

CS7029 Animation Project

Part 2: Materials and Textures

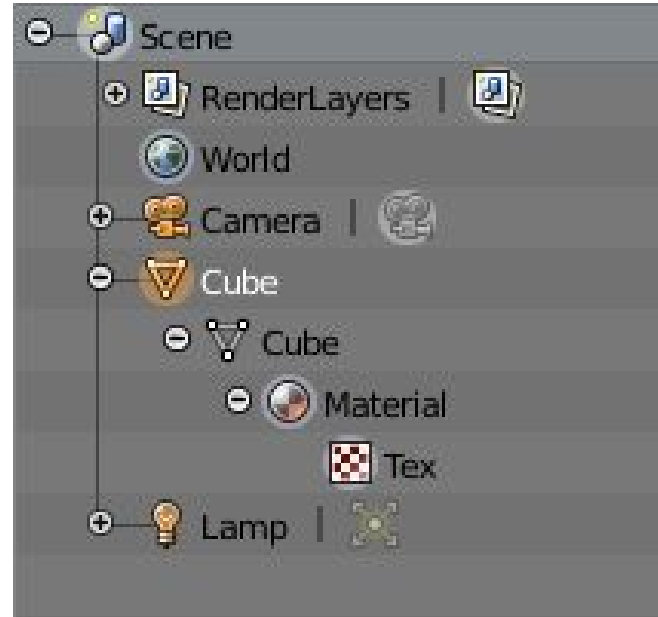
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materials with shaders

Materials

What is a “material” exactly?

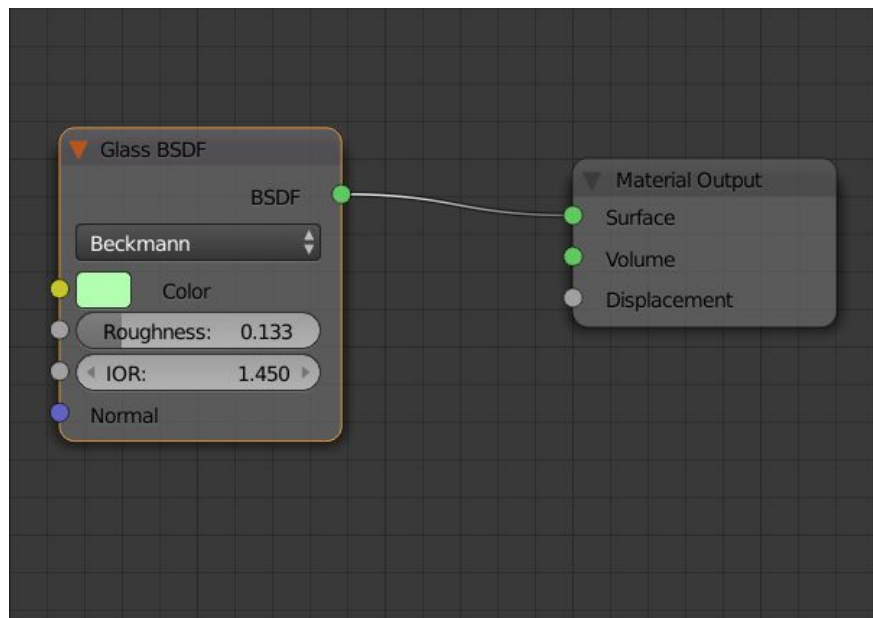
- container/abstraction
 - **shaders:** define drawing style
 - **textures:** (images)



