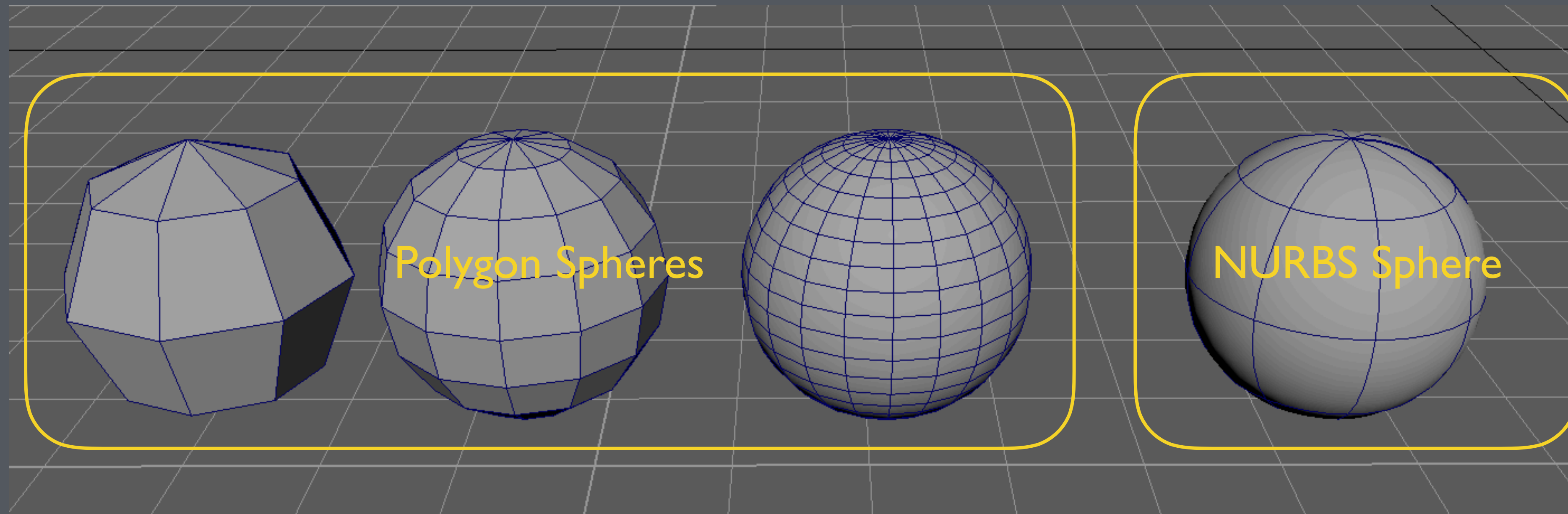


SM2231::3D Animation I Basics

Polygonal Modeling

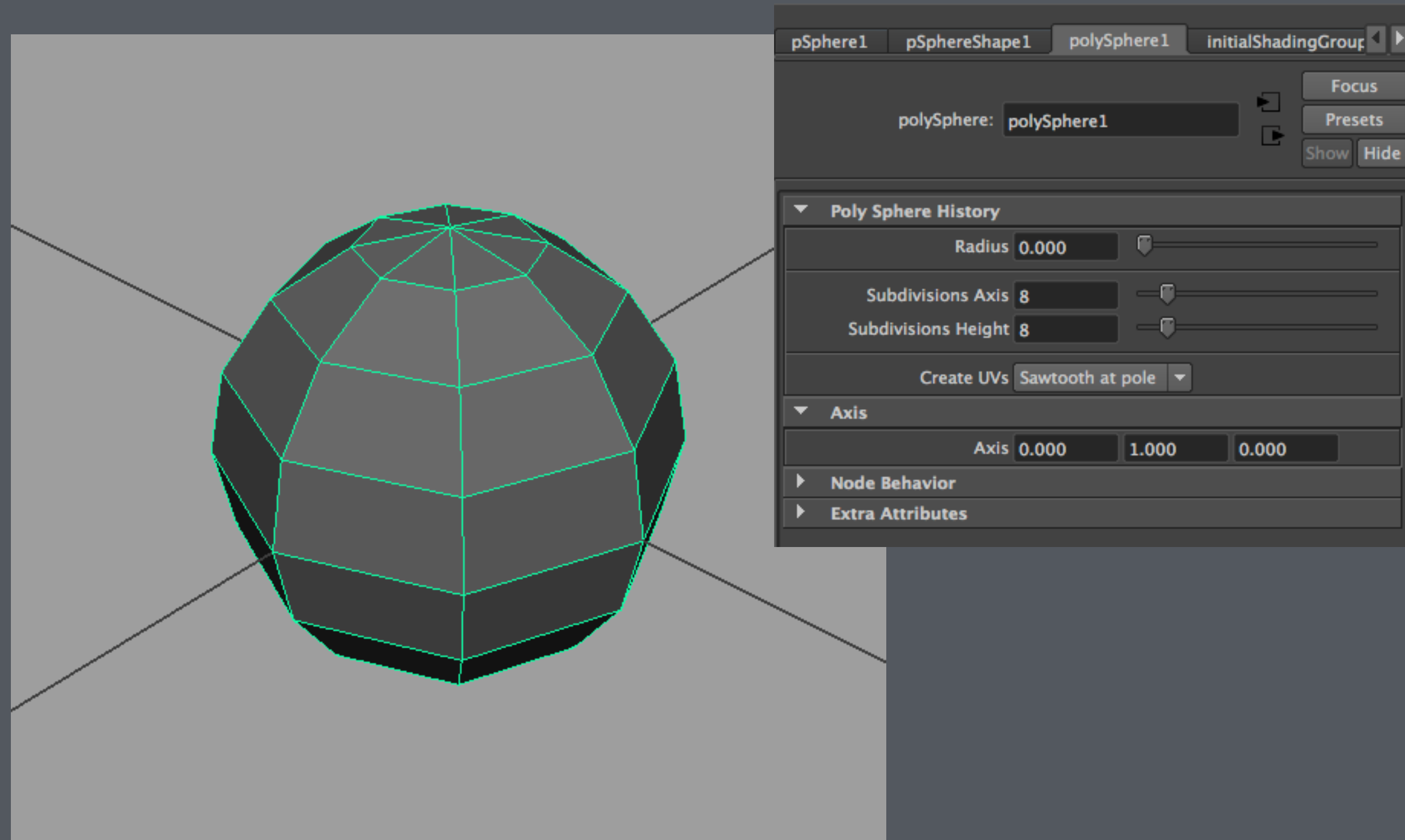
Types of surfaces in Computer Graphics

- Polygonal Mesh
- Non-Uniform Rational B-Spline (NURBS)
- Subdivision Surface (Subdiv)

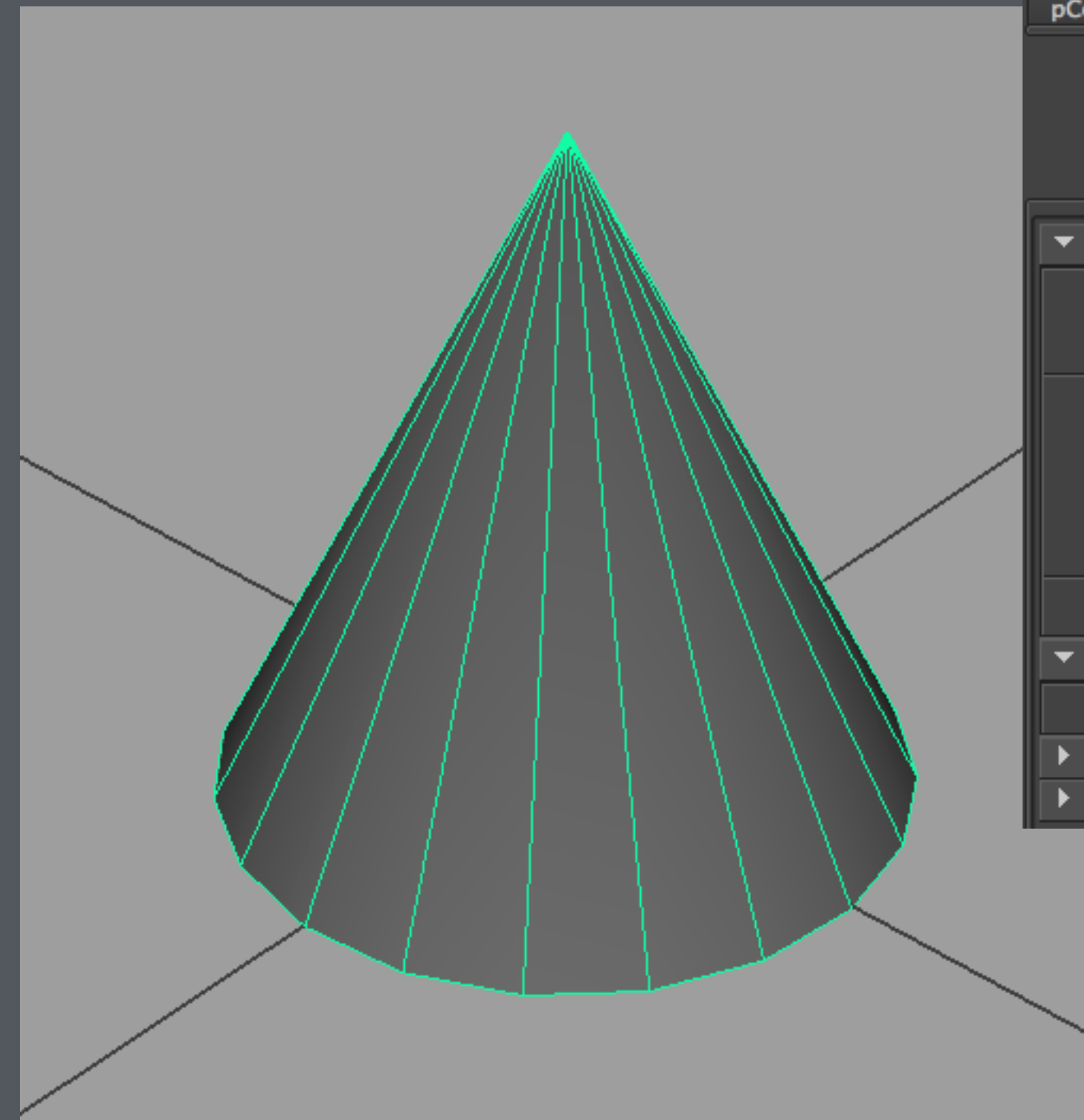


Polygon Primitives

Polygon Primitive - Sphere



Polygon Primitive - Cone



pCone1 pConeShape1 polyCone1 initialShadingGroup

polyCone: polyCone1

Focus
Presets
Show Hide

▼ Poly Cone History

Radius 0.526
Height 0.970

Subdivisions Axis 20
Subdivisions Height 1
Subdivisions Cap 0
Round Cap

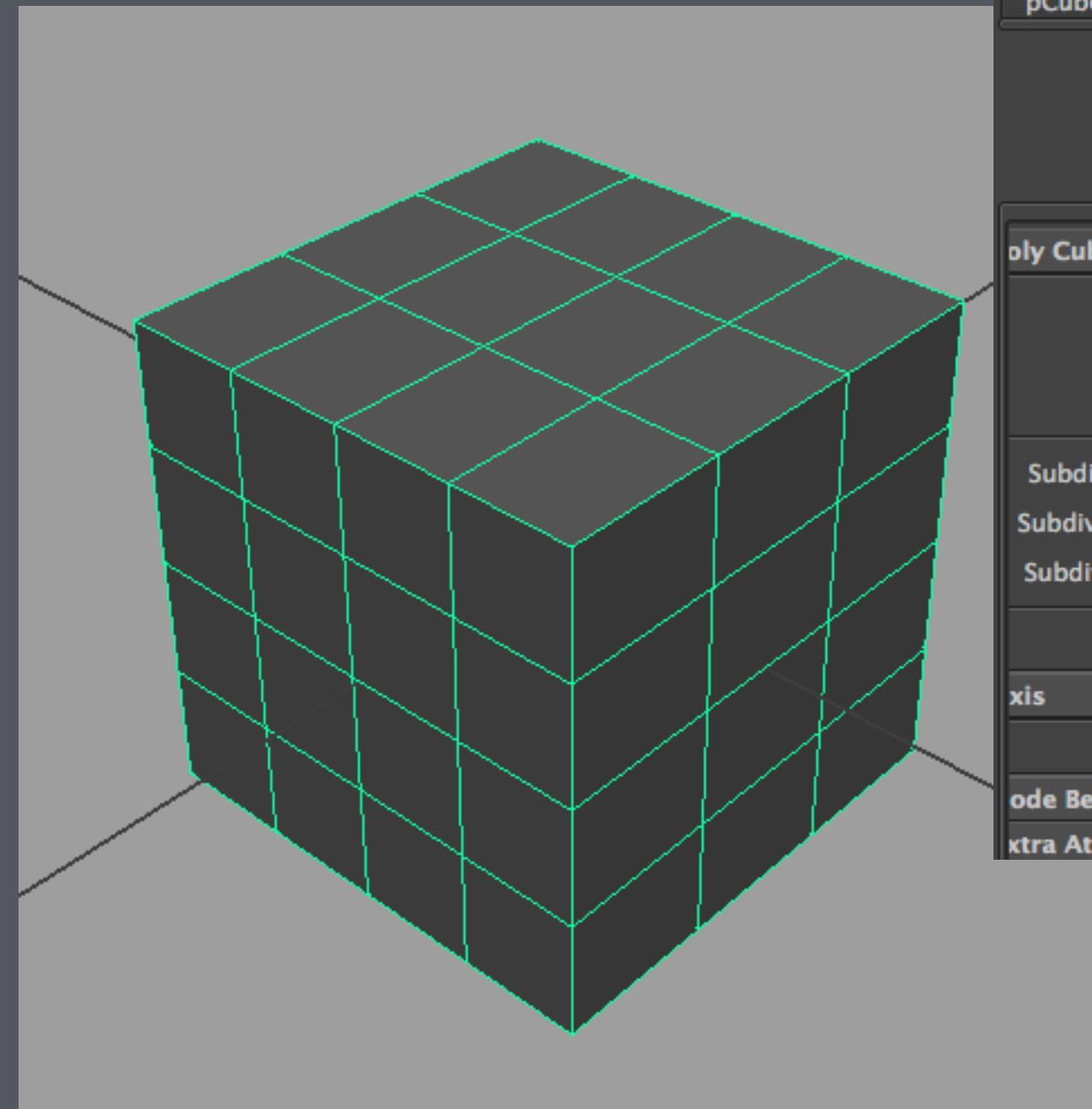
Create UVs Normalize and Preserve Aspect Ratio

▼ Axis

Axis 0.000 1.000 0.000

▶ Node Behavior
▶ Extra Attributes

Polygon Primitive - Cube



pCube1 pCubeShape1 polyCube1 initialShadingGroup

polyCube: polyCube1

Focus Presets Show Hide

poly Cube History

Width 0.000

Height 0.000

Depth 0.000

Subdivisions Width 4

Subdivisions Height 4

Subdivisions Depth 3

Create UVs Normalize Collectively and Preserve Aspect Ratio

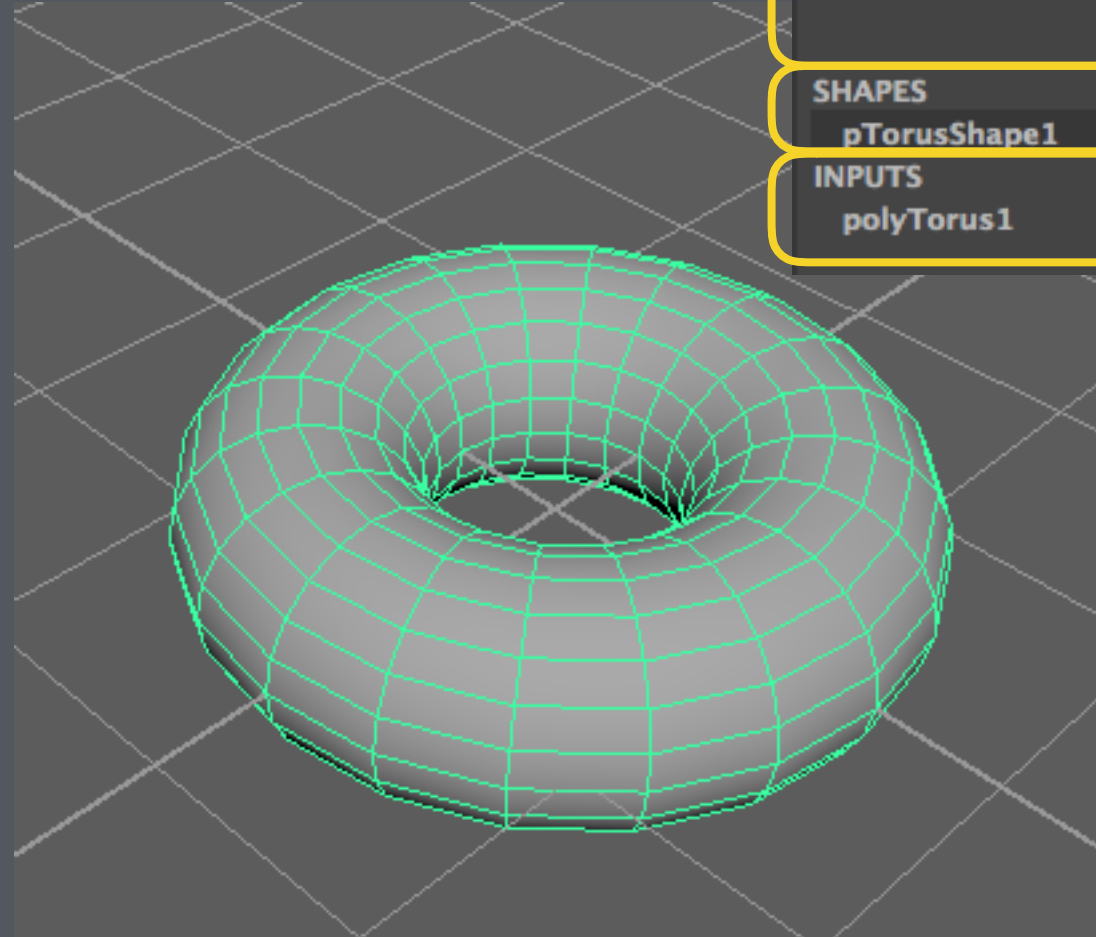
axis

Axis 0.000 1.000 0.000

mode Behavior

extra Attributes

What makes up an object?



