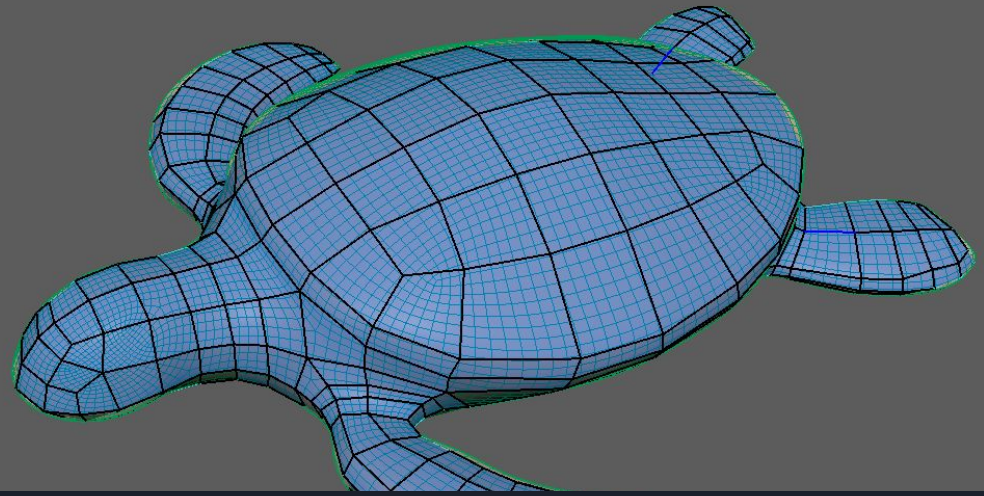
Topology & Retopology



Introduction to topology and retopology for 3D models

Revision: 001

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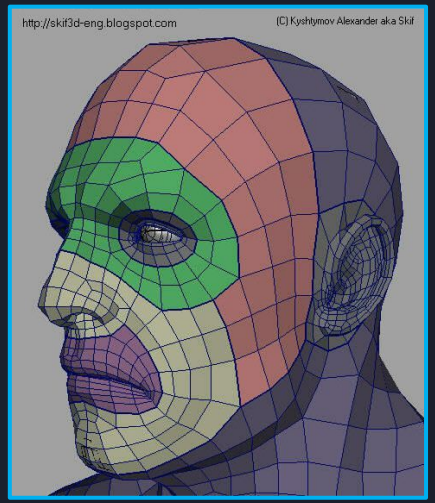
Topology & Retopology | Contents



This lesson will cover the following:

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Topology & Retopology | Overview

The aim of this lesson is to achieve the following outcomes:

- An understanding of 3D topology
- An understanding of the importance of good topology
- An understanding or the importance of retopologizing high resolution models for production purposes
- The process of retopoly, using Autodesk Maya

What is Topology

Topology|What & Why?

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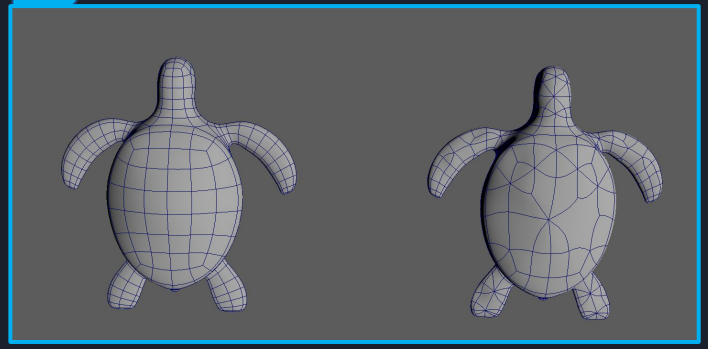

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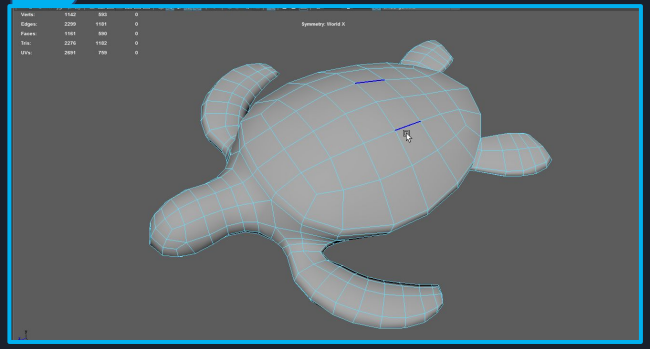

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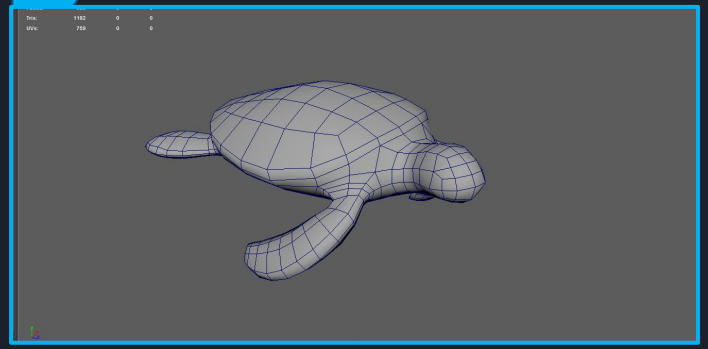

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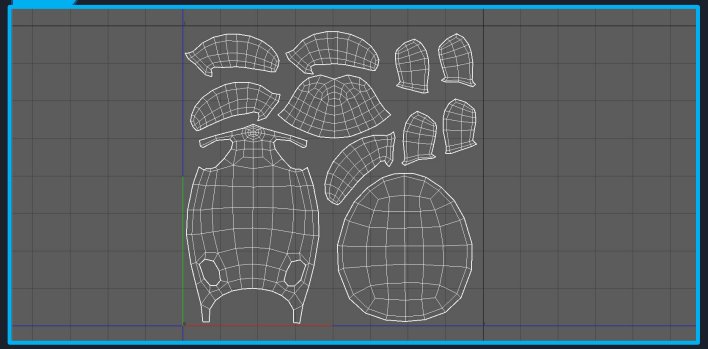

What?