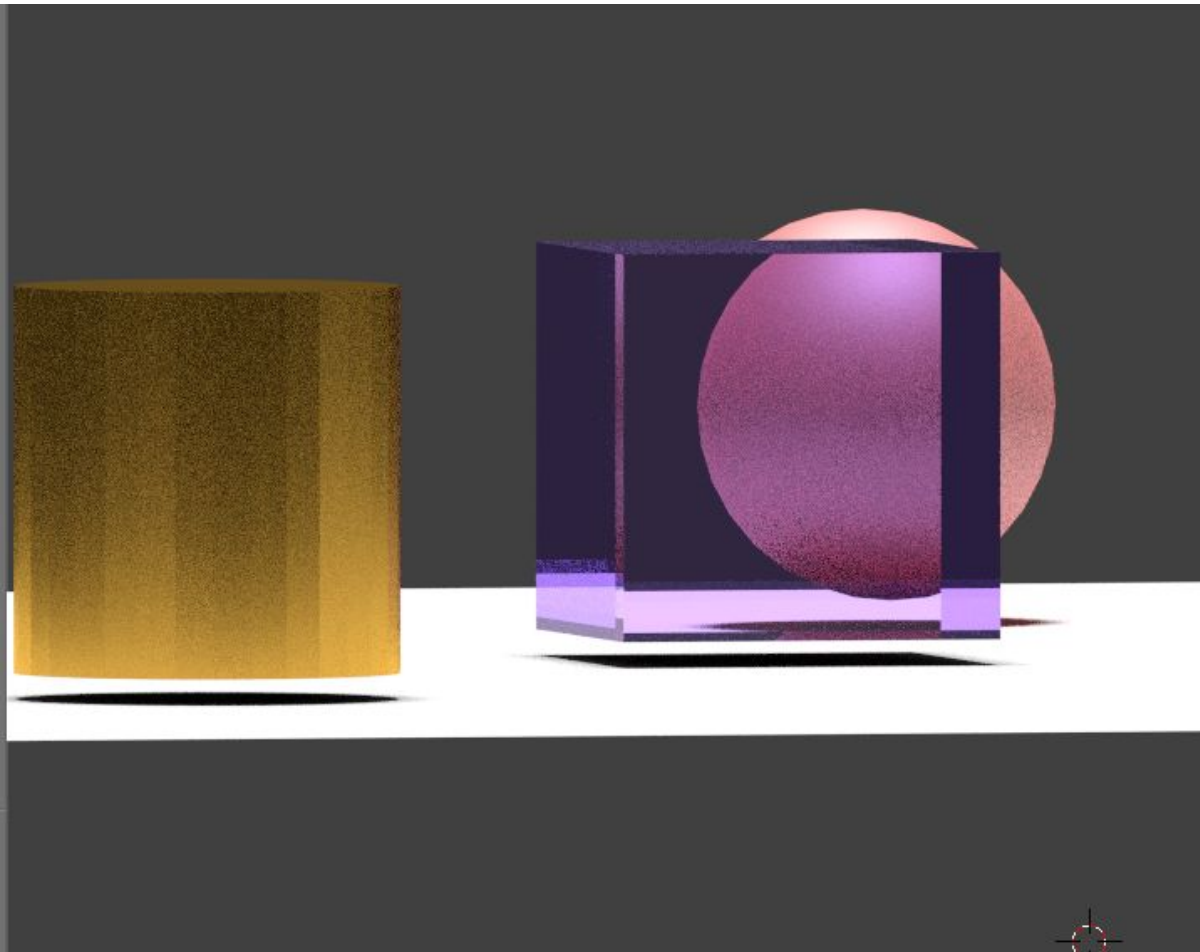
https://www.blender.org/manual/render/blender_render/materials/introduction.html

Shaders: style of rendering

- mini **programmes**
- written in a shader programming language
 - e.g. OpenGL has GLSL shaders
 - Blender has its own too
- define **lighting** interactions:
 - reflection, refraction
 - surface colours
- sample colours from **textures**
- **inputs** and [colour] **outputs**



a material using the “**glass**” shader.
“BSDF” = affected by lighting
tweak some settings
“IOR” = index of refraction
shader **output** is linked to surface colour



▼ Glass BSDF

BSDF

Beckmann

Color

Roughness: 0.000

IOR: 1.450

Normal

▼ Material

Surface

Volume

Displacer

this is a wonderful tutorial for materials in cycles

<https://www.youtube.com/watch?v=YR-m5J6vDt8>

Blender Tutorial - Rendering with Cycles by Sardi Pax

and for reducing noisy 'fireflies' further:

<http://www.blenderguru.com/articles/7-ways-get-rid-fireflies/>

materials summary

- materials **combine** base properties, shaders, [and optional textures]
 - older Blender had properties based on Phong's lighting model
 - diffuse (Lambert) colour
 - specular colour
 - newer Blender has properties based on "physically based rendering"
 - base colour
 - roughness
- **style** of rendering / colouring / lighting
- limited control in **object properties** pane
- more *noodly* visual control in the **node editor** mode
 - can **mix** outputs from multiple shaders to final surface colour
- i don't use blender materials for games models

textures

Background to Textures and Texture Mapping

Academic and technical history (insight you won't get this from tutorials)

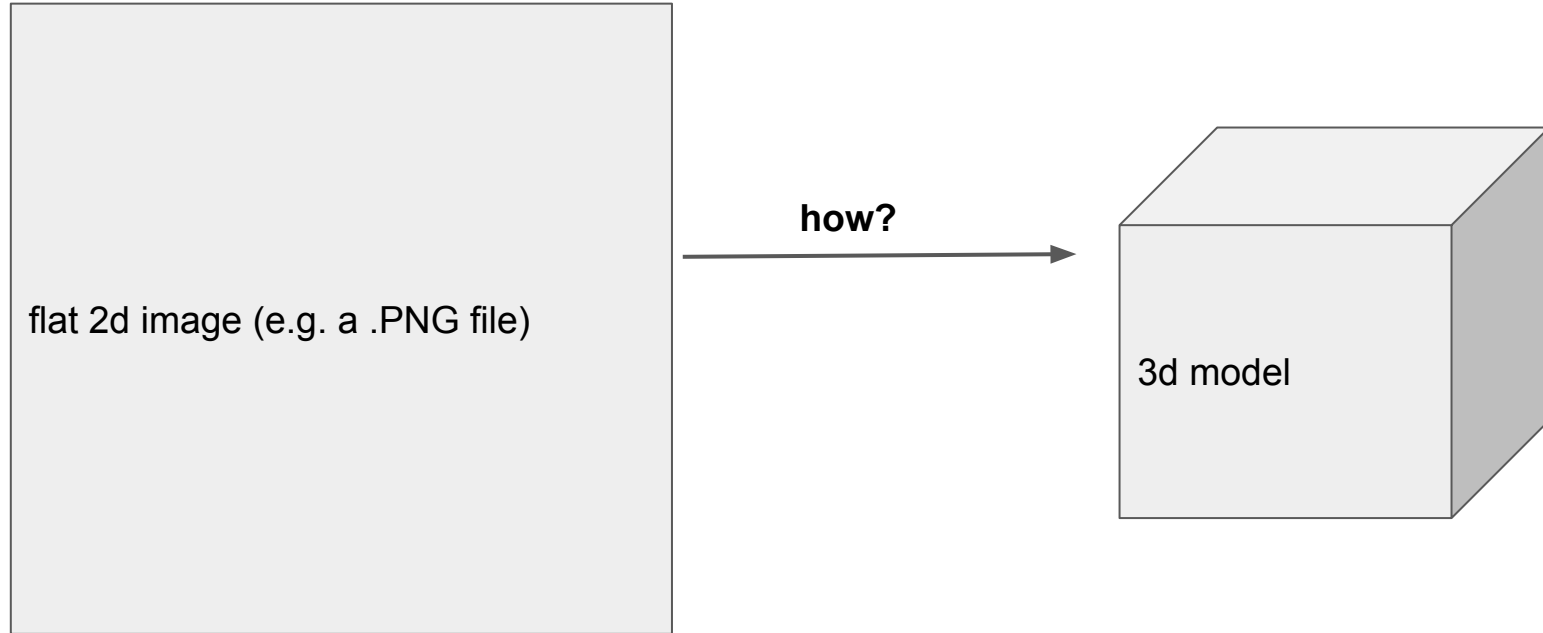
Texture mapping is about **using images transformed in 3d**

Did anyone see **Ed Catmull** talk here before the Web Summit? (Walt Disney and **Pixar** Animation Studios)

