

CGP3007M

Advanced Games Studies

LECTURE : MODELLING PIPELINE



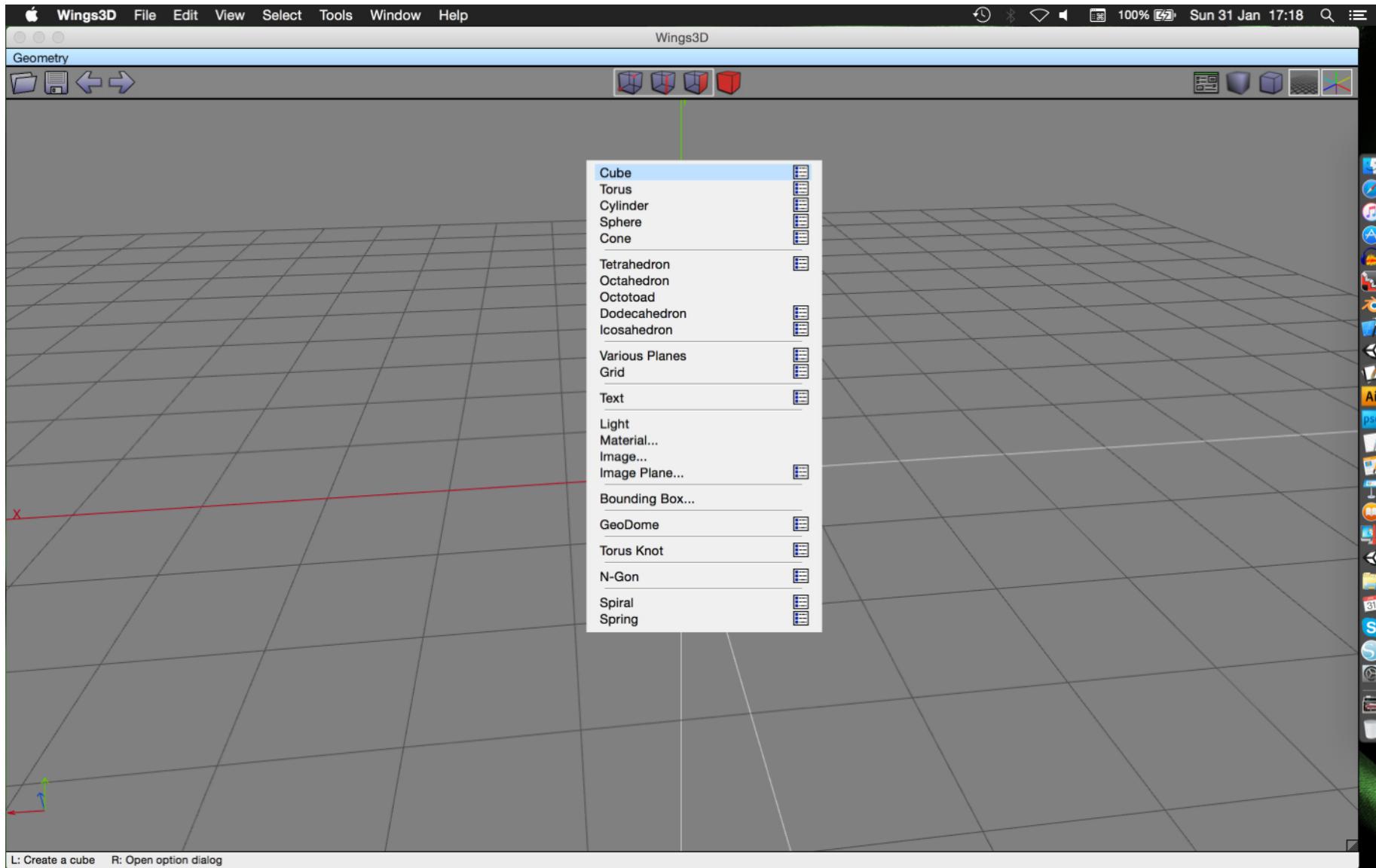
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Wings 3D Recap

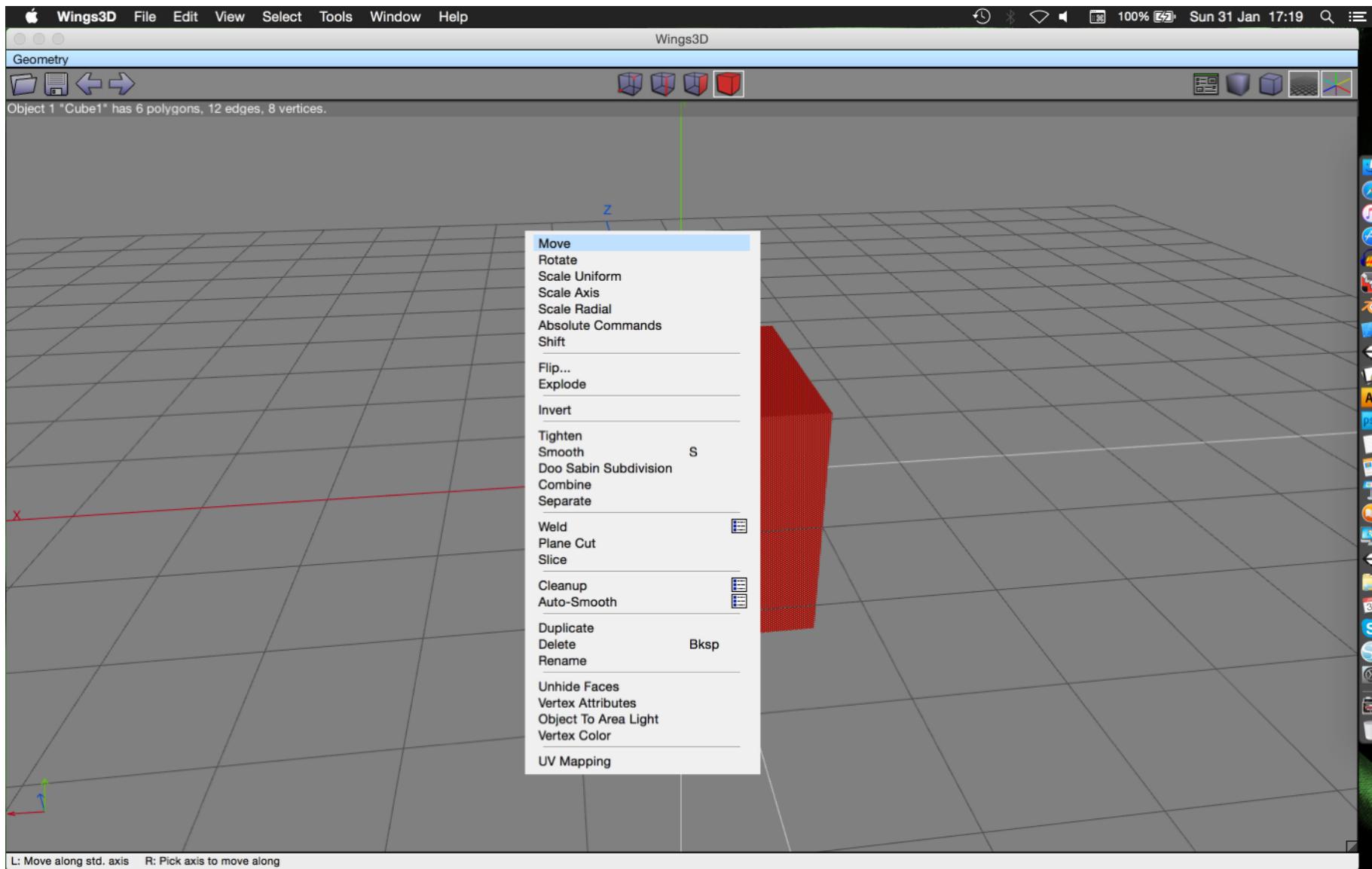
A recap of some of the Wings 3D features...



Object Menu

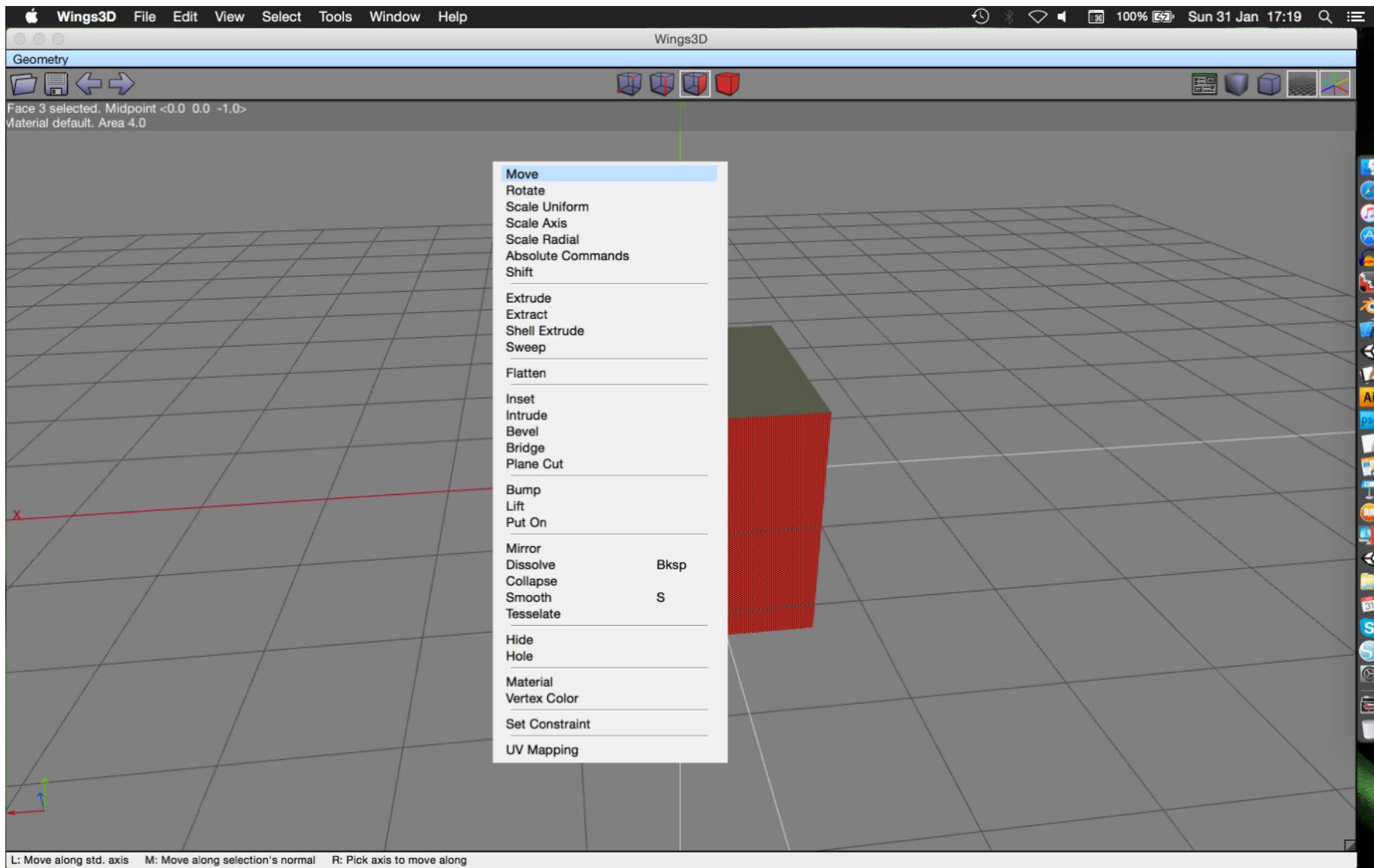


Body Menu



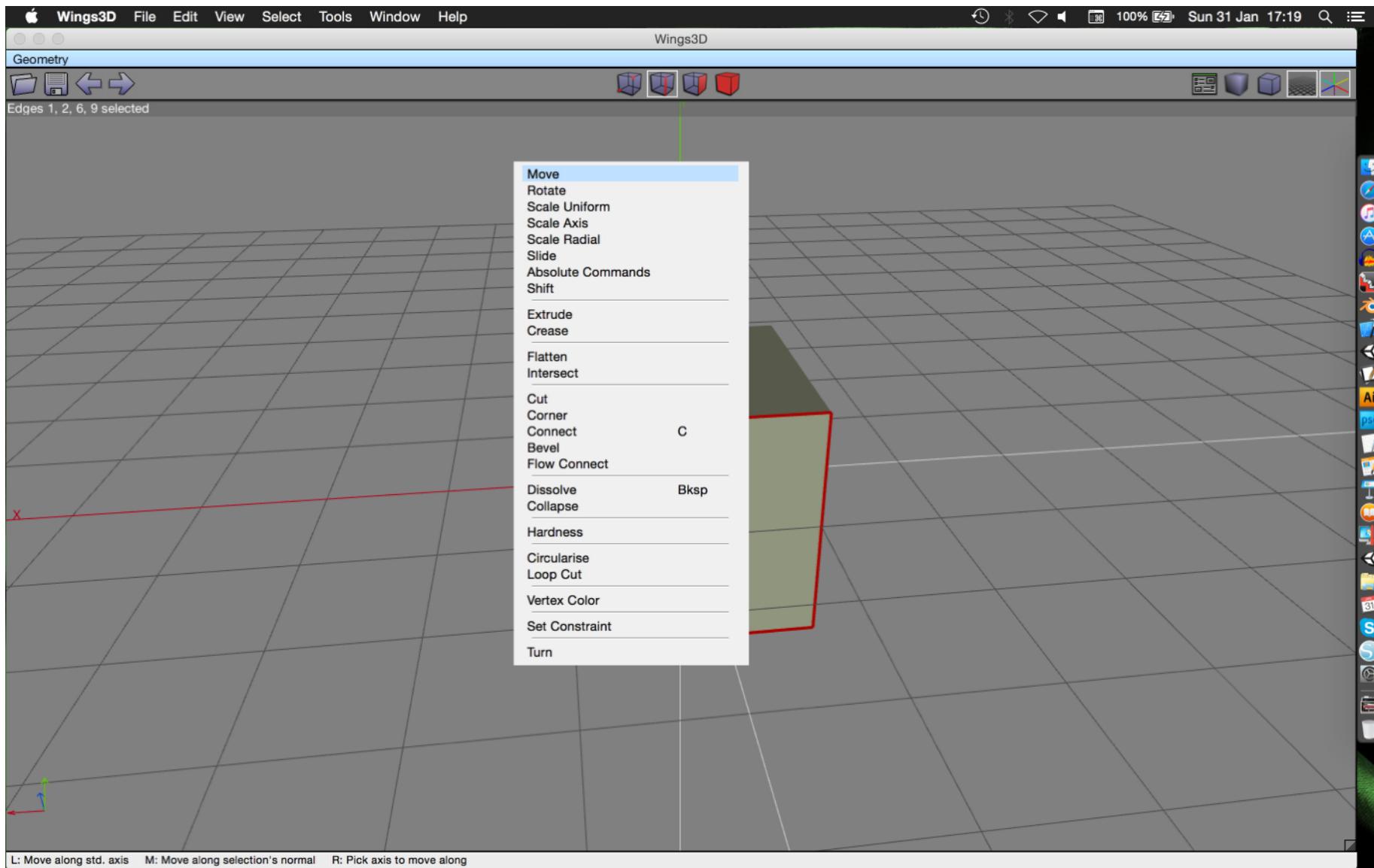
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Face Menu



