

# Blender Visualization Tutorial WS2014-15 II Part I

CELLmicrocosmos Cell Modeling Project WS2014-15,  
Björn Sommer, Bielefeld University,  
Version 29.10.2014

Forum:

<http://www.cellvisualization.org>

Direct link to this forum entry:

<http://www.cellmicrocosmos.org/Cmforum/viewtopic.php?f=21&t=737>

Actual Version of Blender:

<http://www.blender.org>

Here, Blender 2.7X is used.

## Remarks

Some images were taken from the first version of this tutorial with 2.67b. So do not be confused, the explanation works also with the new version and where required, the images were updated. This tutorial is an update of the tutorial from WS2013-14. Please use this actual version, because it was slightly improved and extended.

## Target

Starting from the standard cube which every Blender user knows from the first time starting Blender, we create a simple swan model. In the next tutorial we will use this model to add textures and movement.

## Abbreviation

RMB Right Mouse Button

LMB Left Mouse Button

*! For using most of the shortcuts discussed in this tutorial, you have to be sure that the mouse cursor is WITHIN the view port of the 3D View !*

## Base

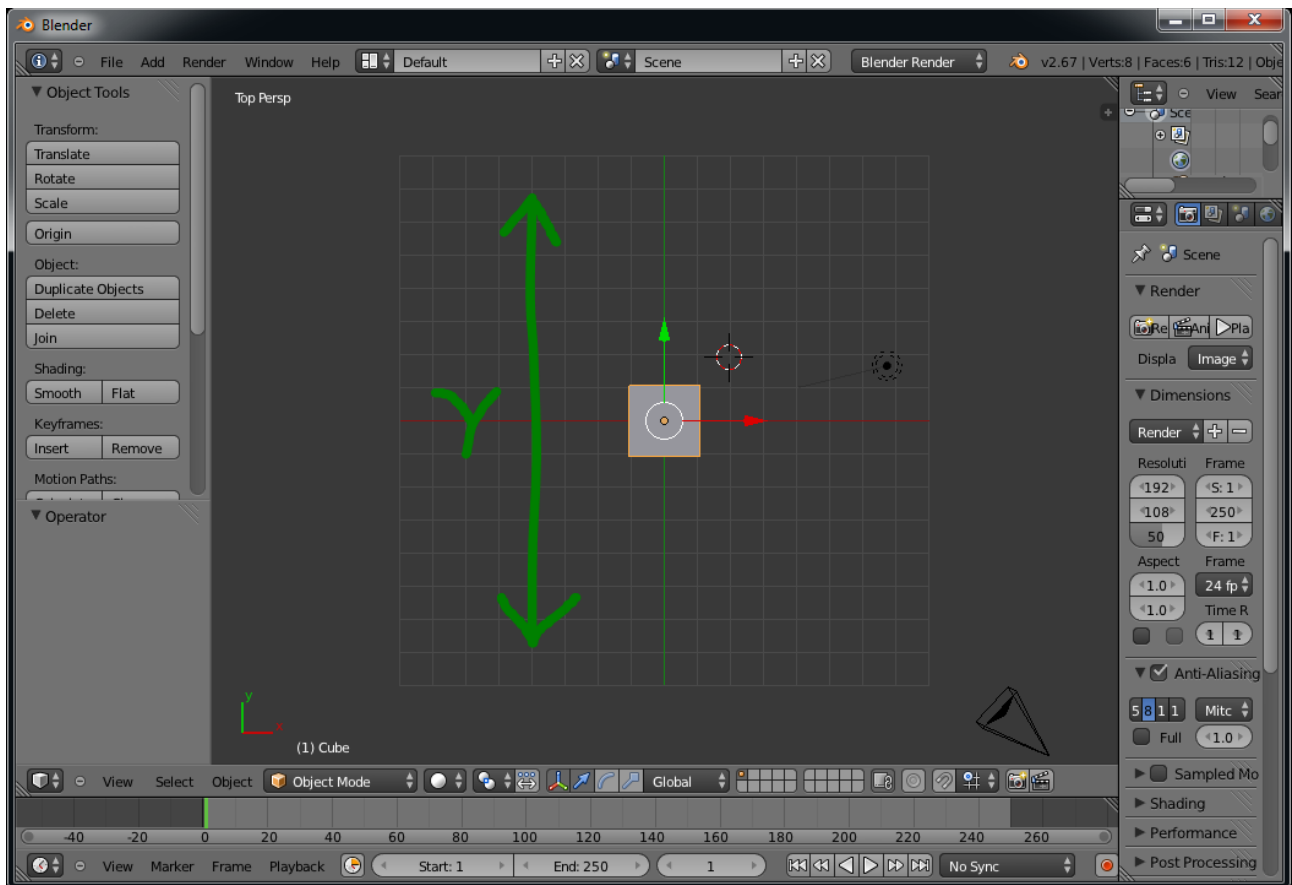
Create a new project (standard project with one camera, one lamp and a cube)