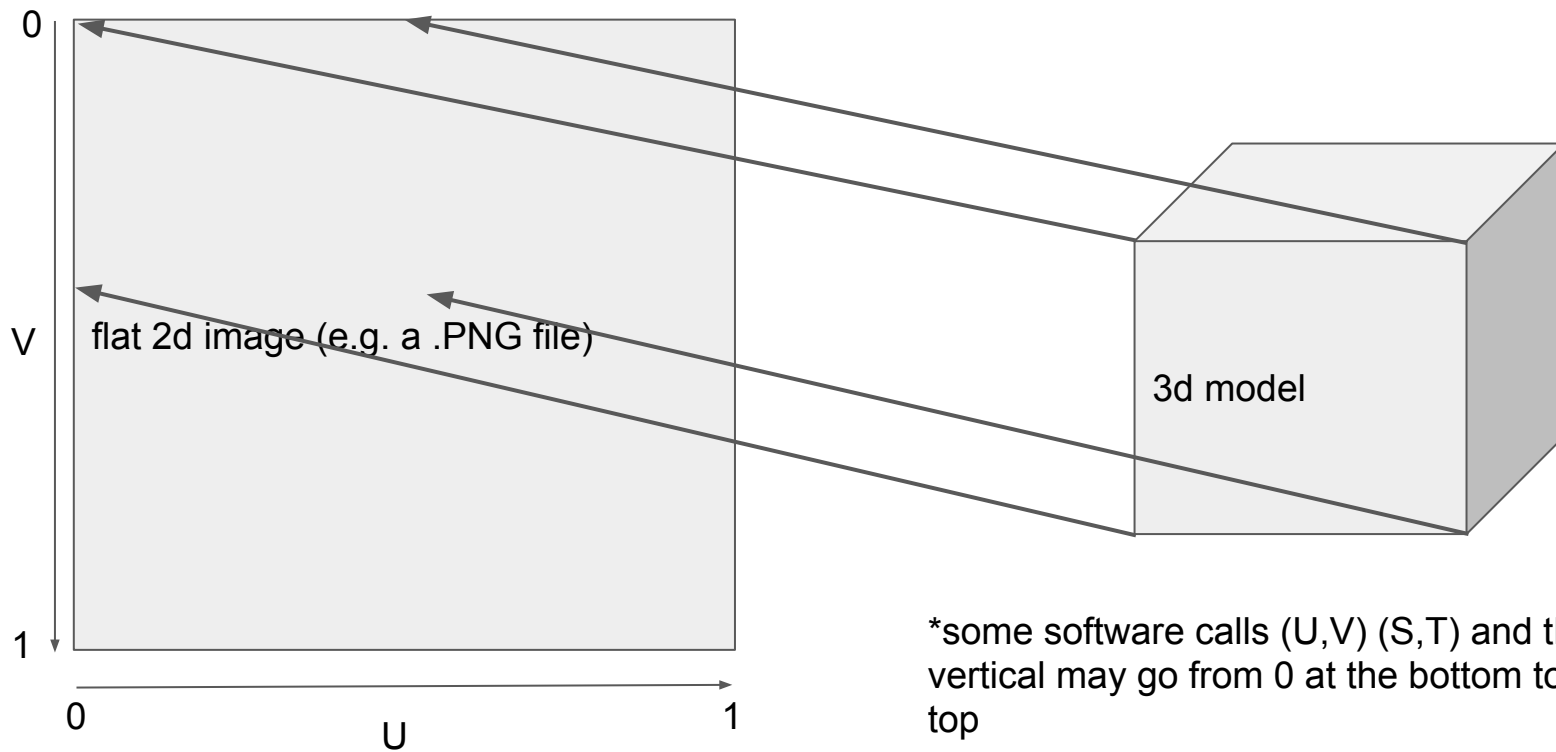
Why “textures?” - that is a weird name. History of CG and lighting.