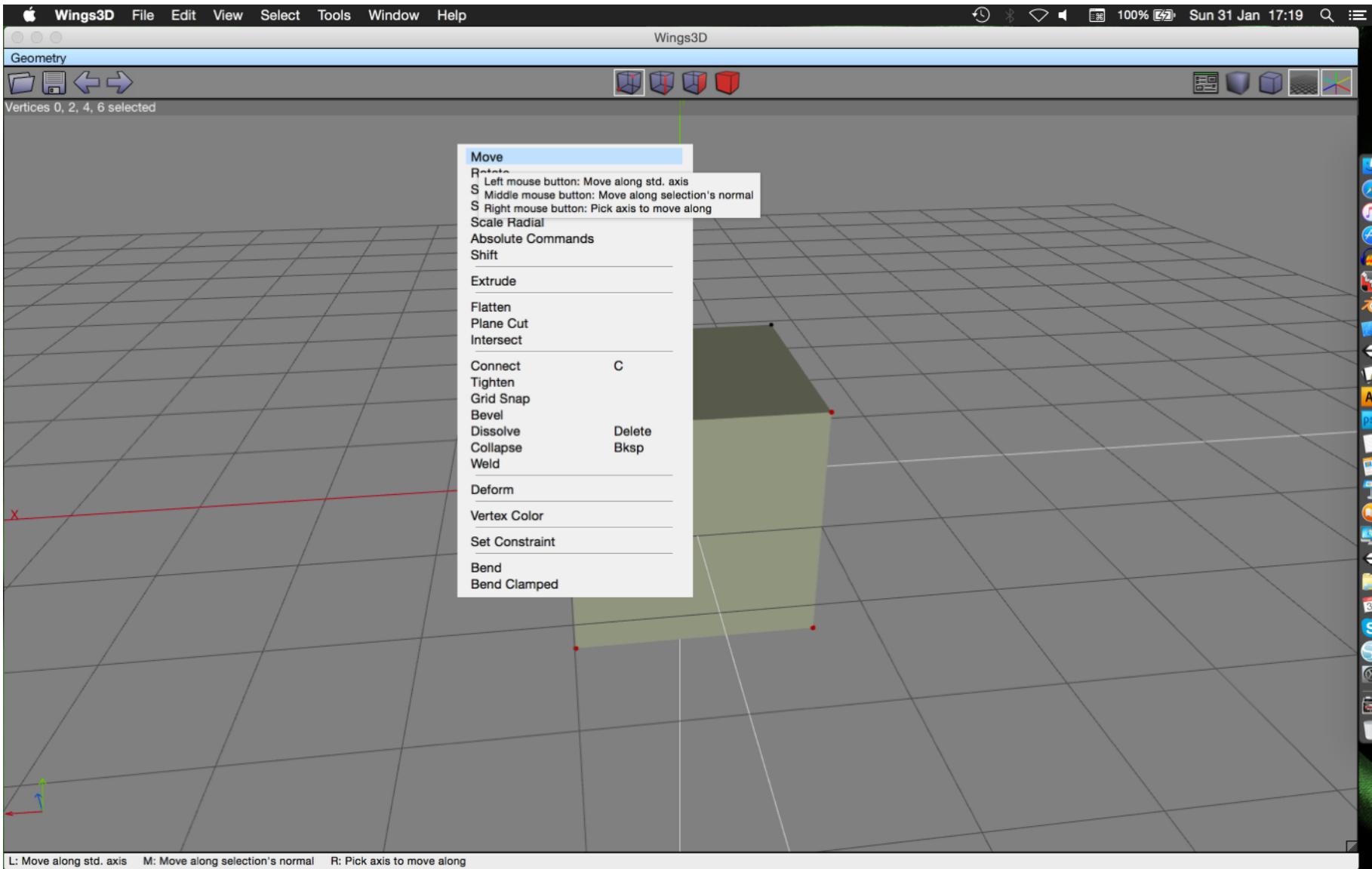
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Edge Menu



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Vertex Menu



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Hotkeys

Useful hotkeys for swapping between the selection modes are:

“B” for body

“F” for Face

“E” for Edge

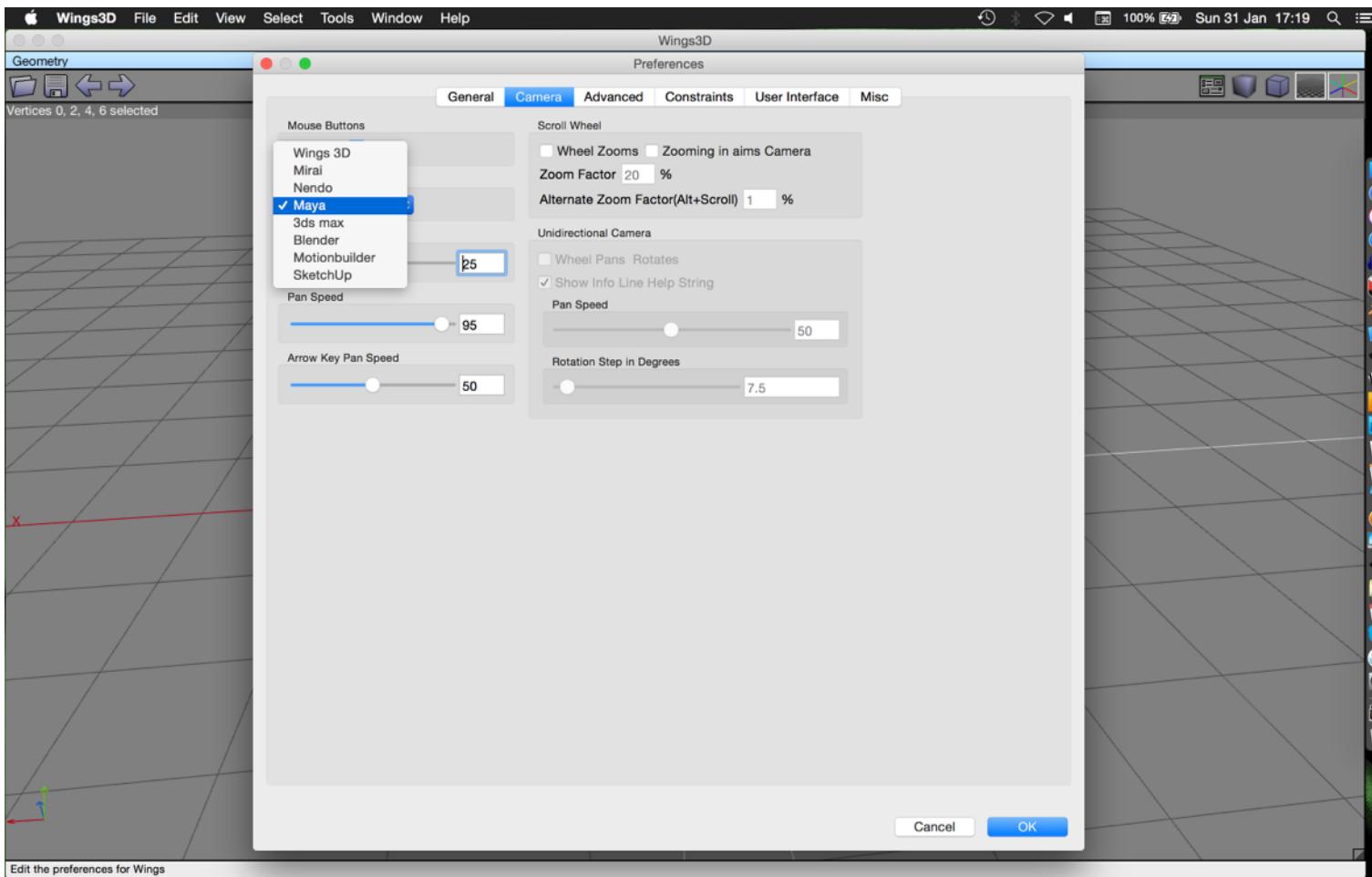
“V” for Vertex

| Defined Hotkeys | |
|----------------------|--------------------------------------|
| Hotkeys in all modes | |
| Space | Select Deselect |
| + | Select More |
| - | Select Less |
| = | Select More |
| ⇧ A | View Frame |
| ⇧ D | Edit Repeat Drag |
| ⇧ L | Select Edge Loop Edge Loop to Region |
| ⇧ X | View Along -X |
| ⇧ Y | View Along -Y |
| ⇧ Z | View Along -Z |
| A | View Highlight Aim |
| B | Select Body |
| D | Edit Repeat Args |
| E | Select Edge |
| F | Select Face |
| G | Select Edge Loop Edge Ring |
| I | Select Similar |
| L | Select Edge Loop Edge Loop |
| O | View Orthographic View |
| R | View Reset View |
| U | View Auto Rotate |
| V | Select Vertex |
| W | View Toggle Wireframe |
| X | View Along X |
| Y | View Along Y |
| Z | View Along Z |
| Tab | View Workmode |
| ⇧ Tab | View Quick Smoothed Preview |
| ⌘ 8 | Hotkey Bind |
| ⌘ 8 | Hotkey Bind |
| ⌘ 9 | Hotkey Unbind |
| ⌘ 9 | Hotkey Unbind |
| ⌘ A | Select All |
| ⌘ D | Edit Repeat |
| ⌘ G | Select Edge Loop Edge Ring Increase |
| ⌘ G | Select Edge Loop Edge Ring Decrease |
| ⇧ ⌘ I | Select Inverse |



Camera Mode Setting

Set to Maya to make the controls match those of the Unity Scene view
(alt + mouse buttons)

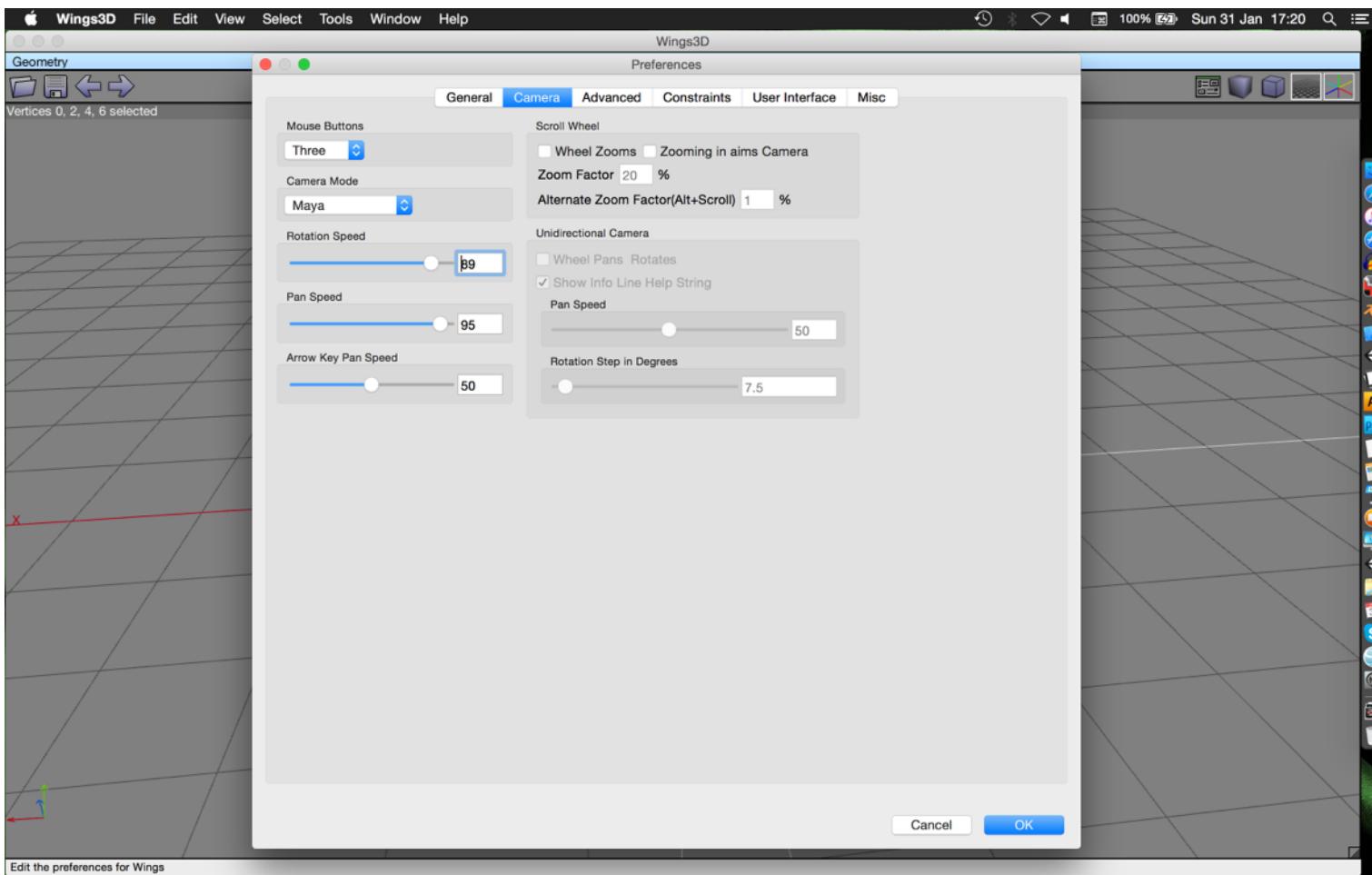


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Rotation and Pan Speed Settings

Both the Rotation Speed and Pan Speed settings default to low values.