- Topology is the organisation, flow and structure of the components(vertices, edges and faces) of a 3D model
- The goal of good topology is to organise your components to produce an efficient and clean mesh with a good distribution of detail where required.

Why?

Good, clean, efficient topology has a number of benefits, including:

1. Reduces shading artefacts across the model
2. The model will be easier to modify and work with throughout the pipeline.
3. Makes deformation better for animation
4. Makes UVing easier

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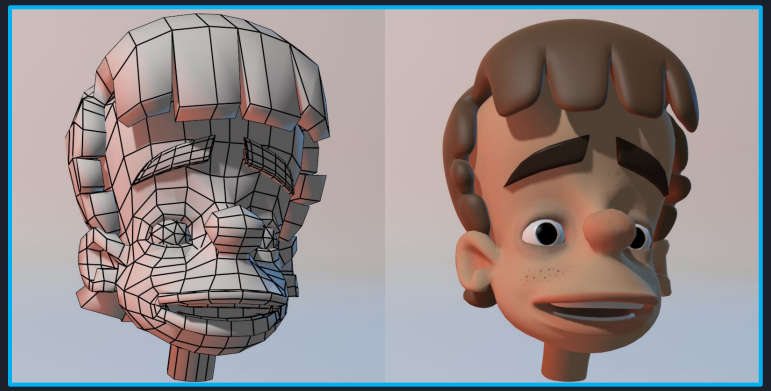
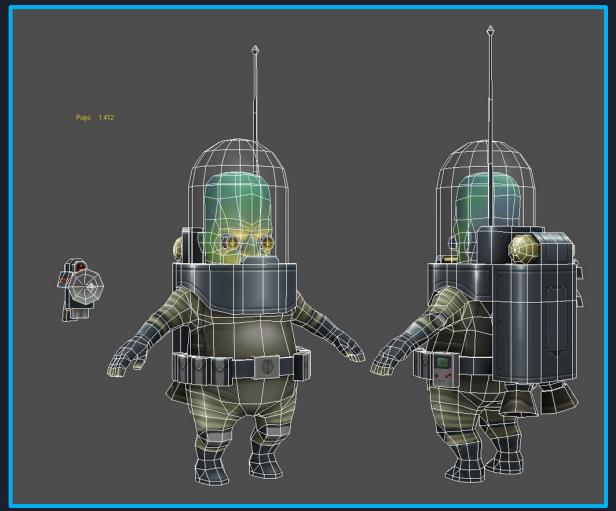
Topology|What & Why?



The topology of a model will be determined by purpose of the model



- Good topology is the hallmark of a good 3D artist
- Good topology should be efficient and take the purpose of the model into account. Will the geometry need to deform or does it only need to support the form of the object?
- Topology for subdivision models must maintain quads.
- For low resolution game models, triangles on the finished model are OK but should be limited as much as possible.

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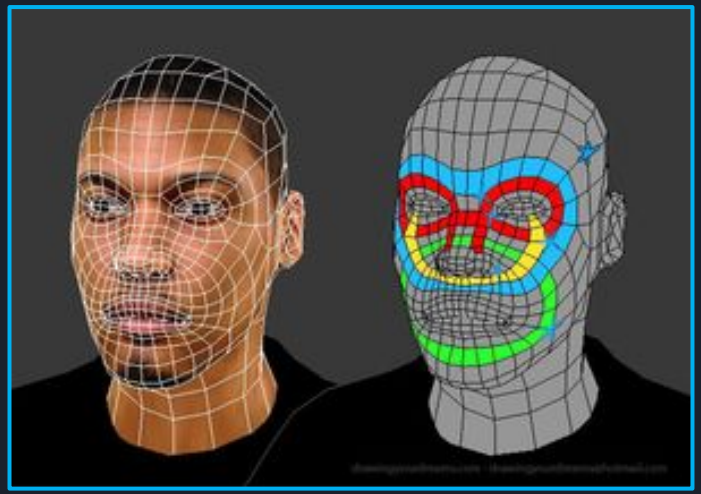
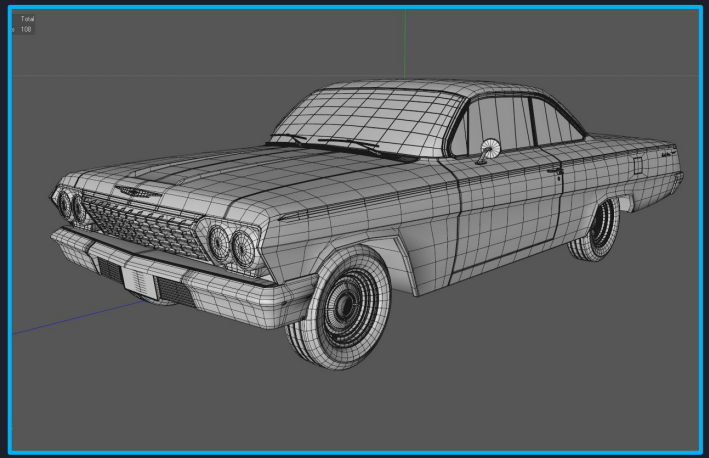
Edge Flow

Topology|Edge Flow





- Edge flow refers to how the edges on a 3D model flow across the mesh.
- Good edge flow should follow and support the forms and contours of the object while maintaining an even distribution of polygons
- Good edge flow also takes deformation into account, especially for animated character models

