

PV227 GPU programming

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Textures

- texture images,
 - diffuse texture,
 - dissolve effect,
 - cube map,
 - normal map.



Diffuse texture

- texture for object appearance,
- used to modulate the computed light,
- should not be used for specular component.

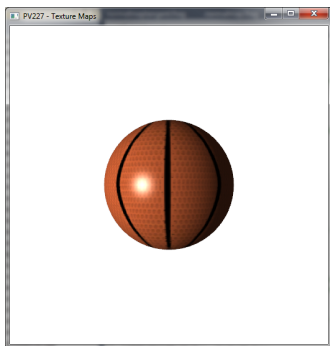


Figure: Texture modulating ambient + diffuse color.

Dissolve effect

- **discard** some of the fragments based on the texture value,
- animation through changing the threshold.

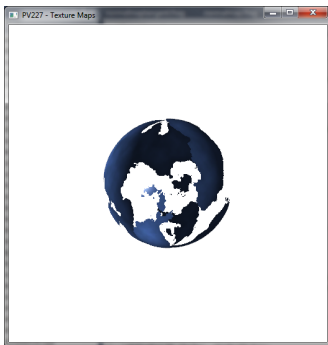


Figure: Dissolve effect with $t=0.5f$.

Cube map

- six textures mapped to sides of a cube,
- accessed with a vector from the center of the cube in world space.

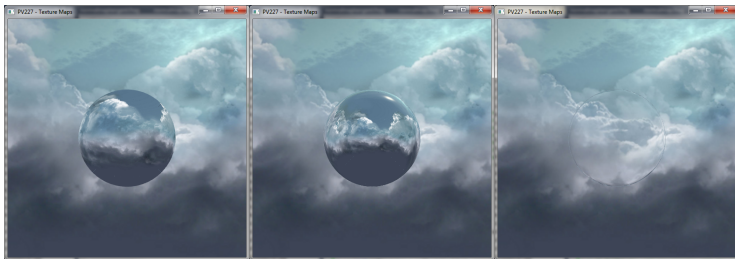


Figure: Various methods of computing cube map vector.

Cube map

- any access vector can be computed,
- can be used as regular texture,
- can be used to “follow” a modified light path.

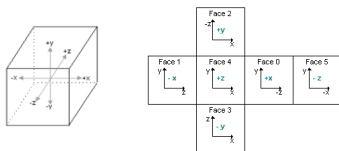


Figure: D3D perspective. Taken from gpwiki.org

Normal map

- modify the normal for lighting to increase details,
- the normal map may be position dependent / independent.

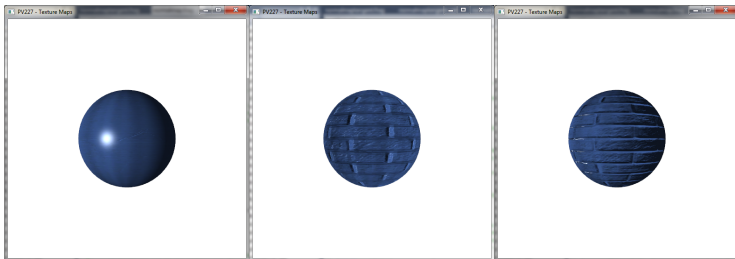


Figure: Various methods of using the normal map.

Normal map

- vector is stored per texel (only height for bump map),
- Object/World normal map,
 - stores normals in object/world space,
 - predominantly green / yellow / red,
 - usefull only for fixed objects,
- Tangent normal map,
 - stores normals in tangent space,
 - predominantly blue,
 - any object, any position / rotation.



Normal map

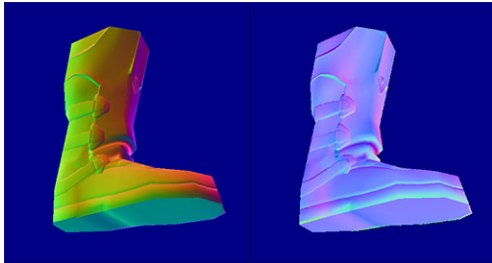


Figure: Taken from crydev.net

Tangent Normal map

- computations take place in tangent space,
- light and eye must be transformed to this space,
- conversion by a transform matrix,
- \vec{n} , \vec{t} , \vec{b} are in camera space.

$$\begin{pmatrix} t.x & t.y & t.z \\ b.x & x.y & b.z \\ n.x & n.y & n.z \end{pmatrix}$$