## Baseline

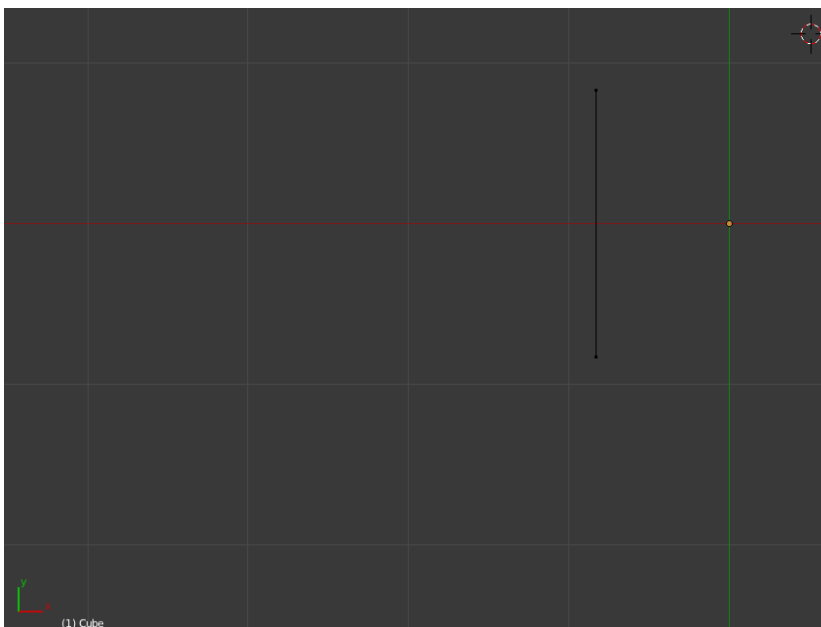
First, we have to create a simple line. We start with the standard cube of Blender. If you do not have the standard cube in your new scene, just add it by using

Add → Mesh → Cube

Your scene should look like this from the top (*NUM 7*):

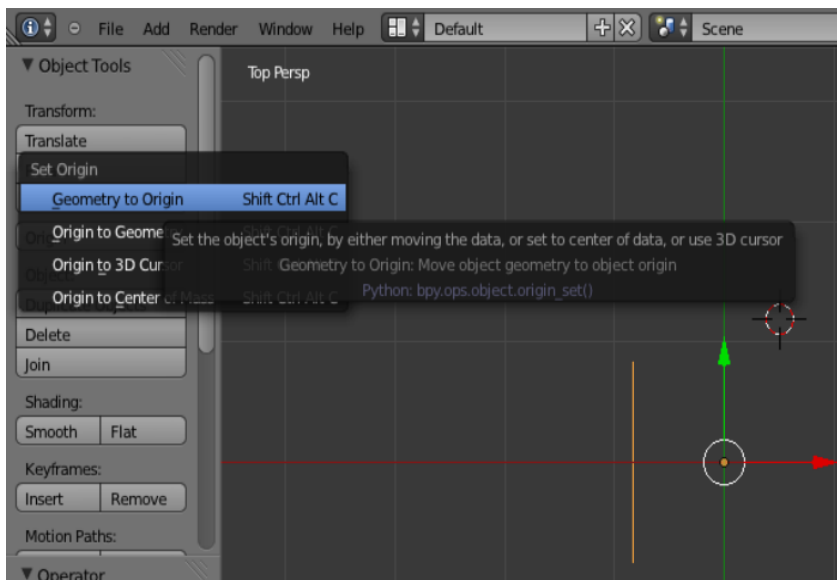


The green Y marks the Y axis. Go to Edit Mode. Delete now all vertices except 2 nodes like this:

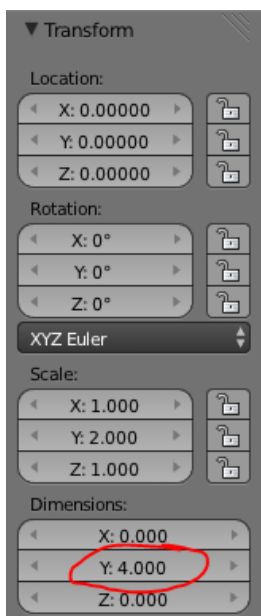


Be sure that the line is aligned along the Y axis (this will be important later)!

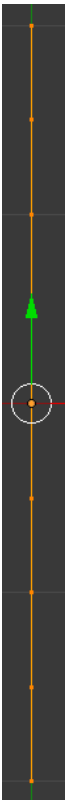
Now leave the Edit Mode (go to Object Mode) and shift the geometry to the origin like this:



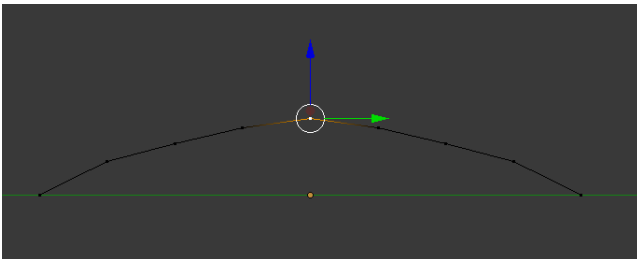
Increase the line size now to 4.