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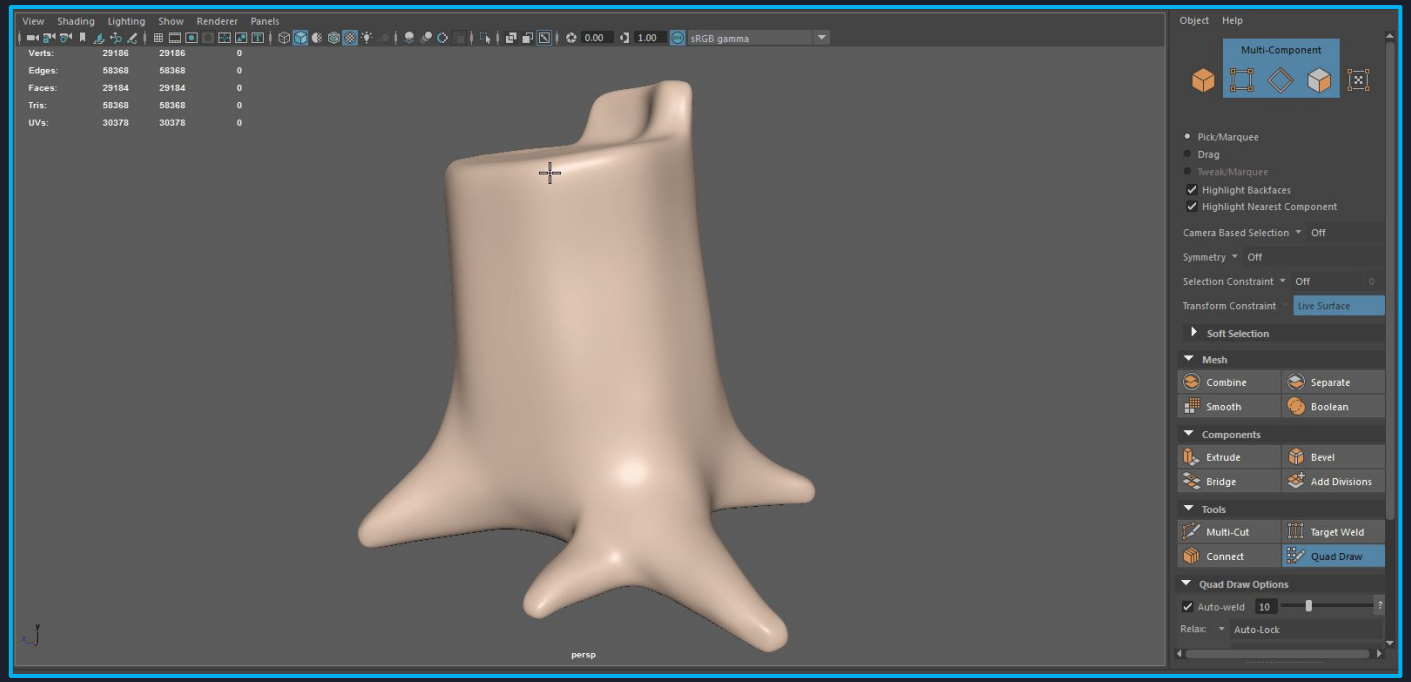
Retopology

Retopology|What & Why?



- Retopology is the process of building new topology over the top of a high resolution mesh.
- Retopology is an important step to make 3D sculpts into functional, production meshes.
- Retopology can be done in most 3D software packages. Choosing which one to use, is a matter of accessibility and which workflow suits you best.
- For this lesson, you will be working with Maya's Quad draw retopology tools.

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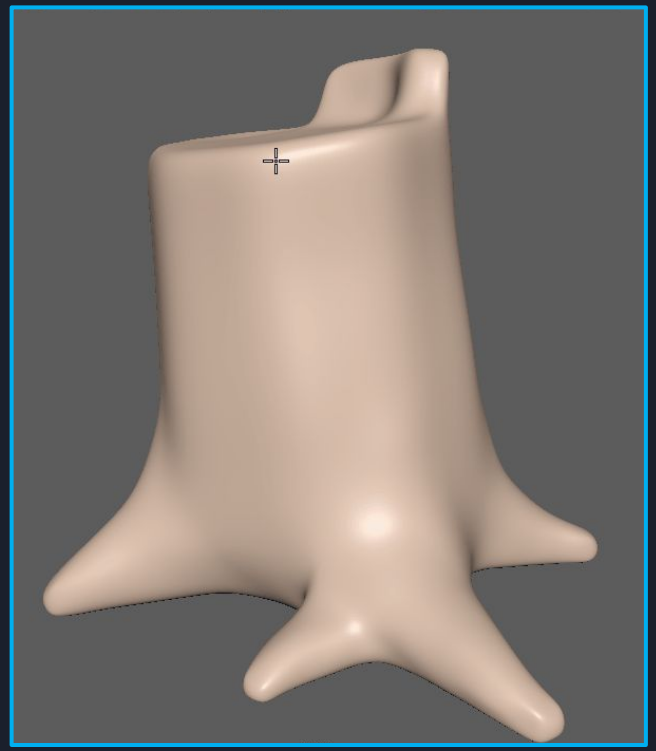
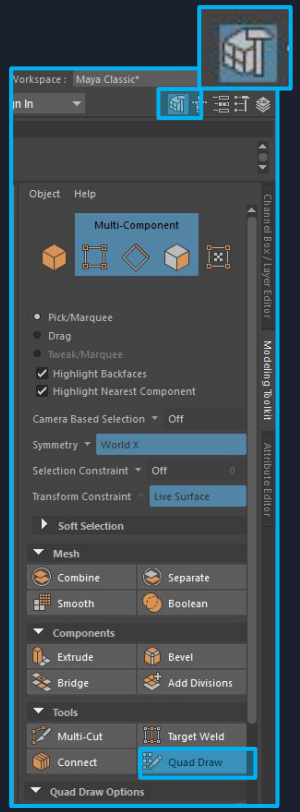
Retopology|Quad Draw





