Shading Lightening Rendering

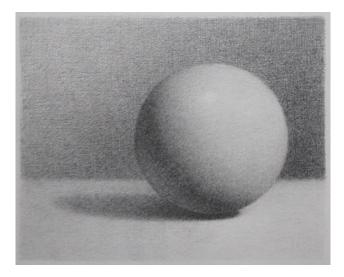
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Lab 02

Shading:

In computer graphics refers to the process of altering the color of an object/surface/polygon in the 3D scene, based on its angle to lights and its distance from lights to create a photorealistic effect.



Materials and Texture

Blender has 3 different rendering engine:

OpenGL - Internal - Cycles

Non Physically vs Physically Based Rendering

realtime engine of Blender 2.8(beta), nicknamed Eevee

Why are we going to use Cycles for this mini-project?

- Photorealistic
- GPU
- It's the Future
- 360° videos for free

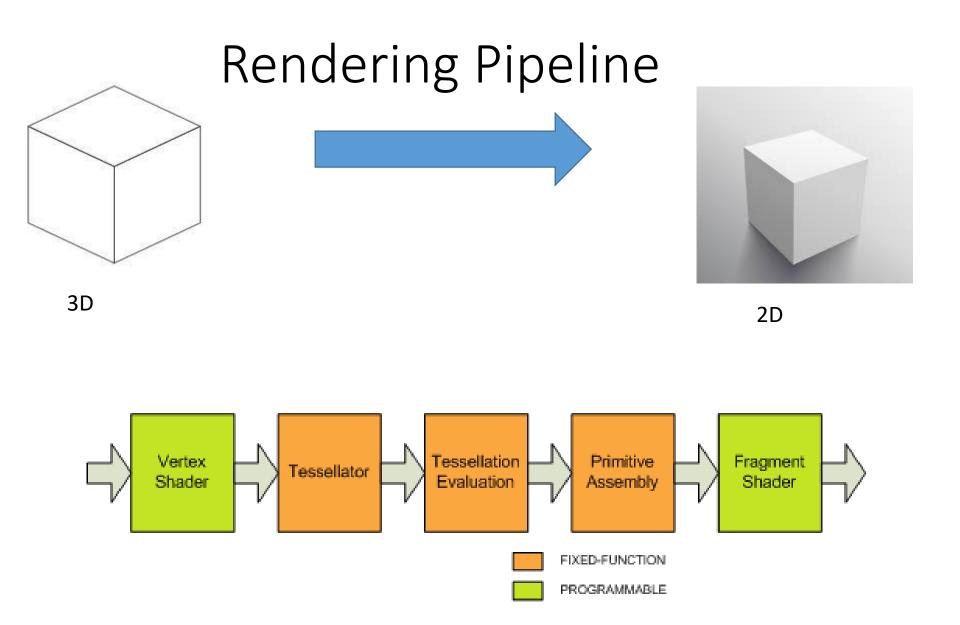
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		Blender <u>R</u> ender	
		<u>B</u> lender Game	
		Cycles Render	
		Engine	



CONS



Slower

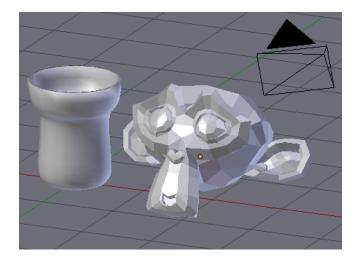


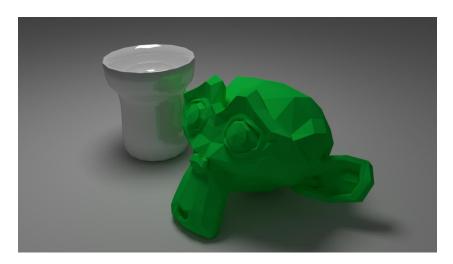
Shaders:

```
shader simple_material(
    color Diffuse_Color = color(0.6, 0.8, 0.6),
    float Noise_Factor = 0.5,
    output closure color BSDF = diffuse(N))
{
    color material_color = Diffuse_Color * mix(1.0, noise(P * 10.0), Noise_Factor);
    BSDF = material_color * diffuse(N);
}
```







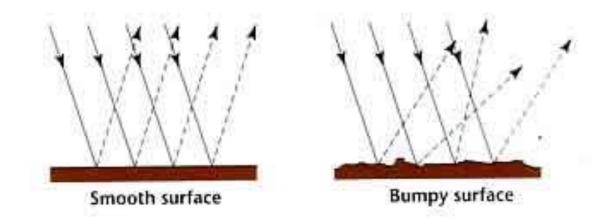


Cycles BSDF Materials (bidirectional scattering distribution function)

"mathy description of how light interacts with a surface."