This line will be the base for the body of the swan. But it consists now only of one line and two points. Let us increase the resolution of the line. Select the line, go to Edit Mode, press *A* until the complete line is selected, press *W* and select “Subdivide”. Repeat this step additional two times. In the end, the line has to look like this (it contains now 9 vertices):

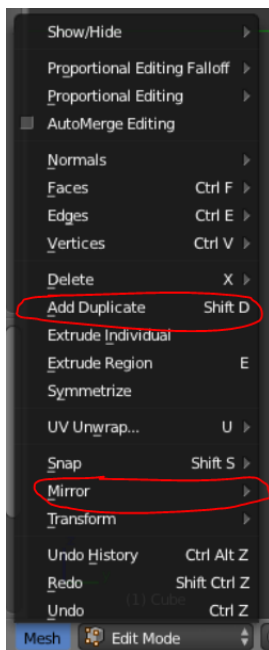


But this line is still a one-dimensional object. So let us change this. In Edit Mode, go to the right perspective (*NUM 3*). Try to generate now a half segment of an ellipse by changing the Z position of the nodes. In the end, it should look like this:

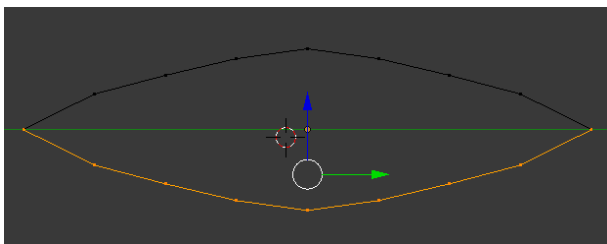


But we want to have a complete ellipse. For this purpose, select the complete segment with *A* and press *SHIFT+D*. The generated duplicate has now to be mirrored. Press *CTRL+M* and then *Z* and accept with *LM*.

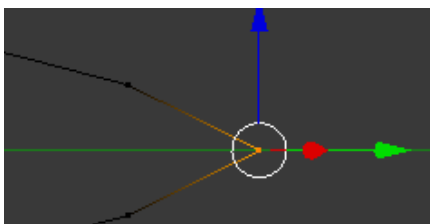
You can find these options also in the Mesh Menu:



Now move the new ellipse segment downwards along the Z axis until an ellipse is visible:



Now, these two lines have to be combined. Make sure that nothing is selected (also with *A*) and select the two nodes at the edge of the ellipse.



Be sure that both nodes are selected. Do this e.g. by using *CTRL+LM*. If only a single node is selected afterwards, deactivate “limit selection to visible”.



Now, press *W* and select “Merge ...” and “Merge at center”. Do the same for the other two nodes of the other ellipse edge. The first part is finished now, we have an ellipse.

→ [Blender\\_Tutorial\\_WS2014-15\\_2pt1\\_\\_1.blend](#)

## Modeling the Shape (1D to 2D)

Now we need some samples for the modeling of the swan. We need

- an image showing the swan from the bottom, and
- an image showing the swan from the side.

You can find these images e.g. at <http://flickr.com>. But have a look to the copy rights, if you want to use the model later on. At flickr, use the extended search for this purpose and limit the search like this:

**flickr** Registrieren Entdecken Hochladen swan

### Erweiterte Suche

**Suchen nach**  
Tipp: Mit diesen Optionen können Sie nach einer genaueren Formulierung suchen oder Wörter bzw. Tags von Ihrer Suche ausschließen. Sie können zum Beispiel nach Fotos mit dem Tag "Apfel" suchen, jedoch ohne das Tag "Kuchen" suchen.

Alle diese Wörter swan  
Volltext Nur Tags

Keines dieser Wörter:

**Nach Inhaltstyp durchsuchen**  
Tipp: Aktivieren Sie die Kontrollkästchen für die Inhalte, die in der Suche angezeigt werden sollen.

☒ Fotos / Videos  
☐ Screenshots / Screencasts  
☐ Illustration/Kunst / Zeichentrick/Computeranimation

**Nach Medientyp durchsuchen**  
Tipp: Stellen Sie den entsprechenden Filter ein, um entweder nur Fotos oder Videos in Ihren Suchergebnissen anzuzeigen.

☒ Fotos & Videos  
☐ Nur Fotos  
☐ Nur Videos  
☐ Nur HD-Videos

**Nach Datum suchen**  
Tipp: Verwenden Sie eine oder zwei Datumsangaben, um nach Fotos zu suchen, die in einem bestimmten Zeitraum aufgenommen oder gepostet wurden.

Aufgenommen nach vor  
MM/TT/JJJJ MM/TT/JJJJ

**creative commons**  
Tipp: Suchen Sie nach Inhalten mit einer Creative Commons-Lizenz.

☒ Nur in Inhalten mit einer Creative Commons-Lizenz suchen  
☐ Nach Inhalten zur kommerziellen Nutzung suchen  
☒ Nach Inhalten für Änderung, Anpassung oder Bearbeitung suchen

Then, we will use these images as background images in the viewport. Go to the property window toggled with *N*. Select “Background Images”, press “Add Image” and select the side image of your swan. As “Axis”, select right. Now, this image is only shown in the right view. You still do not see the image? Then you are probably still in perspective mode – this does not work. To see the image, you have to change to ortho mode. Just toggle between this two modes by pressing *NUM 5*.

The right view should now always show the background image – so just press *NUM 3* to go there.