- Maya's retopology tool is called **Quad Draw**
- You can find Quad Draw in the **Modelling Toolkit**
- In order to use quad draw, you need a base model to draw your topology over
- The base mesh needs to have its surface made "Live" so that new topology can be built over the top, conforming to the underlying surface

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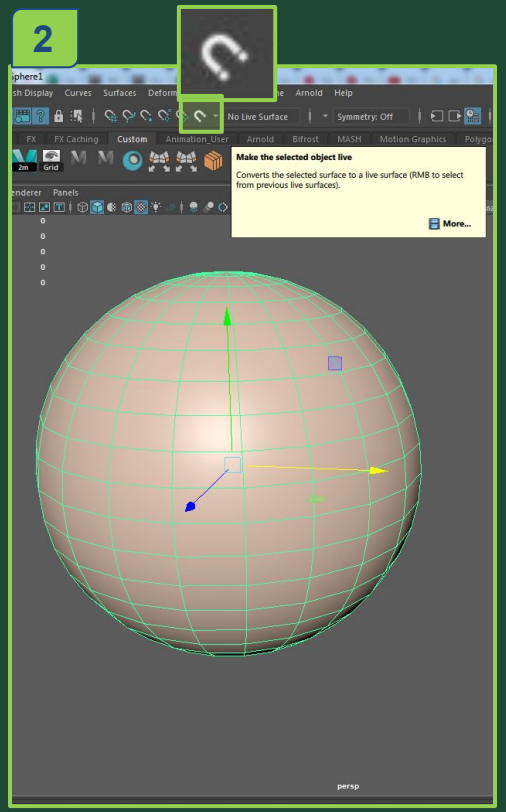
Retopology | Quad Draw - Setup

2



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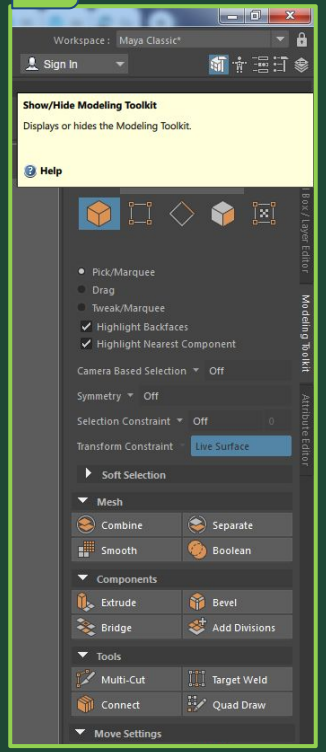

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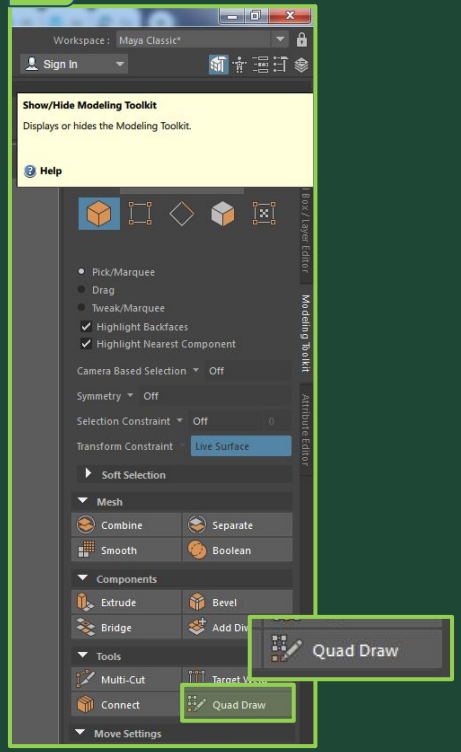

To try out Quad Draw, you need a base model practice on

1. Download and open **Retopo_Scene.mb**
2. Select the pSphere1 model and click on the **Make the selected Object** live button
   Note: The Make Live button allows the object to act kind of like a magnet, if you move any object over it it will snap and slide across its surface
3. Open the modelling Toolkit on the top right corner of the interface.
4. Click in the Quad Draw button to activate Quad Draw

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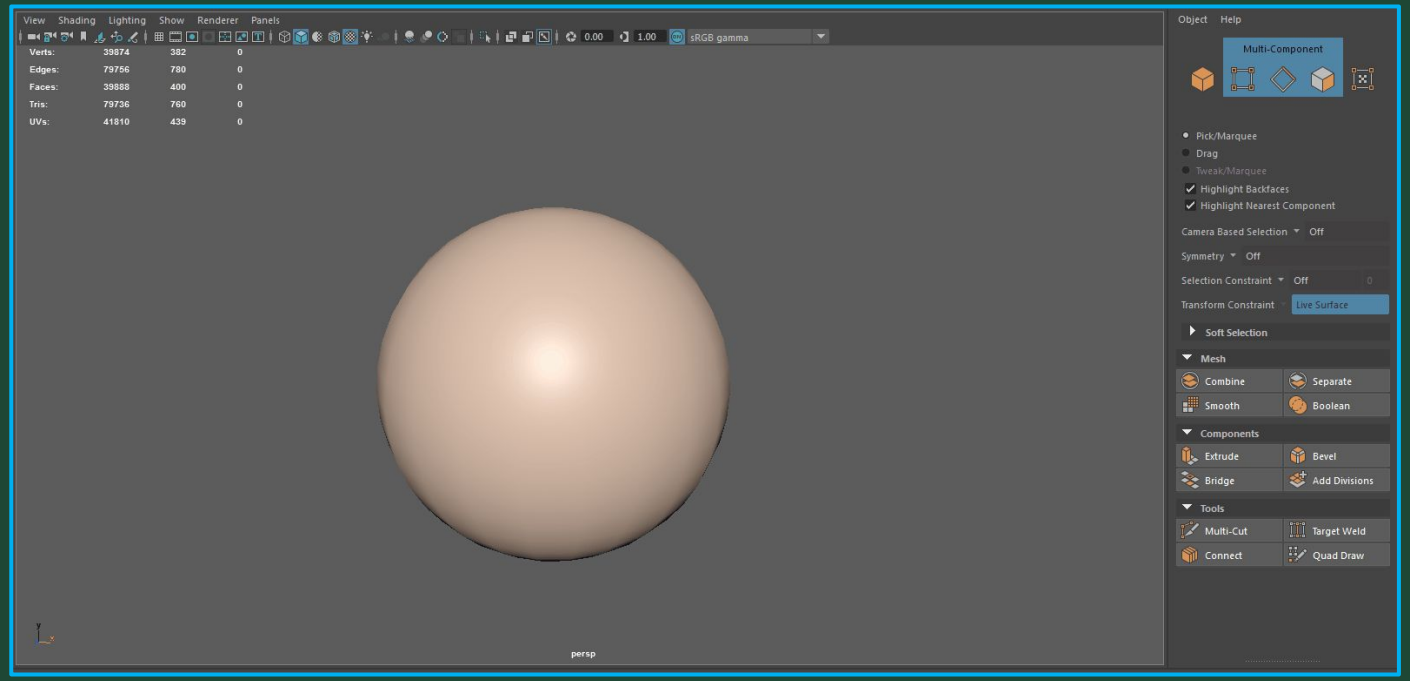
Retopology|Quad Draw - Drawing Polygons