1974 PhD thesis “*A Subdivision Algorithm for Computer Display of Curved Surfaces*”

Basic Principle



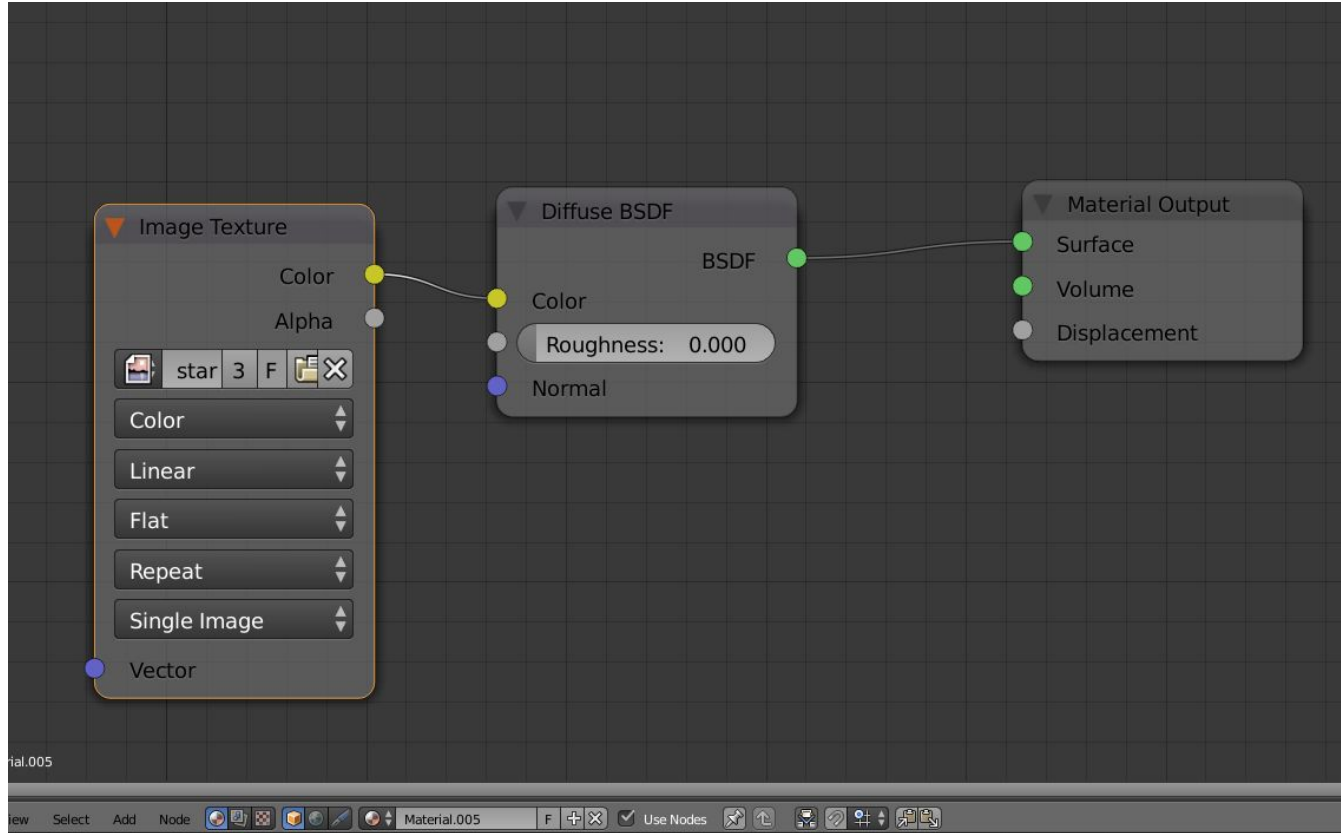
Texture Coordinates



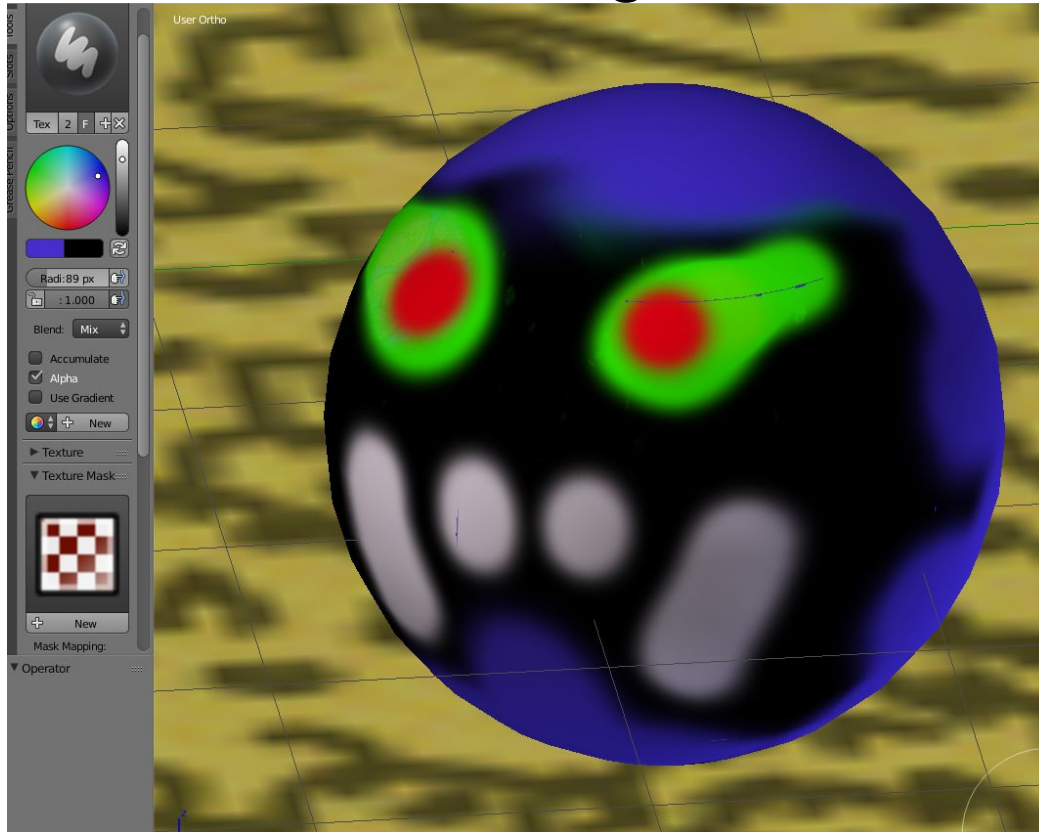
Creating Texture Coords in Blender

- By default each mesh is just a list of XYZ XYZ XYZ vertex positions
- To add UV for each vertex - “unwrap” a selected mesh
- In **edit mode** (in 3d window) for selected object press **U**
- You have lots of different automatic layout options
- Change the pane view to **UV/Image Editor** to manually lay out texture coords

Easiest Way to Add a Texture Image to a Material

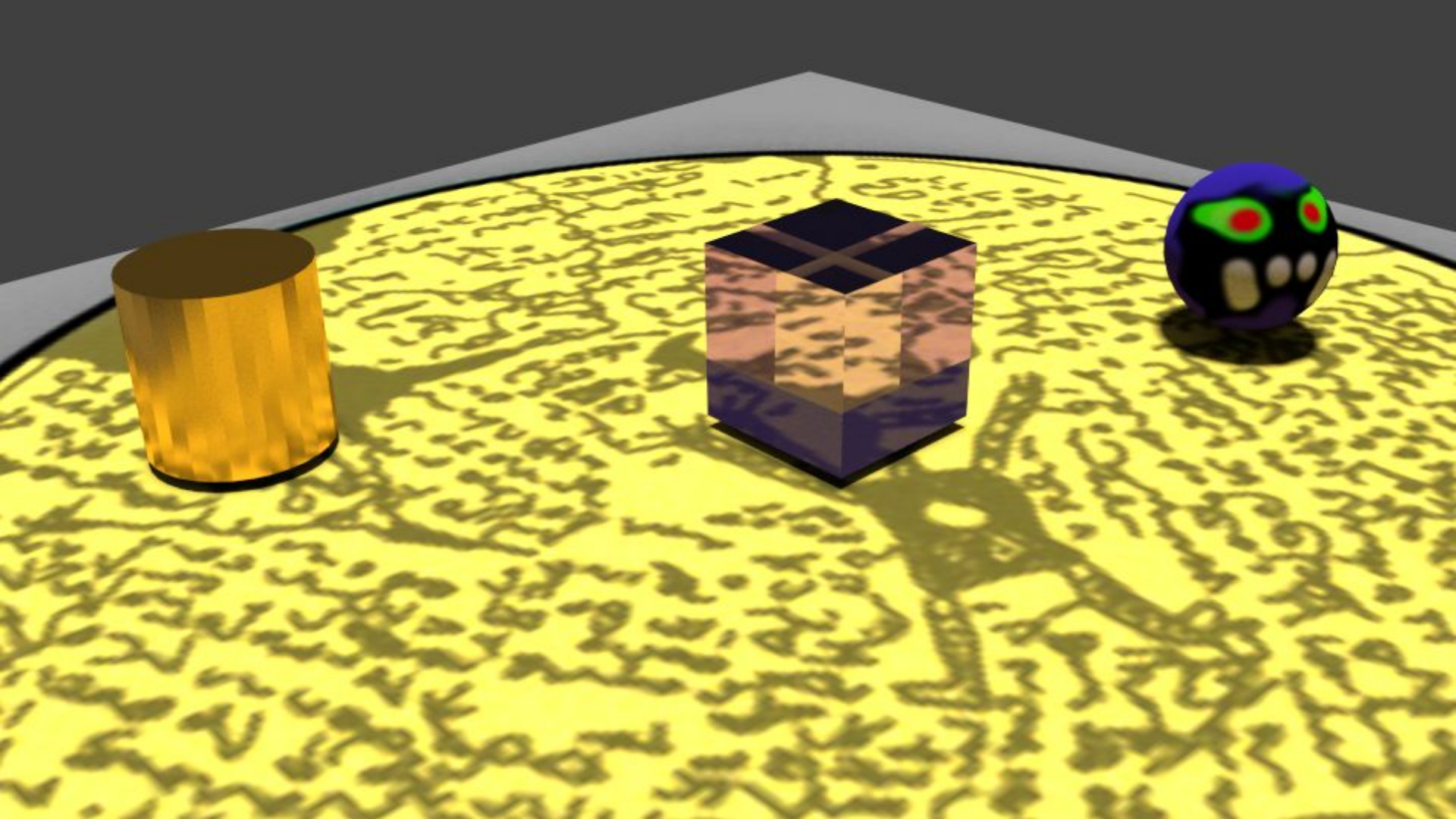


3d Texture Painting in Blender



- loads of fun
- **texture paint** mode in 3d window
- first create UVs
- modify material to accept a texture input (e.g. in **node editor**)
- create a blank texture (e.g. in **UV/image editor**)
- may have to disable Texture Mask and Texture brush in paint pane on the left there (annoying)
- can use a drawing tablet

- remember to save the final image to a file for later (in **UV/image editor**)



little speed-up tip

if your computer has a good graphics card...(my work ones don't)

to make Blender use your GPU with the cycles renderer

https://www.blender.org/manual/fr/render/cycles/gpu_rendering.html

user prefs mode (and drag down) -> system -> CUDA (NVIDIA cards) or OpenCL
(all cards)

->save

Chappie - a nice read about texturing work

<http://image-engine.com/film/chappie/>

“It wasn’t just a case of crafting a single Chappie model and being done with it – Image Engine had to create 16 different damage states for the robot, accomplished through **texture**, **model** and look development **variations**, or a combination of the three. Asset builds were managed with **Shotgun** and **Maya** communicating directly, along with a **proprietary asset management** workflow developed in-house to make sure everything went as smoothly as possible.”

software to create a video from image sequence

http://www.andrewnoske.com/wiki/Convert_an_image_sequence_to_a_movie

our lab uses **virtualdub** and **premier pro** (Windows)

i use **imagemagick** and **openshot** on linux

i was sure Quicktime basic did it too - nope! pro only.

storyboards

<http://www.premiumbeat.com/blog/10-tips-for-creating-storyboards-from-dreamworks/>

grease pencil - hold down **D** and click and drag

stays for subsequent frames until a new penciling is started