede pensar como un “imagen” de un solo téxel de alto

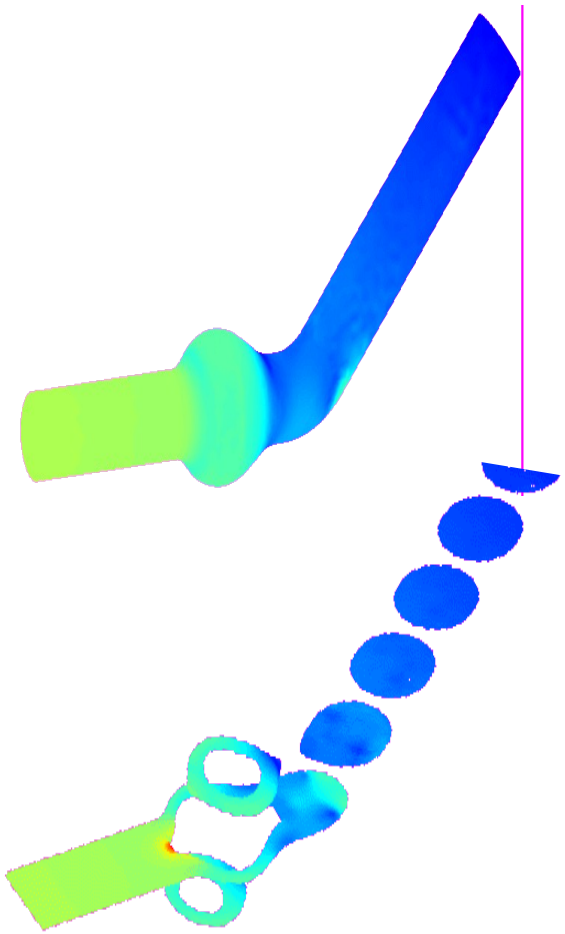


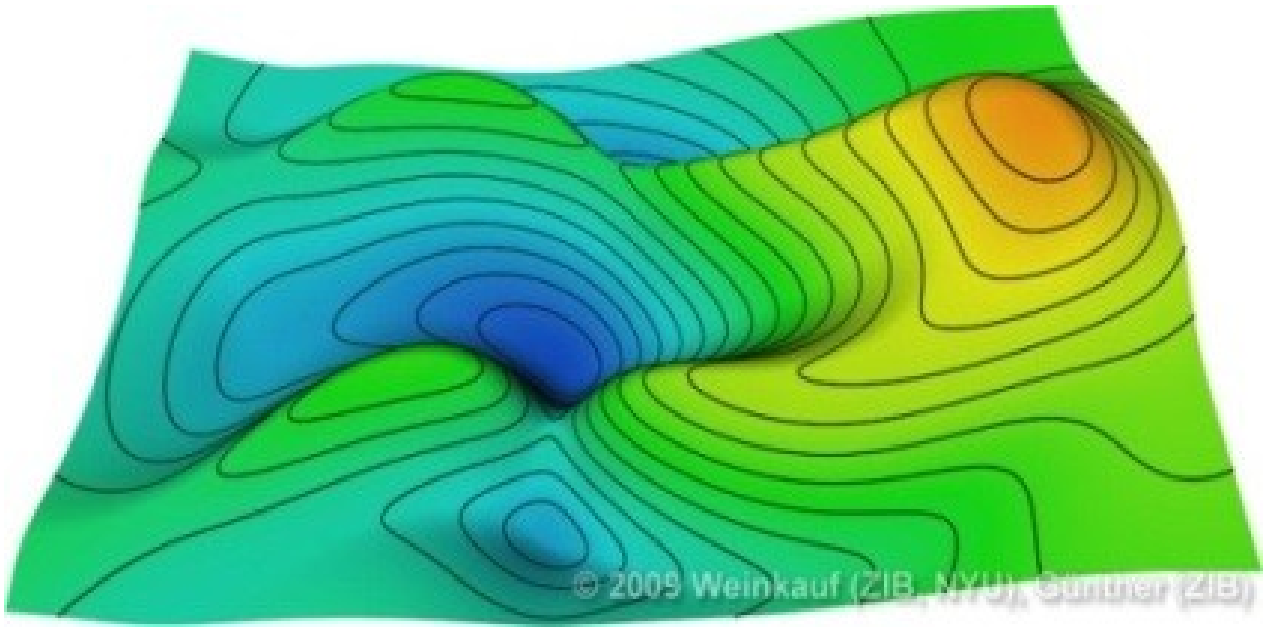
Textura 1D



Aplicada a triangulo