1. In Quad Draw mode, left click to place vertices on the sphere in a square or rectangular formation
2. Hold down Shift and hover your mouse over the center of the quad created by the vertices you just placed.
3. The area will go green, giving you a preview of the face that will be created. If you are happy with it, left click to create.
4. If you do not want to create the polygon face, you can delete the dots by clicking on the Clear Dots button.

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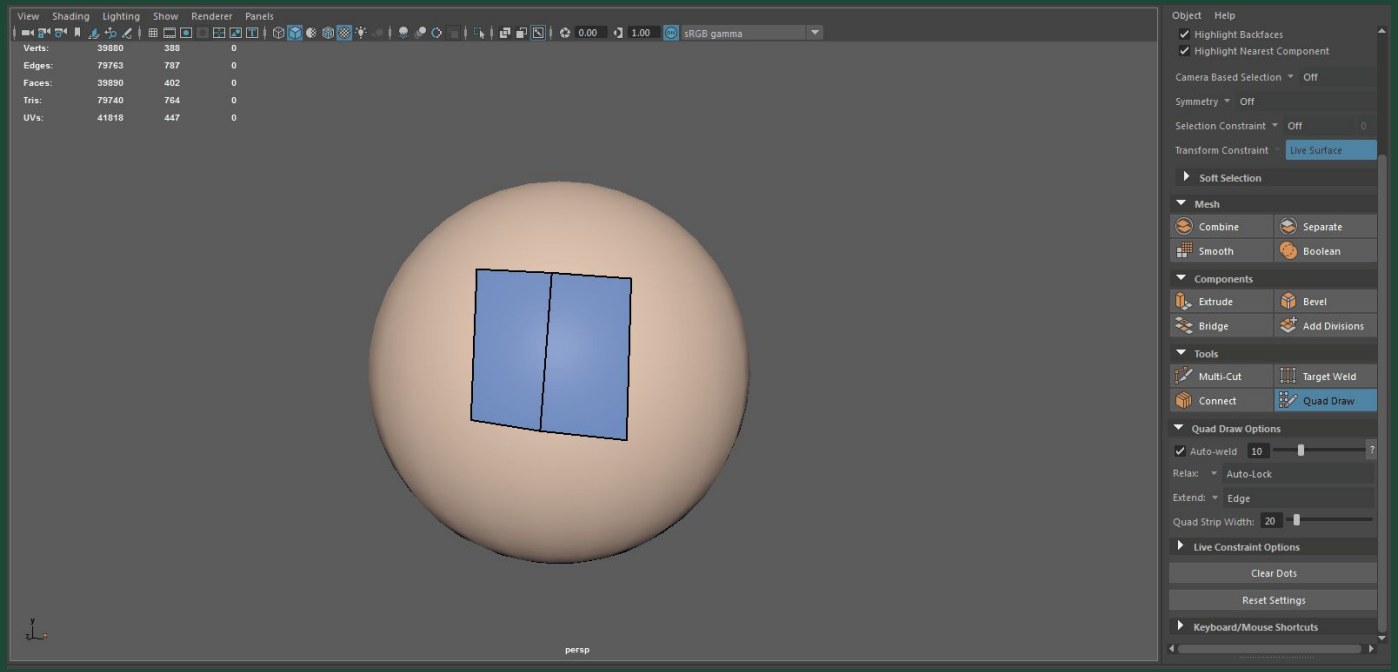
Retopology|Quad Draw - Move Components



To select and move components:

- Hover your mouse over the vertex, edge or face.
- The component will highlight in red.
- You can then left click and hold to select and move the component.
- You will notice that the polygon face conforms to the live surface of the underlying object.