Channels Edit Object Show

pTorus1

Translate X	0
Translate Y	0
Translate Z	0
Rotate X	0
Rotate Y	0
Rotate Z	0
Scale X	1
Scale Y	1
Scale Z	1
Visibility	on

SHAPES

pTorusShape1

INPUTS

polyTorus1

Transform

Shape

History

List Selected Focus Attributes Show TURTLE Help

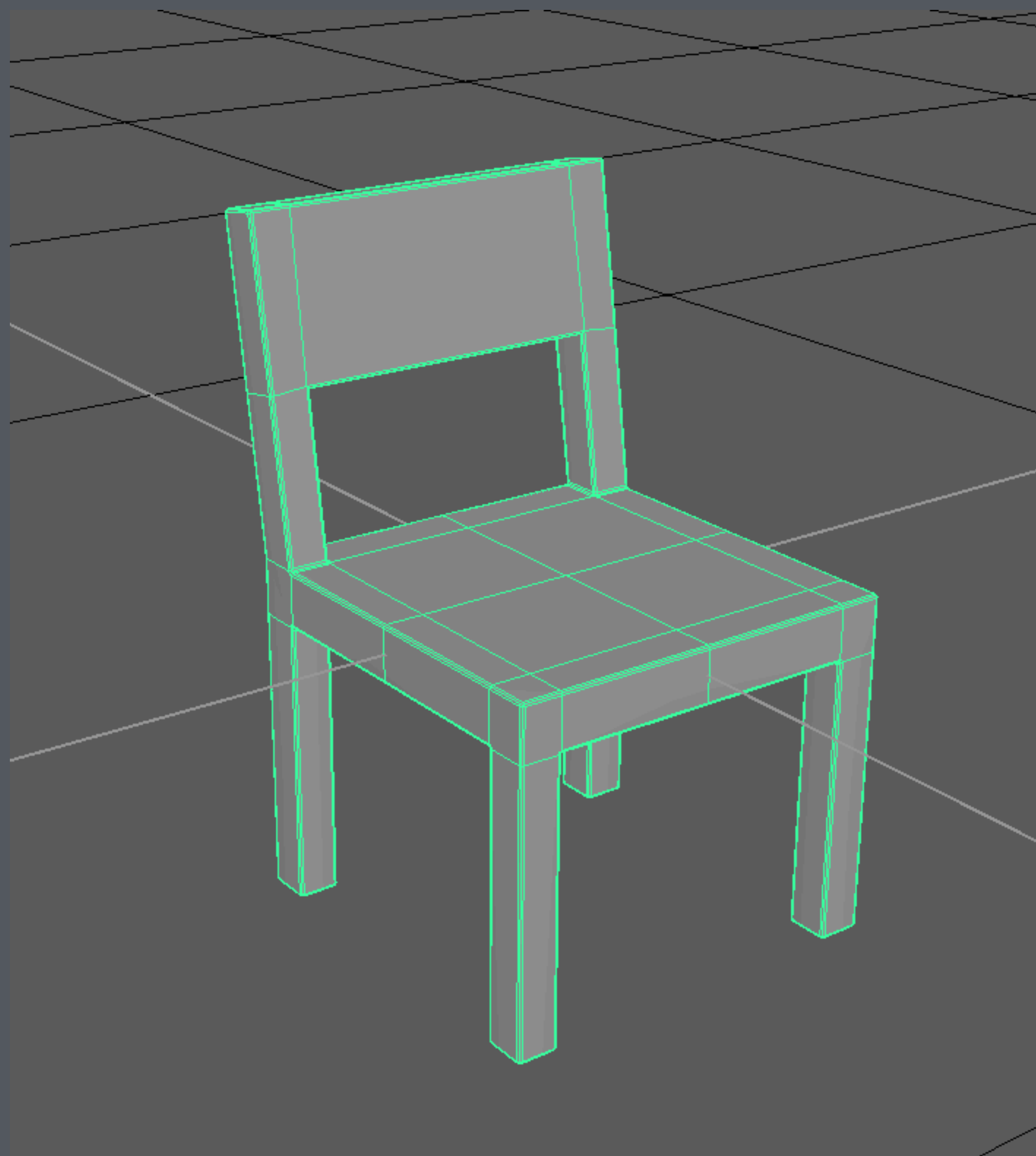
pTorus1 pTorusShape1 polyTorus1 initialShadingGroup lam

mesh: pTorusShape1

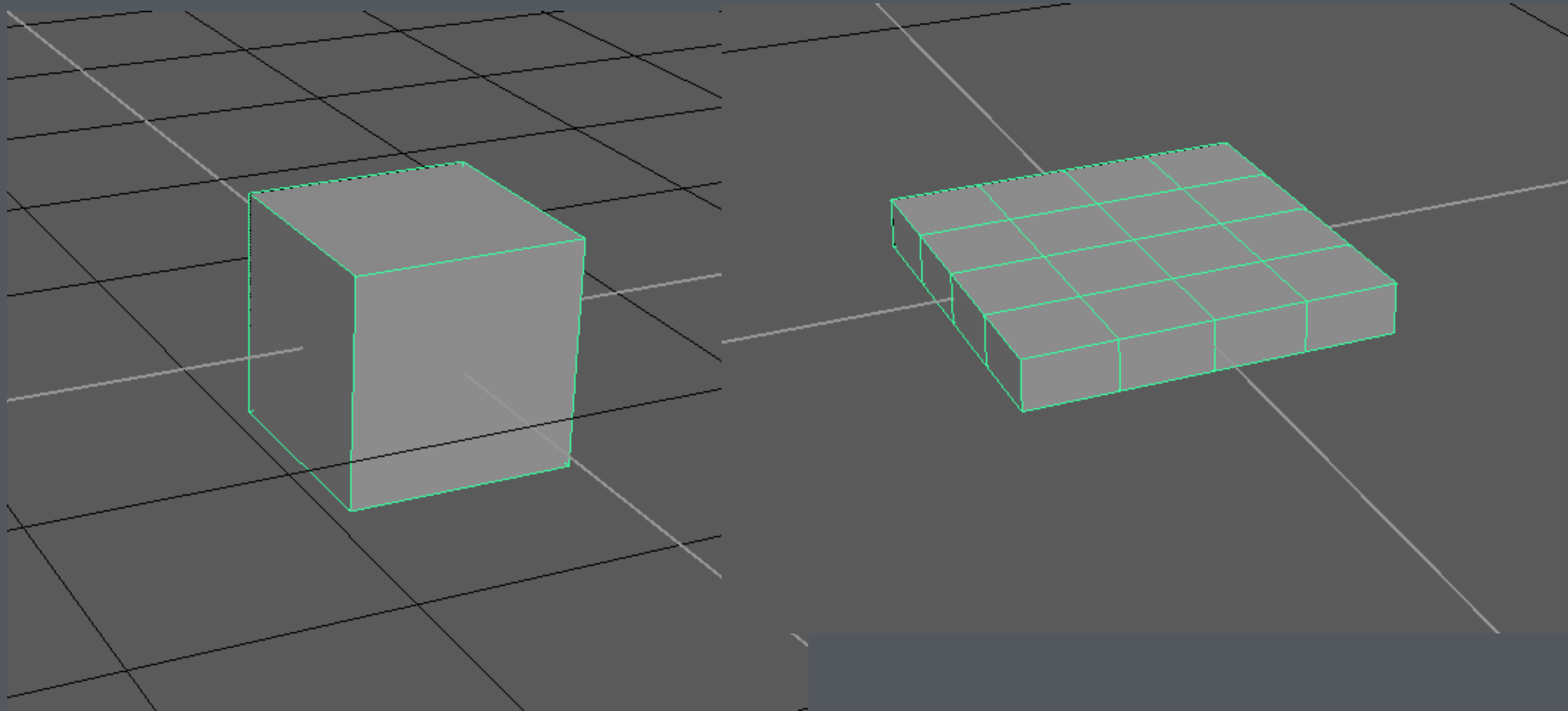
Focus
Presets
Show Hide

- Tessellation Attributes
- Mesh Component Display
- Mesh Controls
- Tangent Space
- Smooth Mesh
- Displacement Map
- Render Stats
- Object Display
- Arnold
- Node Behavior
- UUID
- Extra Attributes

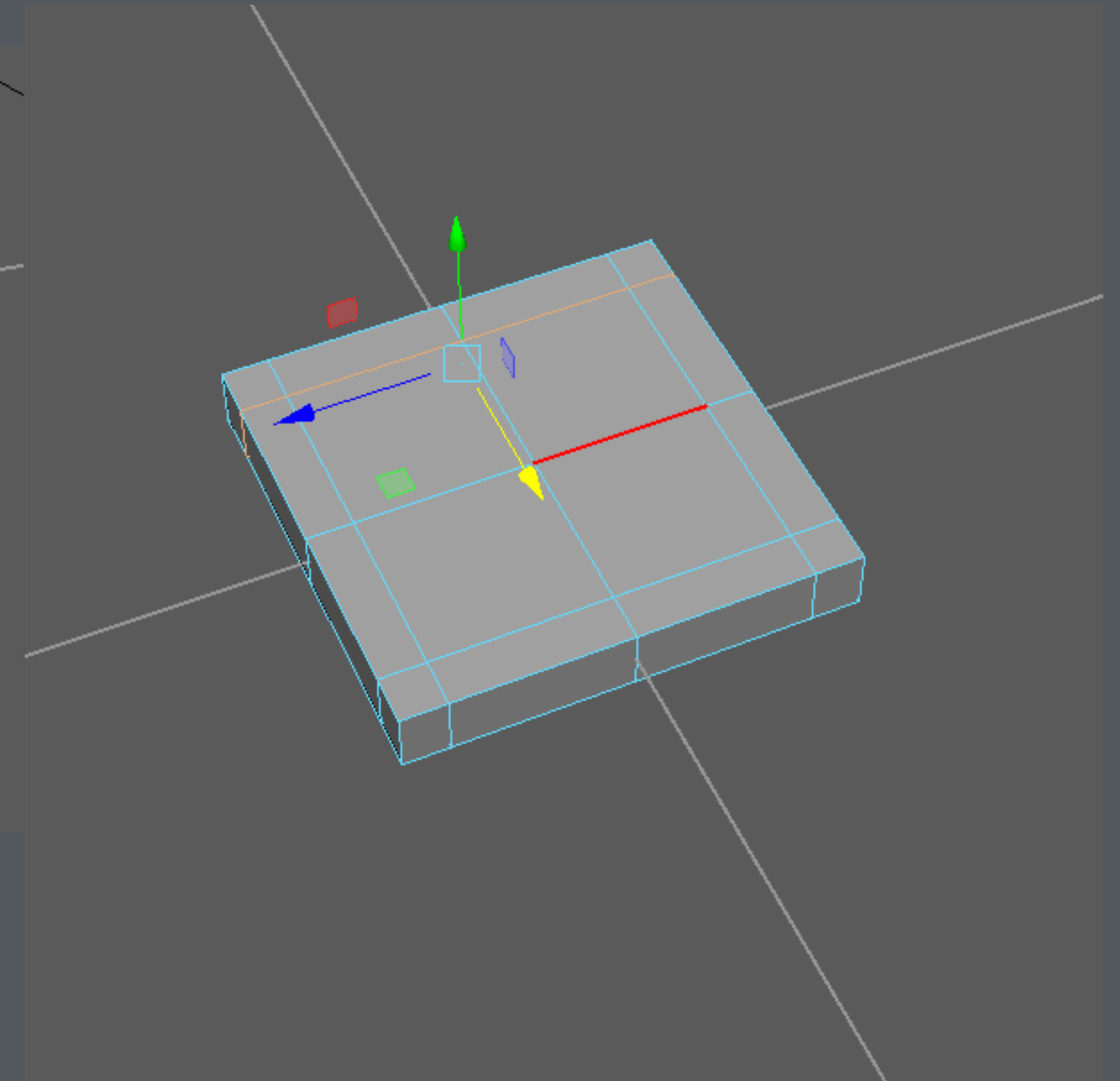
Creating a Polygonal Chair

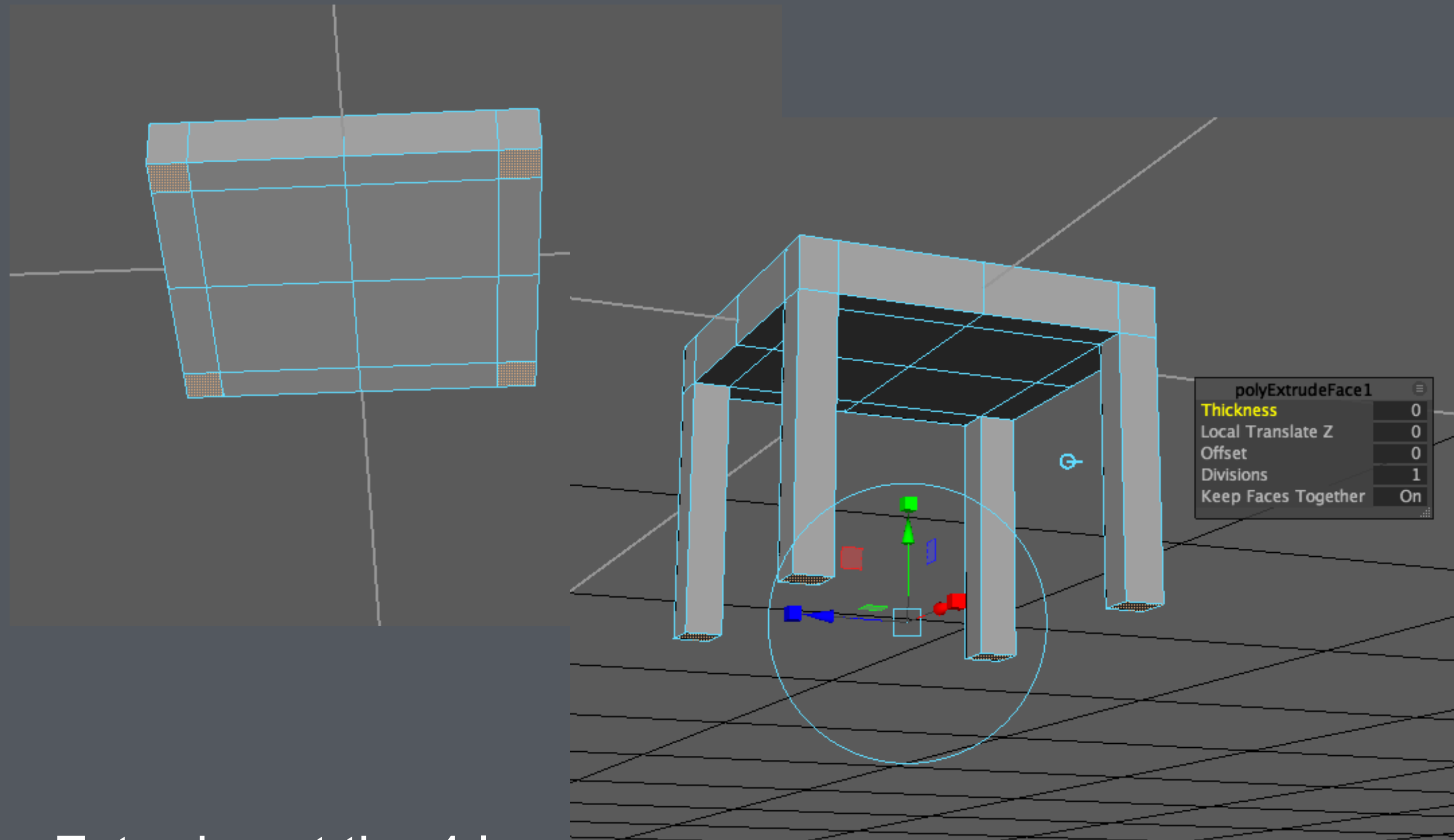


Start with a primitive

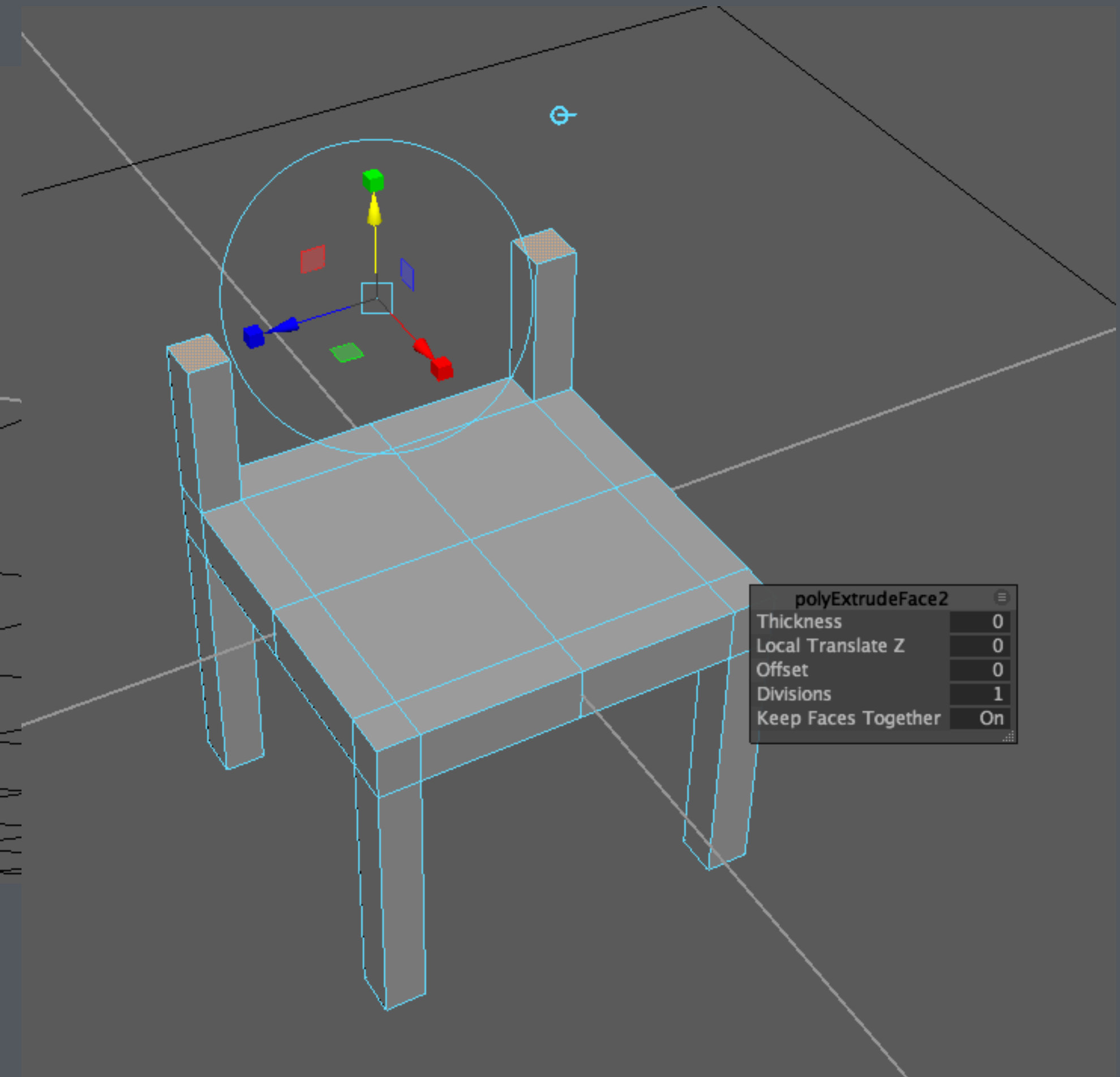


Adjust the edges

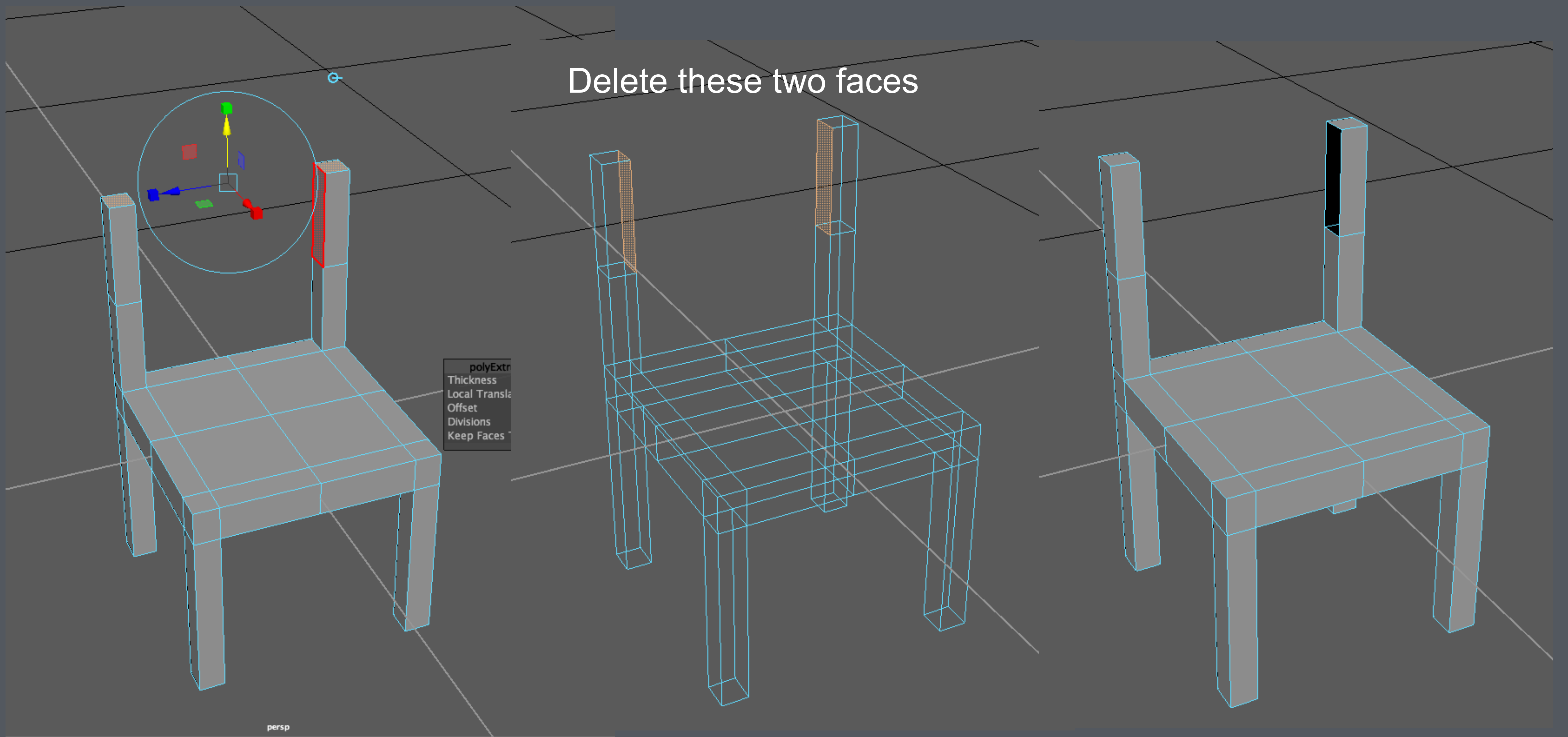




Extrude out the 4 legs

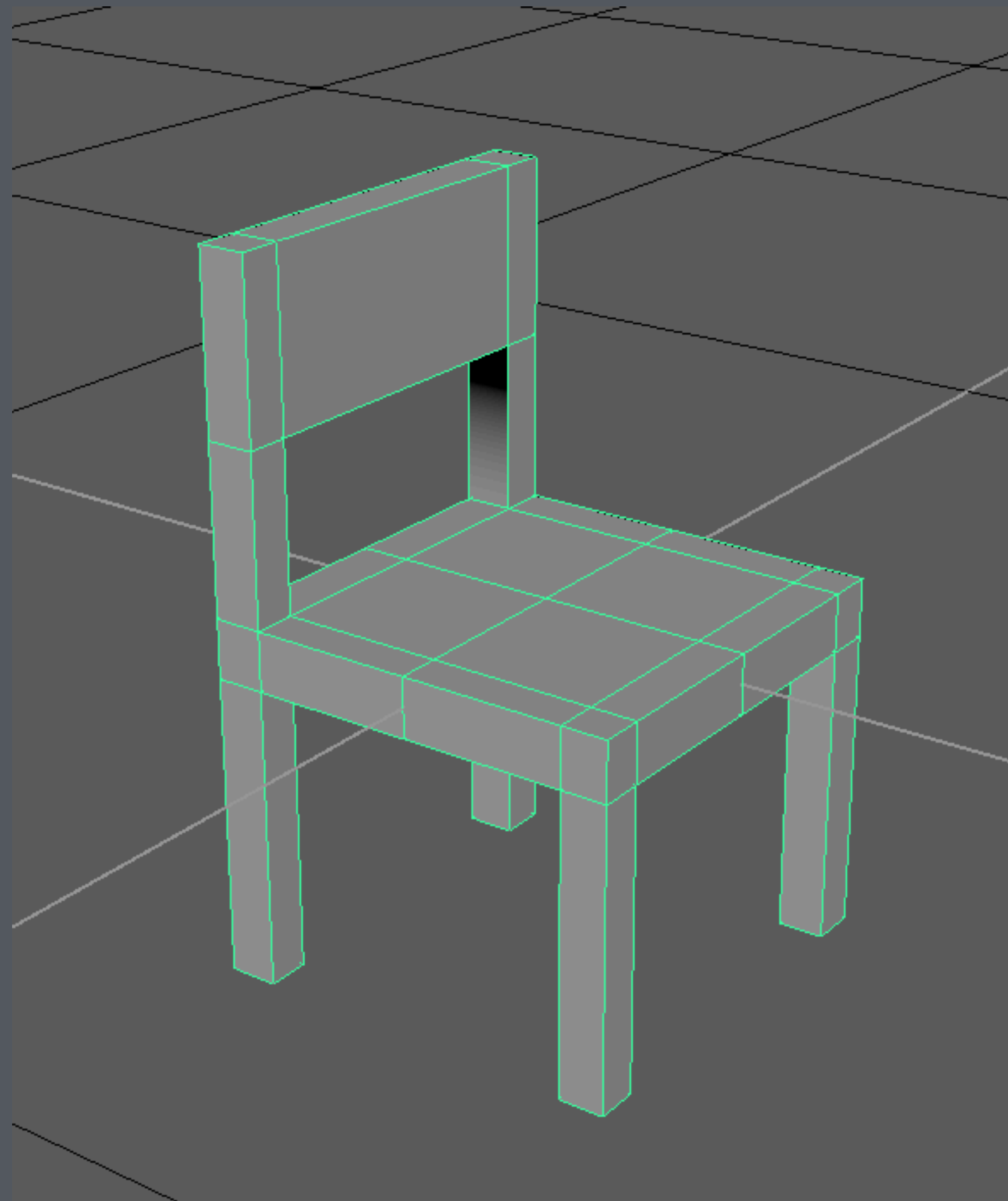
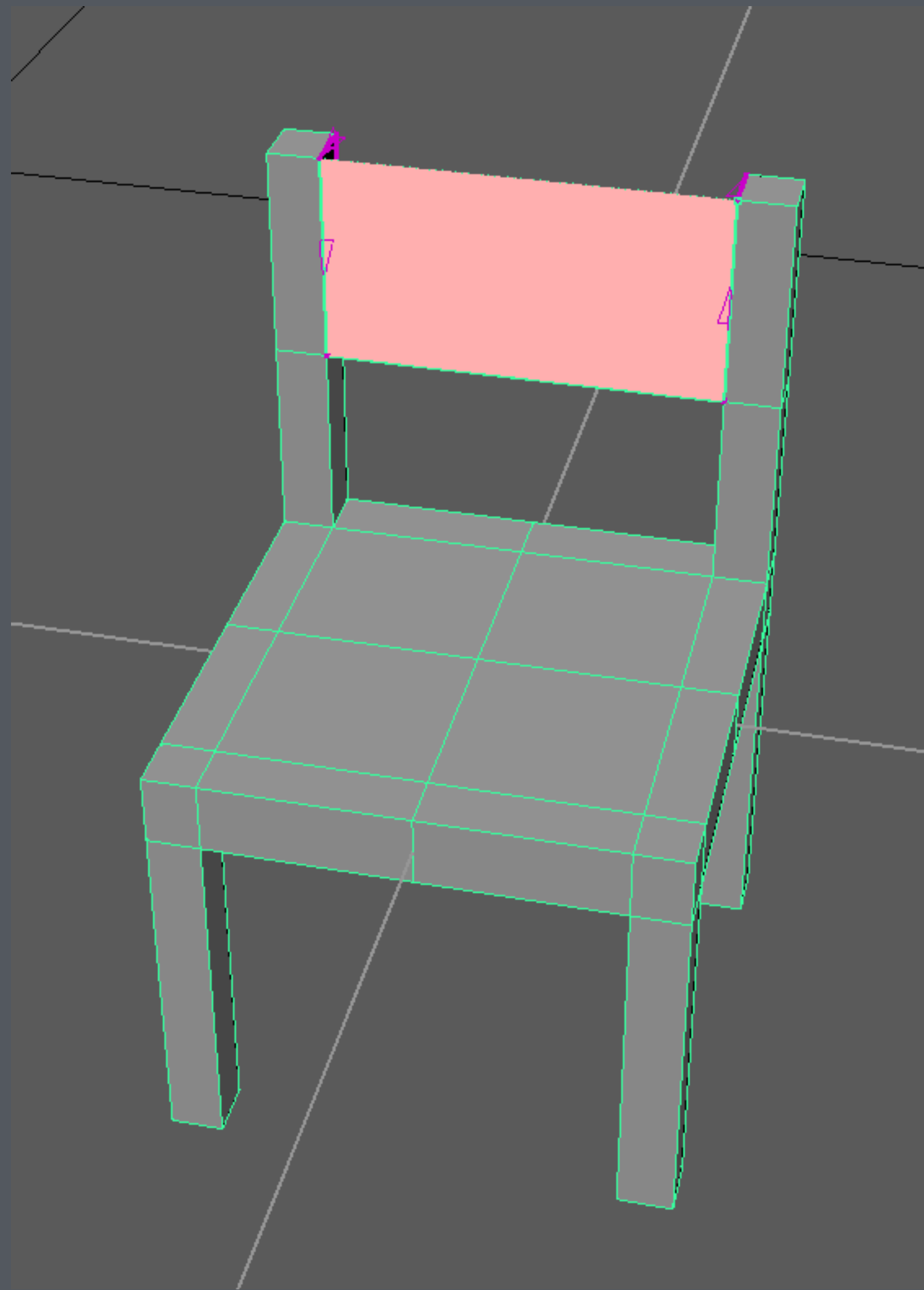


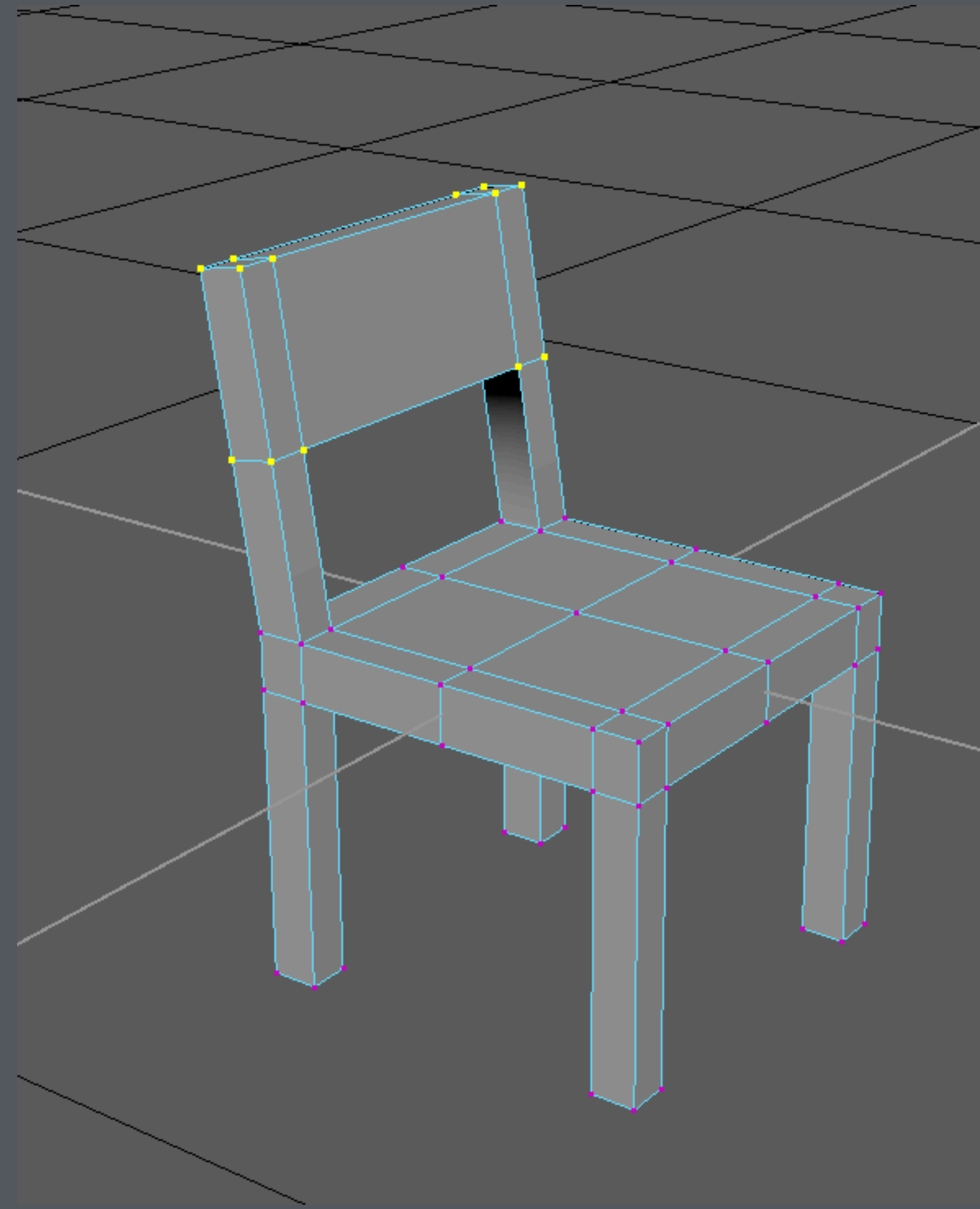
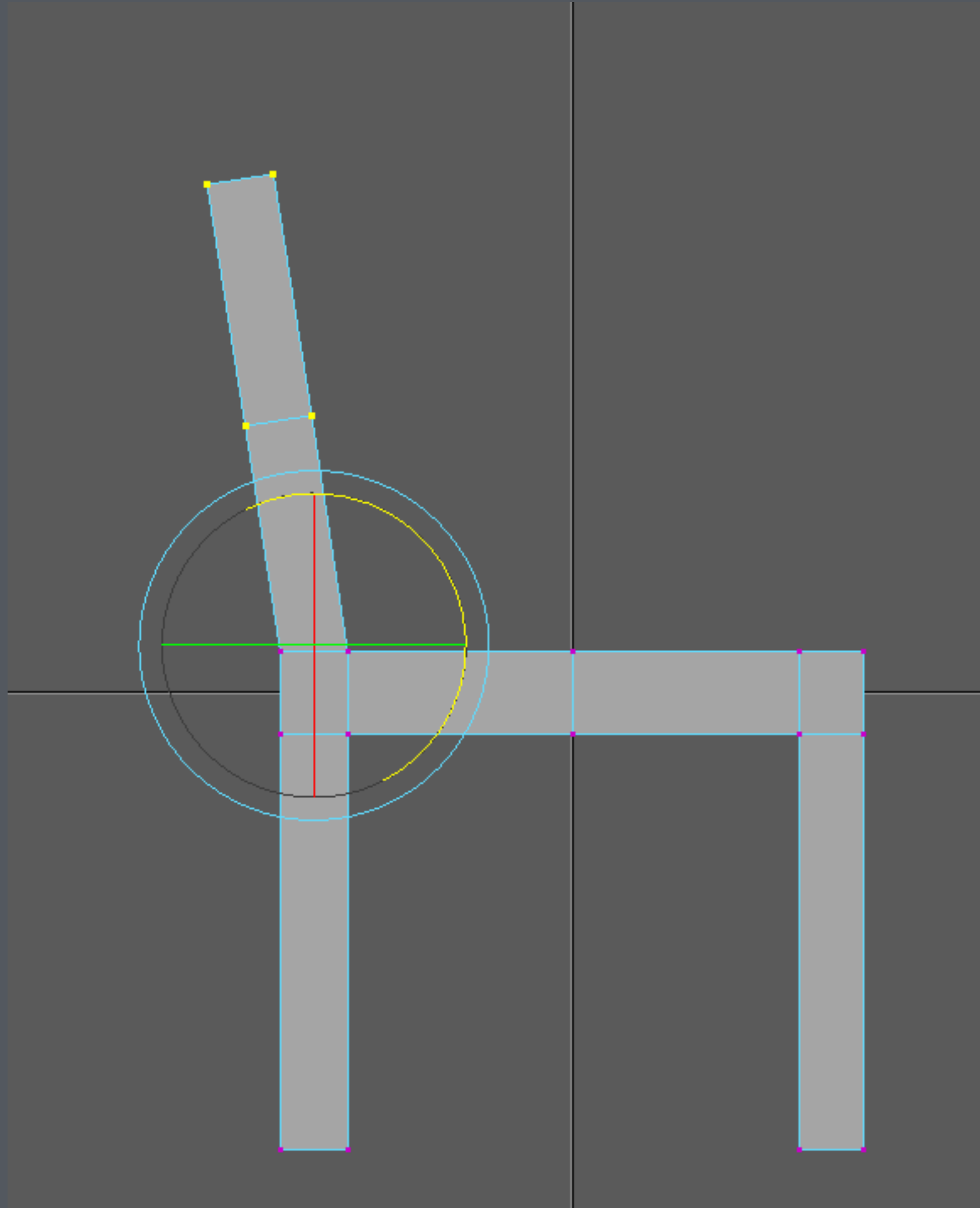
Then extrude the backrest



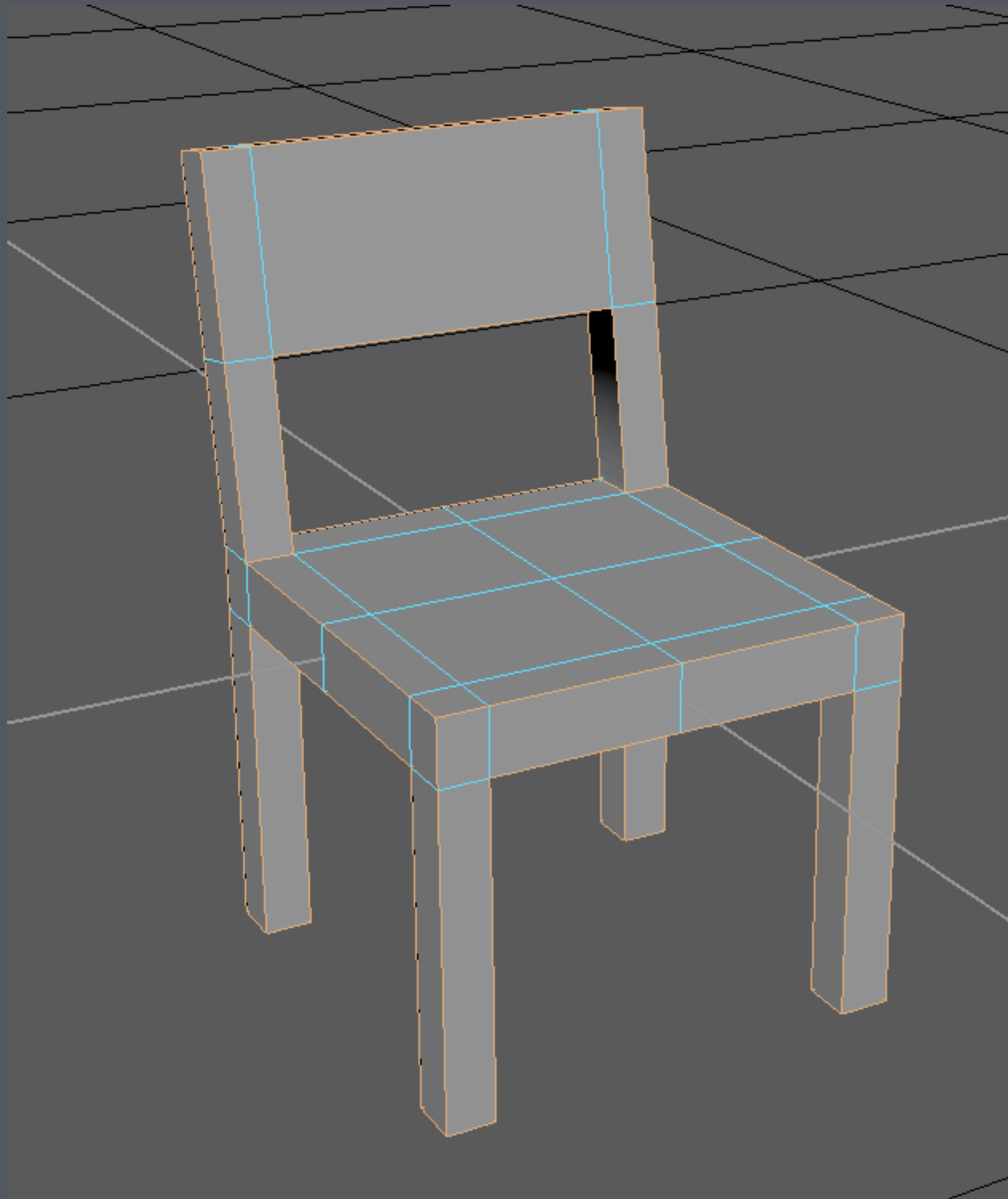
Prepare to make the panel of the backrest

Use the “Append Polygon” tool to fill in new polygonal faces

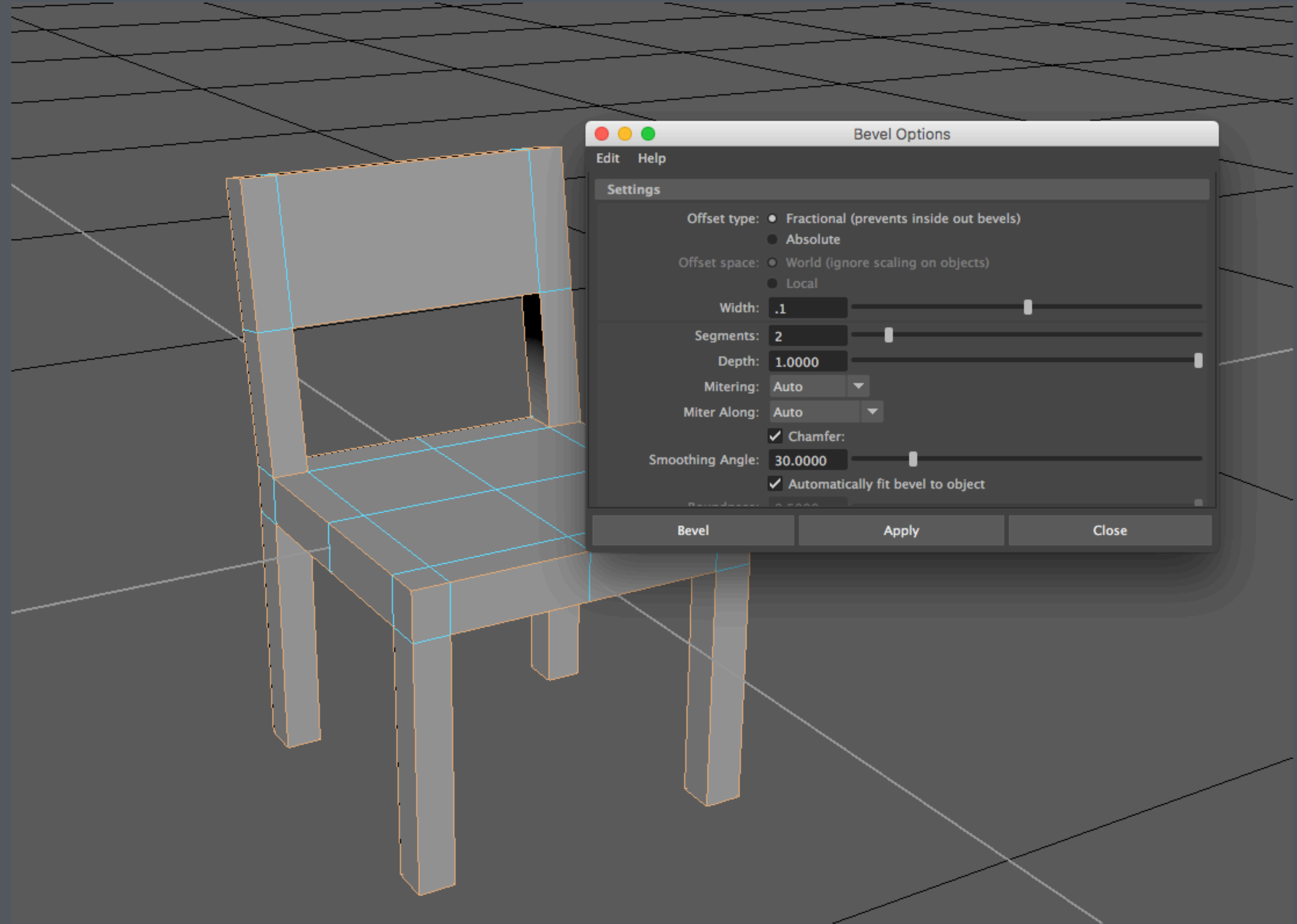




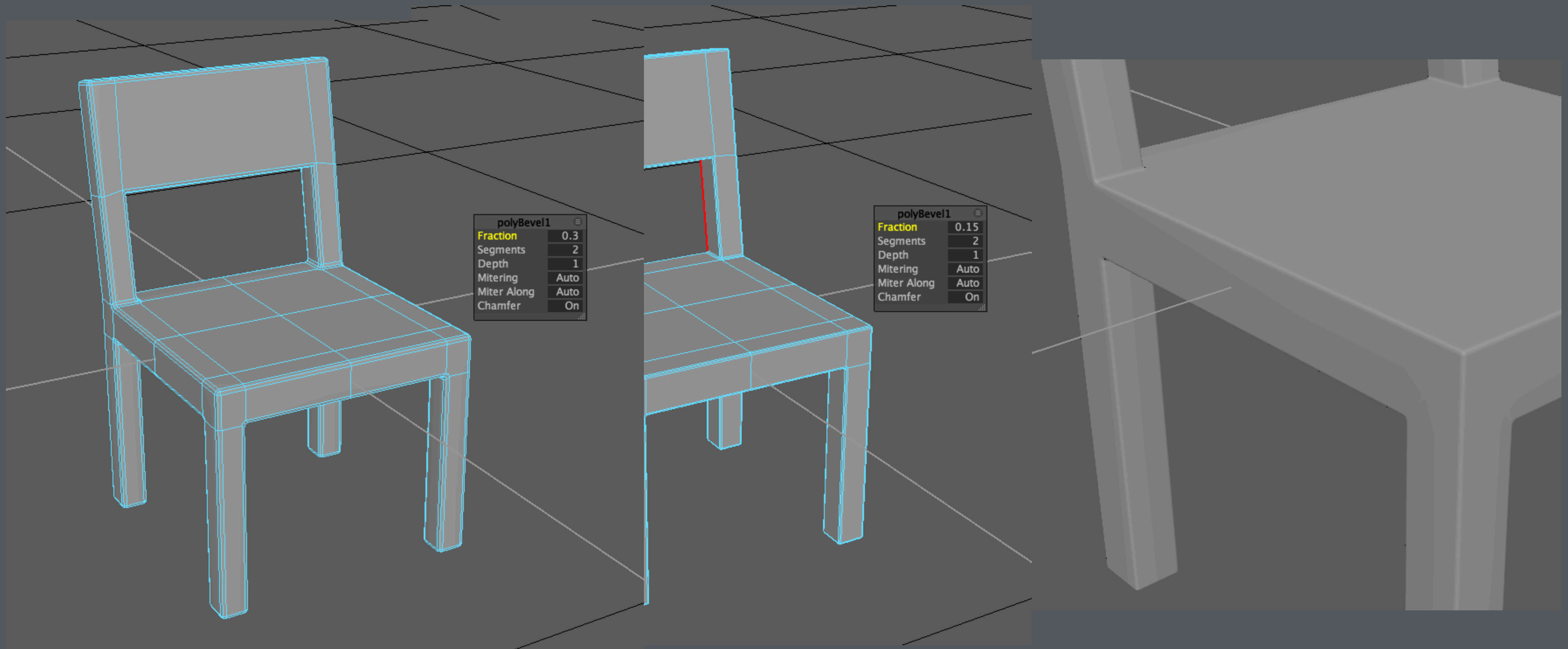
Rotate the backrest slightly backward



Select all the convex and concave edges

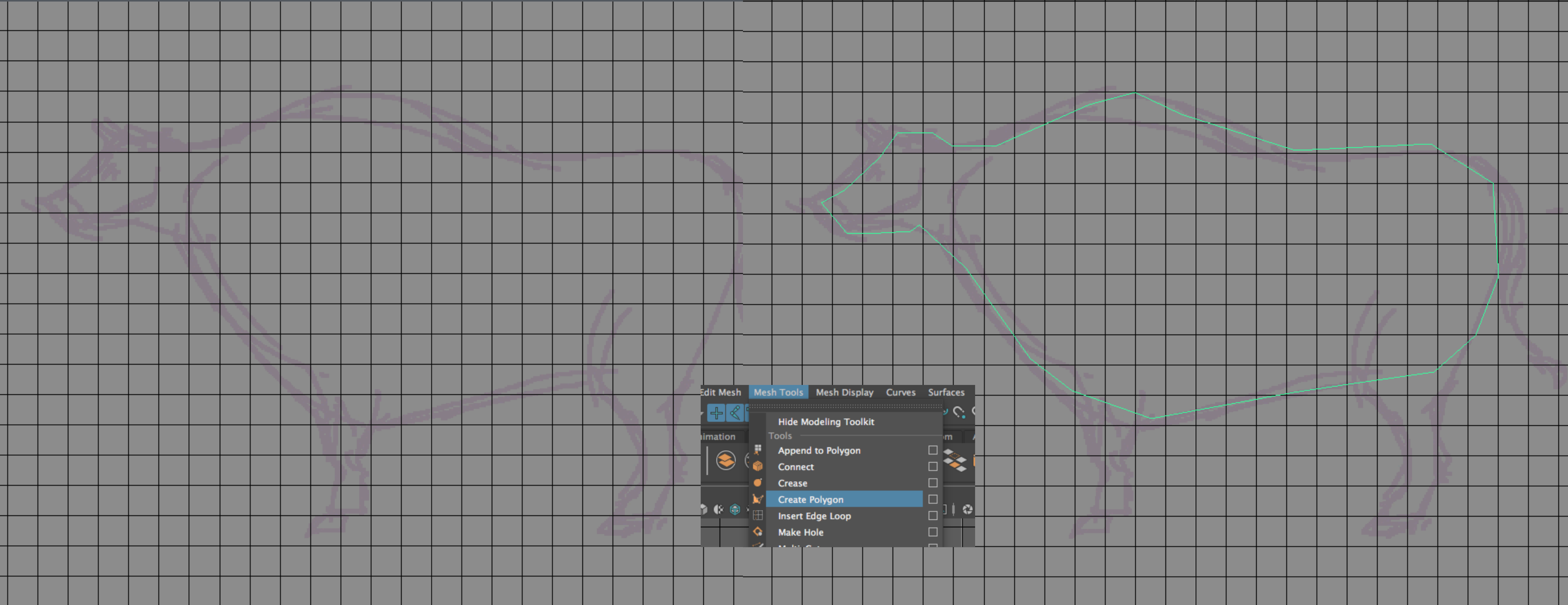


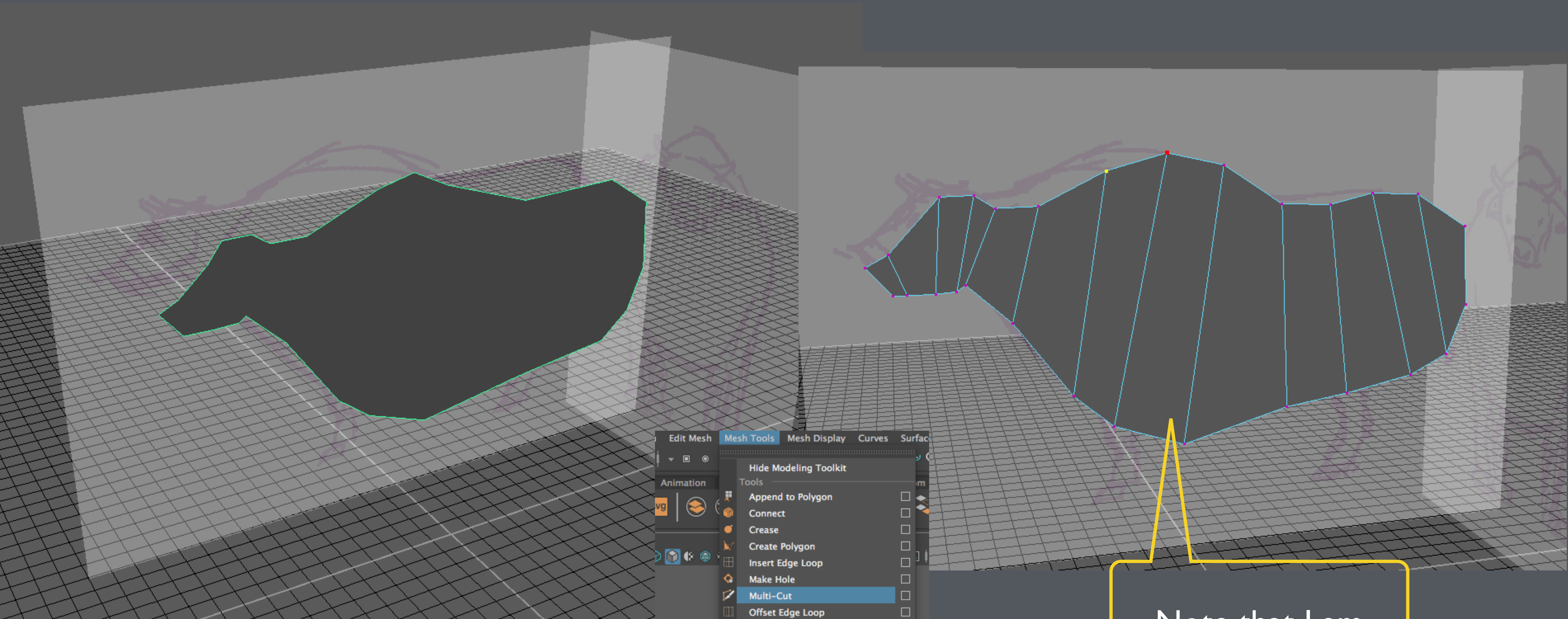
Apply Bevel to these edges



Bevel makes the edges more rounded and realistic

Another way to model





Edit Mesh Mesh Tools Mesh Display Curves Surfac

Animation

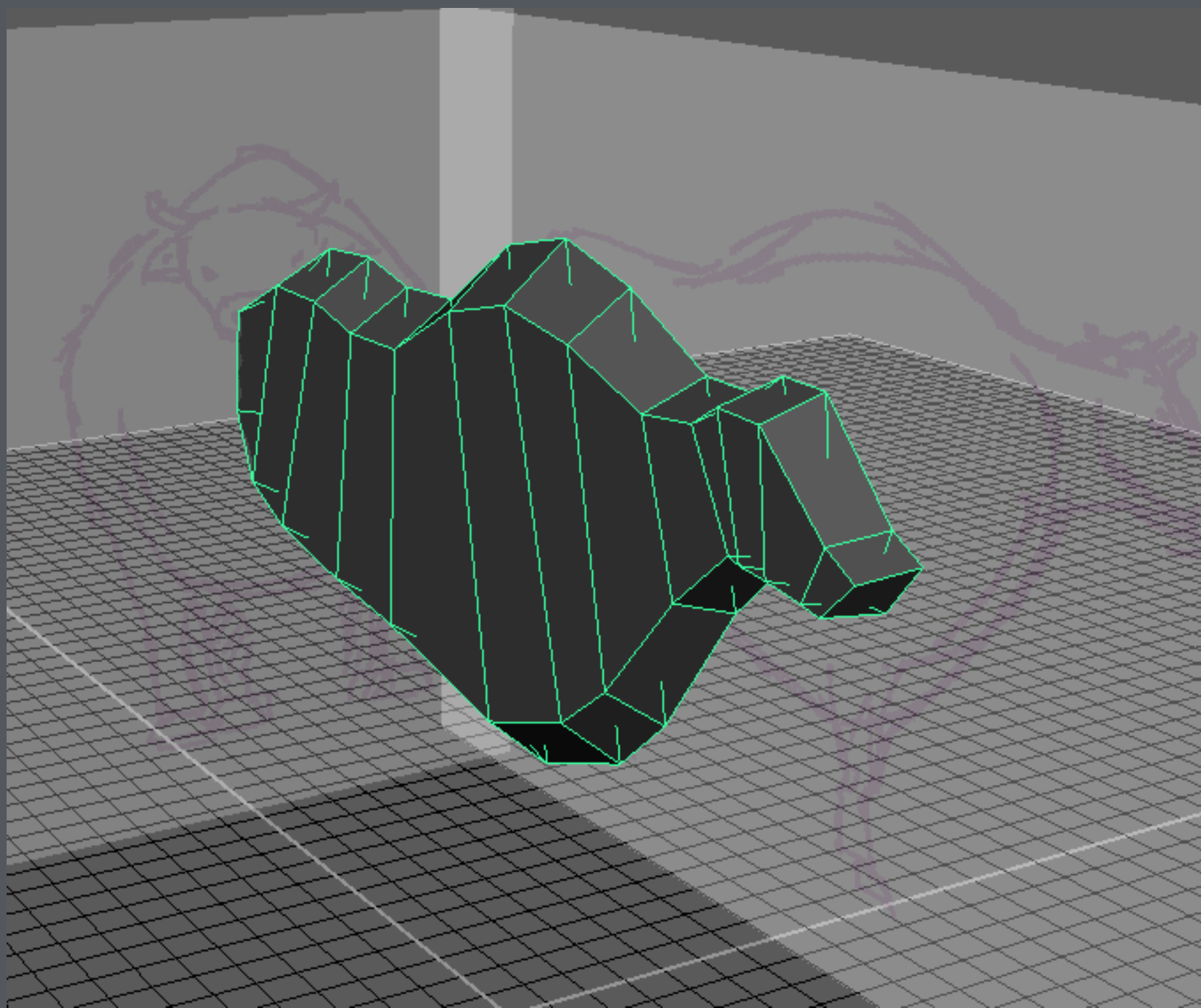
vg

Hide Modeling Toolkit

Tools

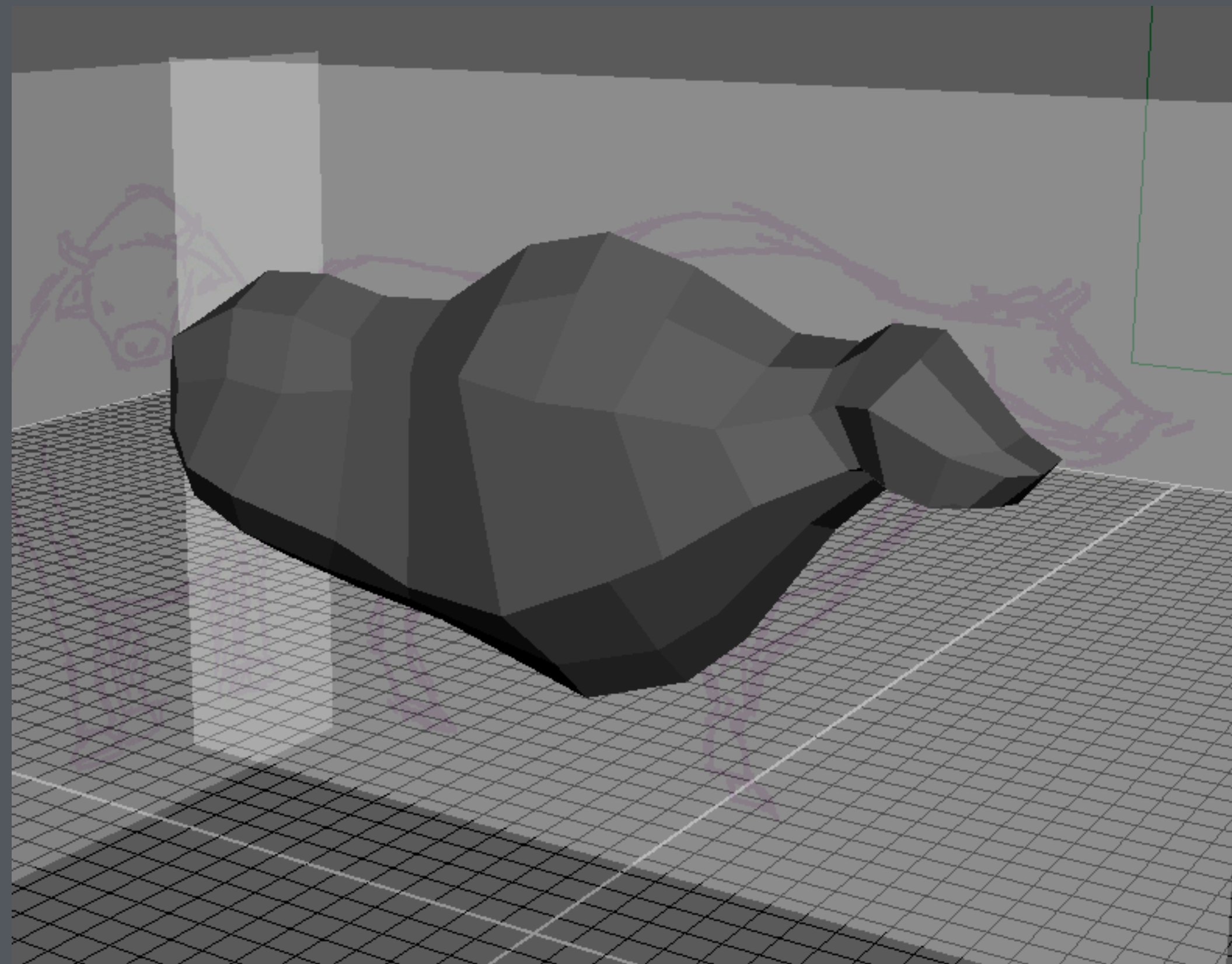
- Append to Polygon
- Connect
- Crease
- Create Polygon
- Insert Edge Loop
- Make Hole
- Multi-Cut
- Offset Edge Loop
- Paint Reduce Weights
- Paint Transfer Attributes

Note that I am keeping all the faces 4 sided

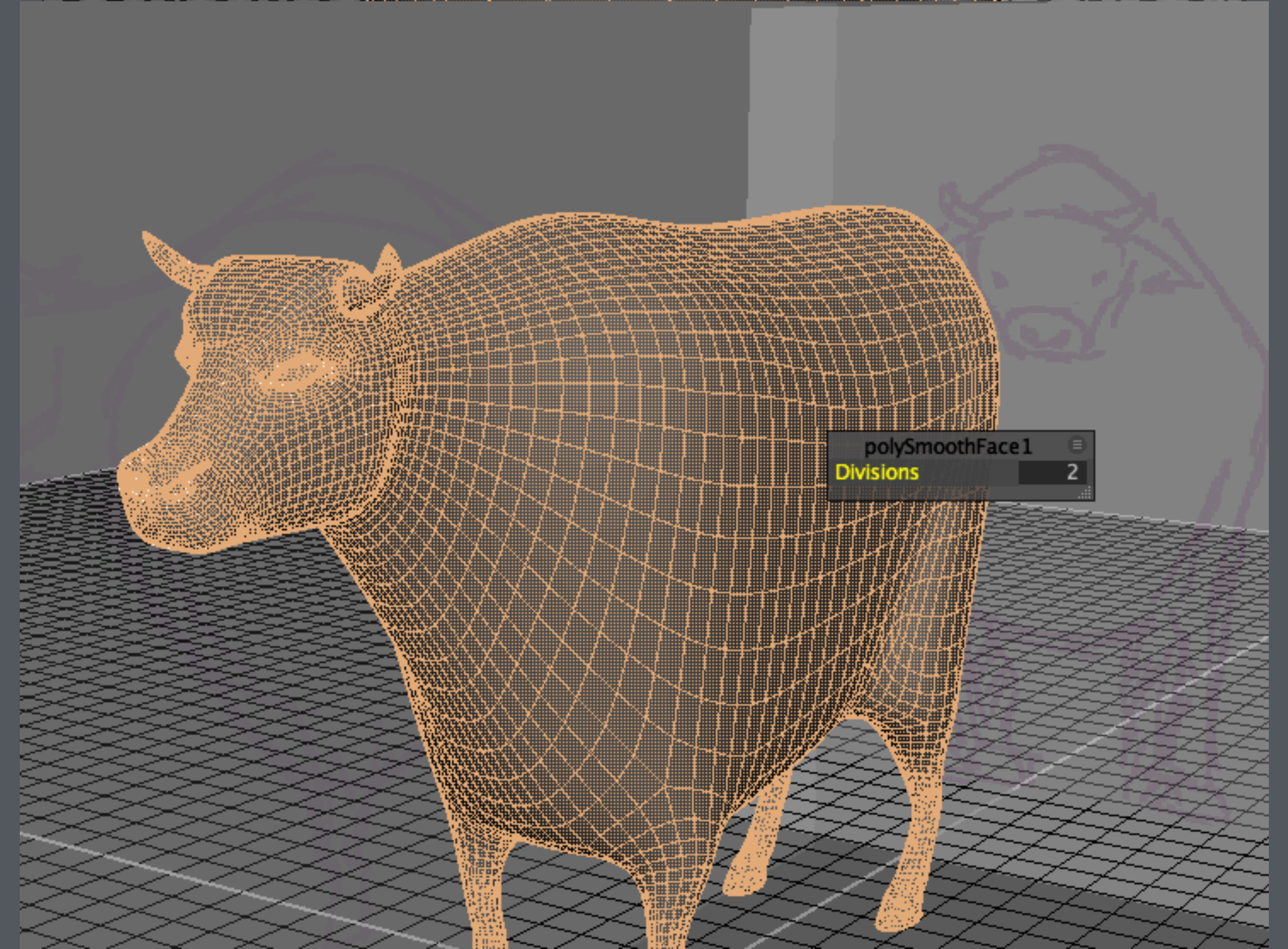
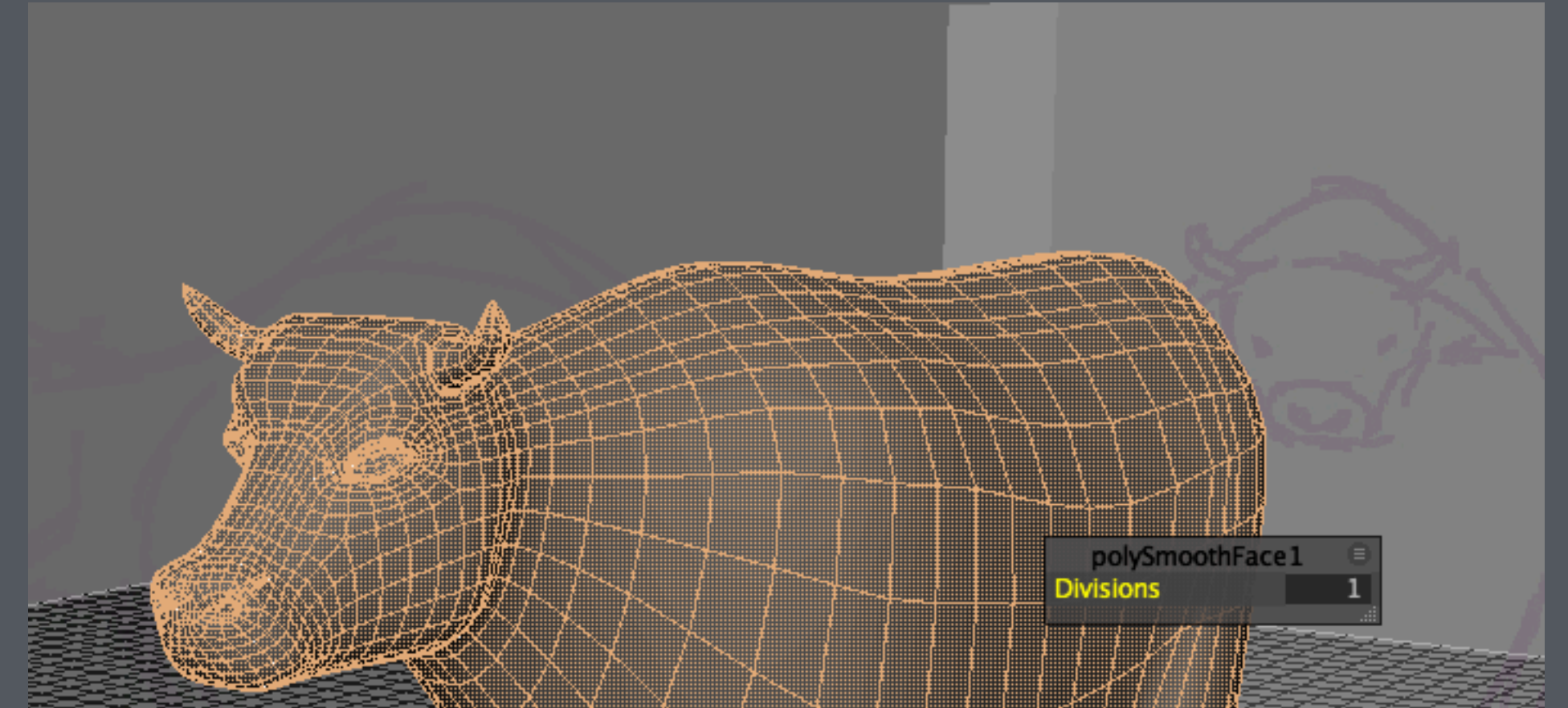
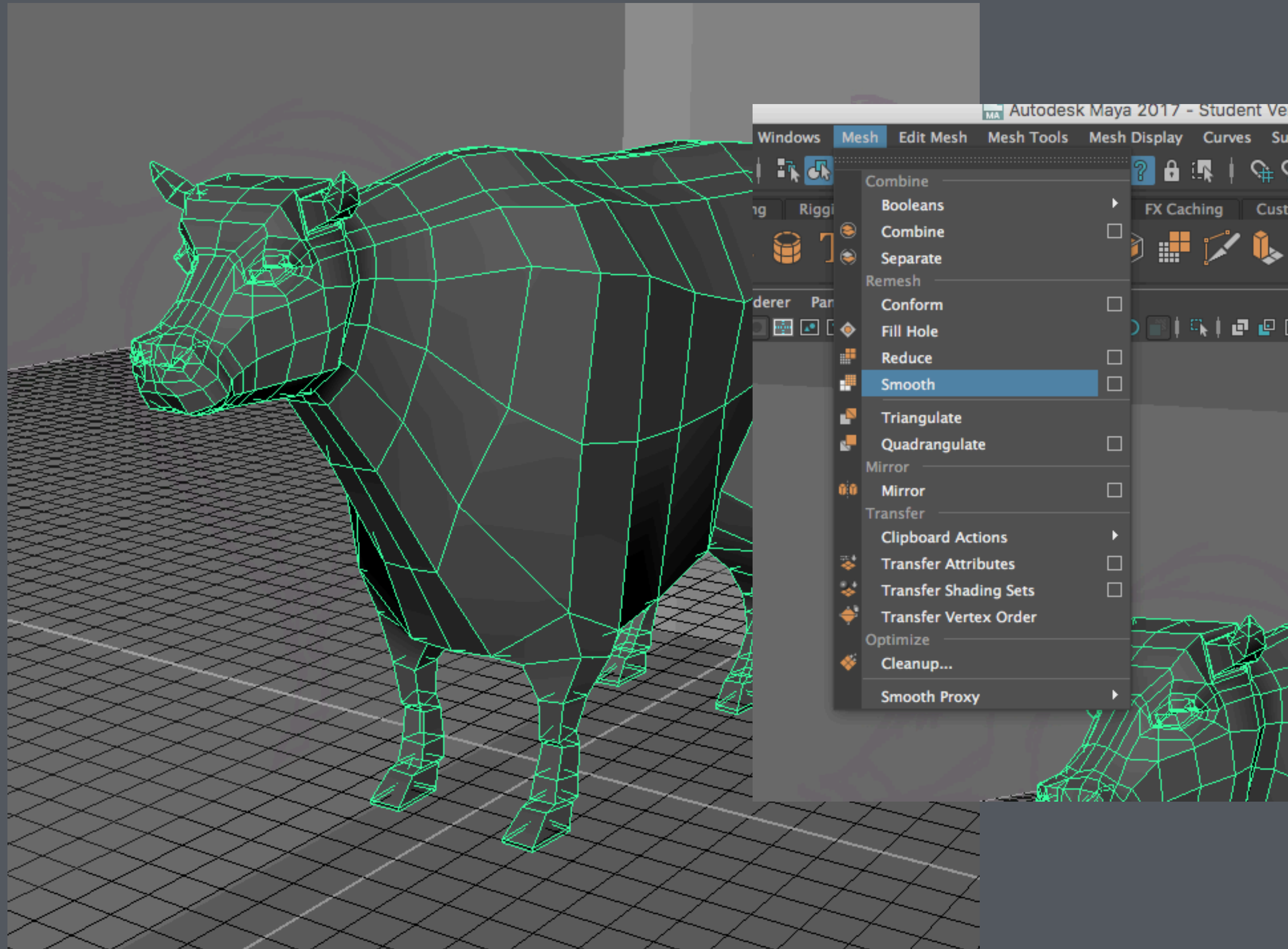


Extrude the faces out two times

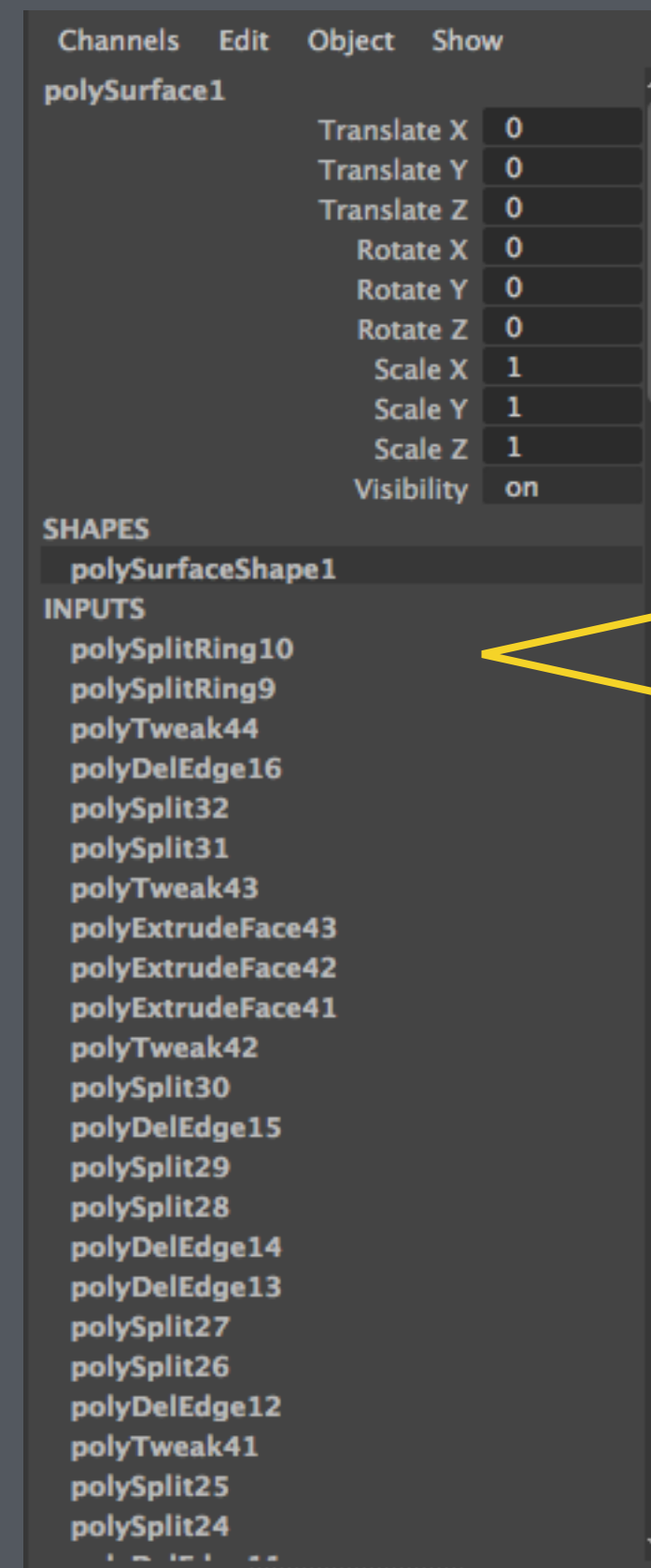
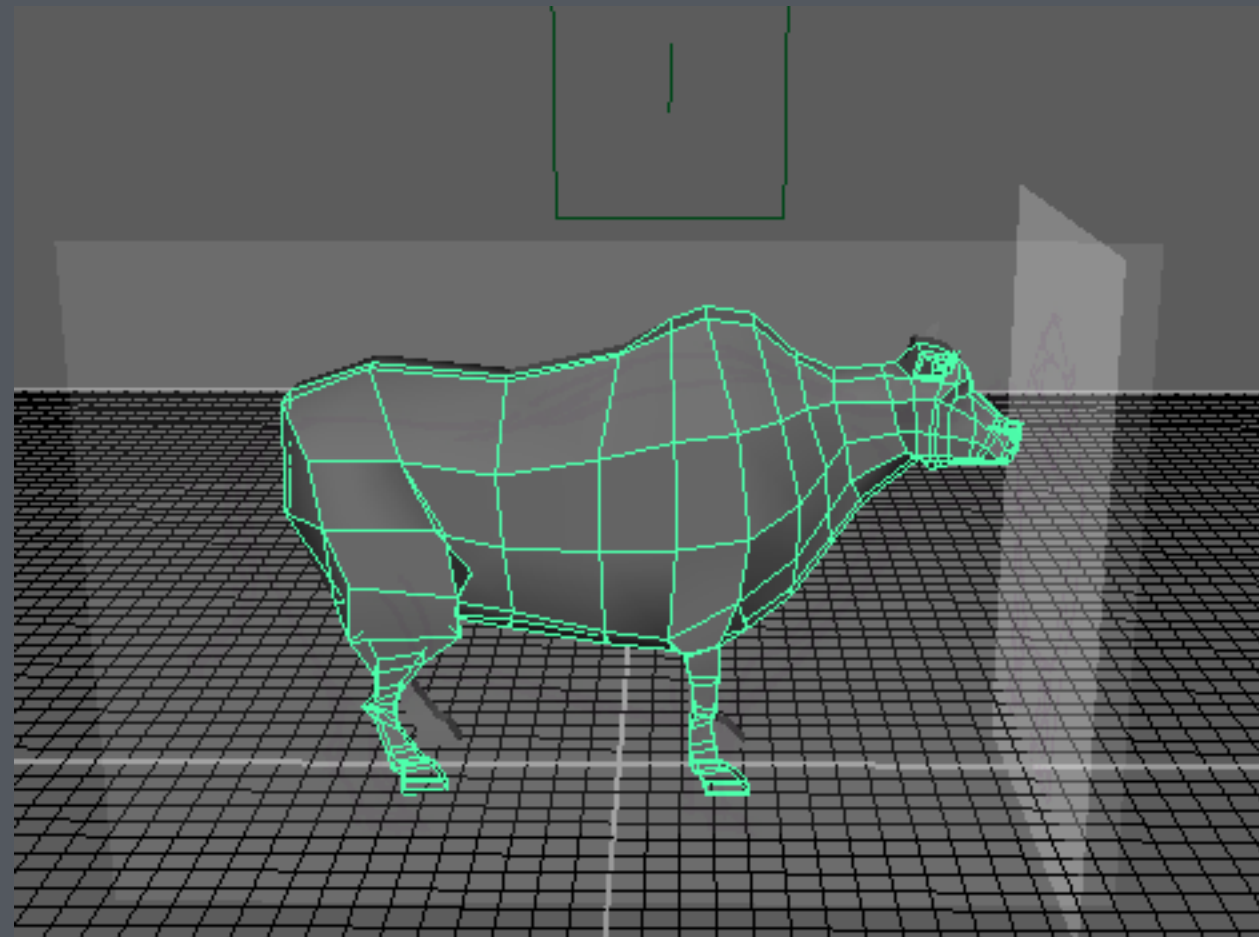
Shape the faces, edges and vertices to the desired shape



Polygonal Smoothing



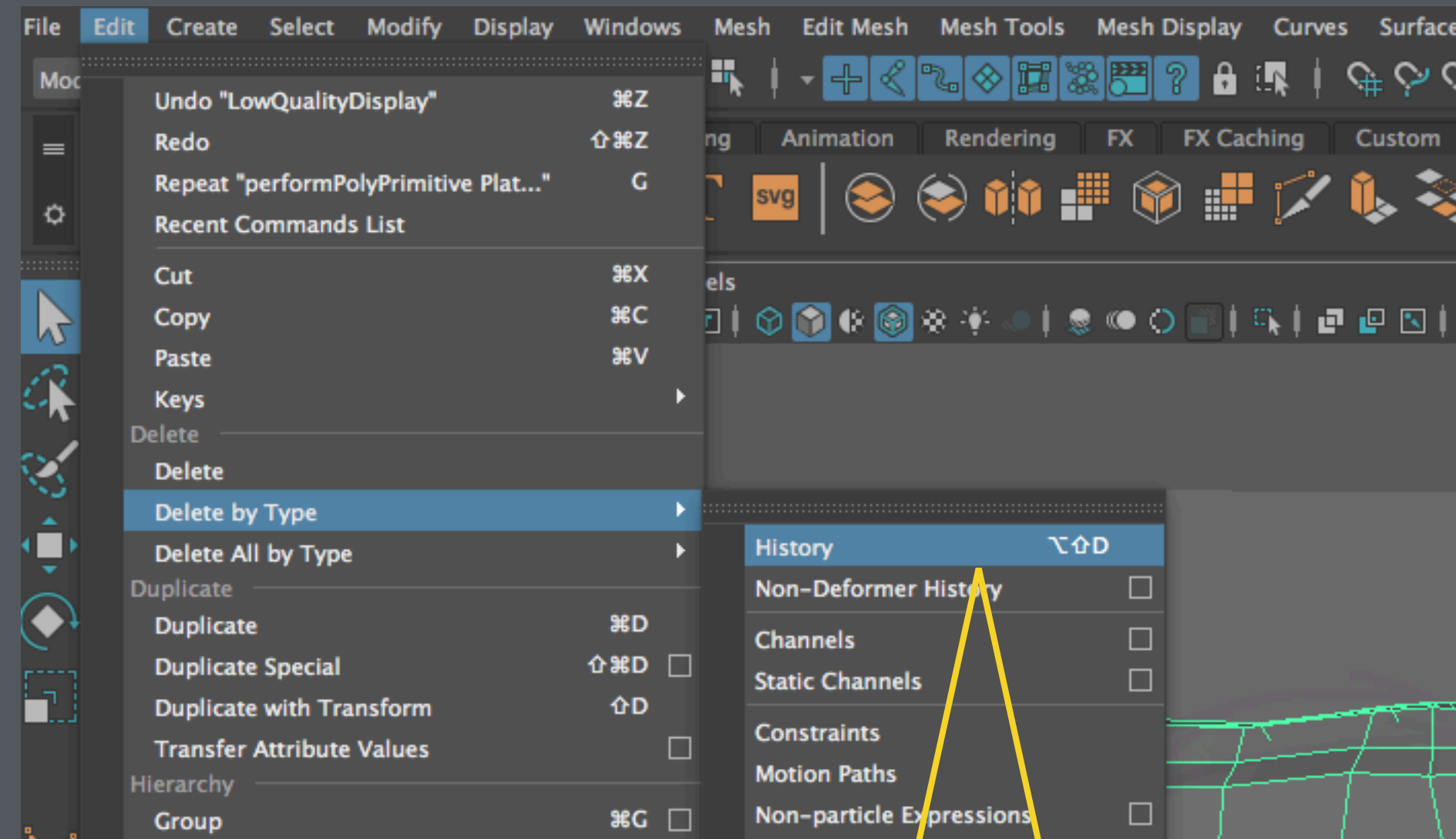
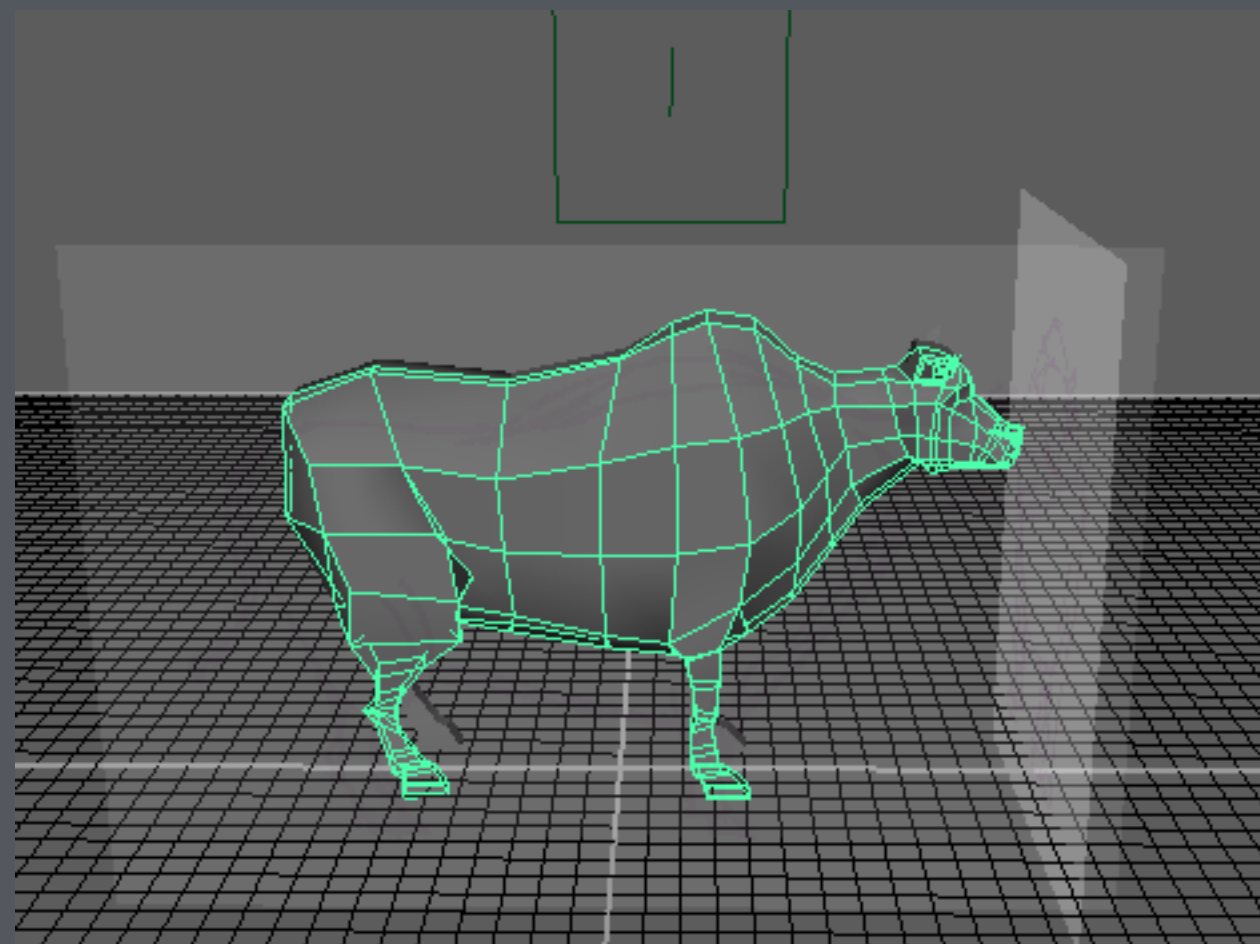
Construction History



Every action is recorded as part of the construction history.

Keeping history will occupy more memory, result in large files, and slow down the interaction.

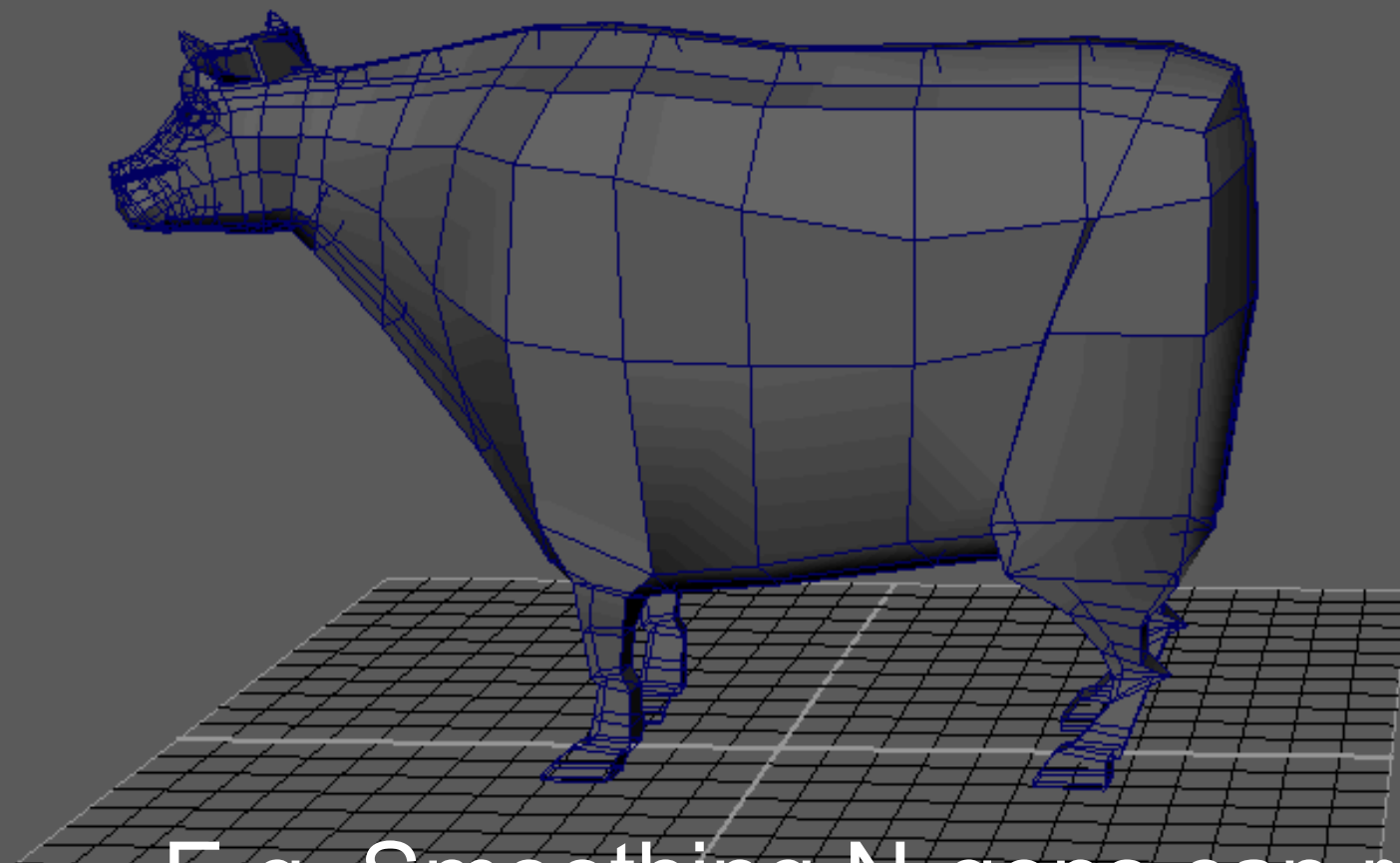
Construction History



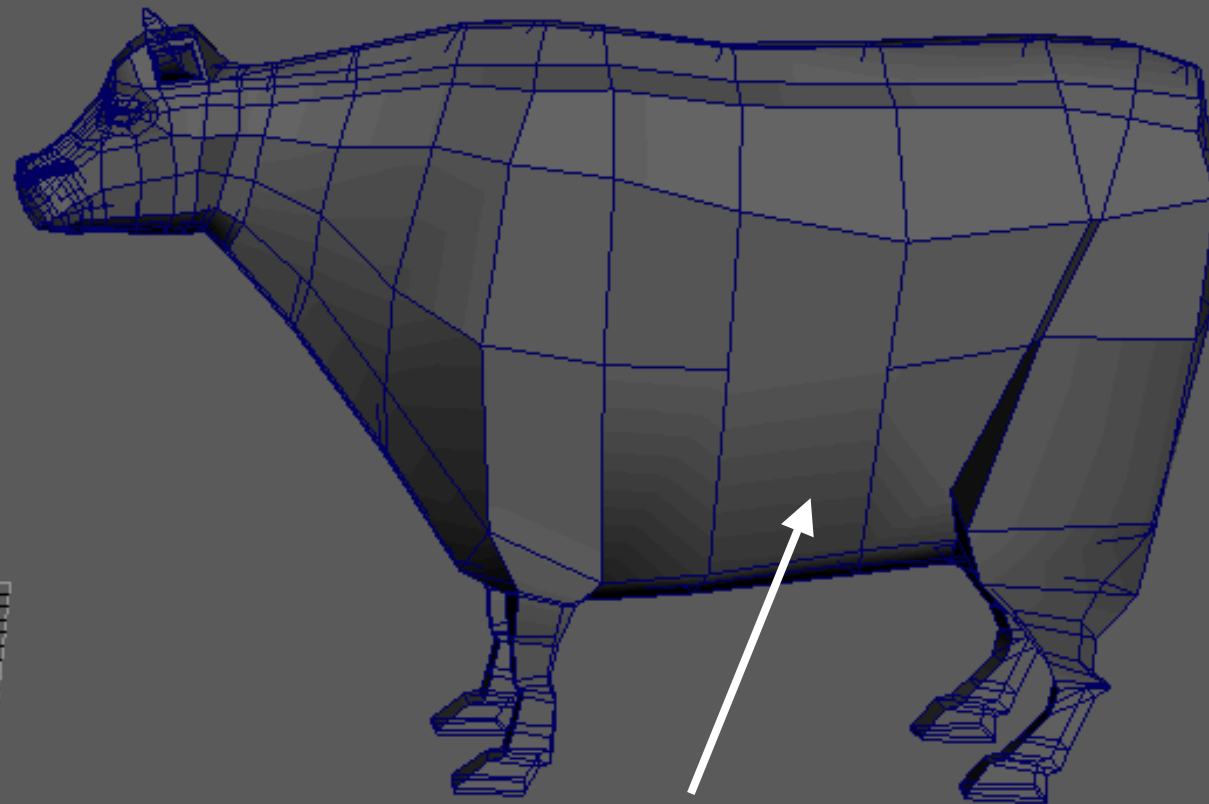
Channels	Edit	Object	Show
polySurface1			
	Translate X	0	
	Translate Y	0	
	Translate Z	0	
	Rotate X	0	
	Rotate Y	0	
	Rotate Z	0	
	Scale X	1	
	Scale Y	1	
	Scale Z	1	
	Visibility	on	
SHAPES			
polySurfaceShape1			

Delete the history when they are no longer needed

Tris, Quads, N-gons



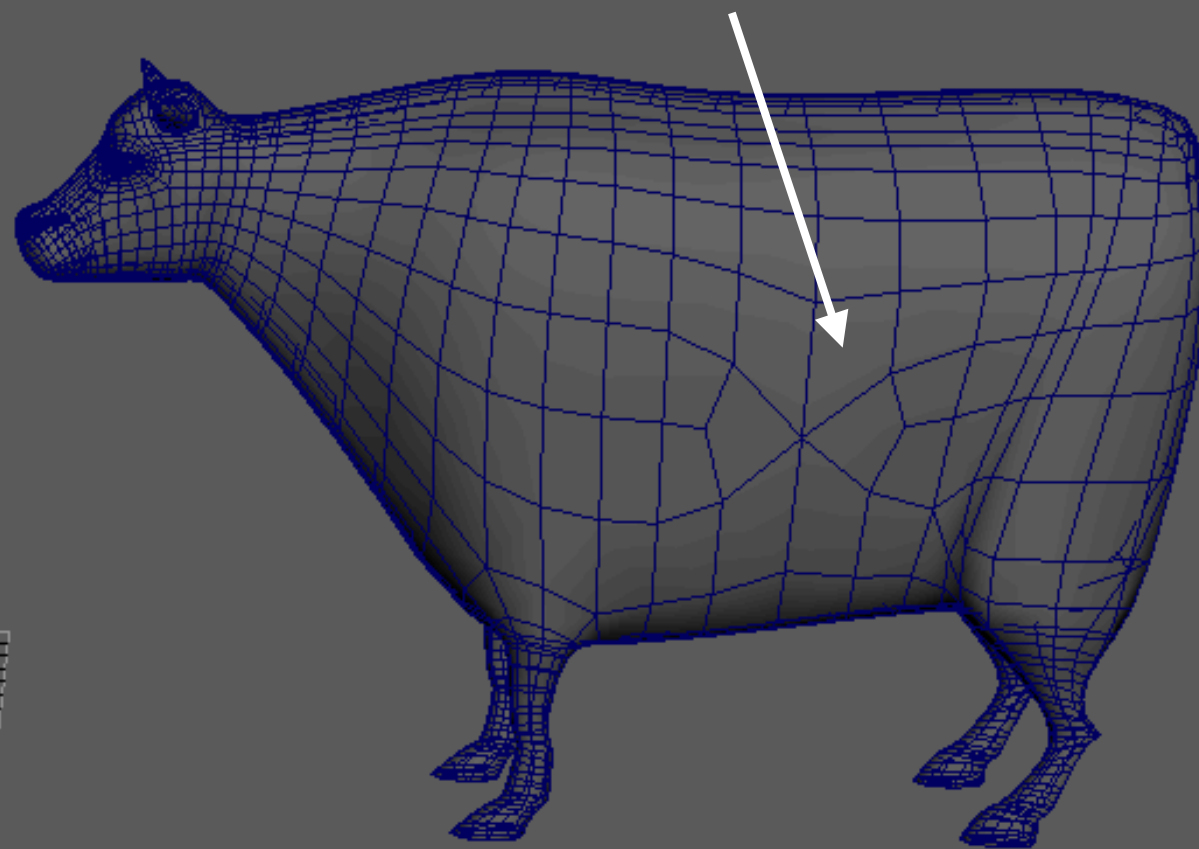
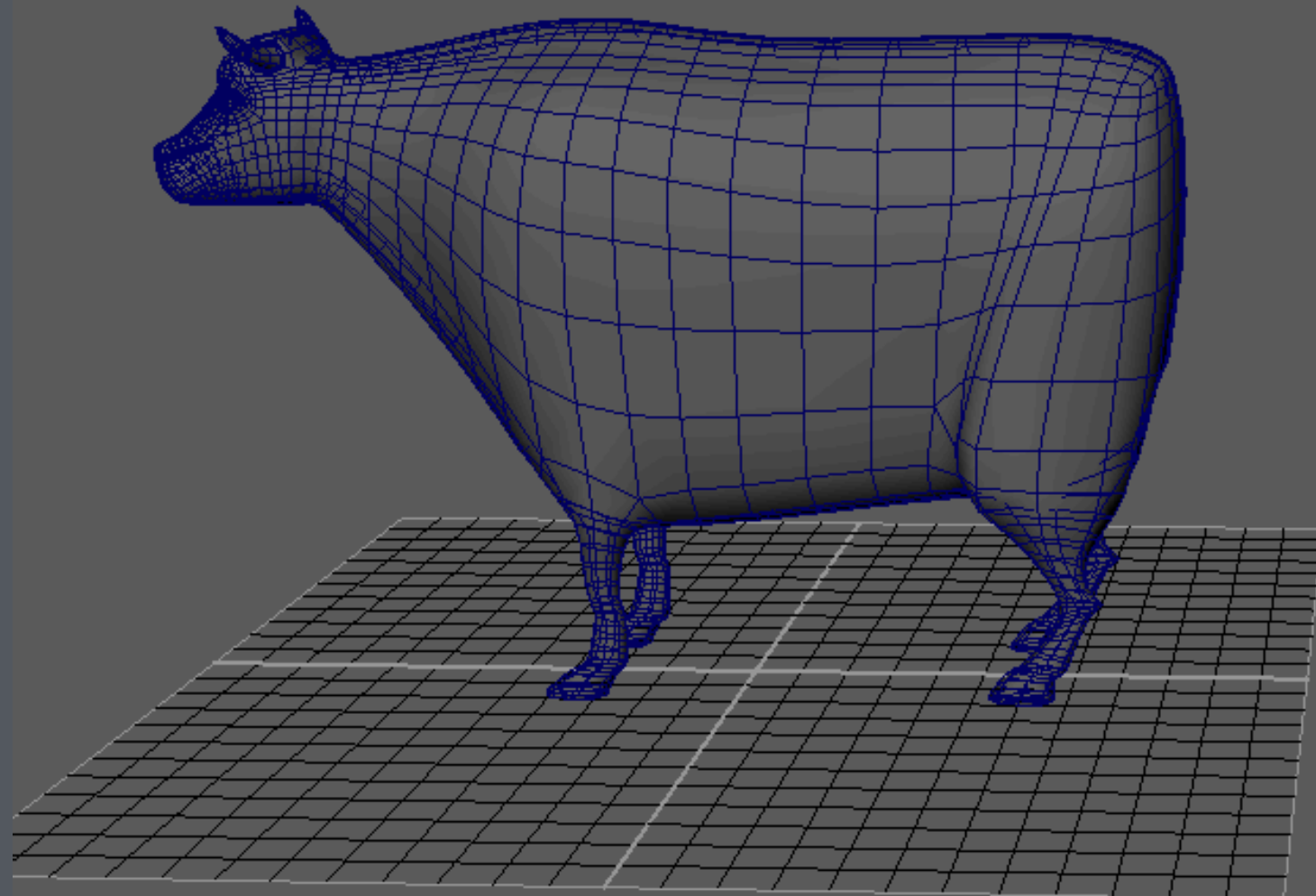
E.g. Smoothing N-gons can result in unpredictable topology



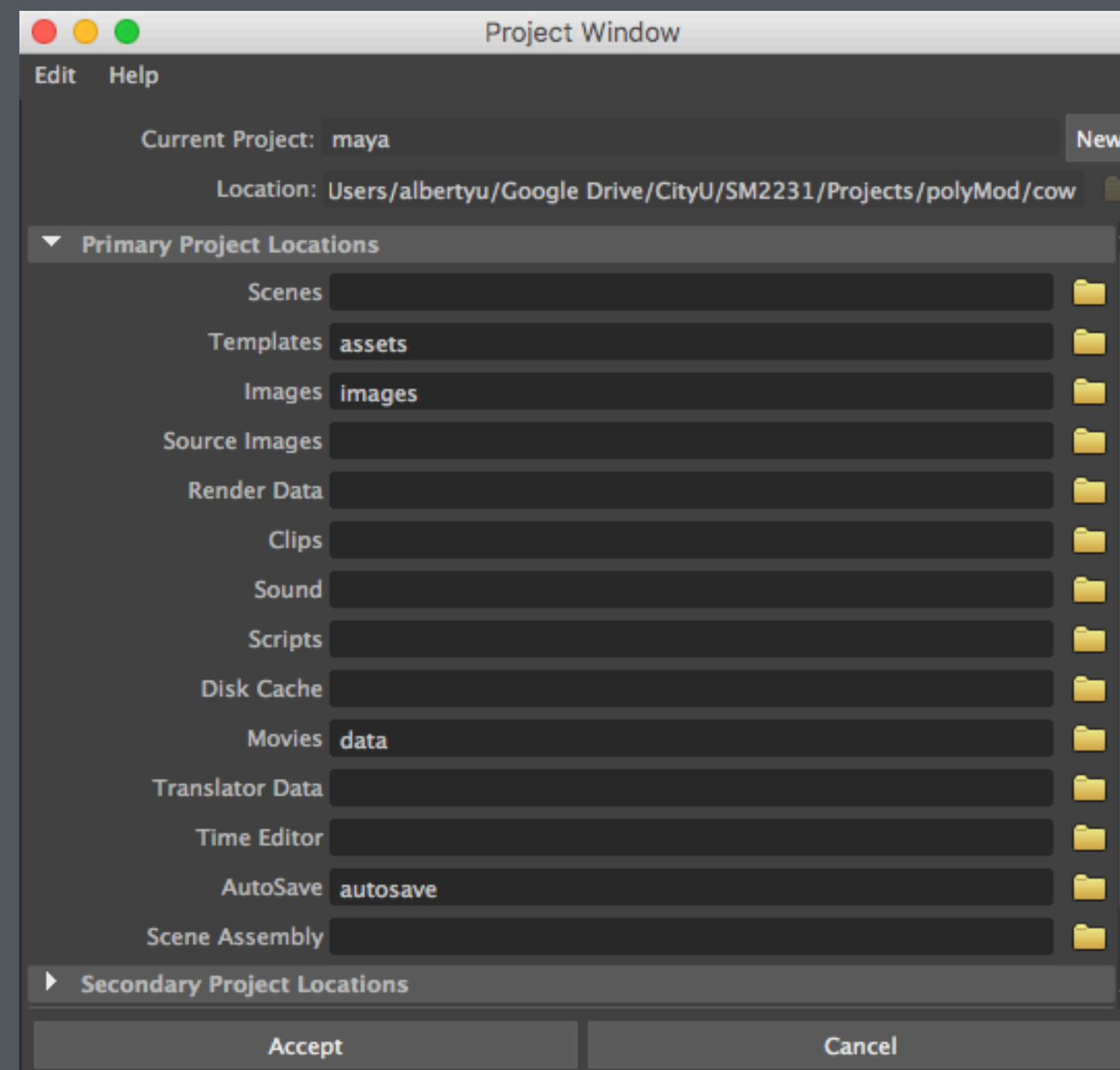
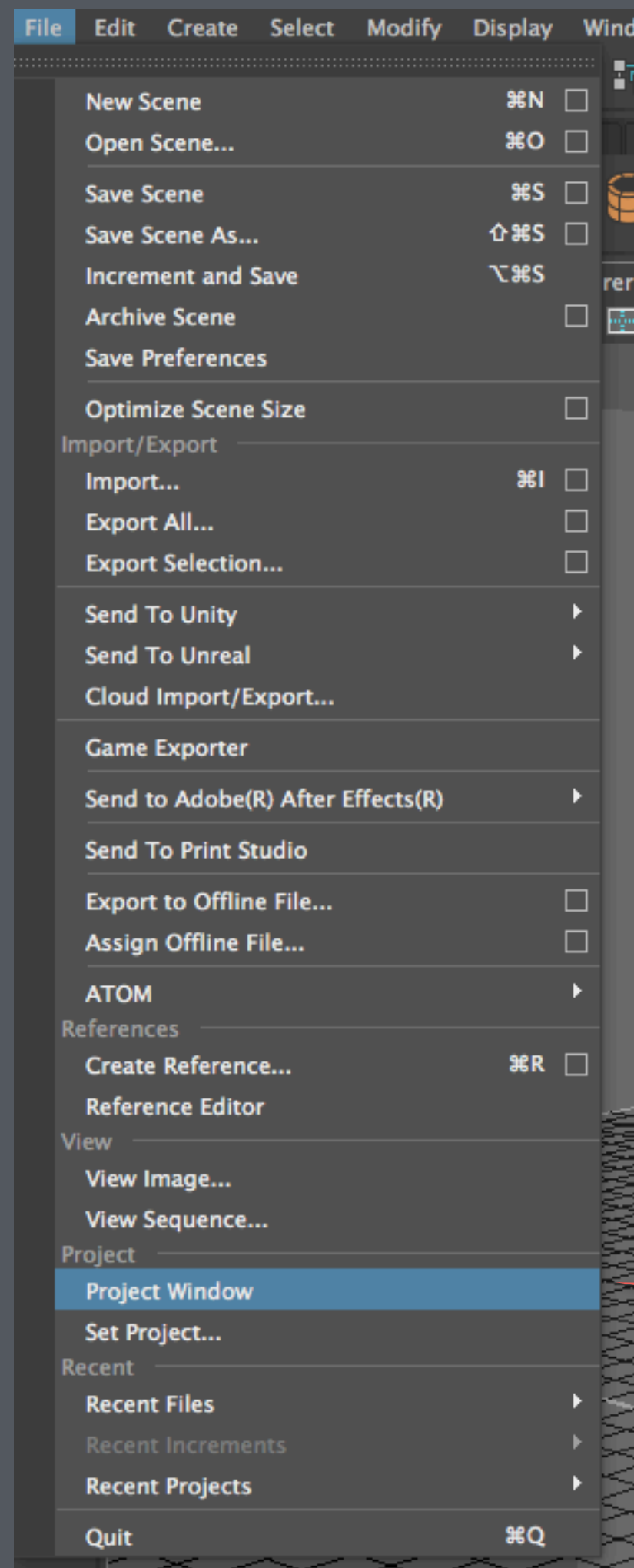
Keep the faces as 4 sides polygons (Quads)

Triangles are ok

But anything more than 4 sides (N-gons) can cause undesirable artefacts



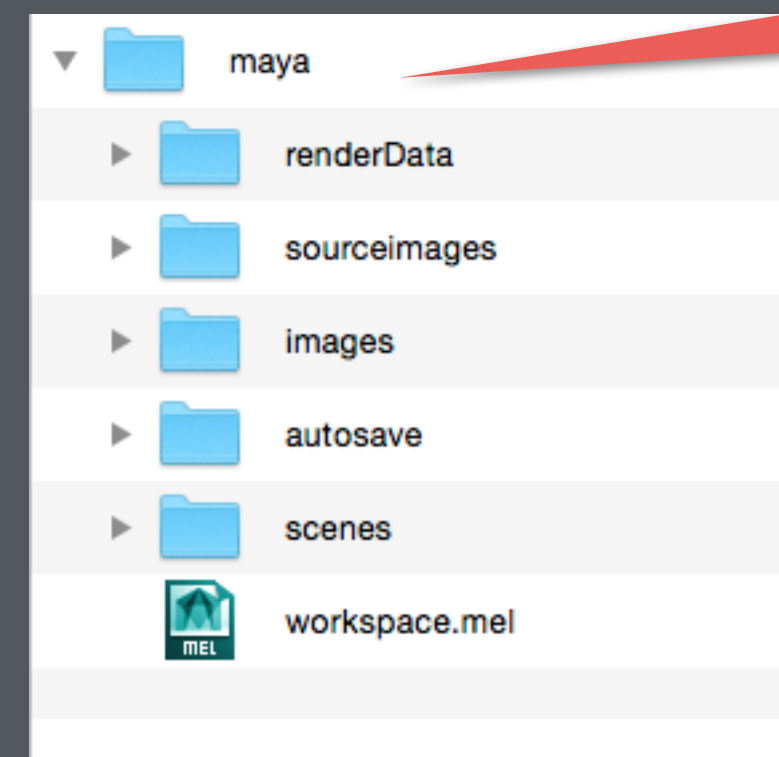
Maya Project



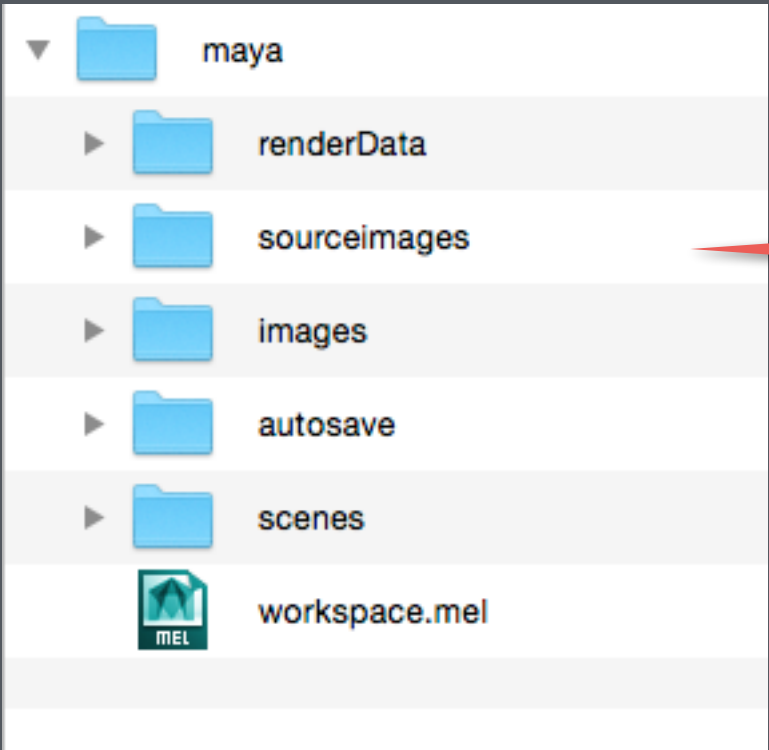
Before you create anything, set up a Maya Project first

A Maya Project

A Maya project folder contains a number of subfolders

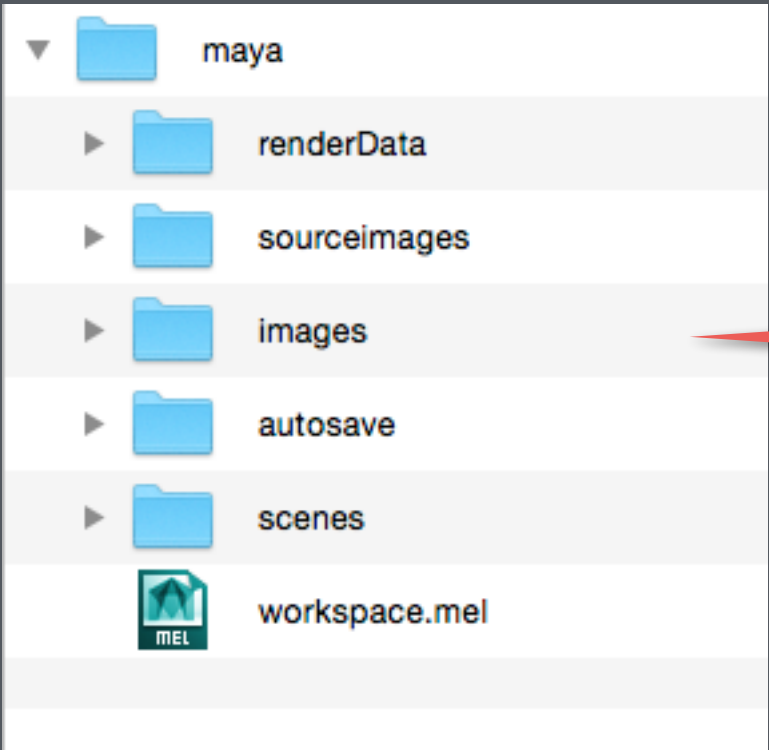


A Maya Project



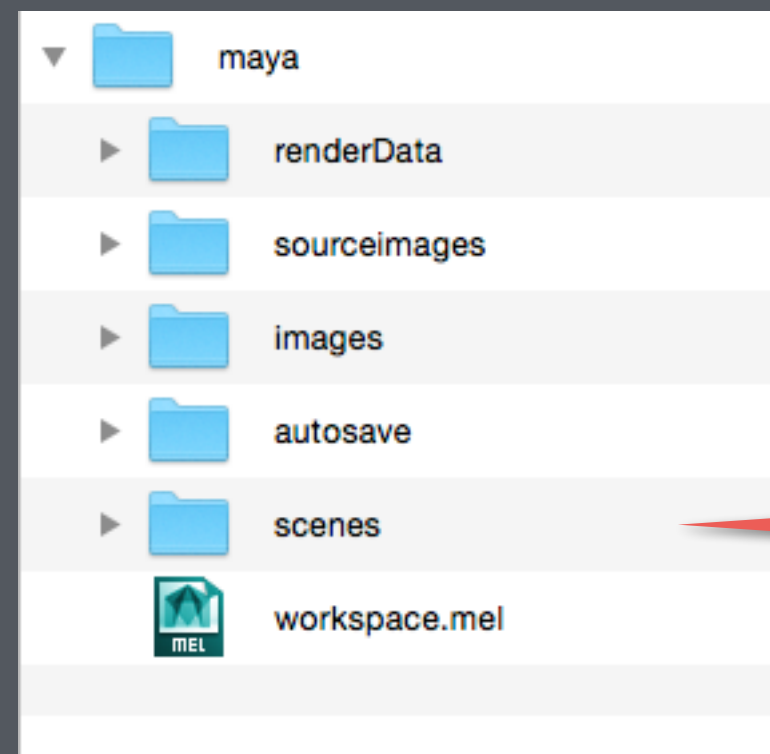
Maya looks for texture files here

A Maya Project



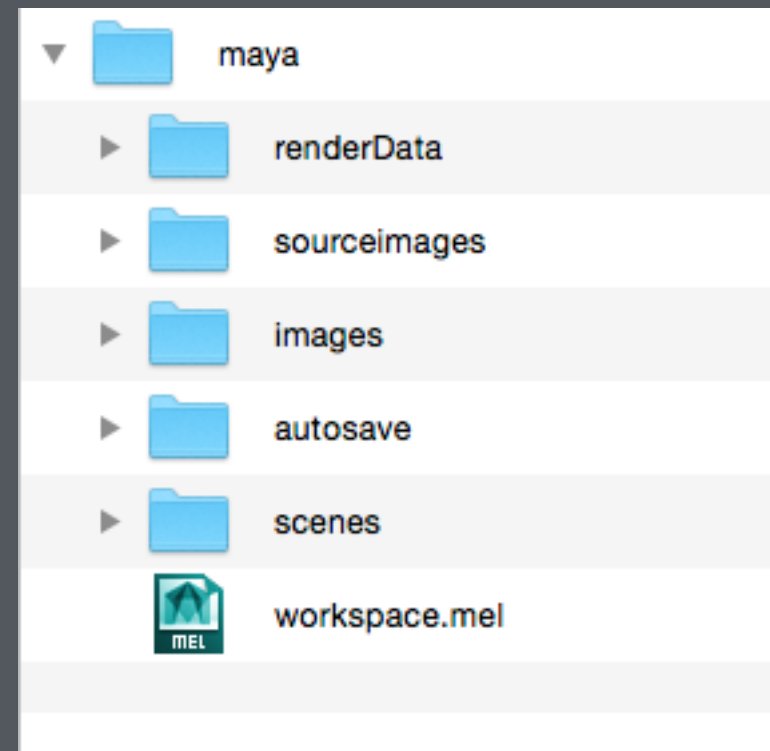
Maya render images here

A Maya Project



Maya looks for other .ma or .mb scene files that are “referenced” by the current scene file

A Maya Project



It is **IMPORTANT** to set up a Maya project folder when you start a new project