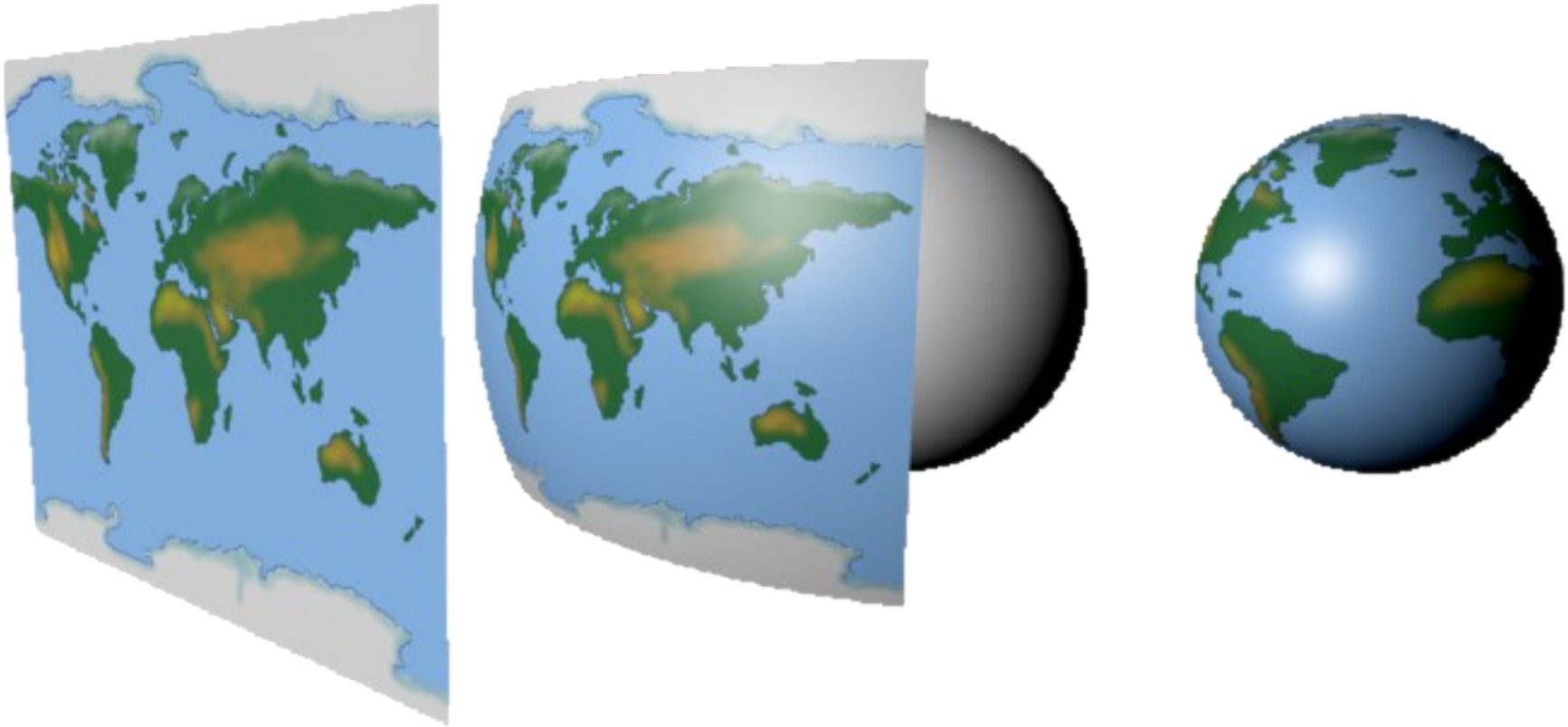
Texturas 1D





Texturas 2D

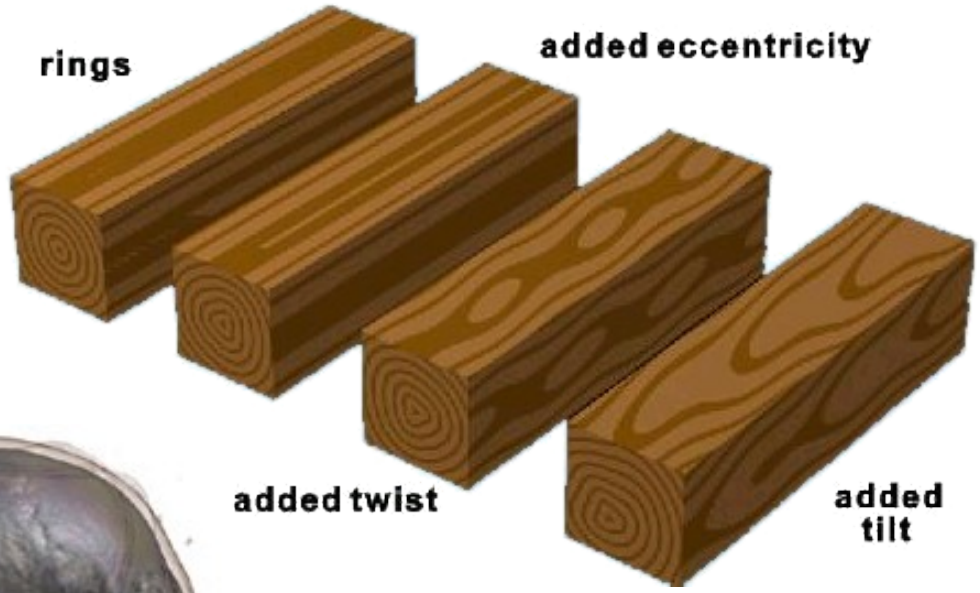
(s,t)=f(x,y,z,w): se puede pensar que se le está pegando una imagen deformable a una superficie en 3D.

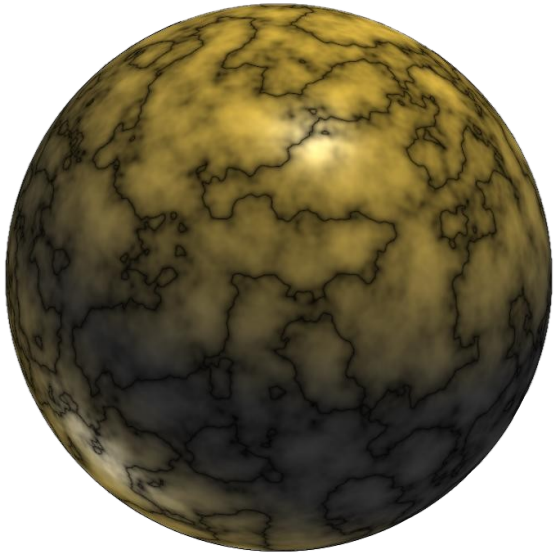


Texturas 3D

(s,t,r)=f(x,y,z): Volumen con "vóxeles" RGBA.

- Texturas procedurales (mármol, madera).
- Visualización médica de tomografías.