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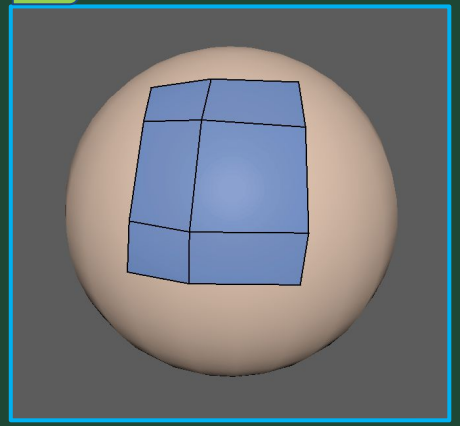
Retopology|Quad Draw - Edit Components

1



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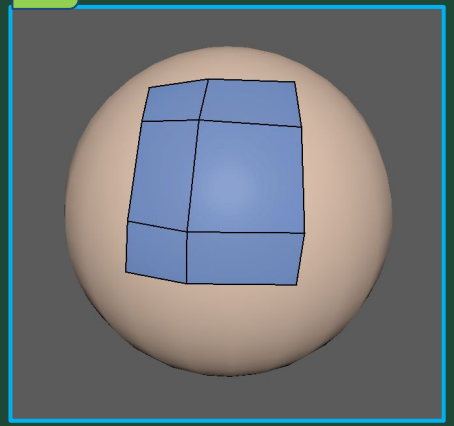

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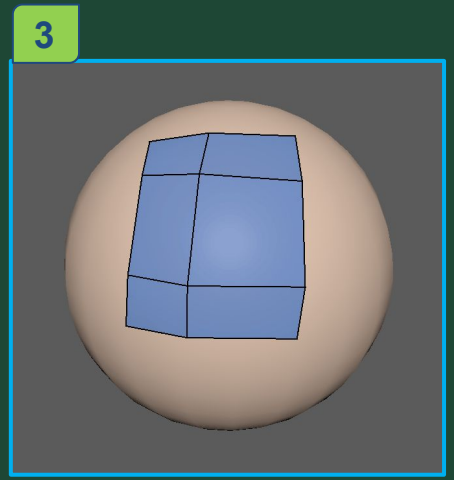

To edit components:

1. By default components will automatically merge when snapped together
2. You can split polys by holding down **Ctrl** and hovering your mouse over the faces to see a green line preview of the split.. **Left click** to commit the split
3. To delete components, hold down **Ctrl + Shift.** Hover over a component and it will highlight yellow. **Left Click** to commit.

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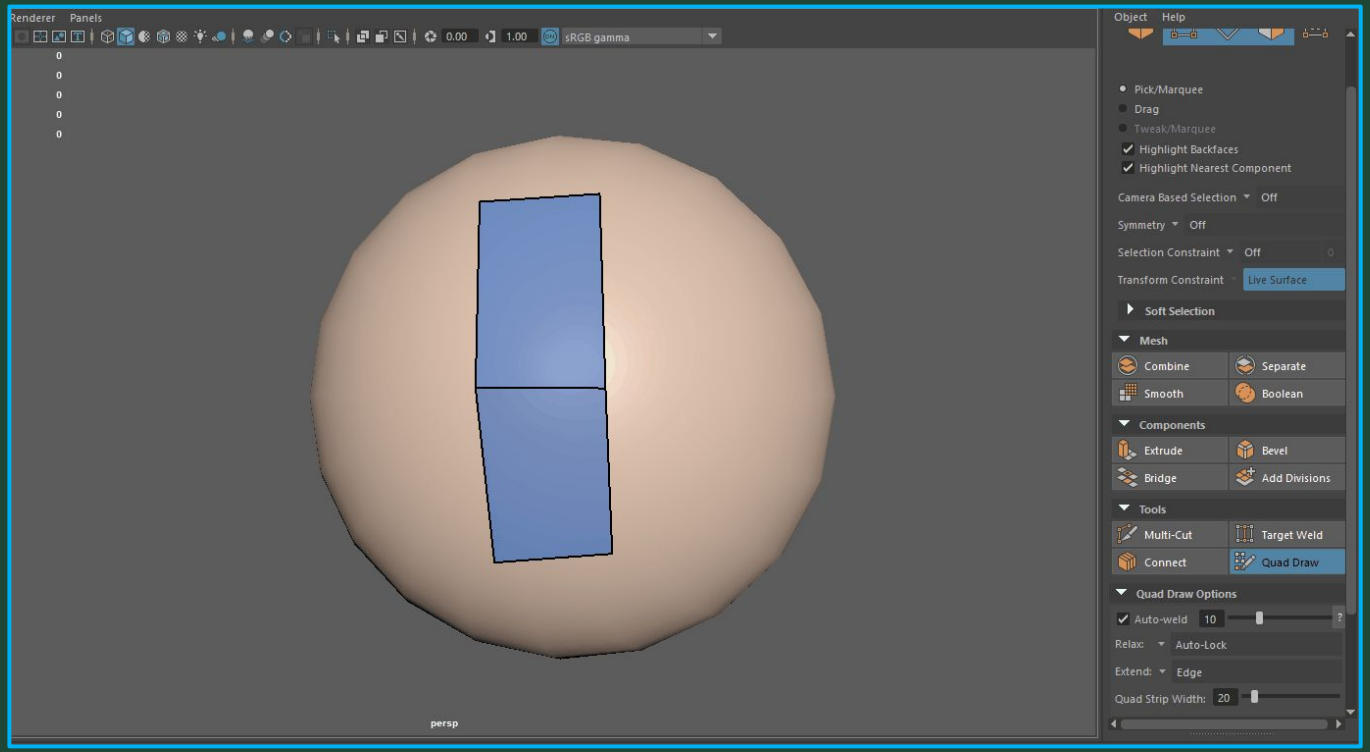
Retopology|Quad Draw - Extend



Once you have created a quad, you can extrude the edges.

1. Hover over an edge with your mouse.
2. Hold down the **Tab** button on your keyboard
3. The edge will highlight Green and word **Extrude** will appear
4. Left click and drag while still holding down the **Tab** key

Note: You can can change the edge extrude options to Loop or Border, via the Extrude drop down menu in Quad Draw Options.

