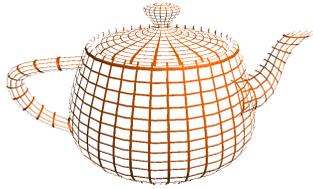




Texturas - Cube Mapping

Computação Gráfica



OpenGL - Environment Map

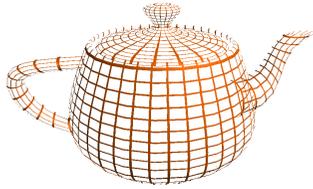
Cube Mapping



www.nvidia.com

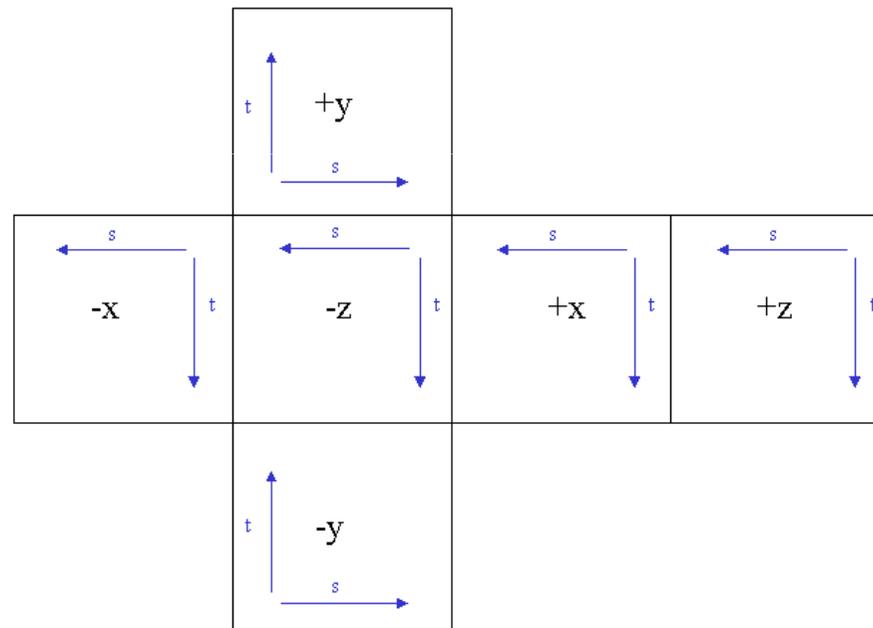


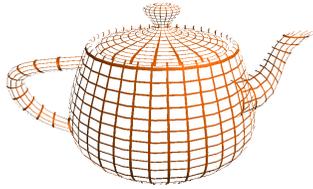
- Cubo centrado na origem.
- Cada texel representa o que seria visto a partir da origem nessa direcção



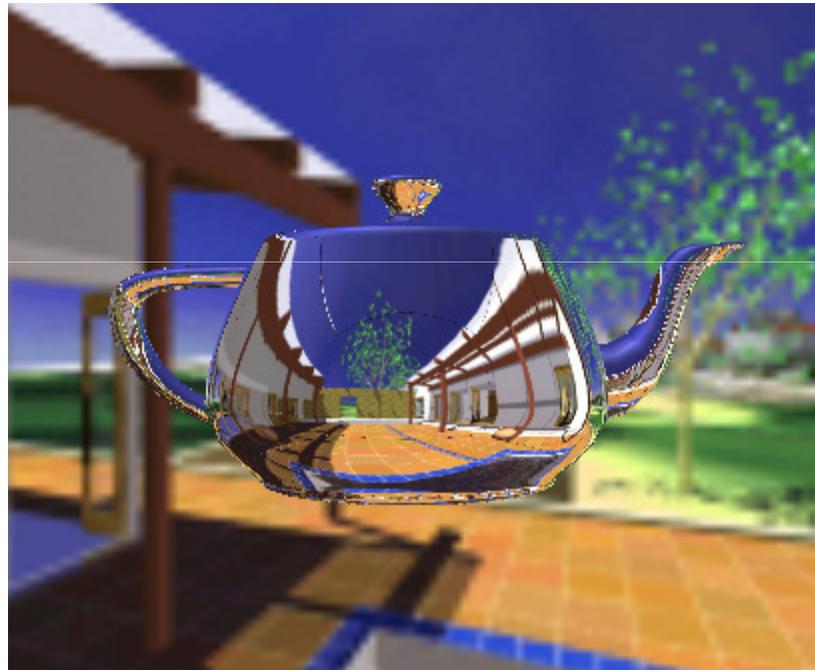
OpenGL - Environment Map

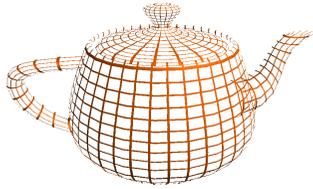
- Orientação das Imagens





OpenGL - Environment Map





OpenGL - Environment Map

- Código OpenGL para criar Cube Map

```
glGenTextures(1, texName);  
glBindTexture(GL_TEXTURE_CUBE_MAP, texName[0]);
```