High values are suggested for better navigation.

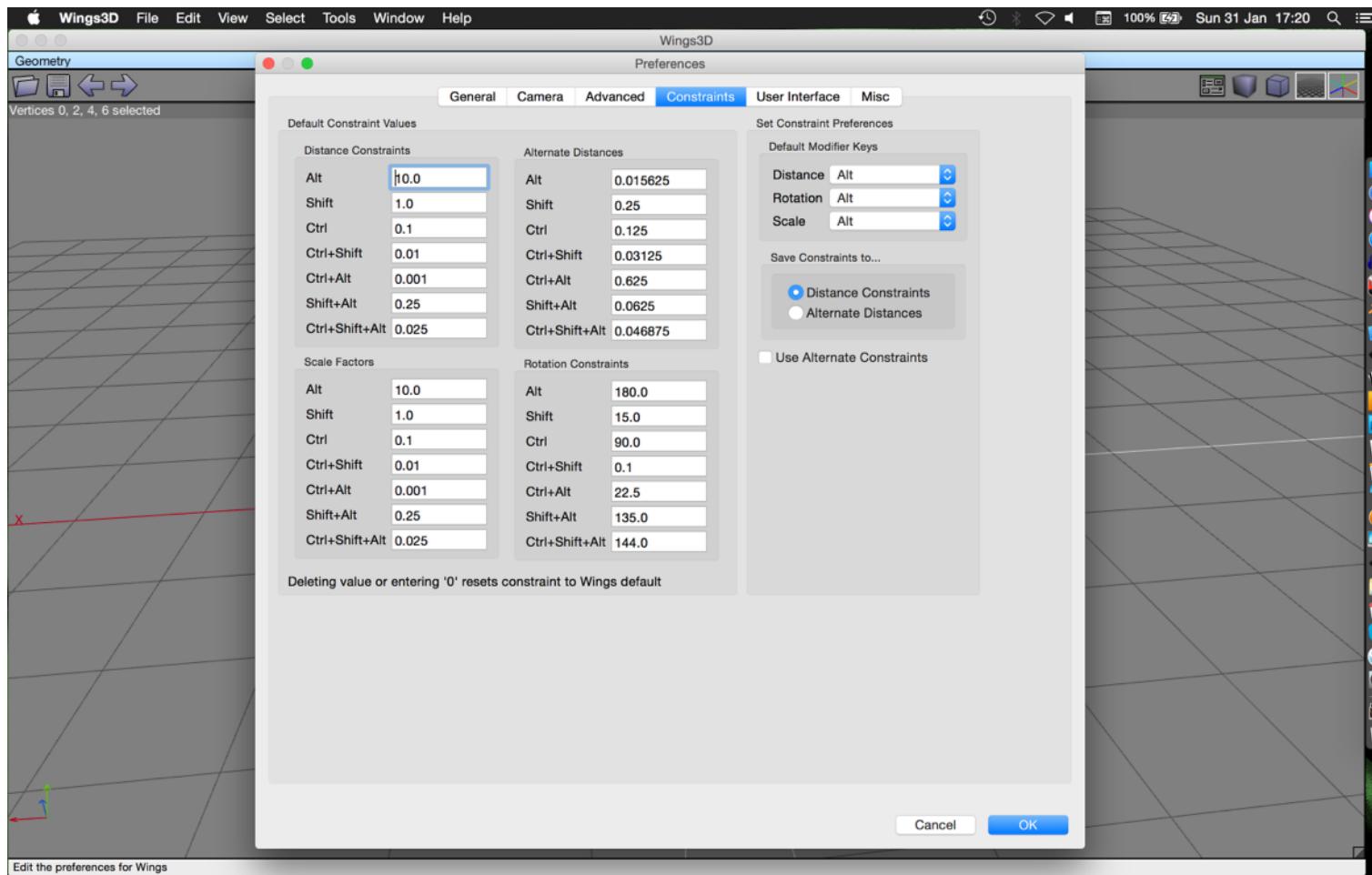


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Constraint Settings

Setting a Rotation Constraint to 90 degrees allows for accurate rotation between axes.

Exiting using the menu option saves the Preferences.



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Modelling Pipeline

- ⌚ 3D models need to be built with their final use in demand.
- ⌚ Games can have the model data set to suit their needs best.
- ⌚ Textures need to be configured to work well in the modelling package and game.
- ⌚ Model data can be derived from other software packages.



Power-of-Two Textures

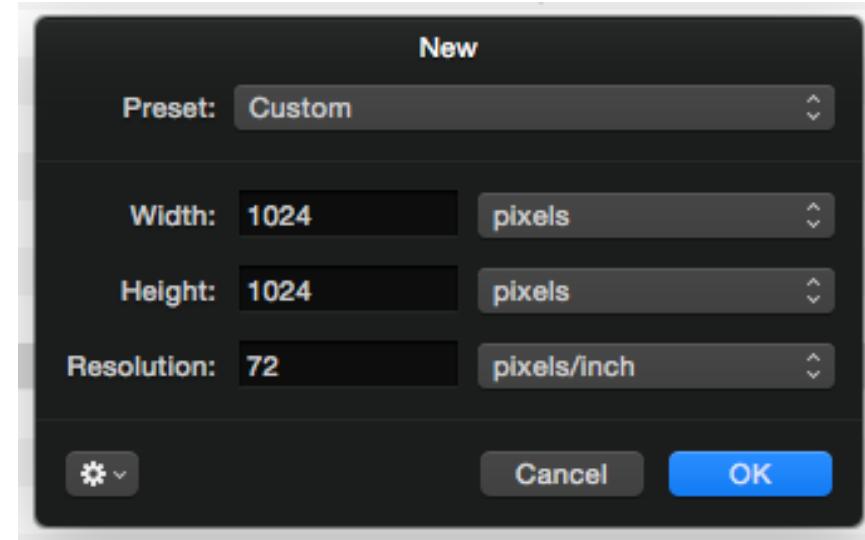
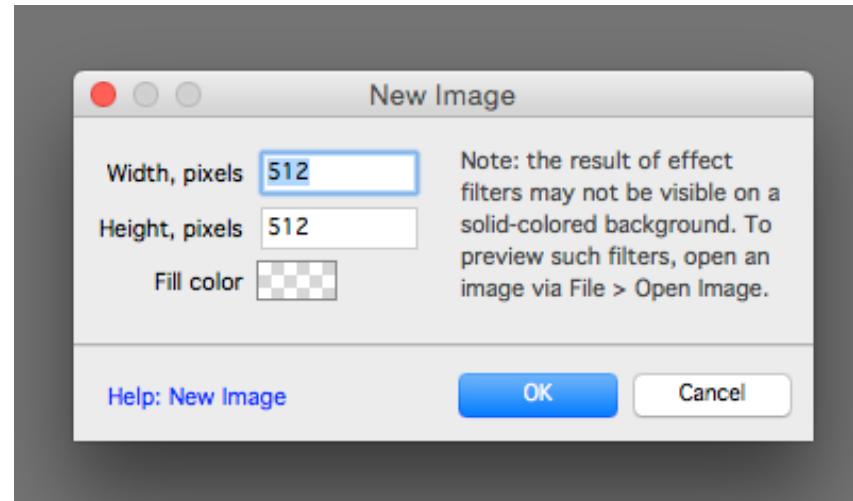
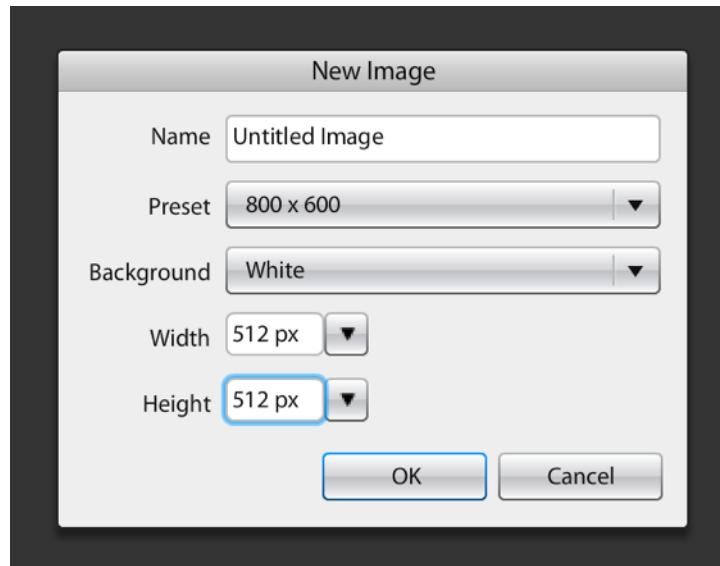
- ➊ Efficiency through continuous binary storage in the framebuffer.
- ➋ Allows subdivision of the image by a regular grid.
- ➌ Some older hardware did not support anything else.
- ➍ Texture compression only works with power-of-two.
- ➎ Mipmaps only work with power-of-two.



Creating Power-of-Two Textures

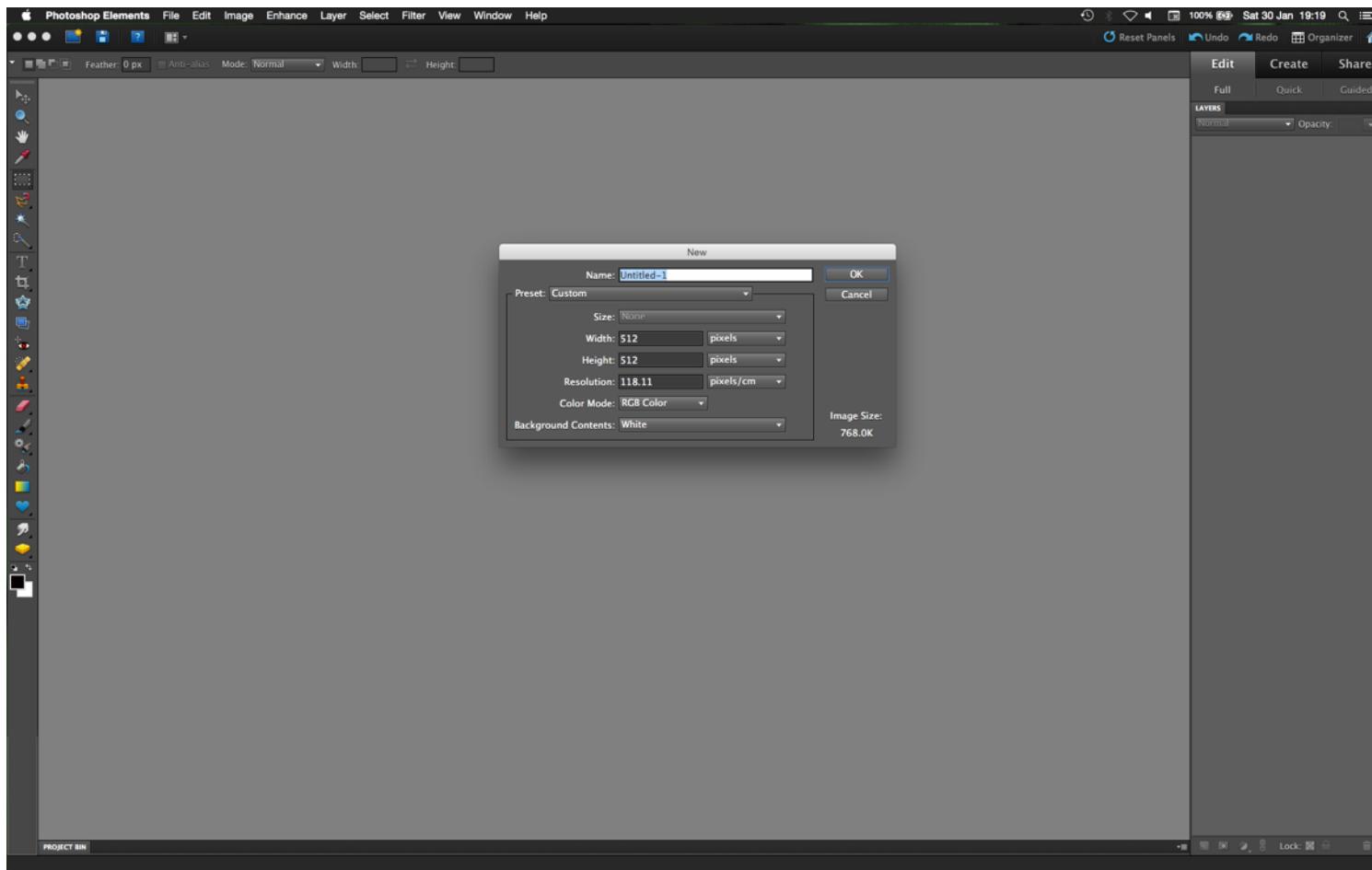
Most art packages make it easy to create a power-of-two image.

Examples here left-to-right: Sumo Paint, Filter Forge, Pixelmator.