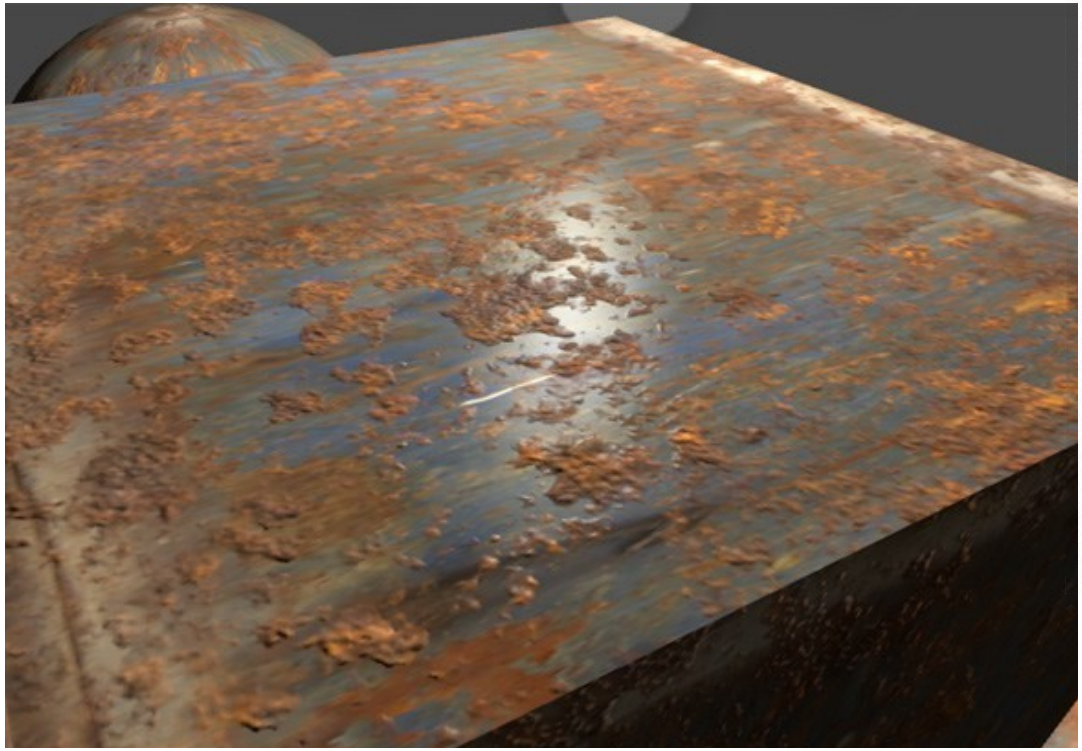
Otros usos/efectos

Las texturas se pueden utilizar para otra información ademas de RGBA

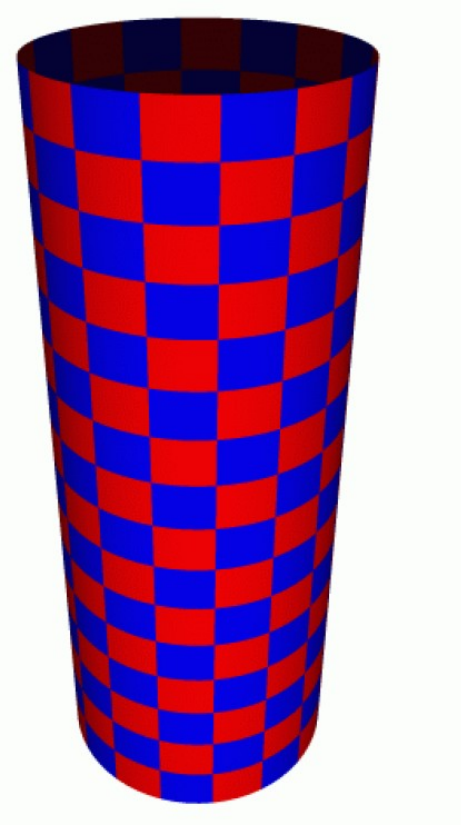
Textura e iluminación avanzada

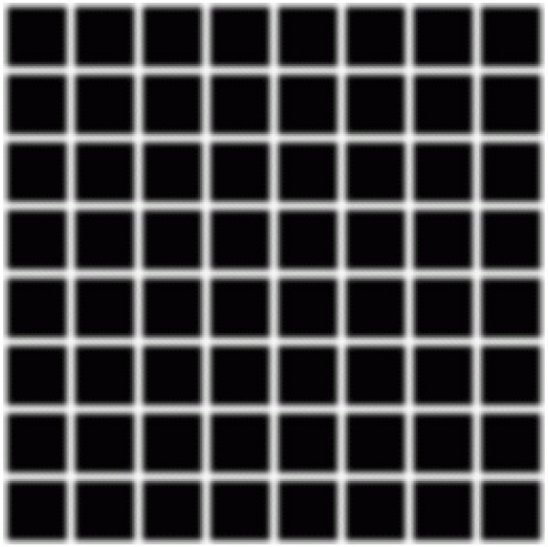