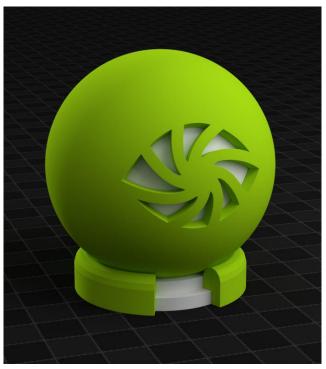


Smooth surface vs Bumpy surface



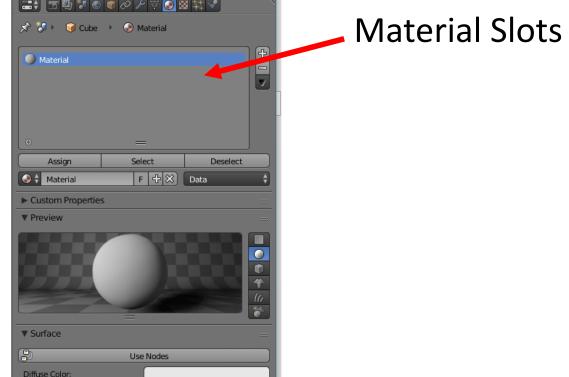
Cycle Shaders

<u>https://www.blenderguru.com/articles/cycles-shader-encyclopedia</u>

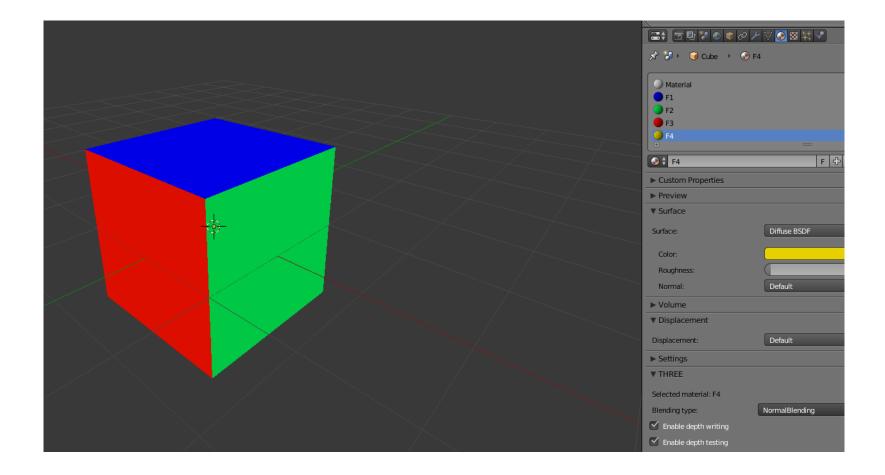


Let's try to assign more materials to the same cube.

- 1. Select a cube face
- 2. Go to the material tab in the property view
- 3. Add a new material and assign it to the selected face

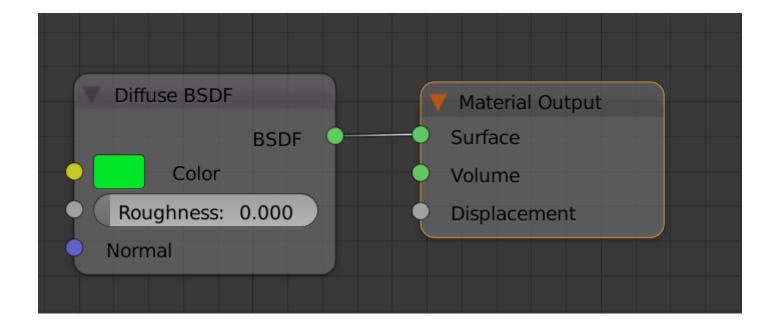


Cube Multi Material:

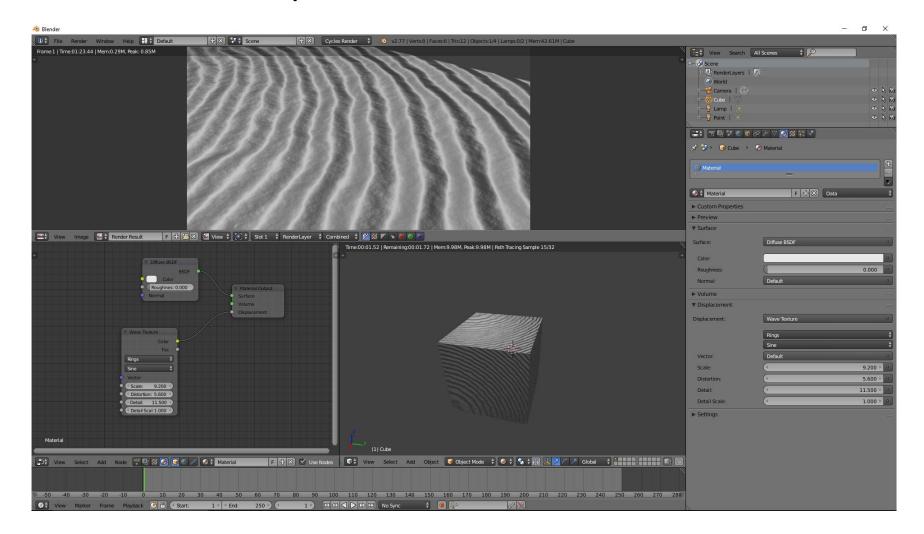


Node Editor (materials)

• How do they works?



Procedural Texture: Color – Displacement – etc etc



Types of Light:

- Point
- Sun
- Spot



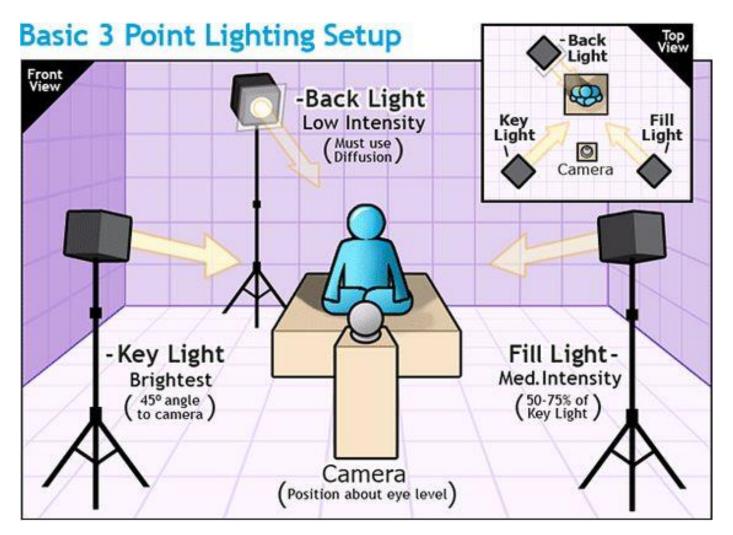
- Area
- ...
- In Cycles you are also going to use meshes with emissive material to light up the scene (scale, colour)

Let's add some plane/lights

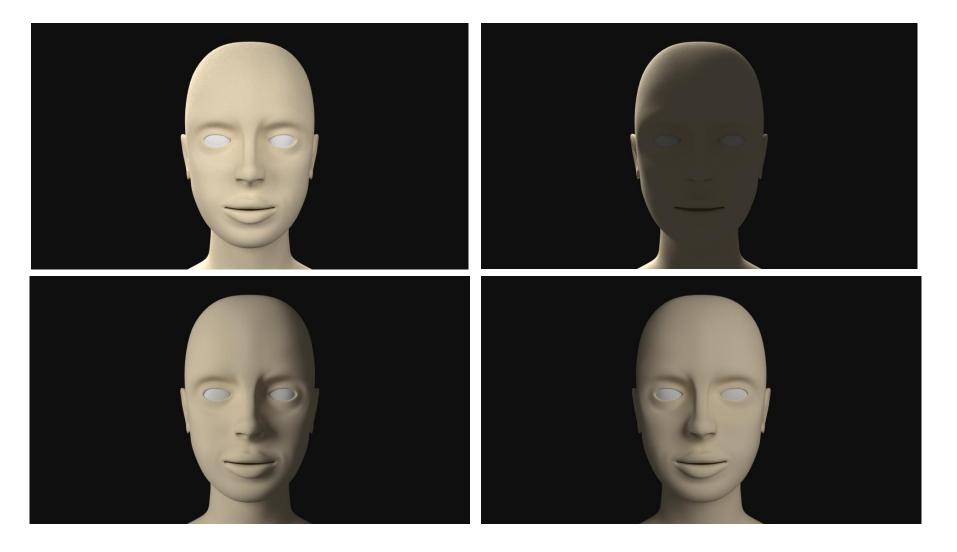
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Lightening