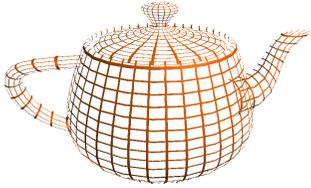
```
for (i=0; i<6;i++) {
```

```
    glTexParameteri(GL_TEXTURE_CUBE_MAP, GL_TEXTURE_MIN_FILTER, GL_LINEAR);  
    glTexParameteri(GL_TEXTURE_CUBE_MAP, GL_TEXTURE_MAG_FILTER, GL_LINEAR);
```

```
    glTexImage2D(faceTarget[i], 0, GL_RGB, imageWidth, imageHeight,  
                 0, GL_RGB, GL_UNSIGNED_BYTE, imageData);
```

```
}
```

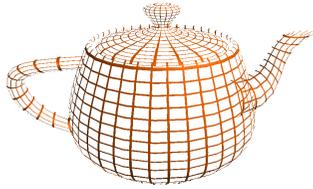
```
static GLenum faceTarget[6] = {  
    GL_TEXTURE_CUBE_MAP_POSITIVE_X,  
    GL_TEXTURE_CUBE_MAP_NEGATIVE_X,  
    GL_TEXTURE_CUBE_MAP_POSITIVE_Y,  
    GL_TEXTURE_CUBE_MAP_NEGATIVE_Y,  
    GL_TEXTURE_CUBE_MAP_POSITIVE_Z,  
    GL_TEXTURE_CUBE_MAP_NEGATIVE_Z  
};
```



OpenGL - Environment Map

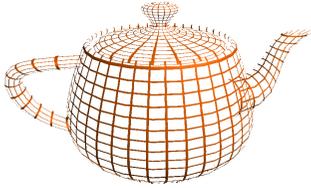
- Código OpenGL para preparar estado para Cube Map

```
glEnable(GL_TEXTURE_CUBE_MAP);  
glEnable(GL_TEXTURE_GEN_S);  
glEnable(GL_TEXTURE_GEN_T);  
glEnable(GL_TEXTURE_GEN_R);  
glTexGeni(GL_S, GL_TEXTURE_GEN_MODE, GL_REFLECTION_MAP);  
glTexGeni(GL_T, GL_TEXTURE_GEN_MODE, GL_REFLECTION_MAP);  
glTexGeni(GL_R, GL_TEXTURE_GEN_MODE, GL_REFLECTION_MAP);
```



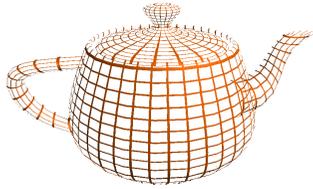
OpenGL - Environment Map

- Vantagens:
 - Rápido em Hardware
 - Fácil de Gerar em Runtime



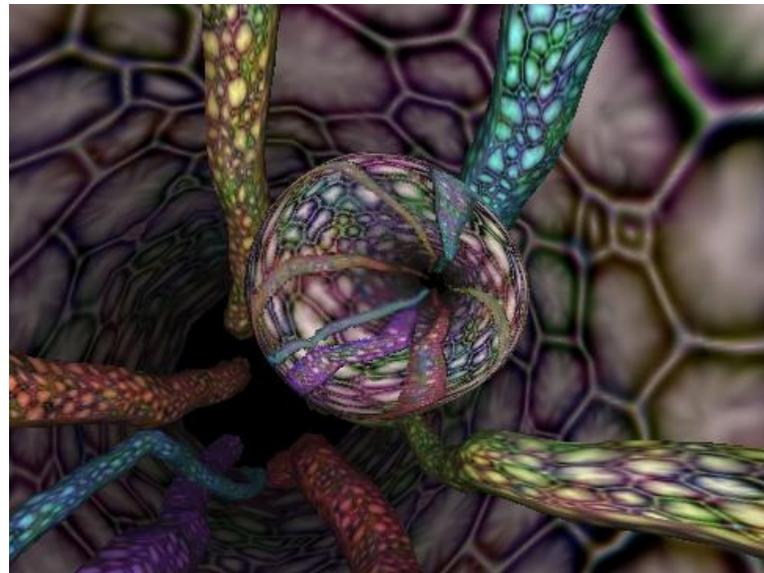
OpenGL - Environment Map

- Geração para cenas artificiais:
 - Definir uma camera com ângulo de visão de 90° centrada na origem do objecto
 - Apontar a camera no eixo do $X+$ e capturar o frame buffer para uma textura do cubo
 - Repetir para as restantes 5 direcções.

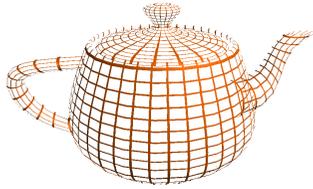


OpenGL - Environment Map

- Geração em tempo real



www.nvidia.com



OpenGL - Environment Map

- Ray Tracing Simulado

