

Blender Visualization Tutorial WS2013-14 IV Part II

CELLmicrocosmos Cell Modeling Project WS2013-14,
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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 2.67b is used.

Target

This tutorial describes how to create a simple swan model incl. its textures.

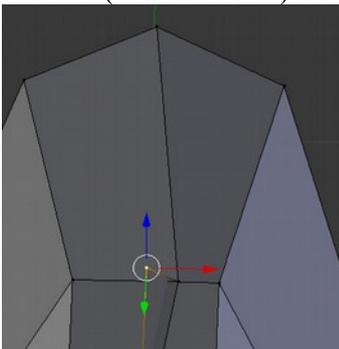
Base

Blender Visualization Tutorial WS2013-14 IV Part I

Texturing the Swan

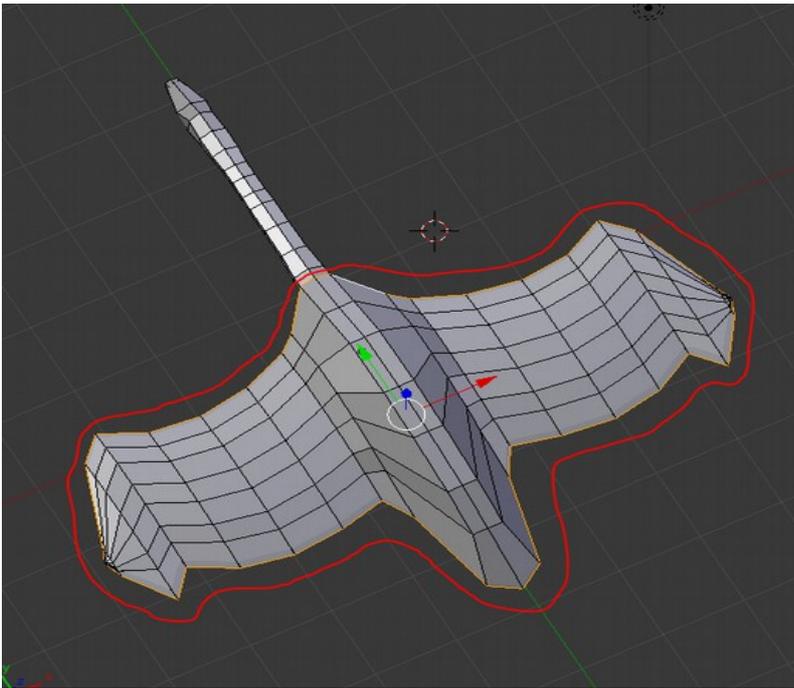
The shape of the body might be okay, but the swan is naked, he will not like this a lot! So let's do something against it!

Before continue, make sure that there are no double vertices found on the center of the swans body where the two mirrored sides meet. In this example, a superfluous vertex is selected which has to be deleted (vertex delete). Remove all these nodes.



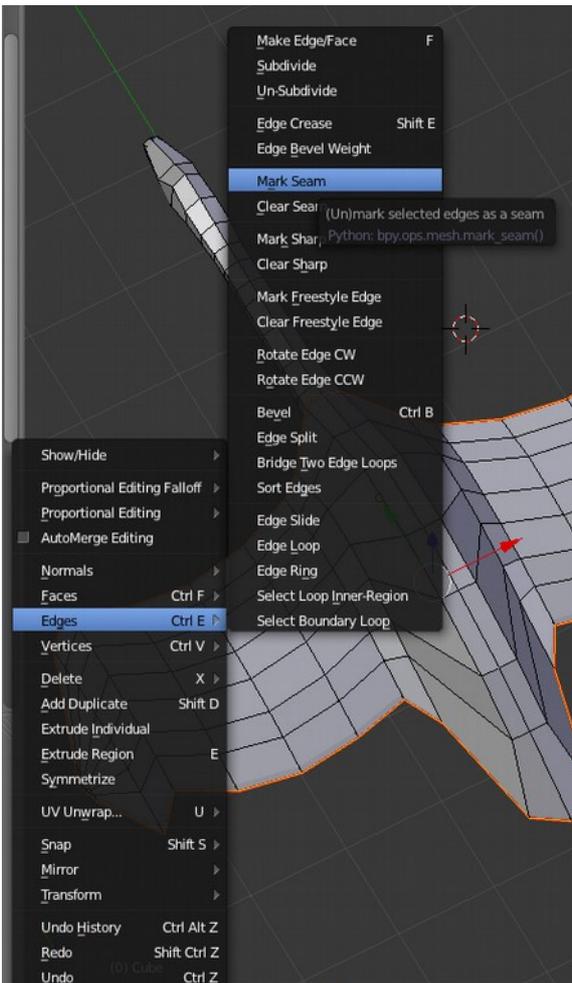
Now, we have to create a seam. A seam defines the borders of the area, onto which the texture is placed later on.