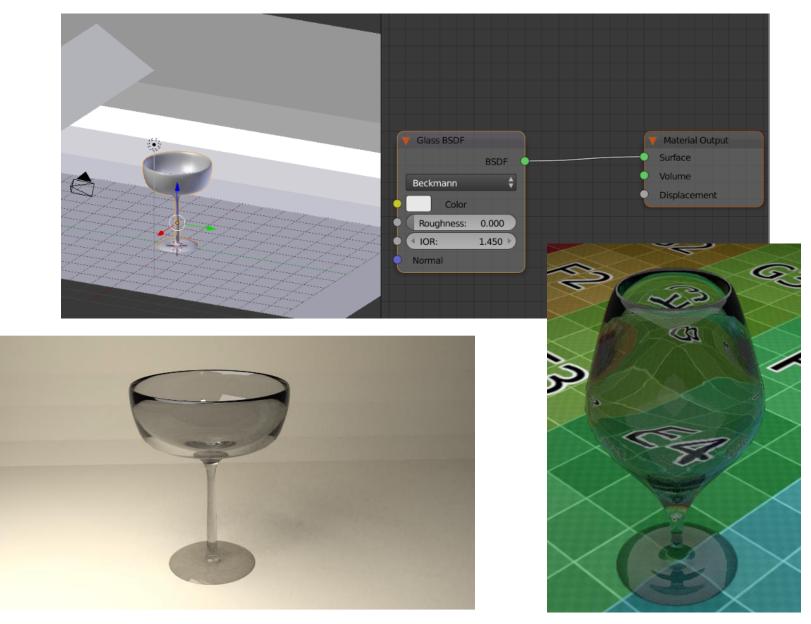
• Let's talk about the Three-point Light setup



3 points light setup result:



Glass BSDF Shader:



Porcelaine (mix Shader)



What is an HDR image ?

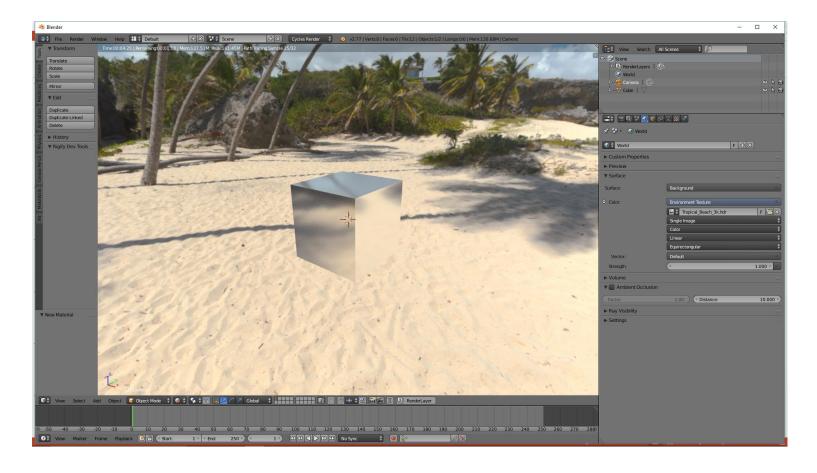
- The pixel's colour of an RGB image is defined by 3 uchar 0-255 (24-32 bit)
- The colour white for example is R=255 G=255 B=255
- In the HDR image the range values is greater



HDR Lightening: (Environment)

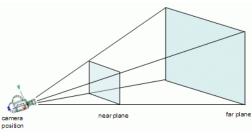
• Use the World nodes to add an HDR image

http://www.hdrlabs.com/sibl/archive.html (free hdr images)



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Output format:

 Single Images: (preferred way) (Png Lossless vs Jpg Lossy vs openEXR hdr) Compositing required (from image to video)

• Video:

Fine for fast prototypes, but if something goes wrong we need to render everything again... (not the optimal choice for production)