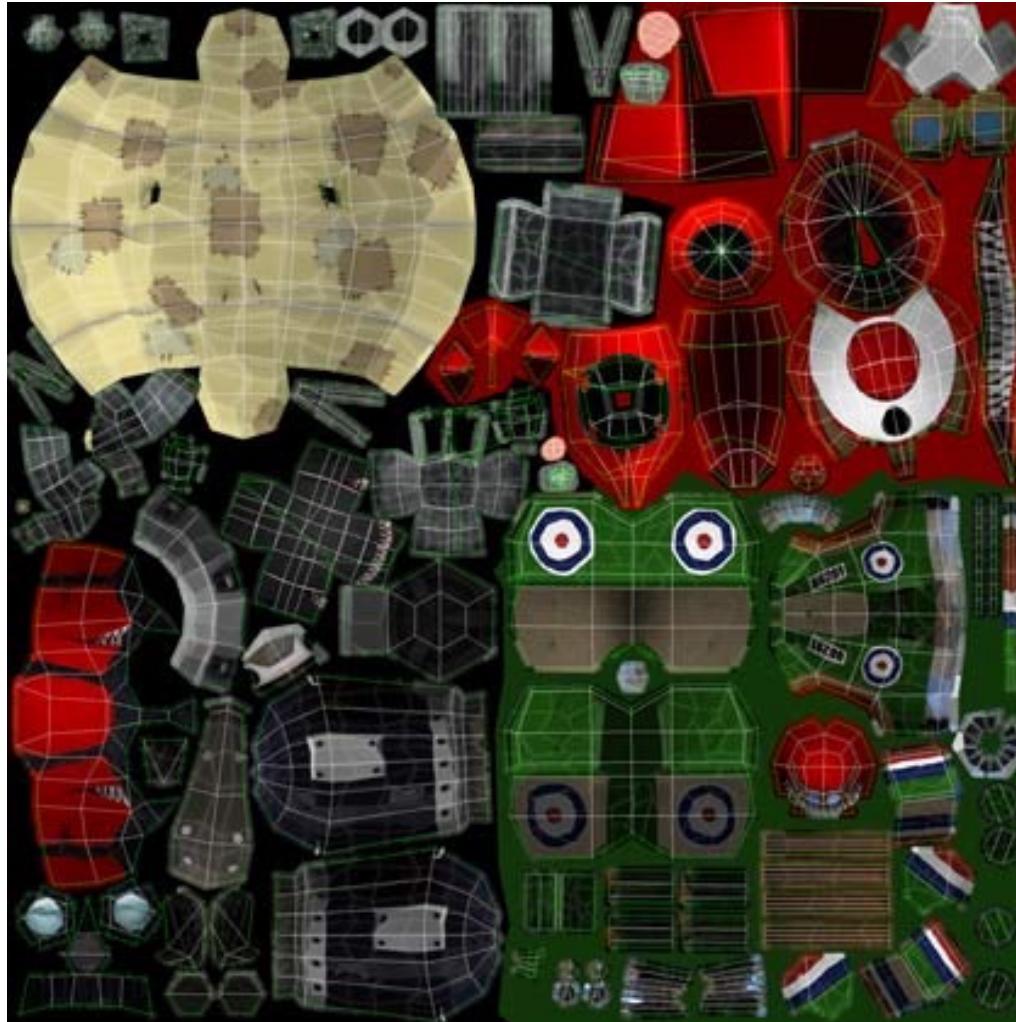
Creating Power-of-Two Textures

Photoshop is the industry standard package, and makes it very easy to create power-of-two images.



Texture Atlases

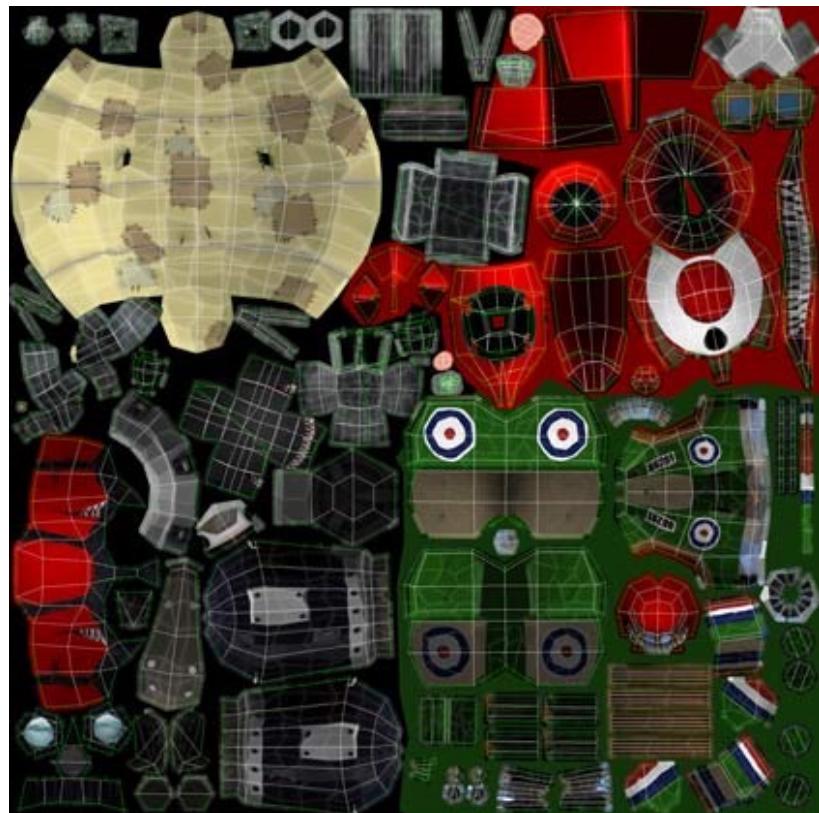
A texture atlas combines multiple images into one texture.



<http://awshub.com/blog/blog/2011/11/01/hi-poly-vs-low-poly/>

Texture Atlases

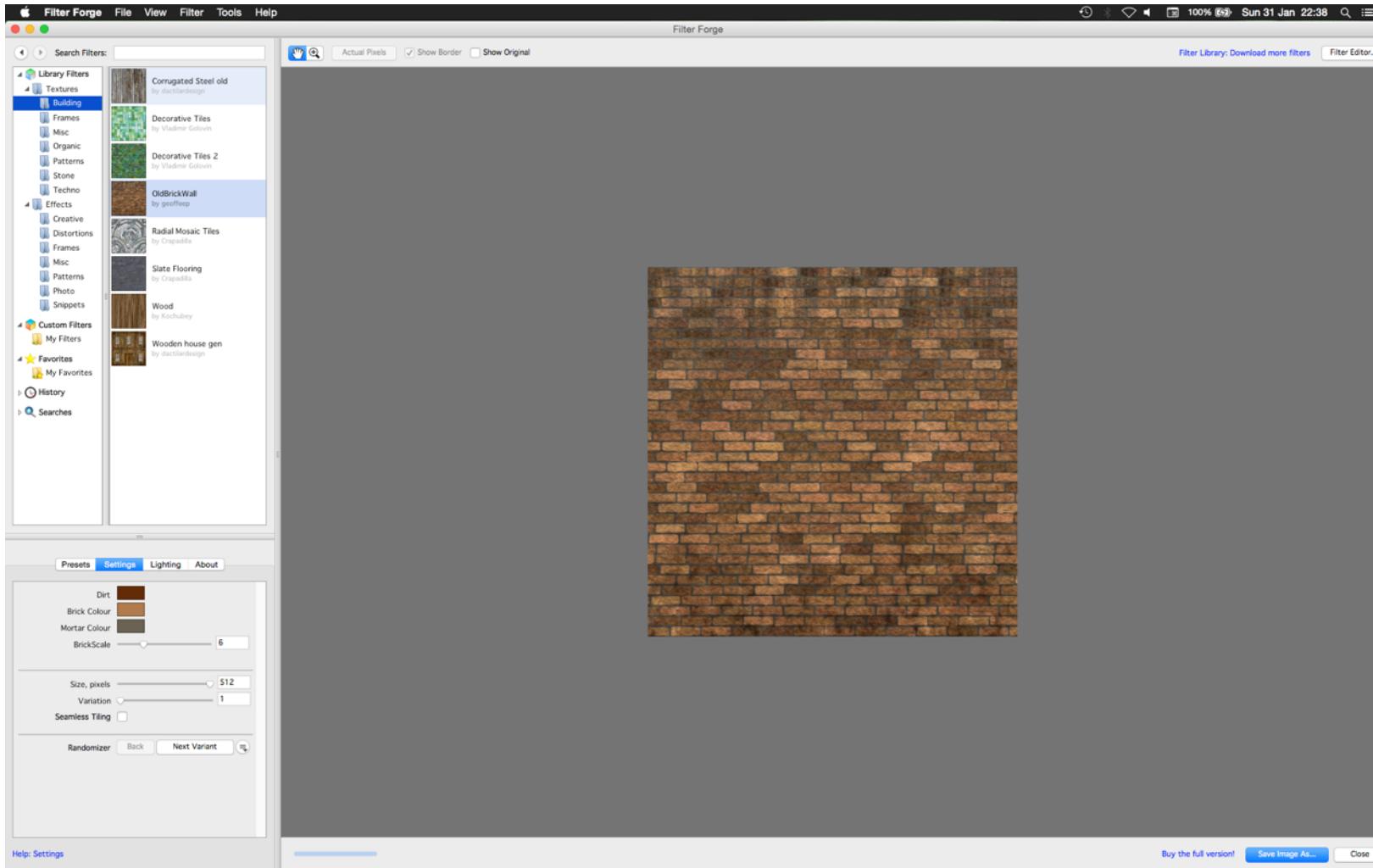
- Allows multiple objects to be rendered in a game with a single draw call.
- Individual images are freed from being power-of-two.
- Pieces can be reused on multiple models.



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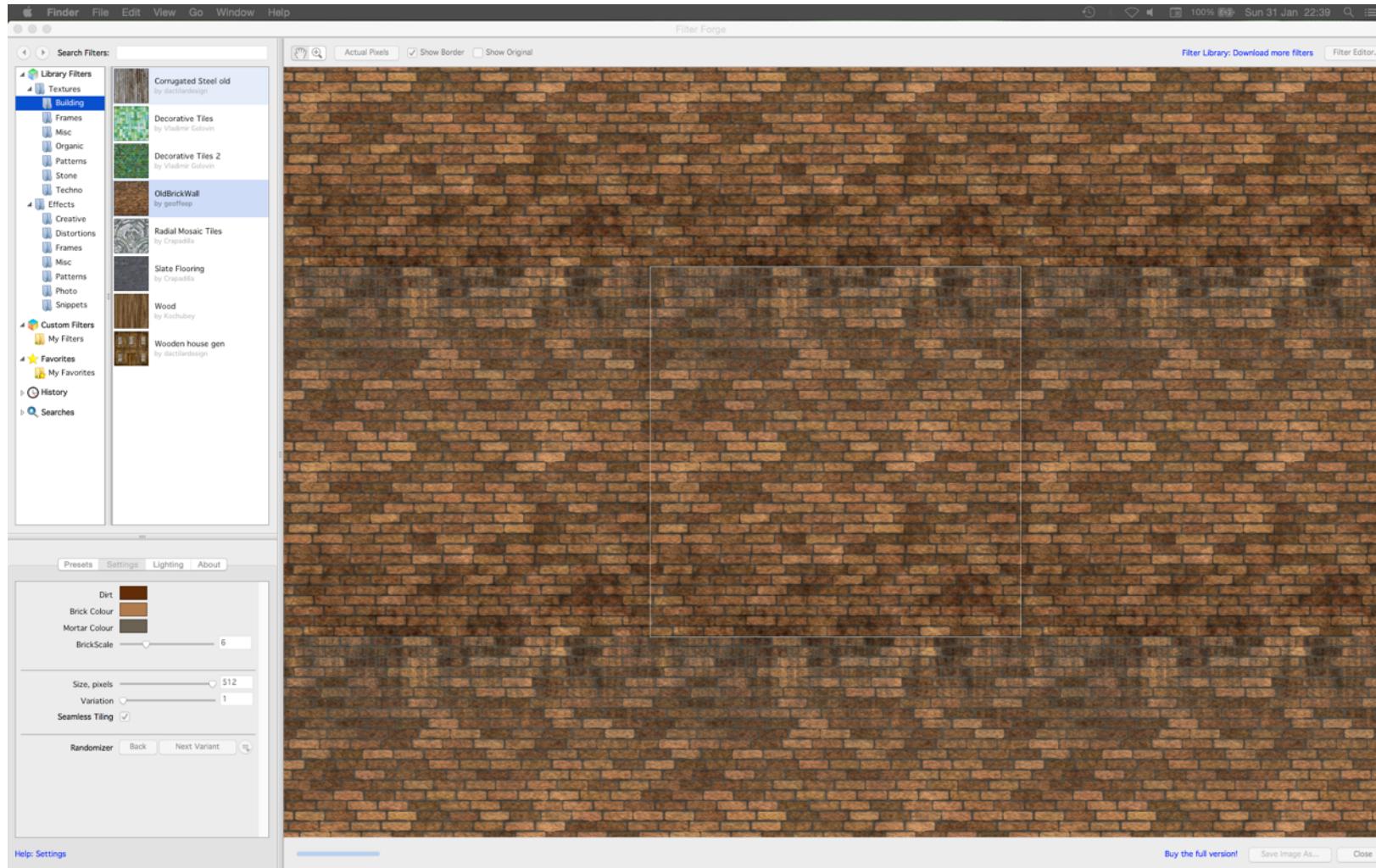
Procedural Artwork

Filter Forge procedurally generates textures, no photographs involved.



Procedural Artwork

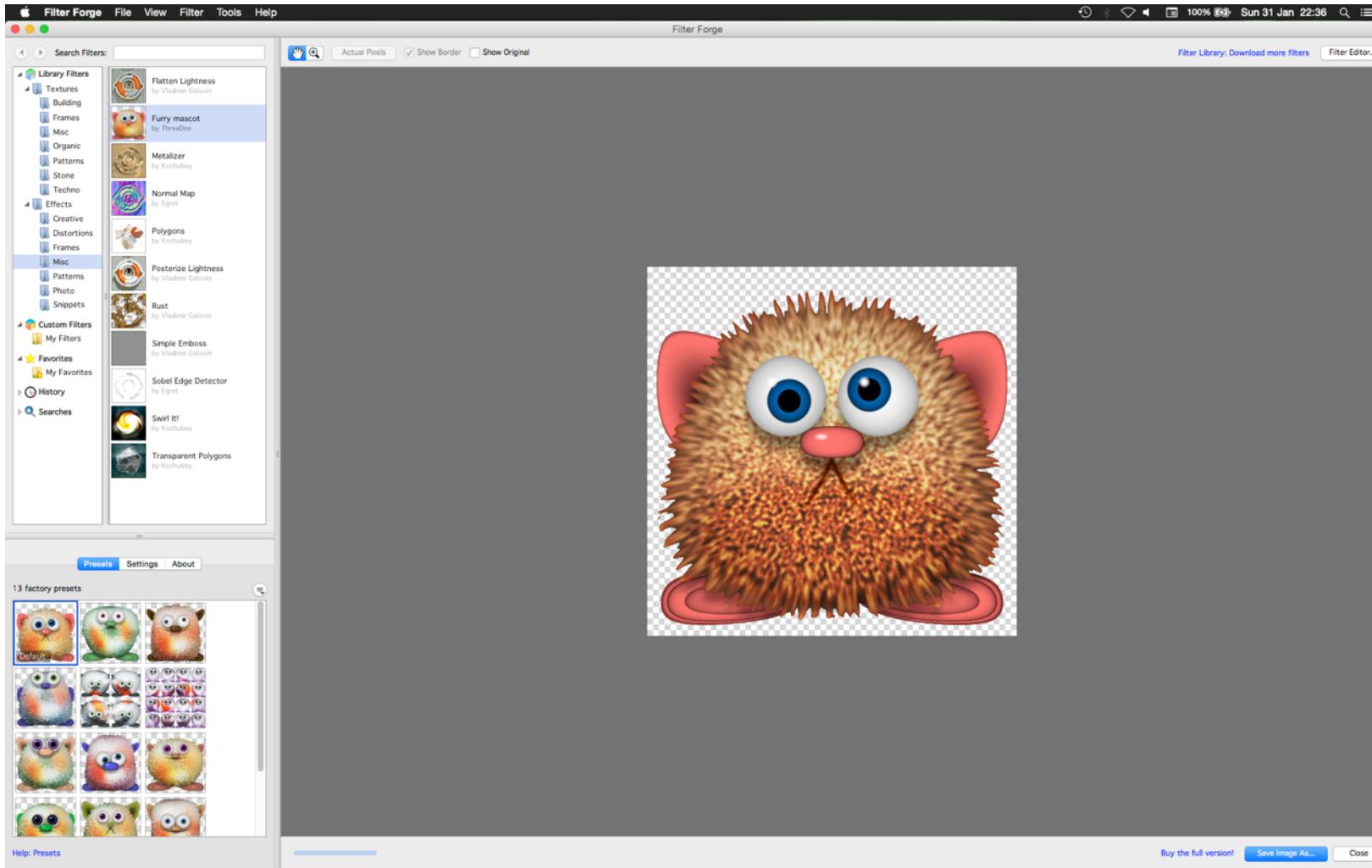
Many filters allow tiling textures.



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Procedural Artwork

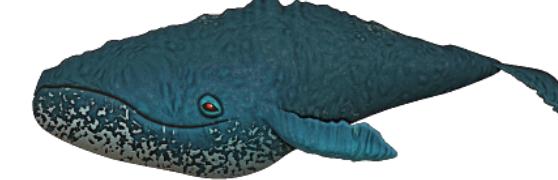
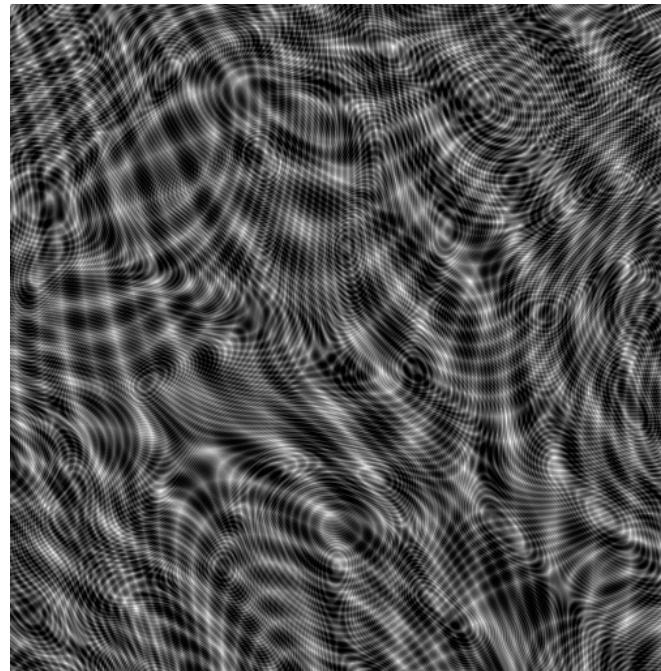
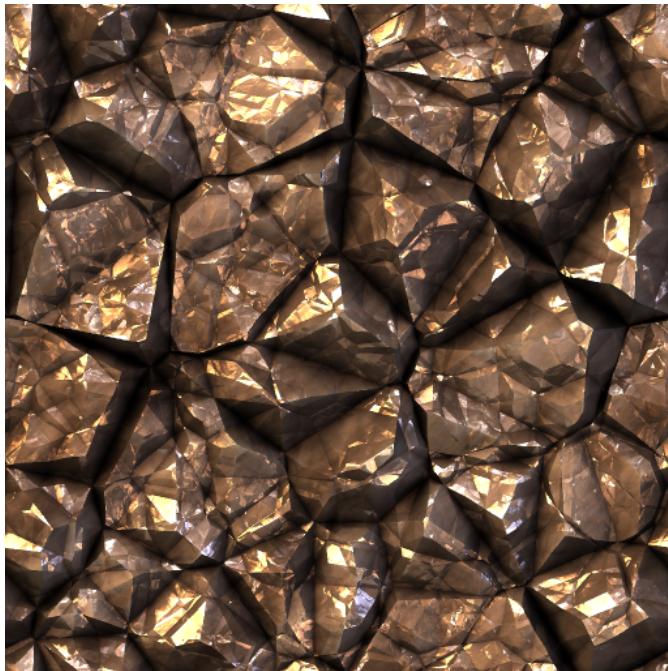
Some filters are more serious than others...



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Procedural Artwork

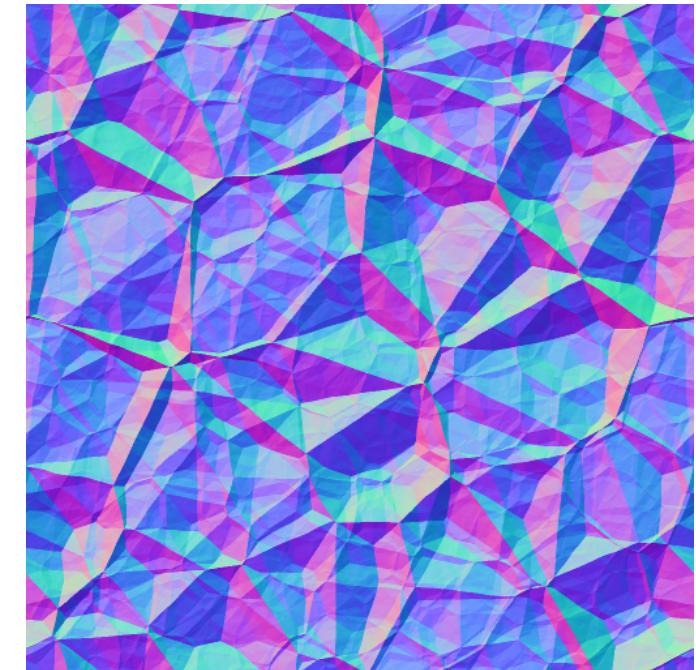
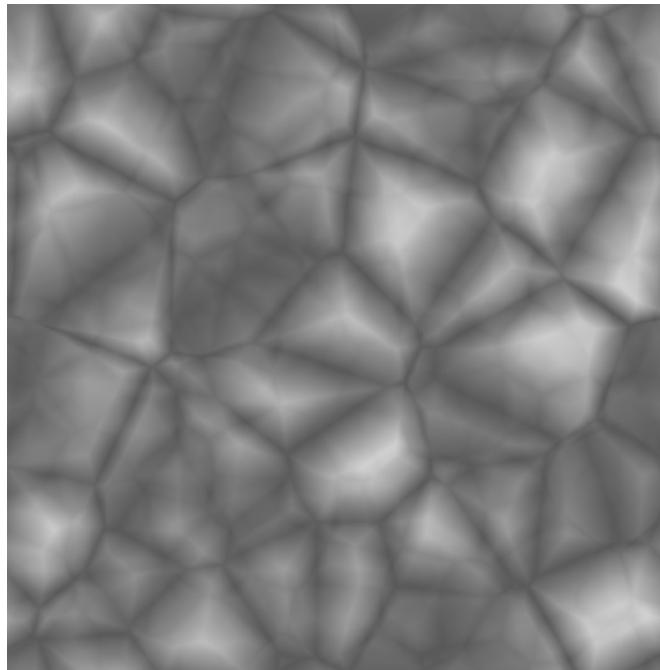
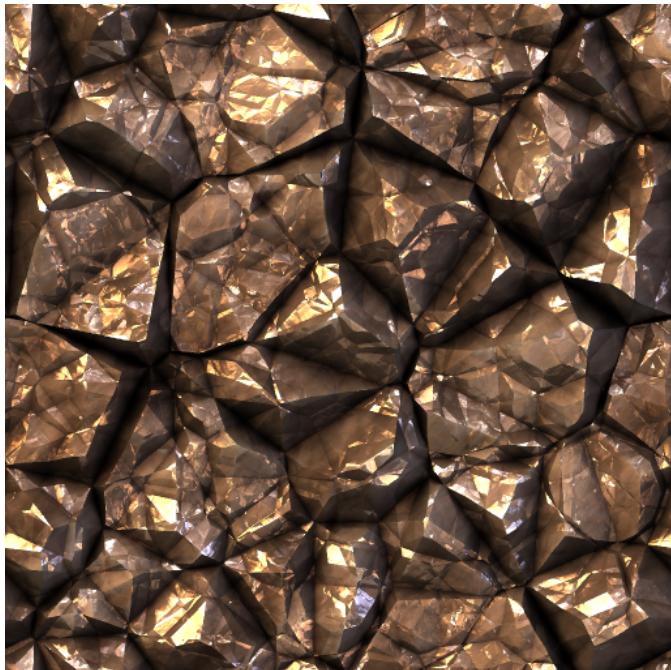
Thousands of different filters available, all adjustable to your needs.



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Procedural Artwork

Render maps can also be created such as bump, normal and specular.



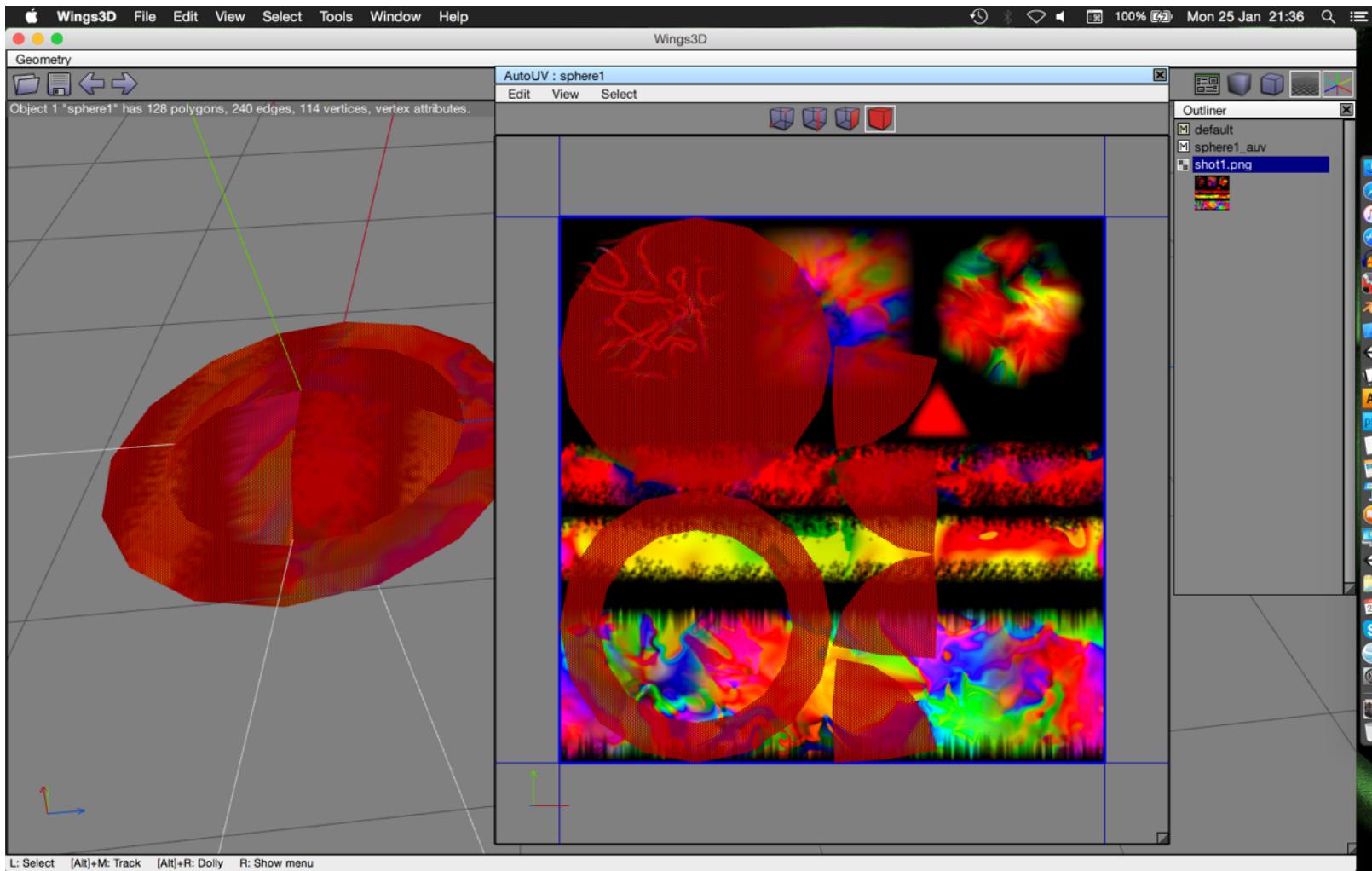
Note that Filter Forge is not available on the Lab computers.