Color Specular Glossiness

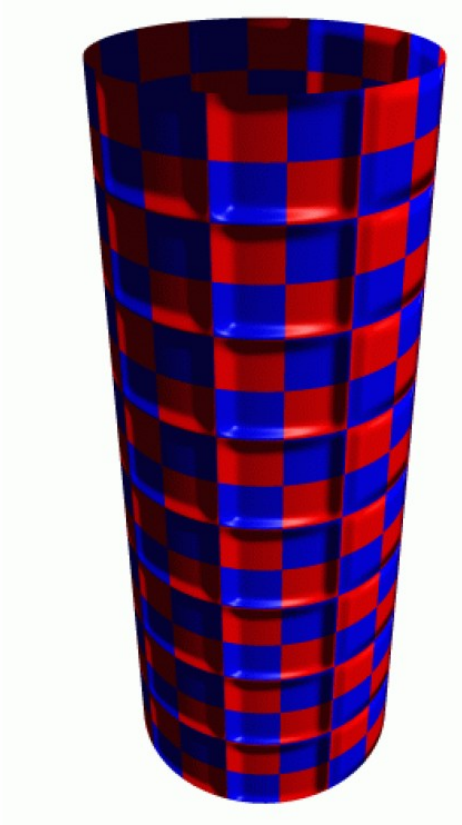
Textura e iluminación avanzada



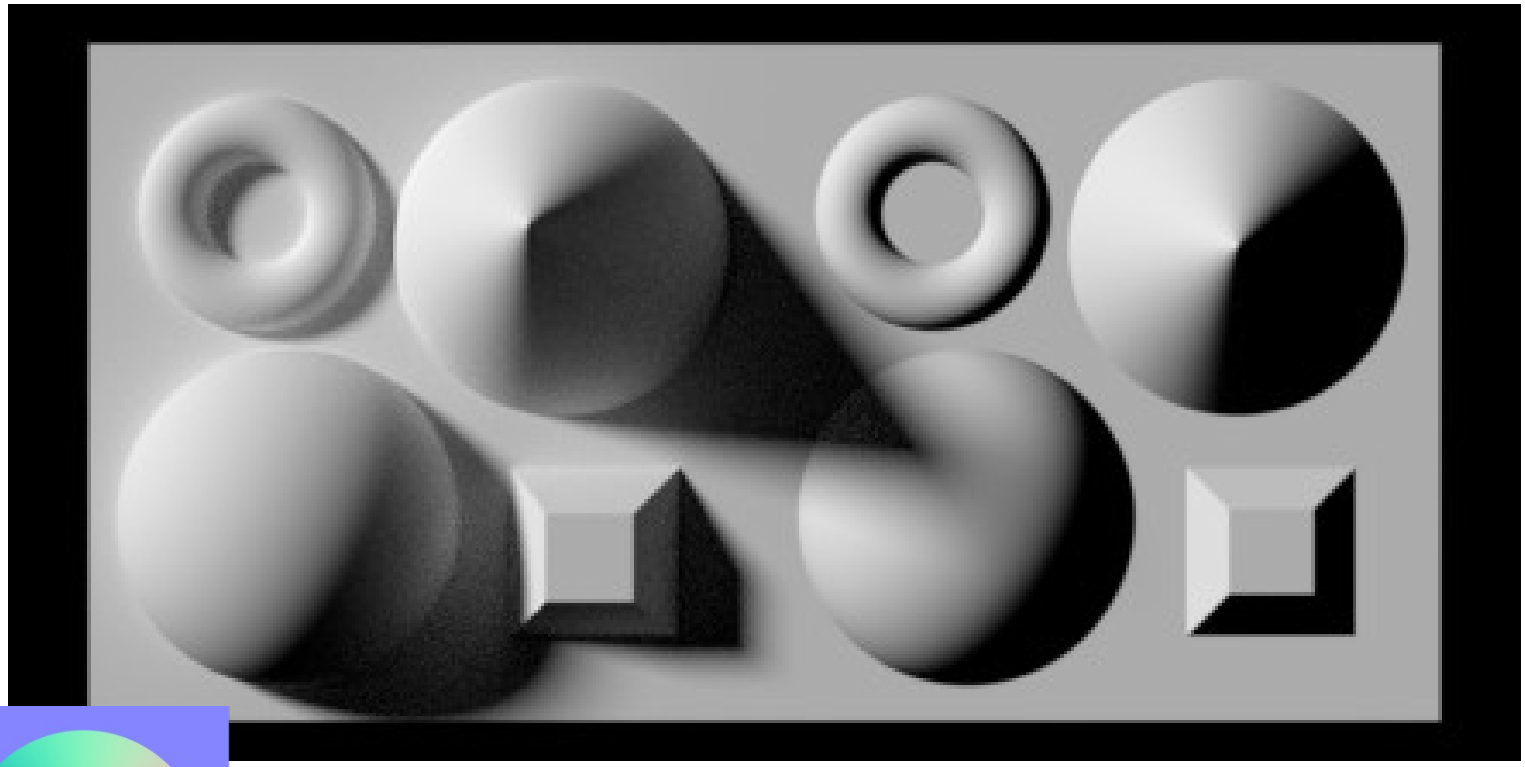
Otros efectos: Bump Mapping

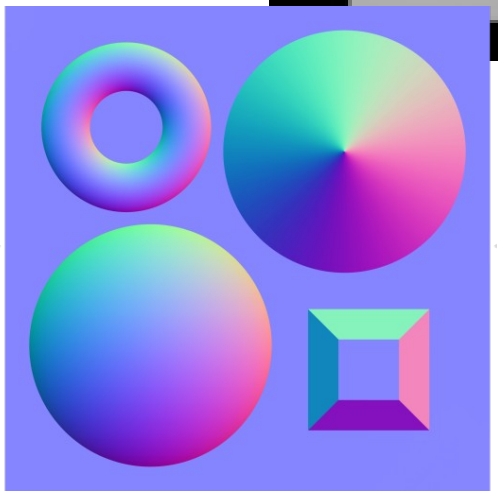