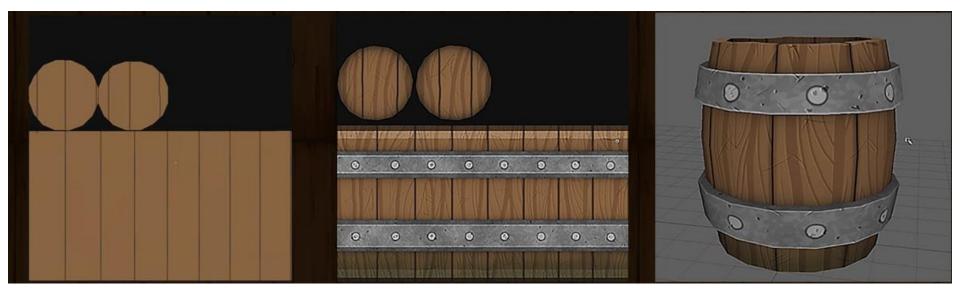
RenderFarm:

• We can also setup a Renderfarm



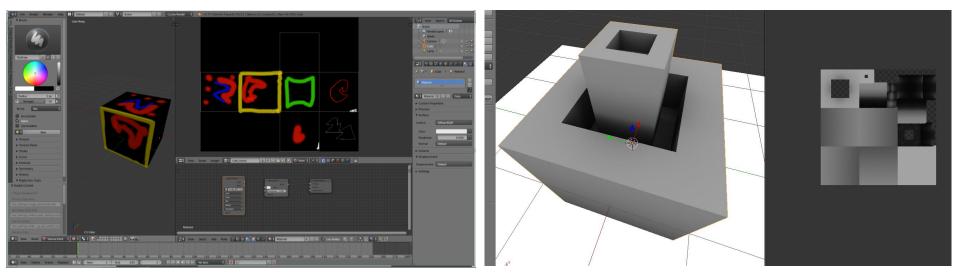
Texturing:

- From images/painting
- Procedural

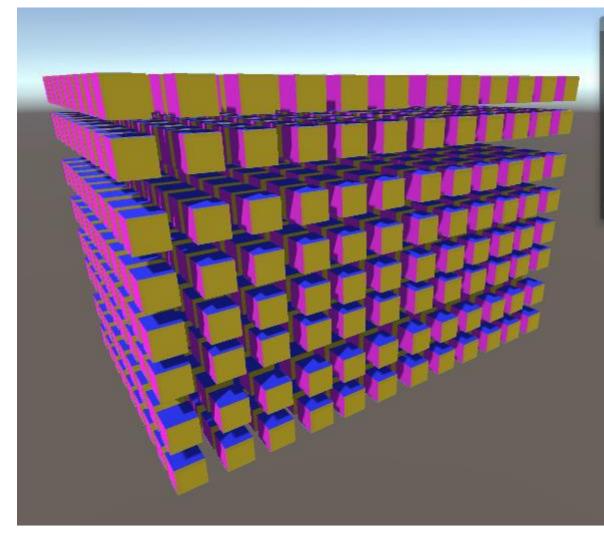


Unwrapping the mesh:

- The texture is projected (stretched) from 2D to 3D
- Automatic vs Manual unwrapping
- Mark/Remove seams (were to cut?)
- Paint texture
- Bake texture/AO



Texture vs Material in Unity3D:



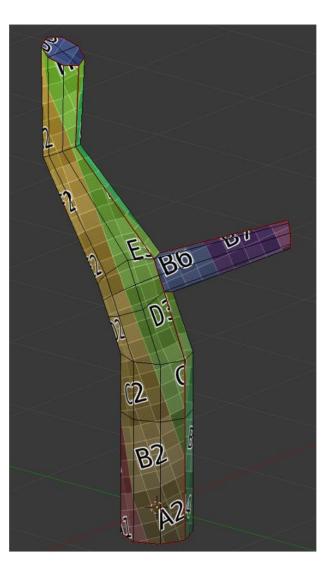
Graphics:

CPU: main 6.0ms render thread 4.4ms Saved by batching: 3565 Batches: 8 Tris: 44.5k Screen: 1101x551 - 6.9 MB SetPass calls: 8 Shadow casters: 1842 Visible skinned meshes: 0 Animations: 0

Network: (no players connected)

Where to Mark Seam?

- Avoid stretching
- Avoid visible cut (Seamless texture)



Texturing palette low poly scene:

