Lesson 7 – Textures
PV227 – GPU Rendering

Jiří Chmelík, Jan Čejka
Fakulta informatiky Masarykovy univerzity

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Textures

Lots of usages...

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

Diffuse Texture

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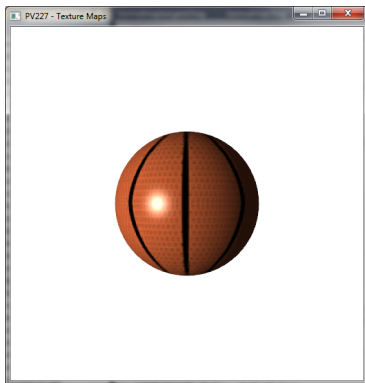- should not be used for specular component.

Figure: Texture modulating ambient + diffuse color.

Dissolve Effect

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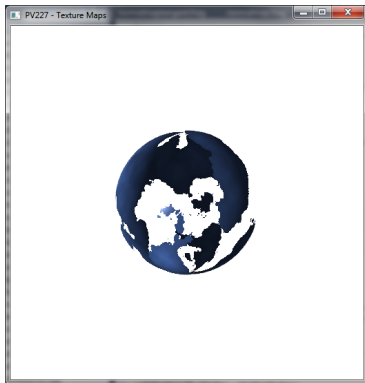- animation through changing the threshold.

Figure: Dissolve effect with t=0.5f.

Cube Map

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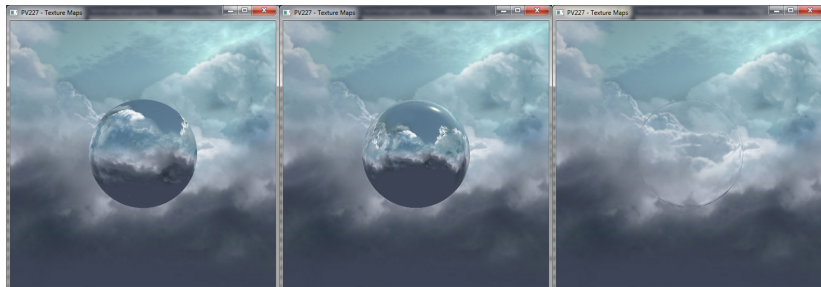- accessed with a vector from the center of the cube in world space.

Figure: Various methods of computing cube map vector.

Cube Map Indexing

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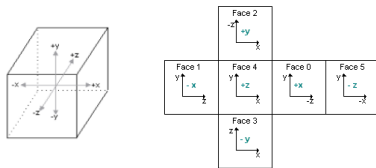- can be used to "follow" a modified light path.

Figure: D3D perspective. Taken from gpwiki.org

Normal Map

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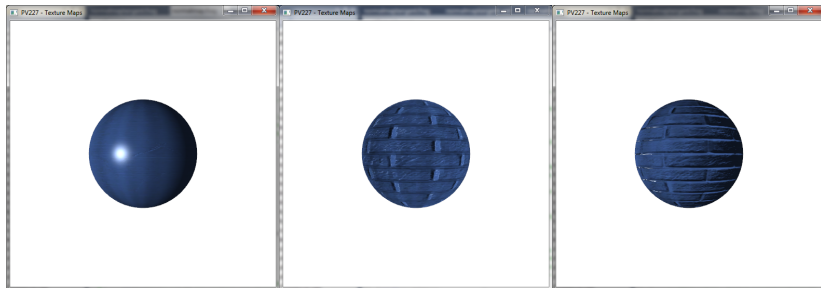- the normal map may be position dependent / independent.

Figure: Various methods of using the normal map.

Normal Map Types

- 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,
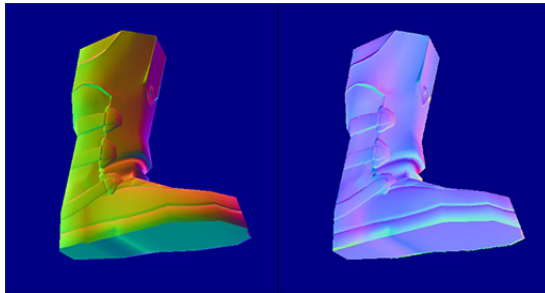 - any object, any position / rotation.

Normal Map Examples

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.

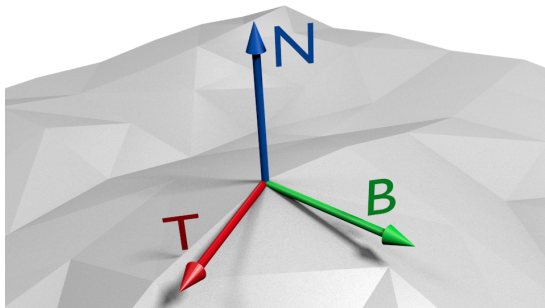$$\begin{Bmatrix} t.x & t.y & t.z \\ b.x & x.y & b.z \\ n.x & n.y & n.z \end{Bmatrix}$$

Tangent Space

Figure: Taken from txutxi.com