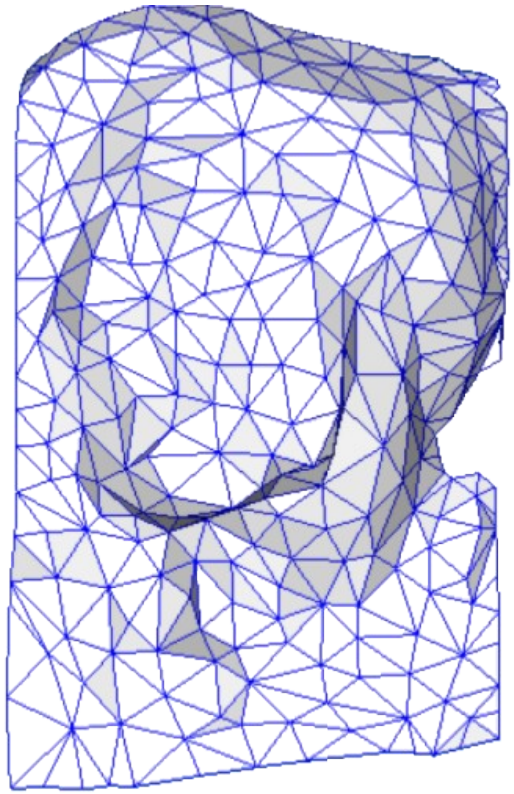
Otros efectos: Normal Mapping



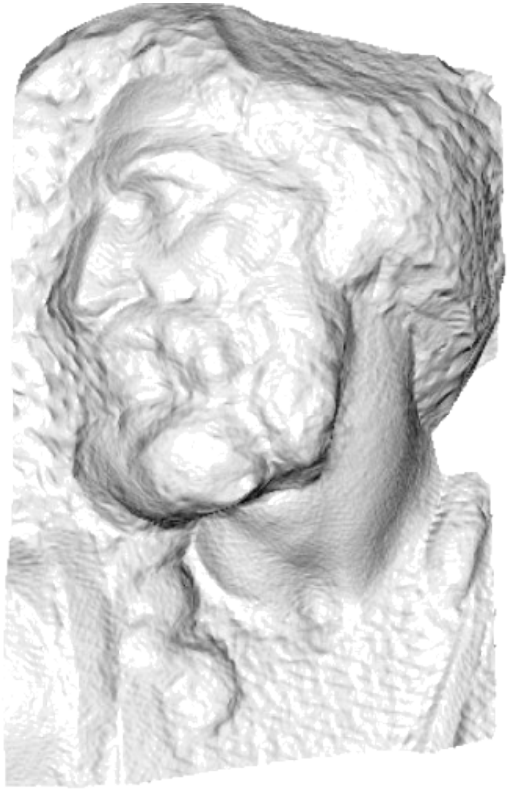


Otros efectos: Normal Mapping

original mesh
4M triangles

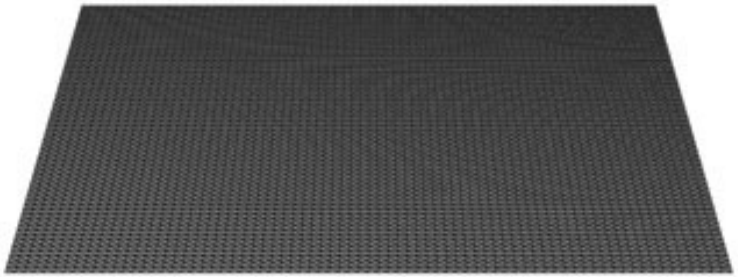


simplified mesh
500 triangles