Make sure that the image fits your needs. You can change the position of the image by changing the X and Y value and also the size, as you can see in the screenshot above. But you cannot change the rotation. For this purpose, use GIMP or another image manipulation program. (Yes, you can also do this by using Blender with some tricks, but I think, you are much faster with another program.) The next image shown, how it should look like in the end.

Adjust the ellipse shape now to the body of the swan, similar to this image:

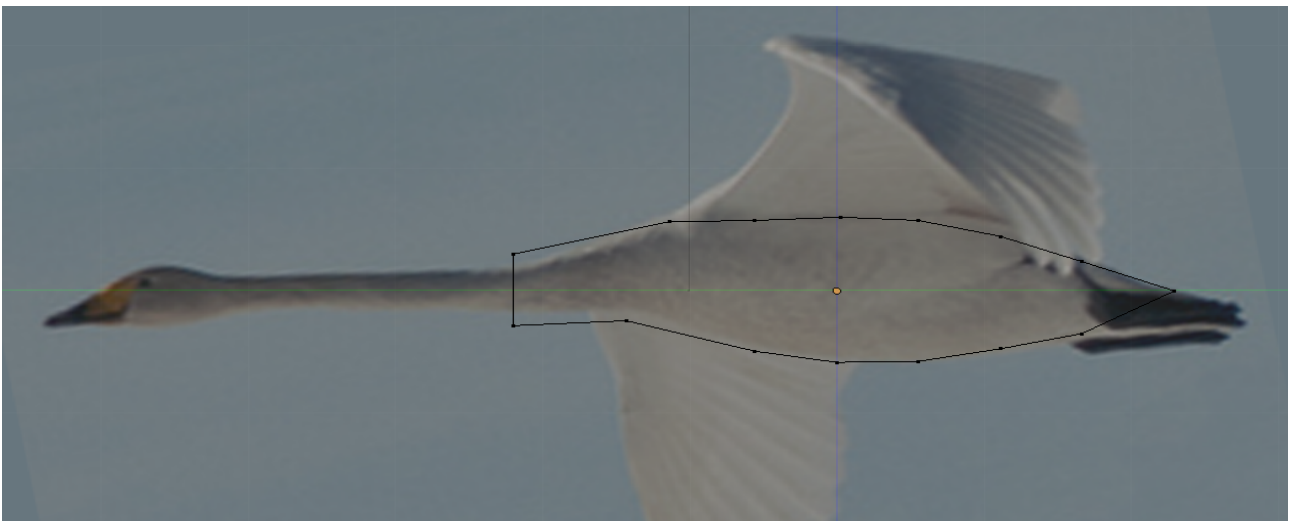
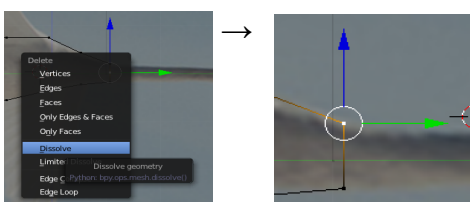


Photo: © Bryant Olsen/flickr.com

! Attention: be sure that all nodes are located in  $X=0$ . If the X position has changed, shift it back to  $X=0$ . In the next section, this will be important !



Delete the selected node at the previous image by selecting DEL and then "Limited Dissolve".

Here, we will add later the head of the swan.

Now, let us change to the top view (*NUM 7*). We want to extend now the two-dimensional structure into the third dimension. But first, we need also a background image. So get an image of a swan from the bottom and load it into Blender as previously described. But this time, limit the “Axis” to “Top”.

The top view should now always show the background image – so just press *NUM 7* to go there.

It is important that you make sure that both background images match in their position! So switch between *NUM 7* and *CTRL+NUM 3* and check if the curve appears at the correct positions!

Left view:



Photo: © Bryant Olsen/flickr.com

Top view:



Photo: © Excelglen/flickr.com [FE]

The vertex at the end of the tail and the vertex at the starting point of the neck.

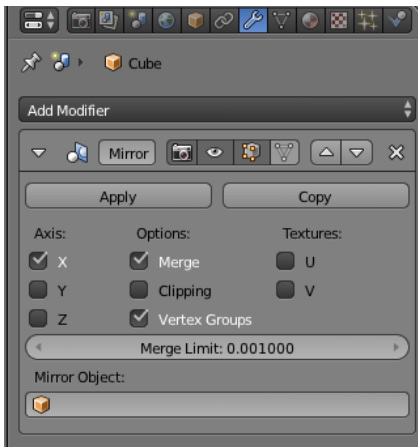
Get the images used here from the website (see top page)

→ [Blender\\_Tutorial\\_WS2014-15\\_\\_2\\_0\\_swan\\_textures.zip](#)



## Modeling the Body (2D to 3D)

Now, we want to model the body of the swan. We could do this for the left and the right side, but we are lazy, and so we use the “Mirror Modifier”. So select the shape in Object Mode and add the “Mirror Modifier” like this:



Now, go to edit mode, select the top view, select the complete shape and press *E* for extrude, finish the extrusion at each step by *LM*. And now you should see something like this:

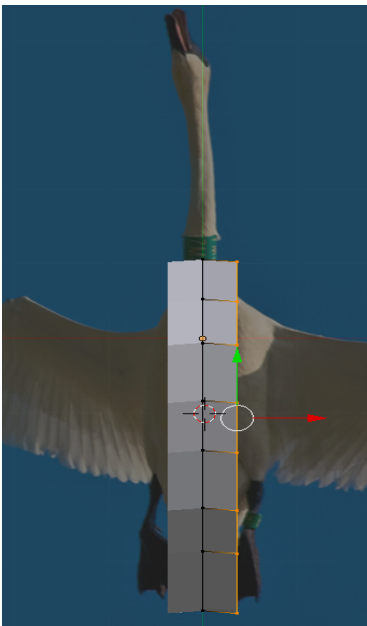


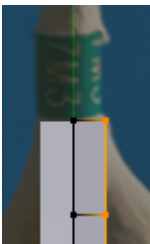
Photo: © Excelglen/flickr.com [FE]

If this image is not placed correctly, just adjust the background image, until it is at the correct position, e.g. like this:




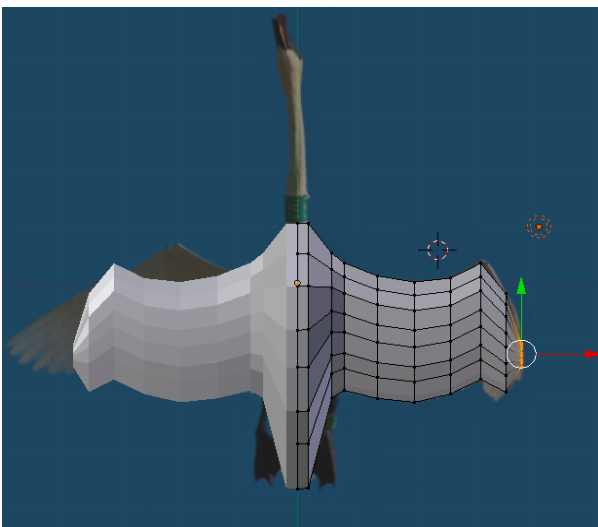
Compare the image of the right side with the one from the top side, and after both position and sizes match, continue with the modeling. In this example, there is not much to do, because the two images are in close correspondence.

Make sure that the first extruded shape has the width (along the x axis) of the neck of the swan shown at the photo:



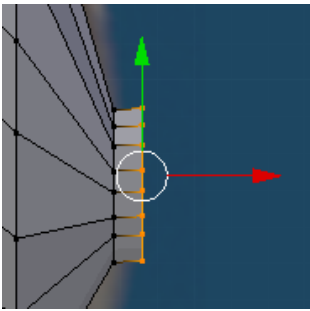
[FE]

Use now the extrusion in combination with the methods which you already know (*S* for scaling, and drag the extruded shapes with the translate operator: ) until the mesh looks like this:

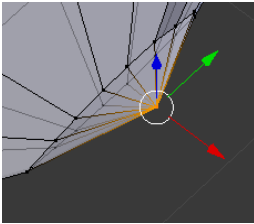


[FE]

In the last step, we close the shape. For this purpose, you see here this small part at the edge of the wing:

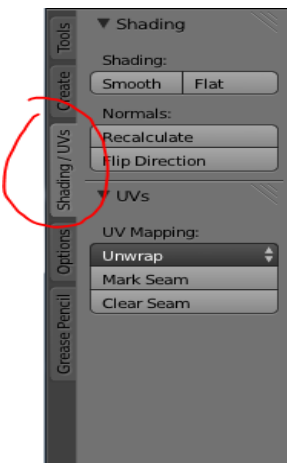


Press now *S* for scale and then press 0. All vertices are scaled to the center of the selection. To merge now all vertices at this position, press *W* and select “Remove doubles”. Result:



The shape is closed now.

Now, optimize the mesh. Keep in mind, the luxury of the Mirror Modifier will be gone soon. So try to make an organic shape and you may also want to look at the swan in smooth shape. Change to Object Mode, select the “Shading/Uvs” tab on the right side and select “Smooth” in the Object Tools section.

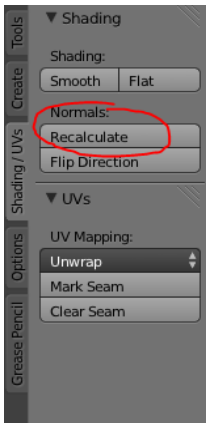


You will see that the surface looks strange:

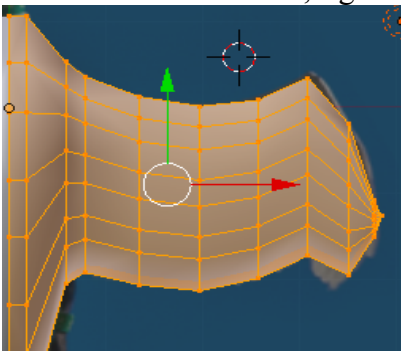


Do not worry, the normals have to be recomputed. Change to Edit Mode, select all vertices and in

Mesh Tools, select “Recalculate” in the “Normals” section.