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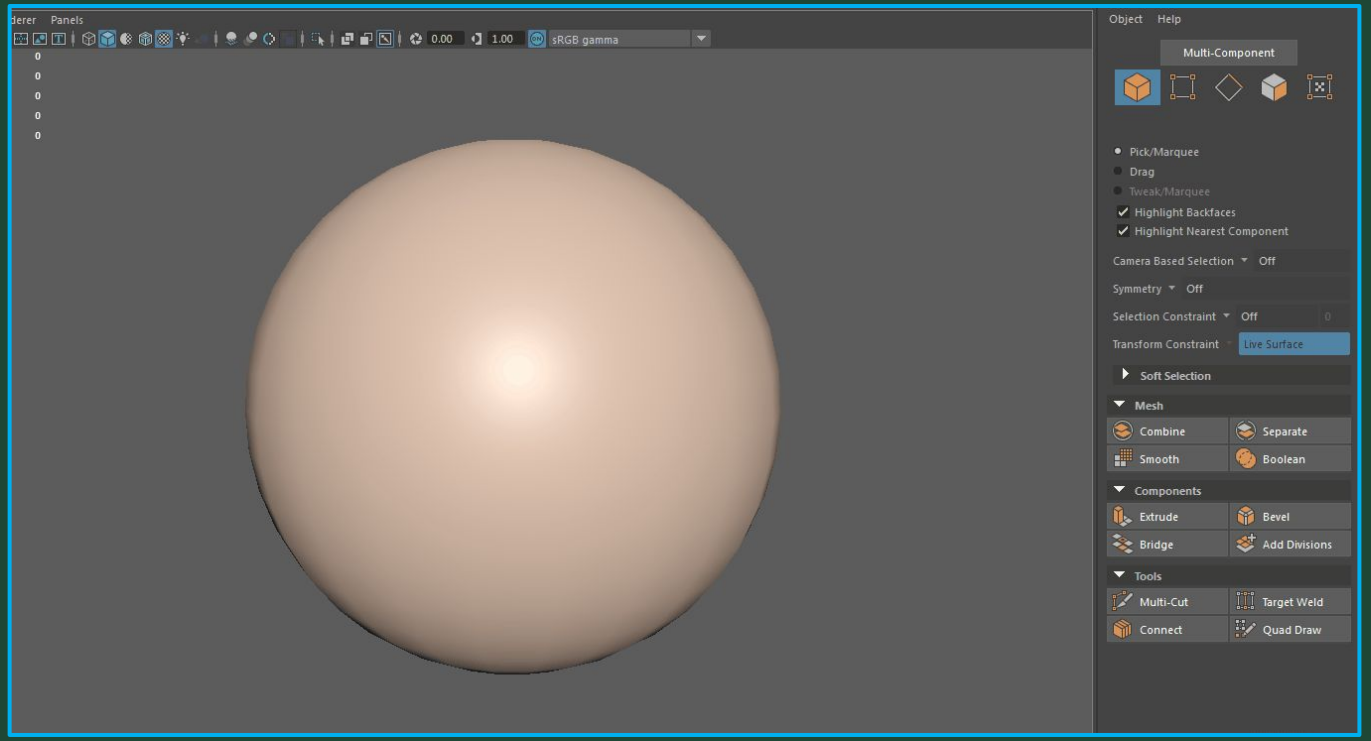
Retopology|Quad Draw - Symmetry



To activate symmetry:

1. From the Symmetry menu select which axis y and 3D space you want to activate symmetry on.

   Note: World will only work if your model if your model is positions at the origin and is perfectly symmetrical across the axis you are activating. Object will apply symmetry from one side to the other regardless of where its located in the scene.

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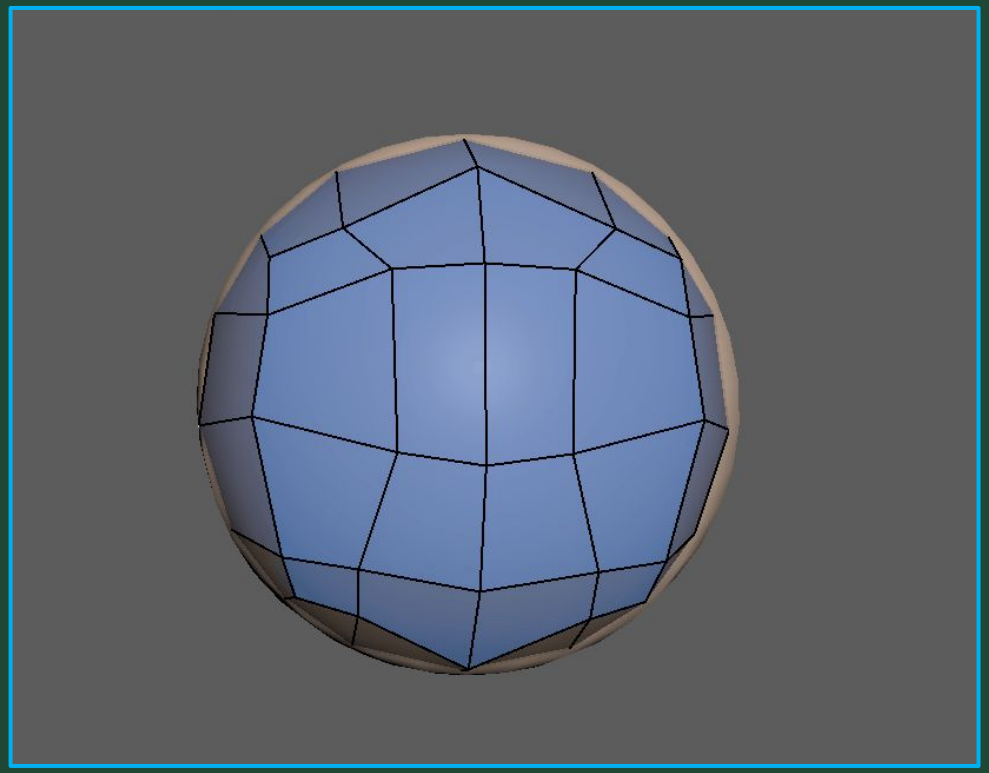
Retopology|Quad Draw - Relax