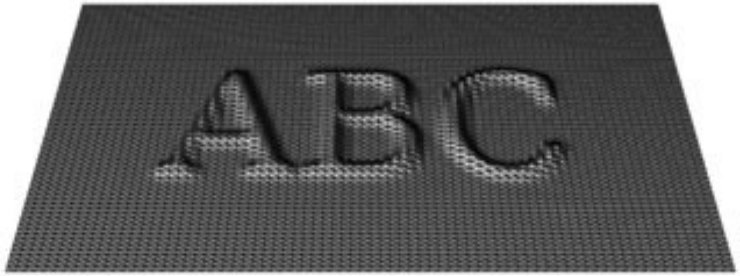
simplified mesh
and normal mapping
500 triangles

Otros efectos: Displacement Mapping

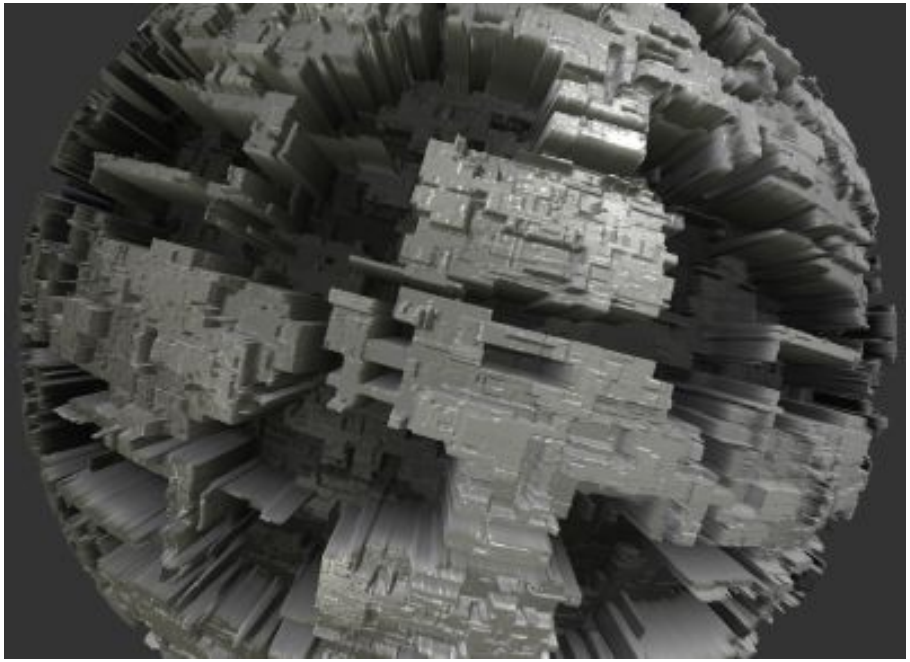


ORIGINAL MESH

DISPLACEMENT MAP



MESH WITH DISPLACEMENT



Fin

¿Preguntas?