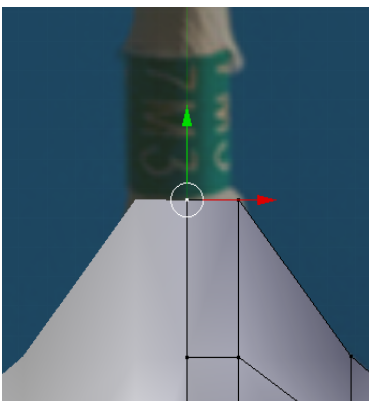


Looks much better now, right?



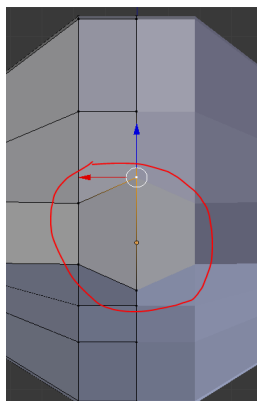
A last aspect is important for the next step: shape the part, where the neck should be attached to, as a hexagon like this:

Top view:

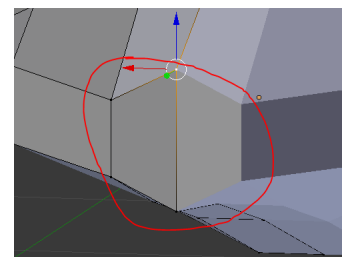


[FE]

Front view:



Angular view:



→ [Blender\\_Tutorial\\_WS2014-15\\_2pt1\\_\\_2.blend](#)

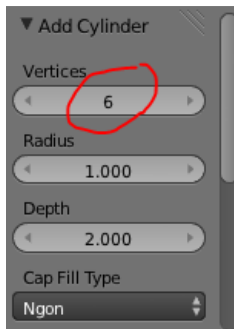
## Modeling the Head

Now let us think about the head of the swan! We will start with a simple cylinder. Got to Object Mode and

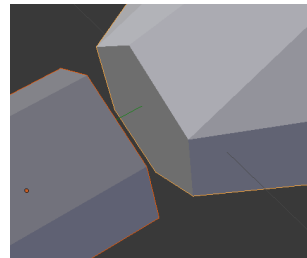
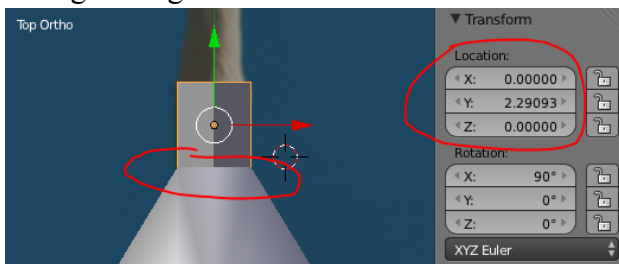
Add → Mesh → Cylinder

The resolution of the cylinder is much too high, change it to 6! The window you find in the Object

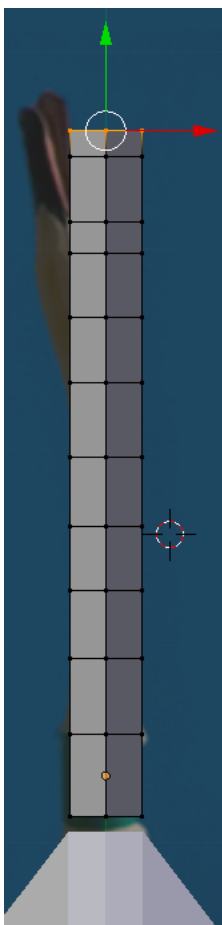
Tools, usually on the left border at the bottom, close to the time line in the Default Layout.



Now use again the background images to align and cylinder to the shape of the swan's neck. Make also sure that the x and z positions are 0. Just place the starting point of the cylinder in front of the swan's body, but make sure to have a small distance between the neck and the body, like shown at the right image:



[FE]



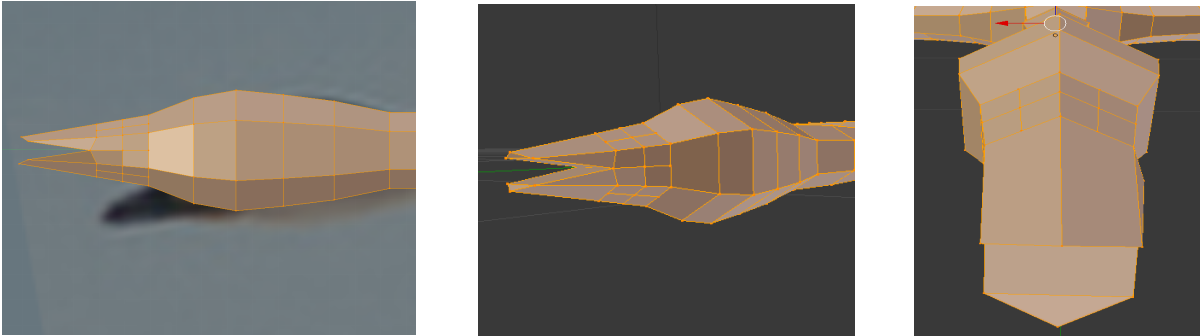
We will use now our well-known technique to extend the structure of the cylinder:

[FE]