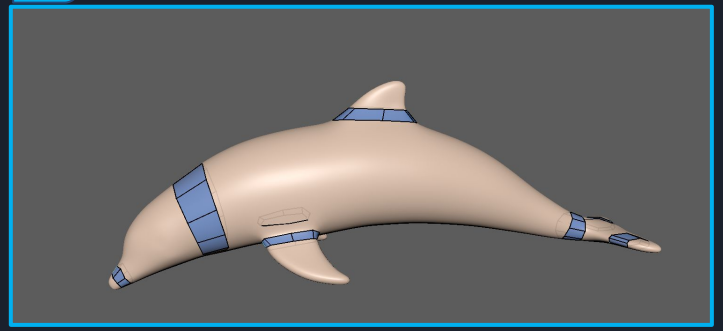


The relax function averages the position of the vertices and improves edge flow.

1. In Quad Draw mode, hold down Shift and left Mouse button and drag the mouse over the vertices you want to relax.

Retopology|Tips

1



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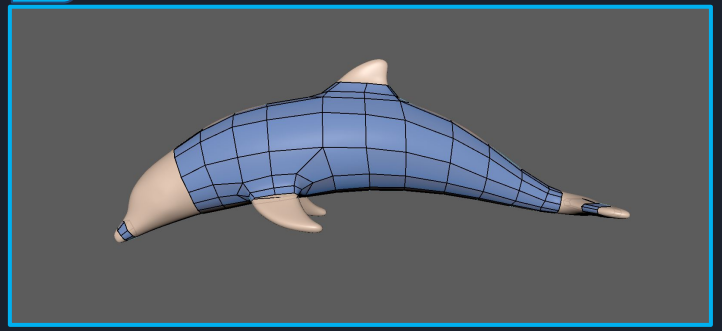

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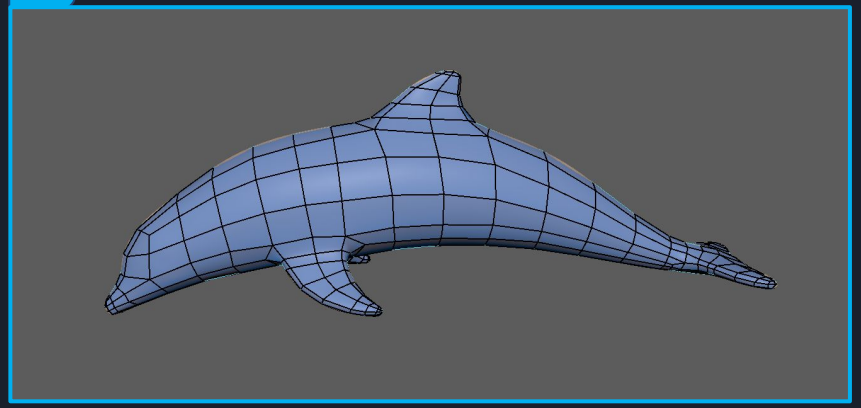

Take a planned, structured approach to retopology. Keep resolution as low as possible to start with

1. It can be helpful to start by creating rings of geometry of the same number of divisions at key areas of the model. For example 4 or 8 sided loops
2. Then connect the loops up, terminating as needed
3. Maintain quads and refine

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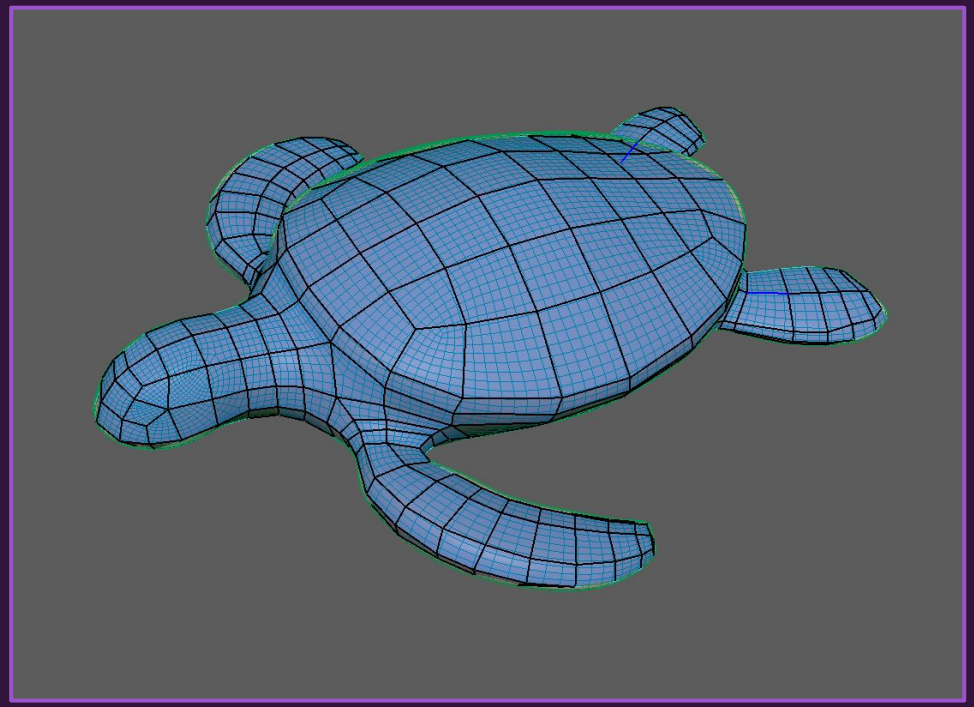
Exercise|Retopologize the Turtle or TreeStump



Practice what you've learned:

Open ***Retopo_Scene.mb***

- Using Quad Draw, Retopologise either the Turtle or TreeStump the
- Maintain quads and an even distribution of geometry

You have 30 mins.

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