Go to Edit Mode, select the “Edge select” mode, and *SHIFT*+select all edges which should be defined as the seam. Of course, they all have to be directly connected. Choose the border between the top wings and the bottom wings and leave the complete neck out!

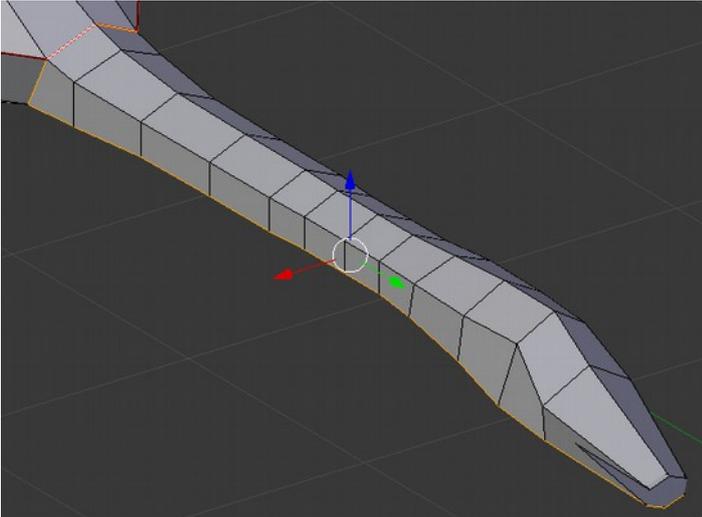


The red line should only indicate the seam which is marked in Blender by the yellow line.

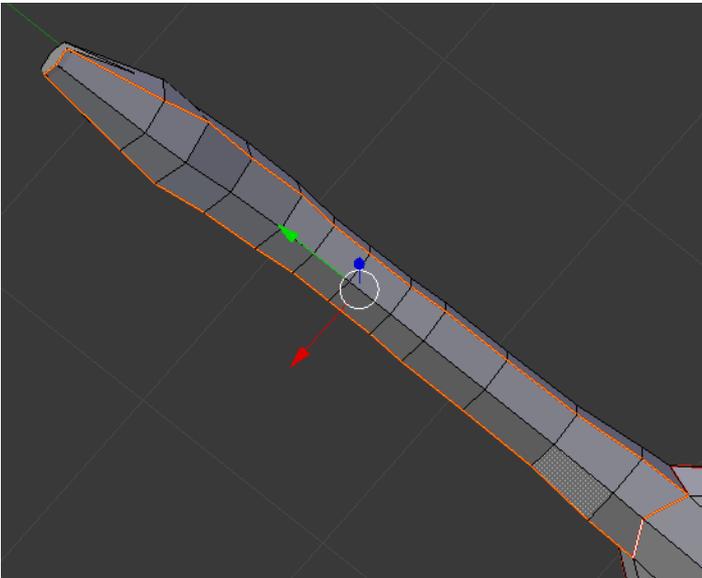
After all edges have been selected (and make sure they are all connected!), select “Mark Seam” like this:



Do the same with the neck. First, the upper part:

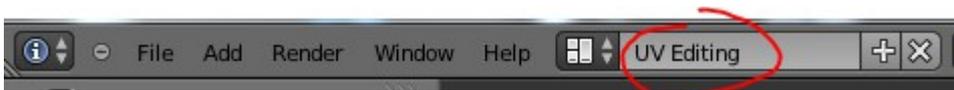


Mark the seam. And then, the bottom part:

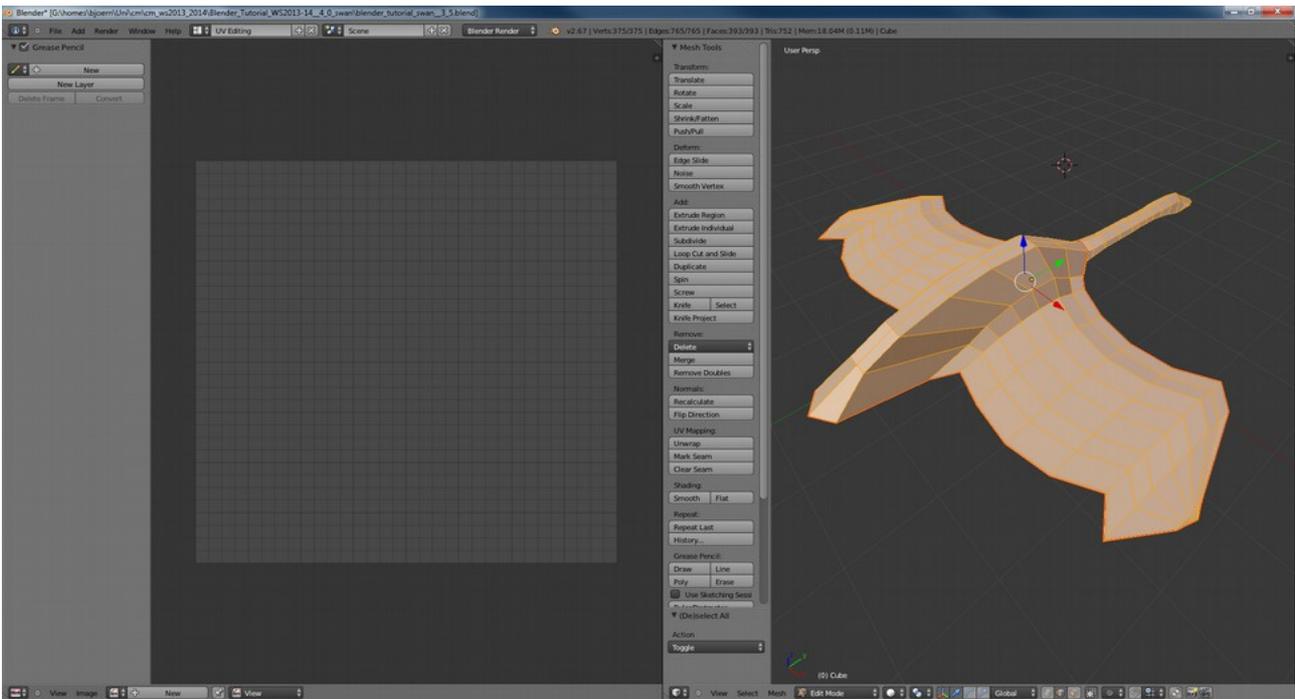


Mark seam again – here, only a selected few edges differ from the ones selected in the previous image.

Now switch to UV Editing mode:

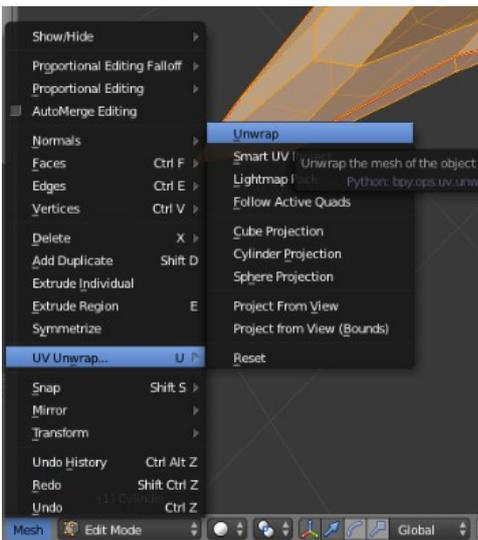


On the left side, you see the area for the textures, the UV/Image Editor, on the right side, you see the 3D view:



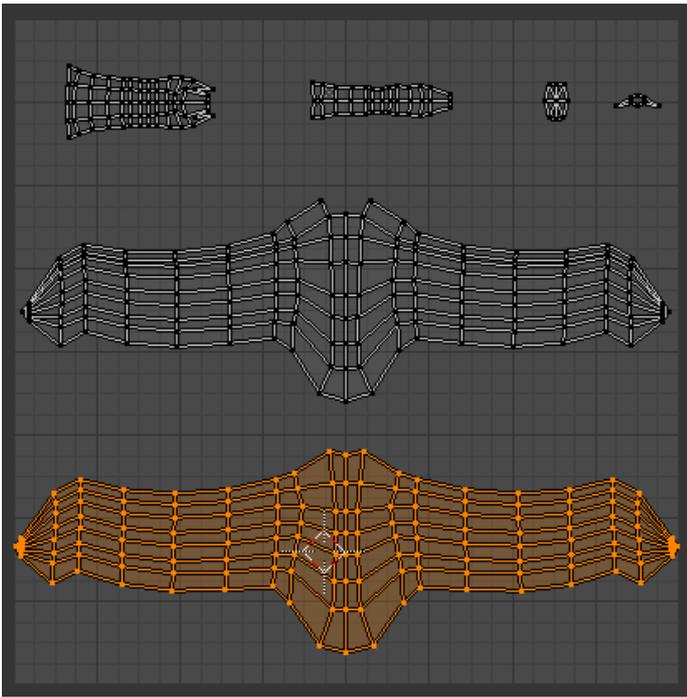
In Edit Mode, select the whole swan, select