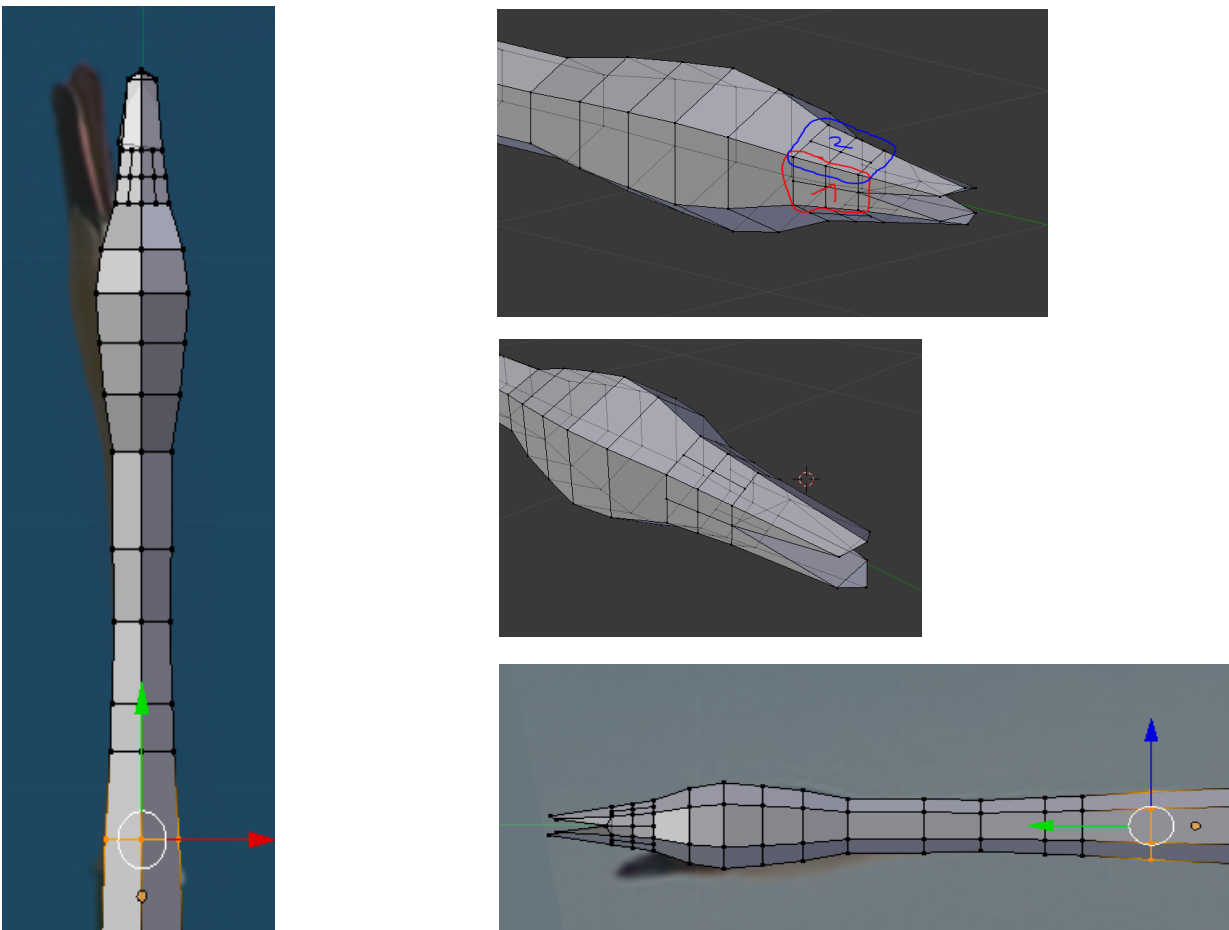
Then, go to Edit Mode, select the upper part of the cylinder and extrude. We will need these different segments in case we want to animate the neck later. At the end of the neck, you may increase the resolution, as shown here at the top of the image. These segments you might want to use later to give your swan a more detailed face. Then adjust the shape of the different segments to the background image.

→ [Blender\\_Tutorial\\_WS2014-15\\_2pt1\\_\\_3.blend](#) (incl. step “Attaching the Head to the Body”)

If you are tired now, just redo the method discussed before: select all nodes at the end of the neck, scale the to zero (with *S* and *0*) and remove the overlapping segments. But you can also use the methods which we learnt in previous tutorial(s) to do something like this:

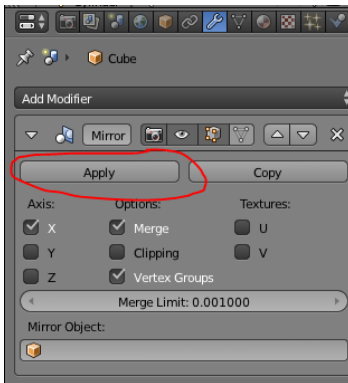


Here, only a few nodes, edges and faces have been added to the end of the shape to add the head with the beak. (Remember: use *W* and “subdivide” to add a new vertex or subdivide a face into multiple faces, and with *F* two selected vertices are connected by a line or a face is created between multiple selected nodes.) E.g., the following right image indicates two faces which were selected by using the face selection and then subdivided each. Shift+Select all 6 faces (the image shows face 1 and face 2 *after the subdivision*) at the position shown there and then subdivide them all in one step!