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Importing into Modelling Software

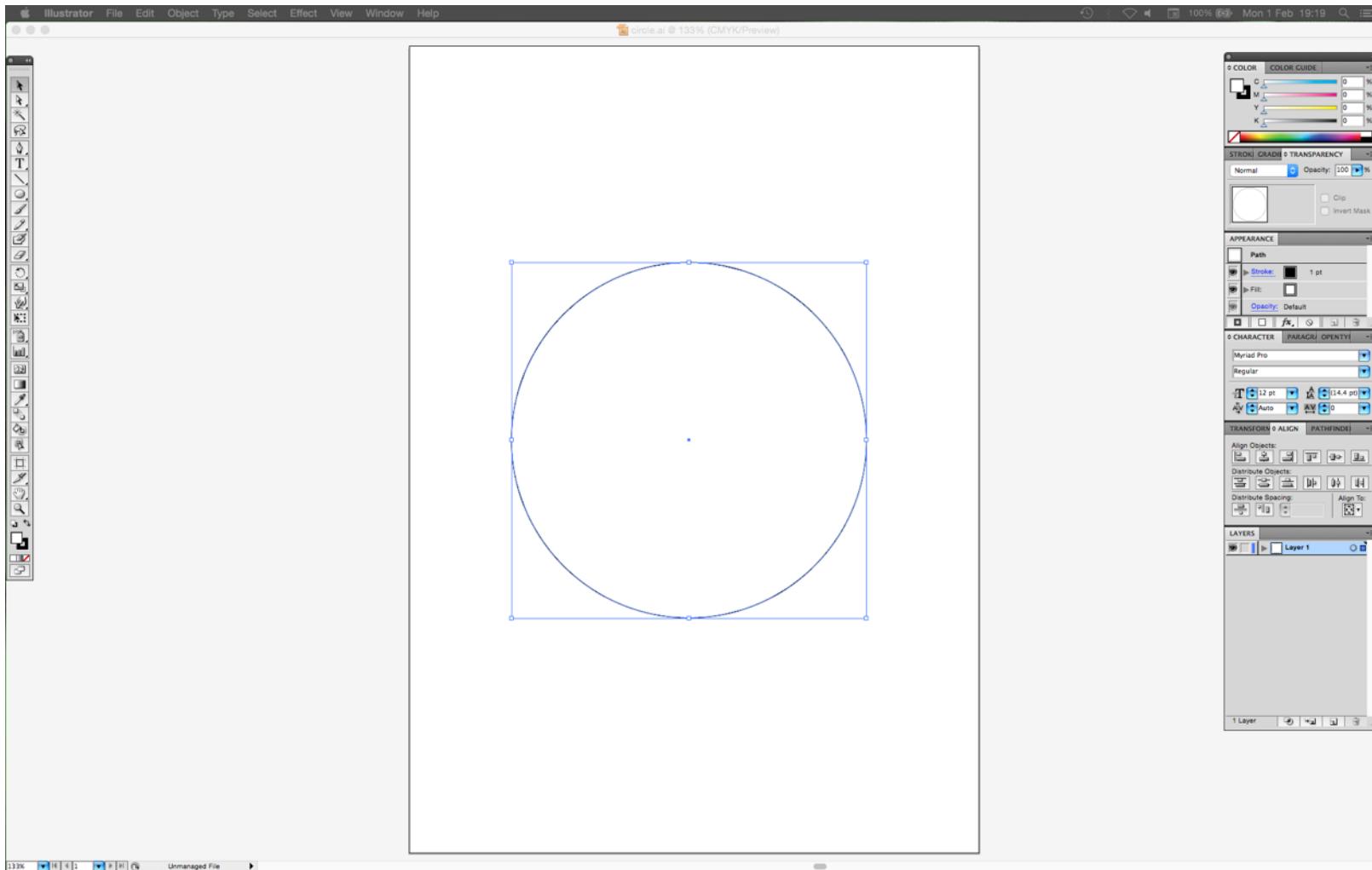
Importing a texture into most 3D modelling packages is simple.



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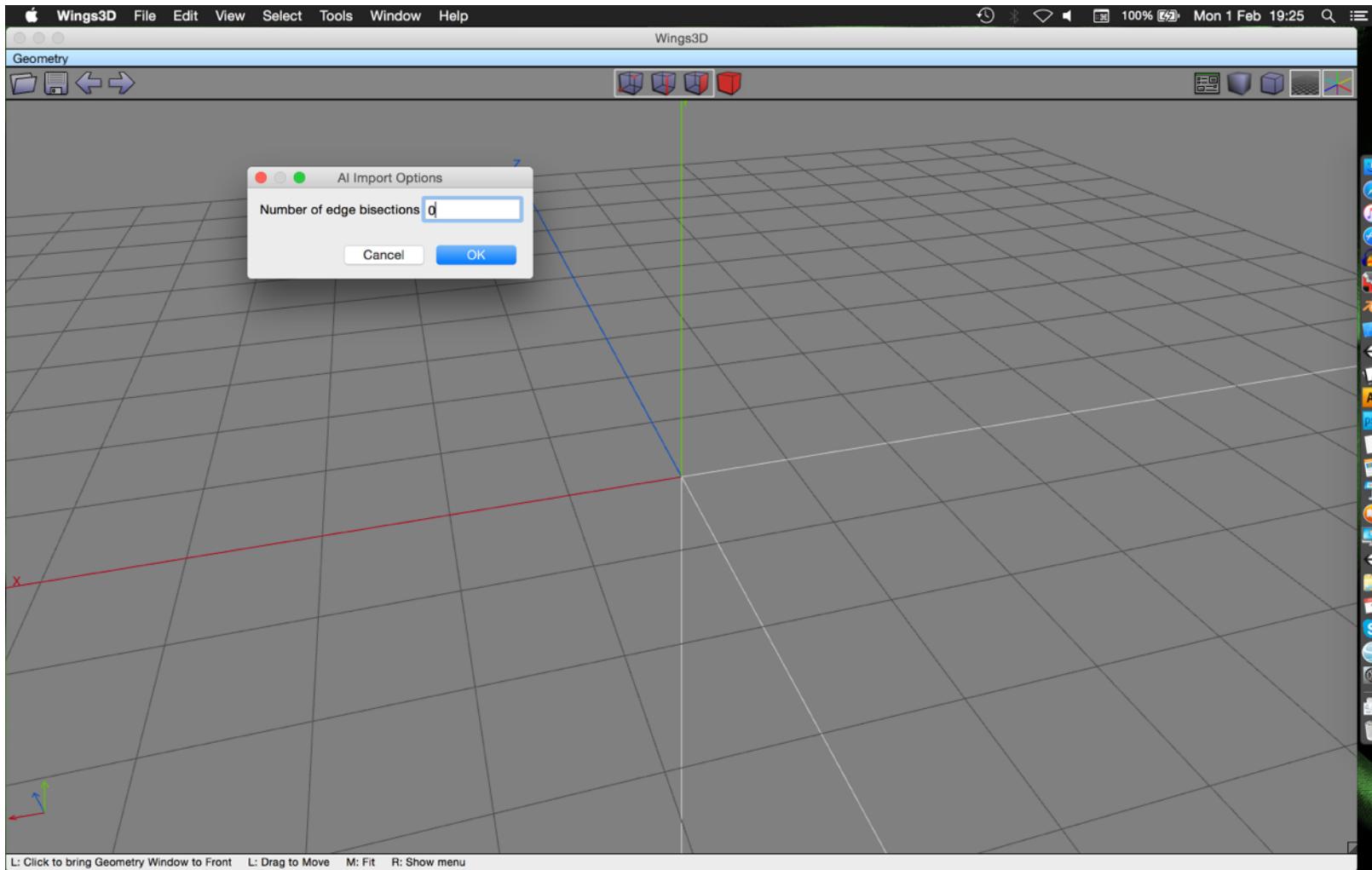
Splines into Modelling Software

Vector splines can also be imported from packages such as Adobe illustrator.



Splines into Modelling Software

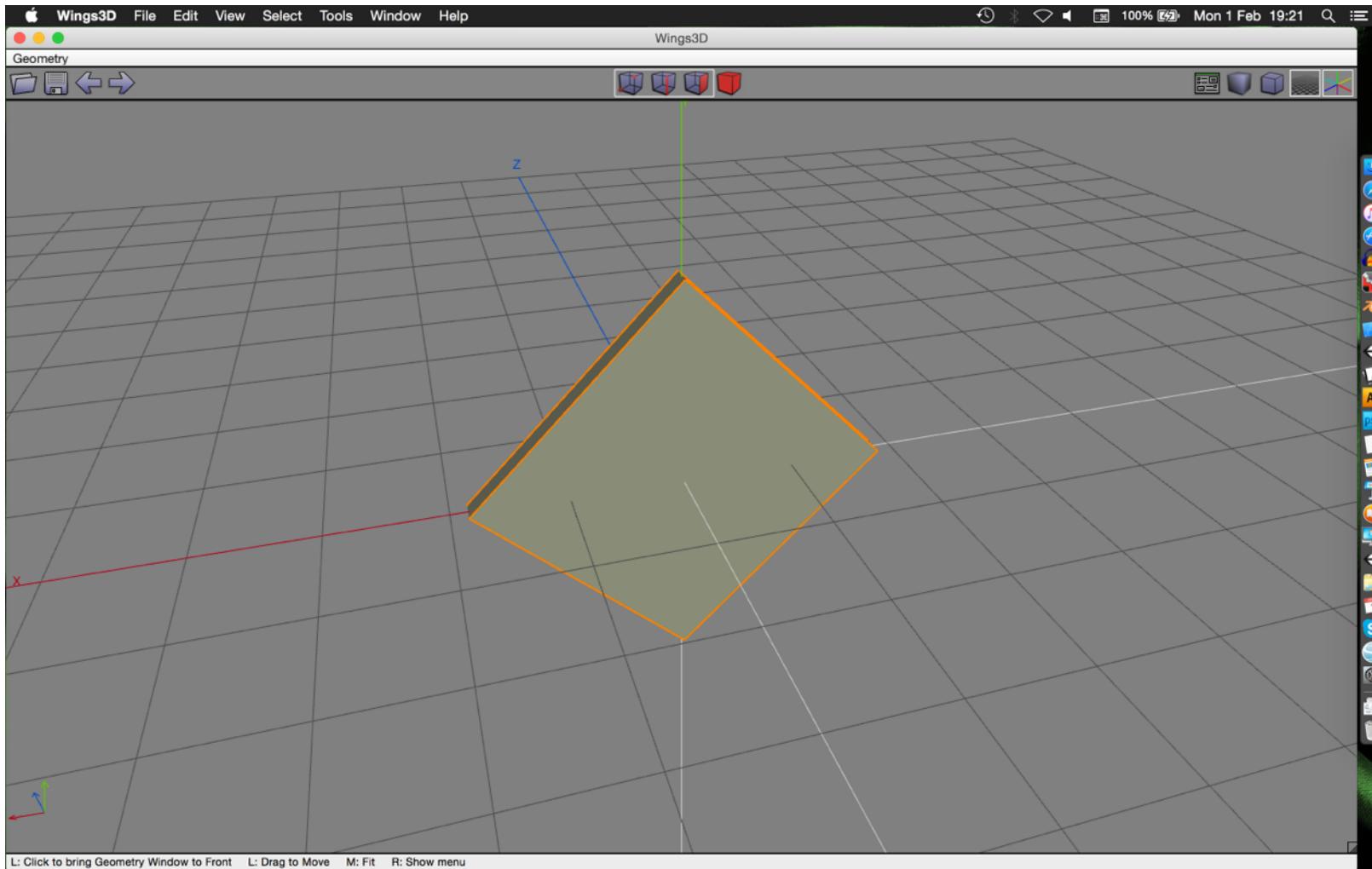
.ai is the most common file format (Wings3D requires Illustrator 8 format or earlier).