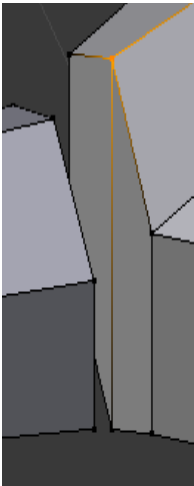


## Attaching the Head to the Body

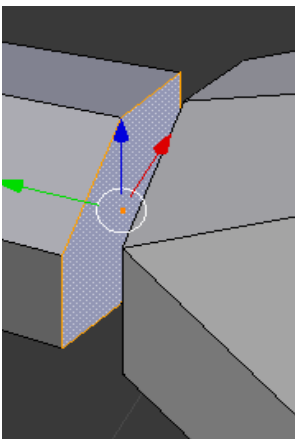
Now, the body has to be connected to the neck. Go to object mode. Select the body of the swan first. Now, “Apply” the Mirror modifier. Afterwards, you cannot use the mirror mode anymore.



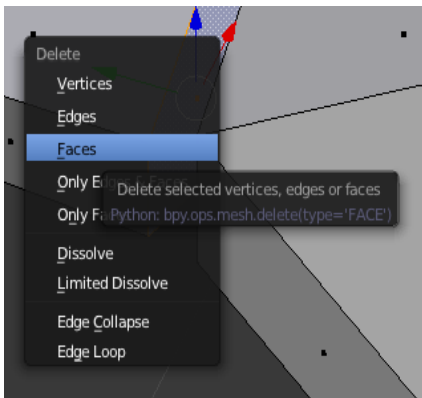
Press *SHIFT* and select the neck and press *CTRL+J* to join both objects. Now, both objects are one. But the neck is still not connected to the body:



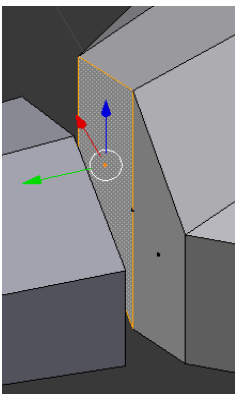
If there is not enough space between both ends, just move the end of the neck a little bit apart, e.g. by switching to Face Select Mode, selecting the whole area of the neck's end and moving it apart:



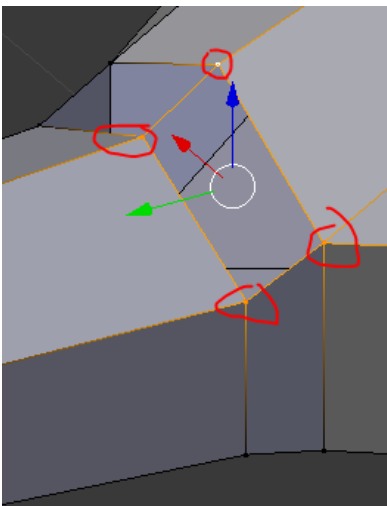
Use the same mode now to delete the outer face of the neck:



It is open now. Do the same with the faces and edges of the hexagon of the swan's body by using the different selection modes:



Make sure this time to delete the vertex/Vertices, not the face!

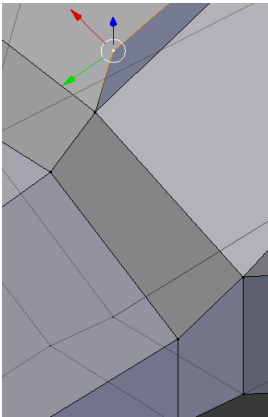


Now, always select two corresponding vertices, one at the neck, and one at the body, and press *F*. The red circle marks a remaining node which has no neighbor at the other side. Just ignore these nodes by now. After all nodes with a neighbor are connected, *SHIFT*+select all 4 nodes surrounding a rectangle and press again *F*.

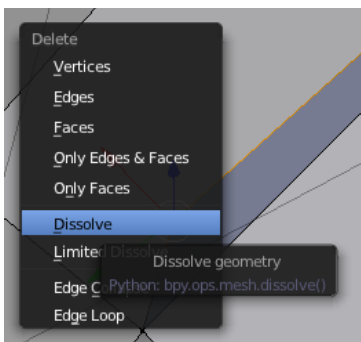
The remaining nodes, in my example these are only two, need to be removed. Move the nodes apart



as shown in this example:



Press DEL and select “Dissolve”.



Find the same node on the bottom side.

Now, the mesh is finished. Next tutorial will continue with the texturing.

→ [Blender\\_Tutorial\\_WS2014-15\\_2pt1\\_\\_4.blend](#)

## References/Images

Thanks go to the following photographers:

[FB] Photo: © Byrant Olsen/flickr.com

<http://www.flickr.com/people/bryanto/>

License: <http://creativecommons.org/licenses/by-nc/2.0/deed.de>

[FE] Photo: © Excelglen/flickr.com

<https://www.flickr.com/photos/excelglen/>

License: <http://creativecommons.org/licenses/by-nc/2.0/deed.de>

[FF] Photo: © William Veder/flickr.com

<http://www.flickr.com/people/woodyrockt/>

License: <http://creativecommons.org/licenses/by-nc-nd/2.0/>