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Splines into Modelling Software

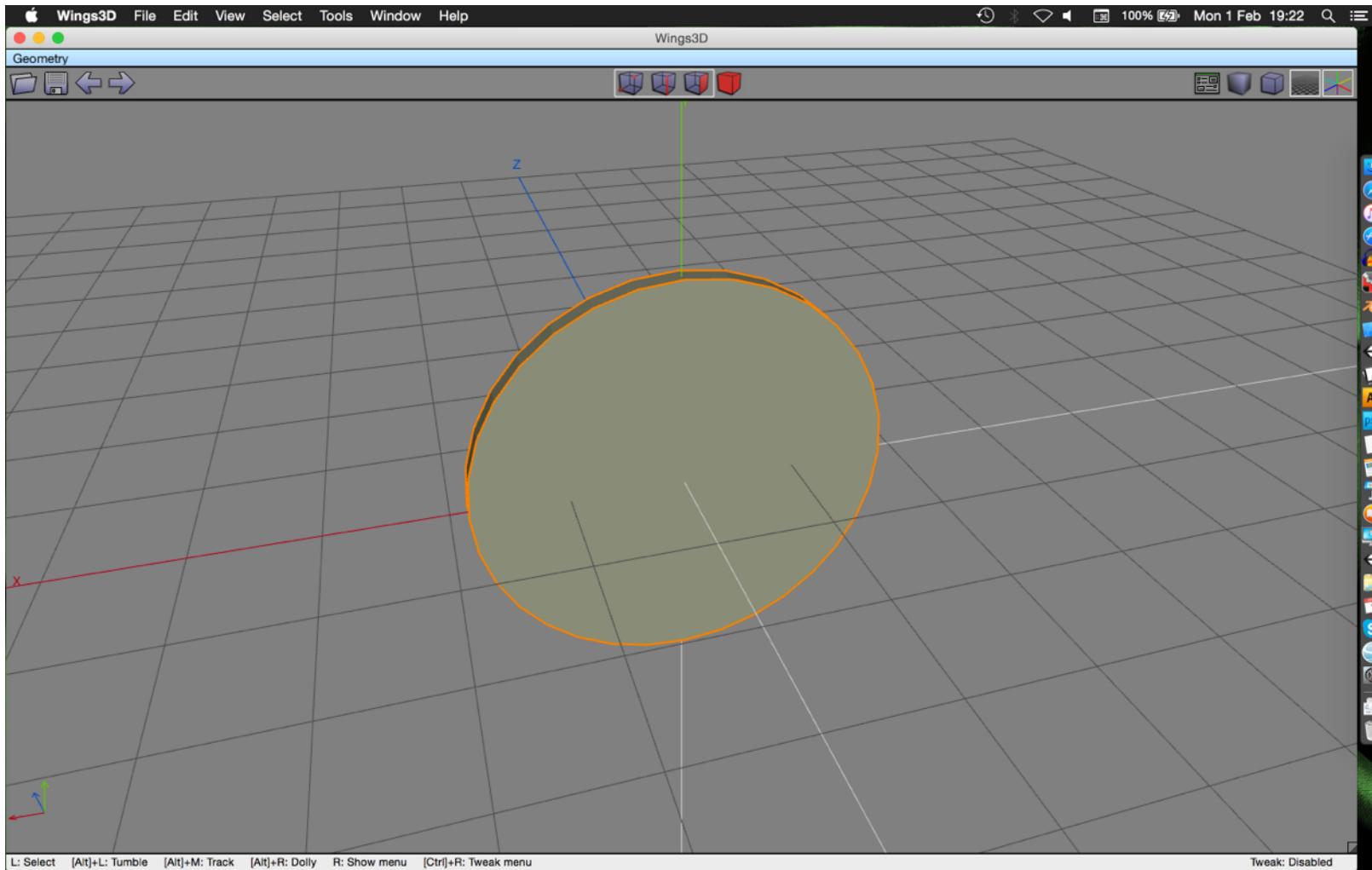
Bisections refers to how many vertices to place on curved lines. This is 0:



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Splines into Modelling Software

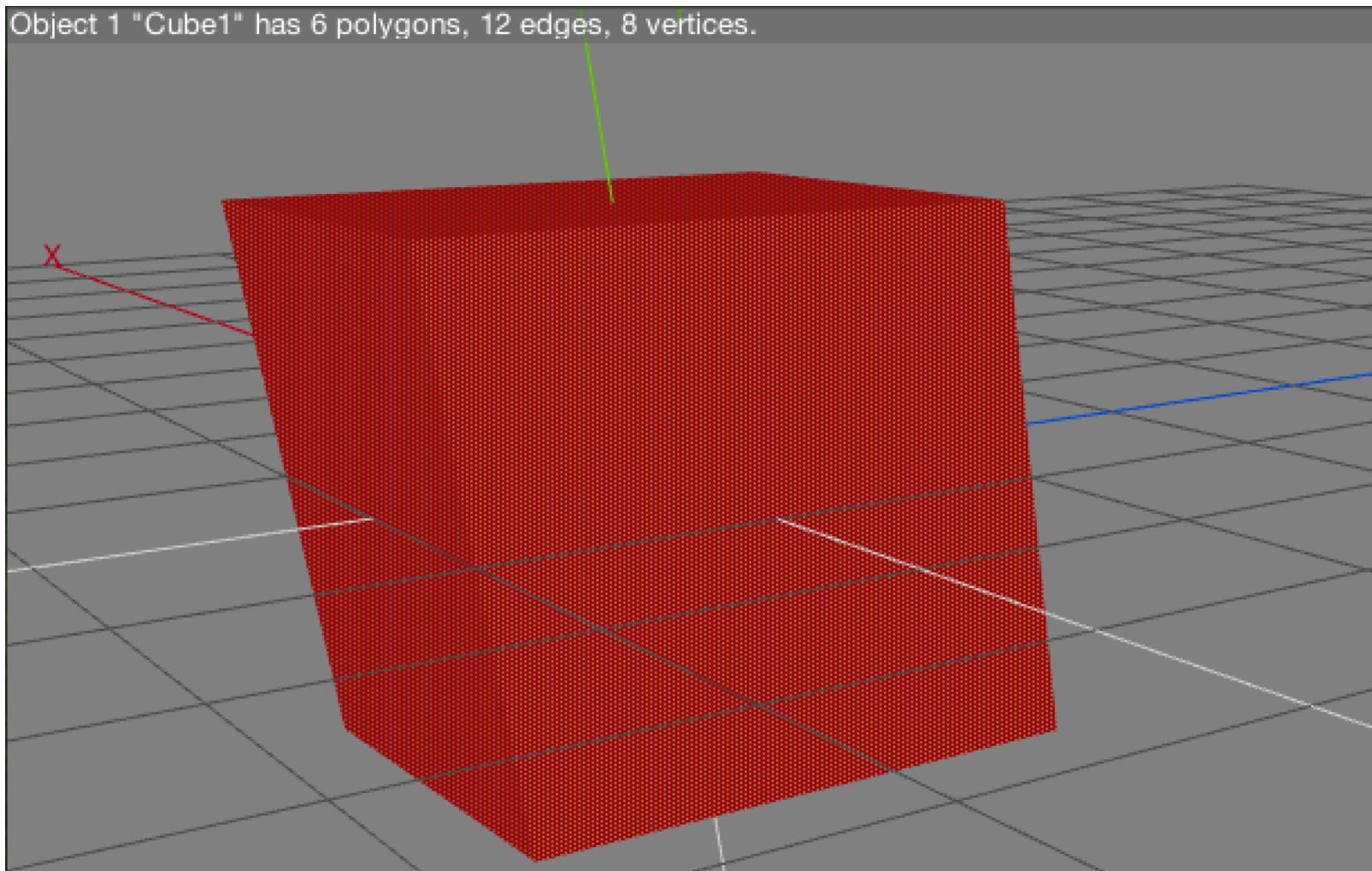
This is 3 bisections:



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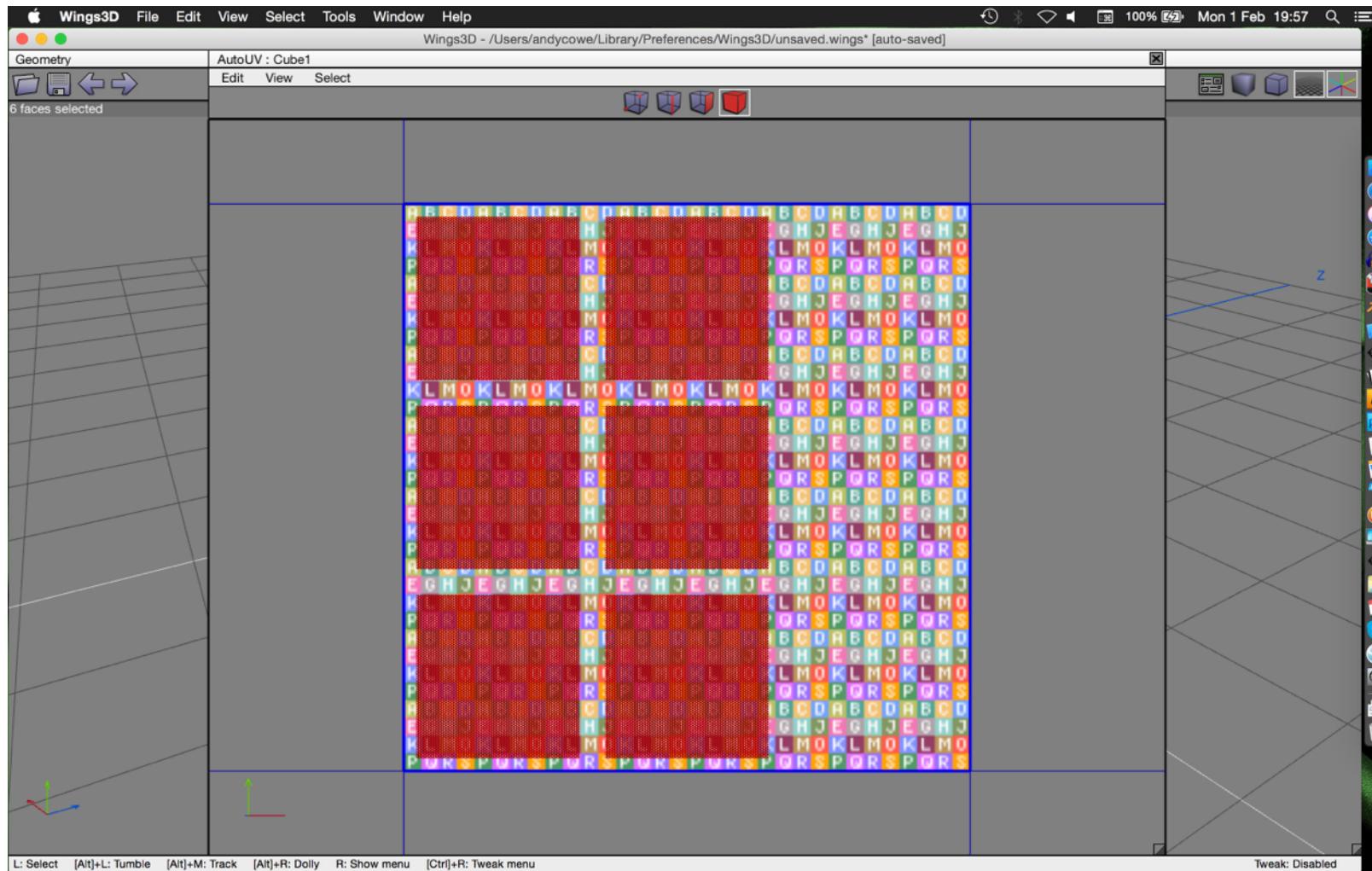
Efficient Vertex Count

Modelling packages count the number of vertices on the object.



Efficient Vertex Count

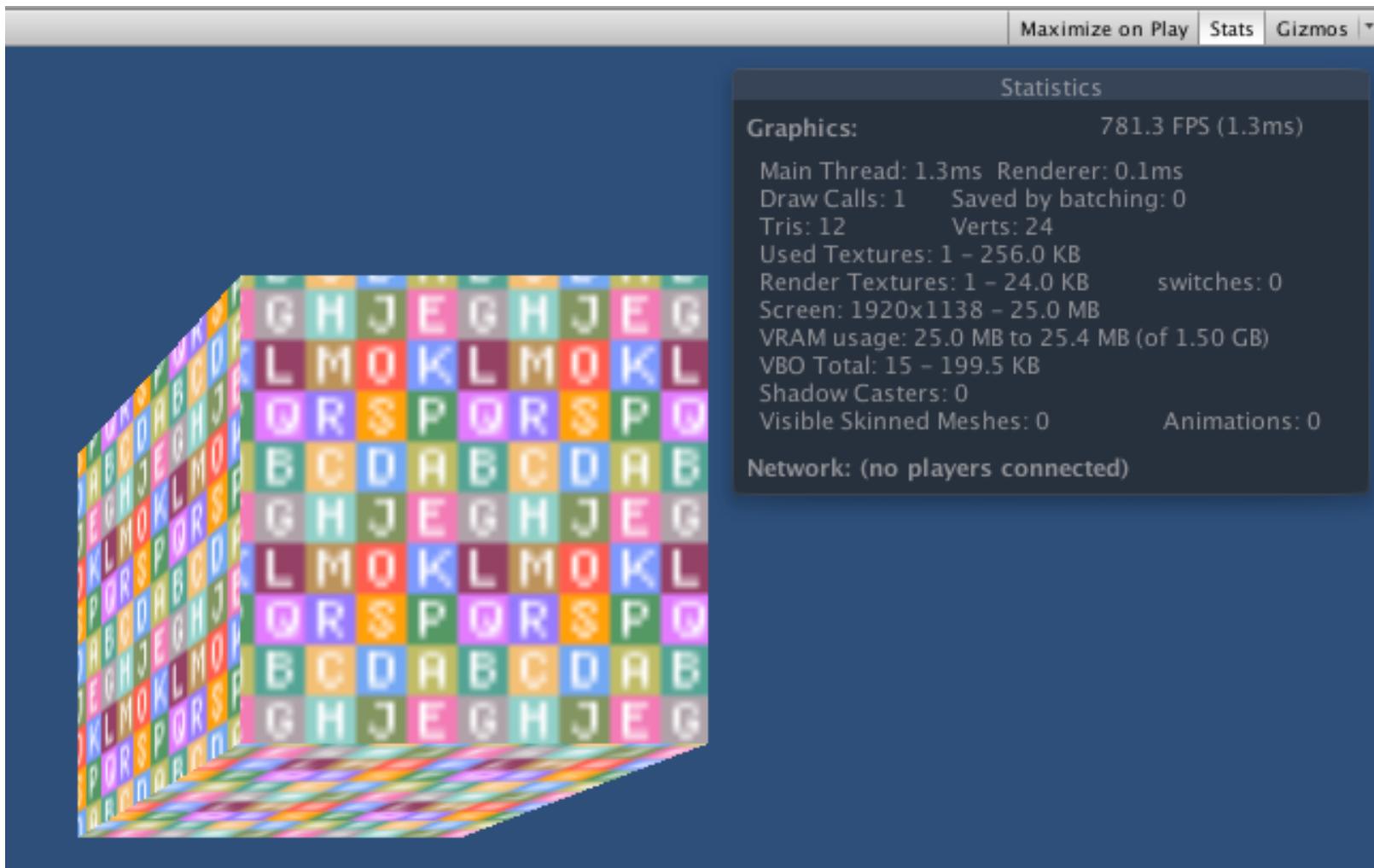
Game engines count the number of UV unwrapped vertices.



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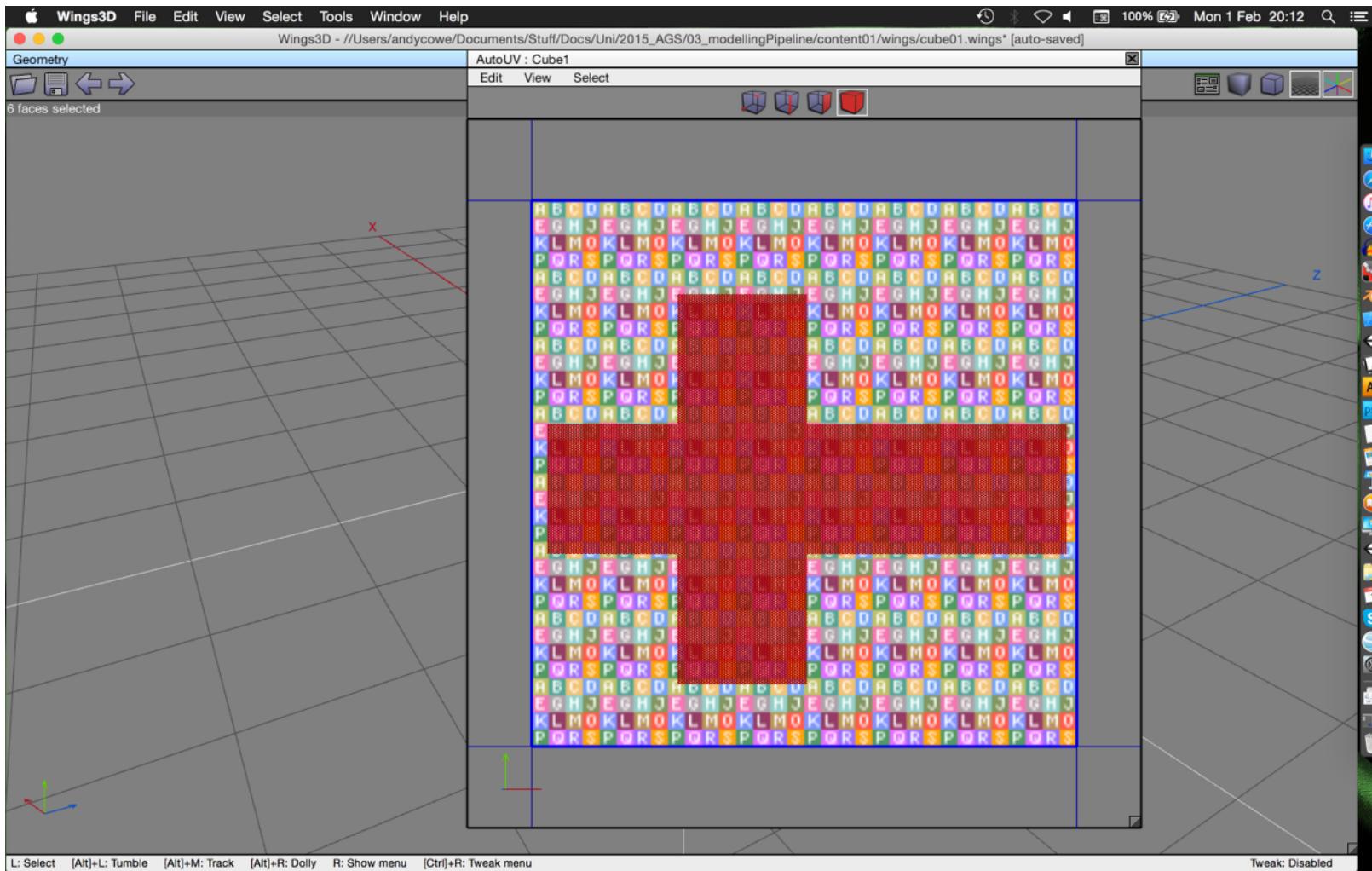
Efficient Vertex Count

Game engines count the number of UV unwrapped vertices. As seen in Unity:



Efficient Vertex Count

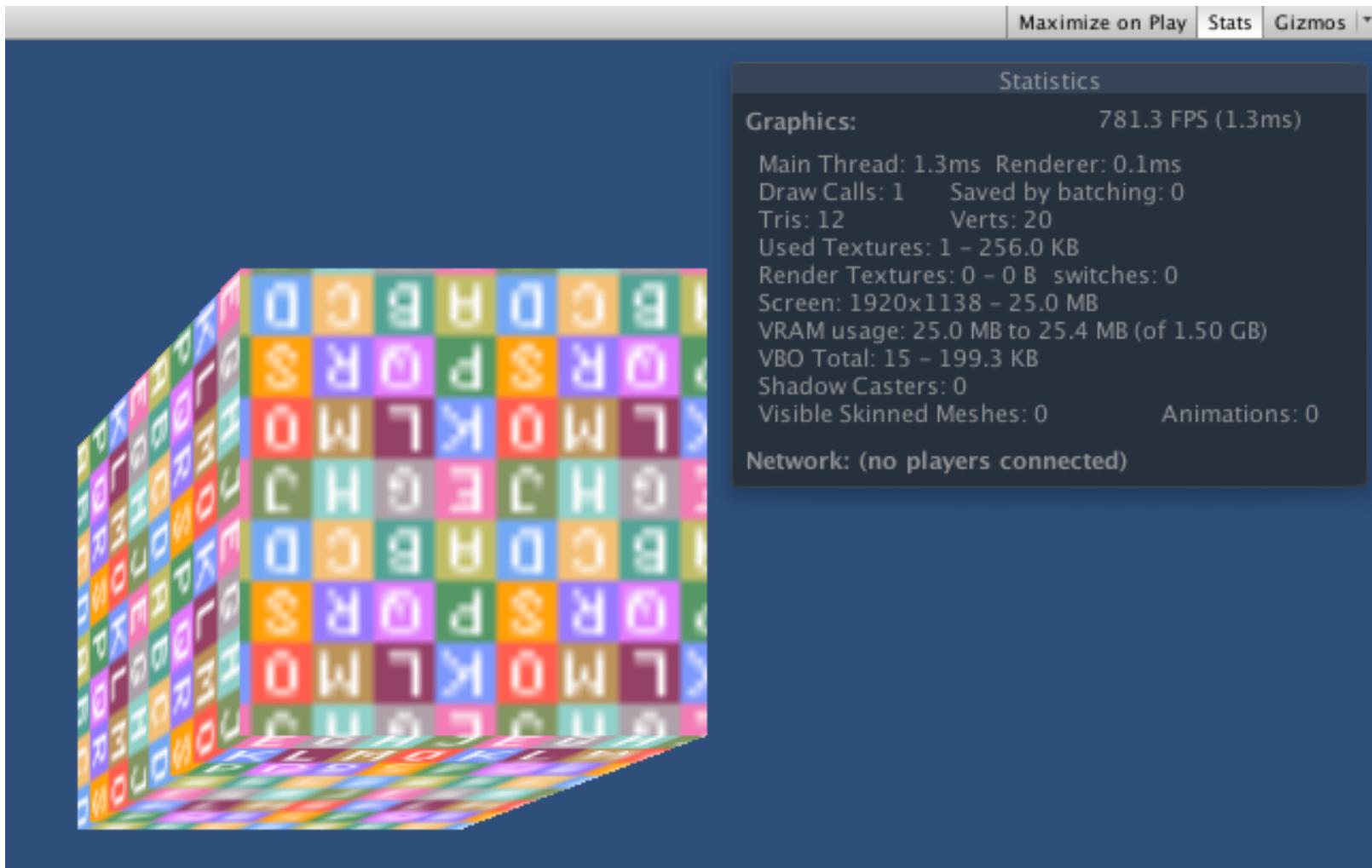
Mapping with few UV seams reduces the vertex count.



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Efficient Vertex Count

Although the results are not always predictable. This model has 20 vertices, not 14.



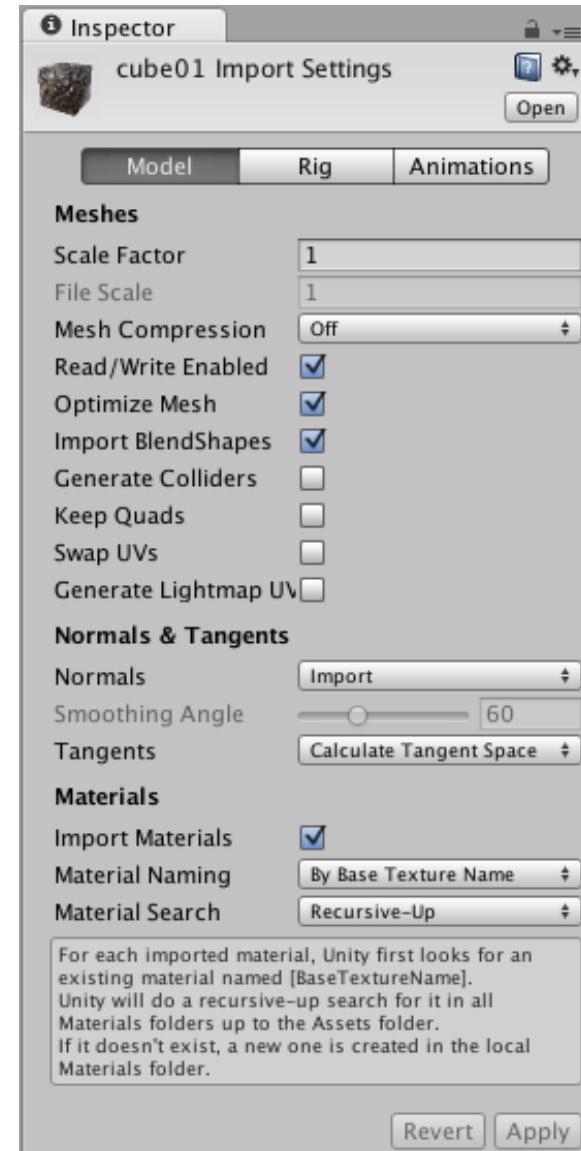
Game Engine Model Import

Game engines such as Unity have a range of import settings.

The BlendShapes option is for animation, as are the Rig and Animations tabs.

There are benefits from not using Import Materials. Import the texture separately and then create a material for it.

Make sure the model is centred on the world origin in the 3D modelling software as this makes placement easier in the game engine.



Game Engine Texture Import

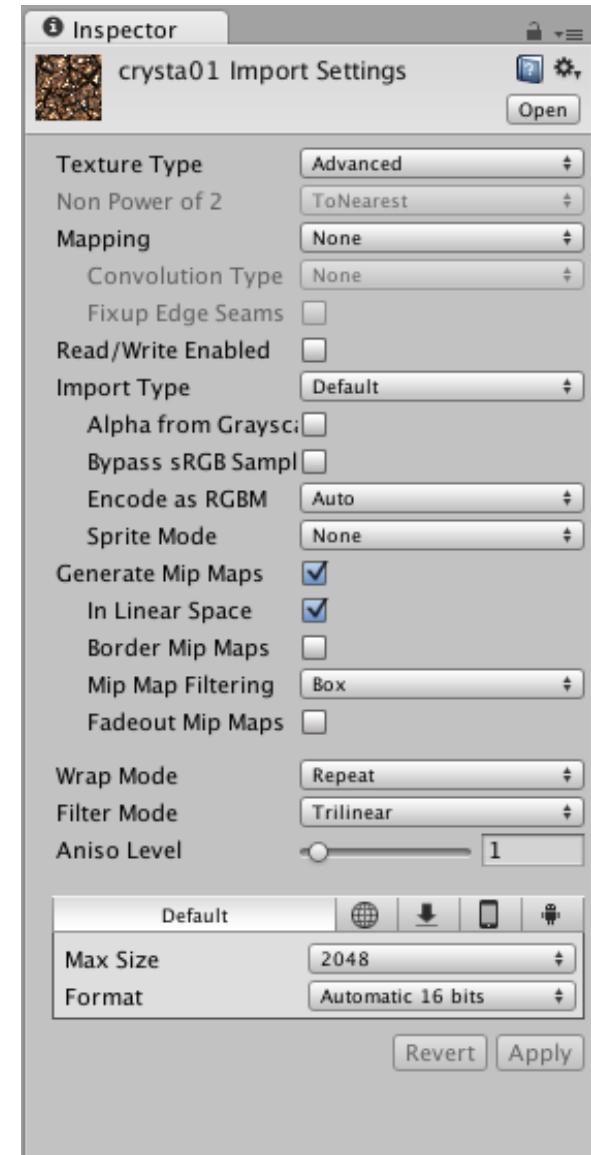
Game engines such as Unity have a range of import settings.

Texture Type set to Advanced offers a range of settings.

Mip Maps create a series of smaller textures in each power-of-two size. The texture size is updated automatically to avoid lots of texture pixels fighting for a single screen pixel.

Trilinear Filtering filters across the texture and between mip map levels to smooth the image with any movement.

Automatic 16 bits can be a good trade-off between memory size and texture quality, but always test each image.



Texture Types

There are other texture types such as Bump Mapped. These can give the impression of 3D textures, avoiding the need for additional model geometry.