Mesh → UV Unwrap → Unwrap:



Now, try to place the two unwrapped shapes in a convenient way to add the textures in the next step. For this purpose you can use the regular *S*, *G* and *R* modifiers. To select only one shape, *RM* onto the shape and press *L*.

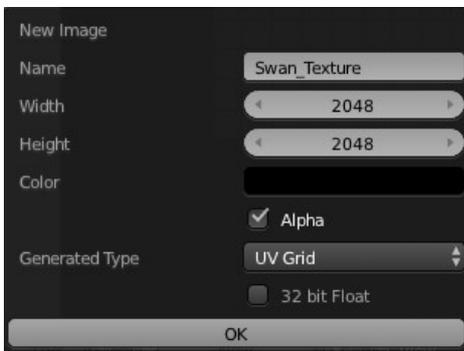
It should look like this:



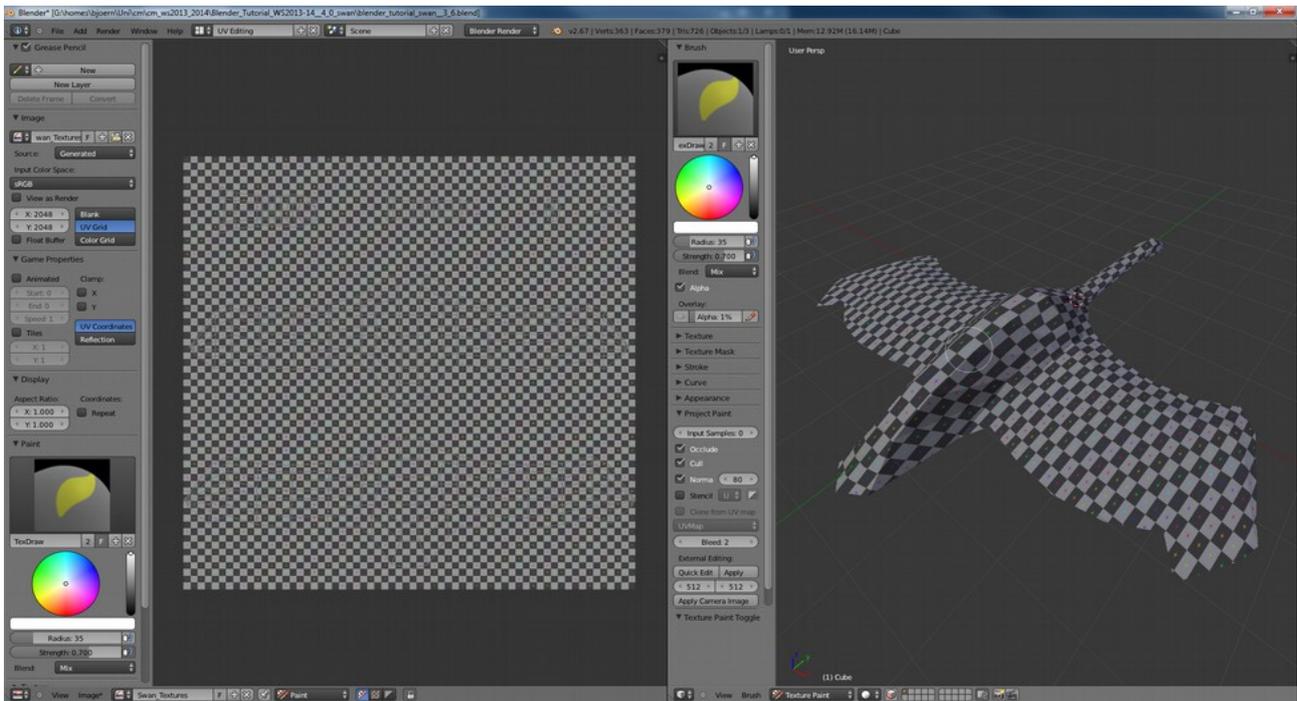
But the area is empty, this is a little bit boring. So let us add a new image. Press:



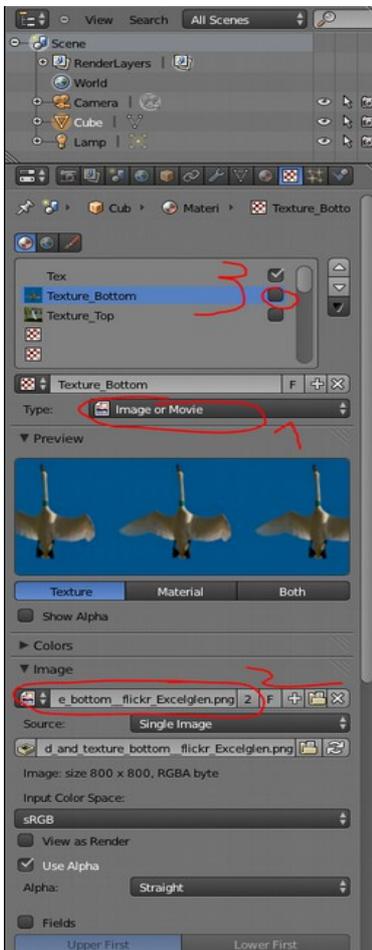
and use the following settings:



The width and the height define the resolution later on, so it is important to choose the correct settings here. The UV Grid will make a nice grid which can be compared to the one in the 3D View. All what we have to do now is to switch the 3D View to “Texture” Mode! And in addition, switch also the UV/Image Editor to “Paint” Mode! See the arrows (the 2D shape is not visible at the moment, but believe me, it is still there!):



But before we can continue, we need to add some textures to our project which we can then use – in the second step – to paint onto the surface of the swan. Switch first back to Default mode:

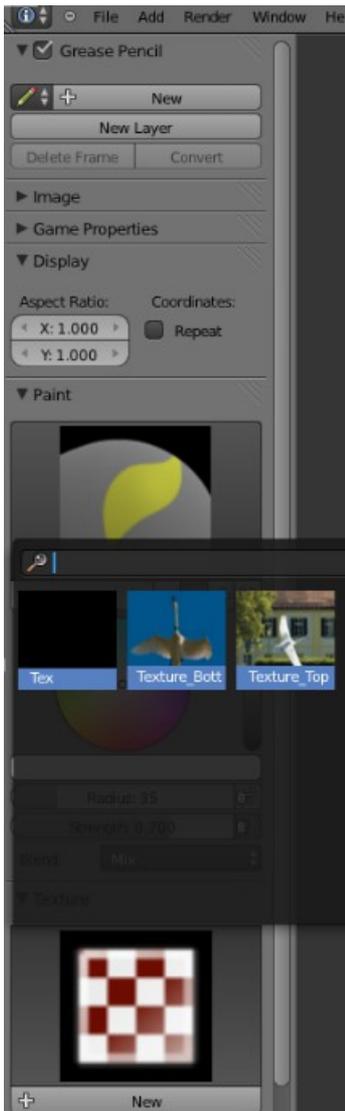


Go to the textures mode now (be sure that a material exists already, otherwise create a new one) and add the textures which you want to paint onto the surface of the swan.

First, add an image, second, select the appropriate image from your hard disk, and third, deselect these textures, because we do not want them to be rendered directly to the surface of the swan.

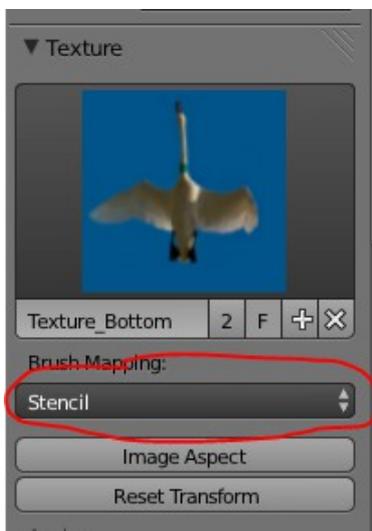
And then, go back to UV Editing Mode

If you click now onto the texture image on the left side of the UV/Image Editor window, something like this will be shown:



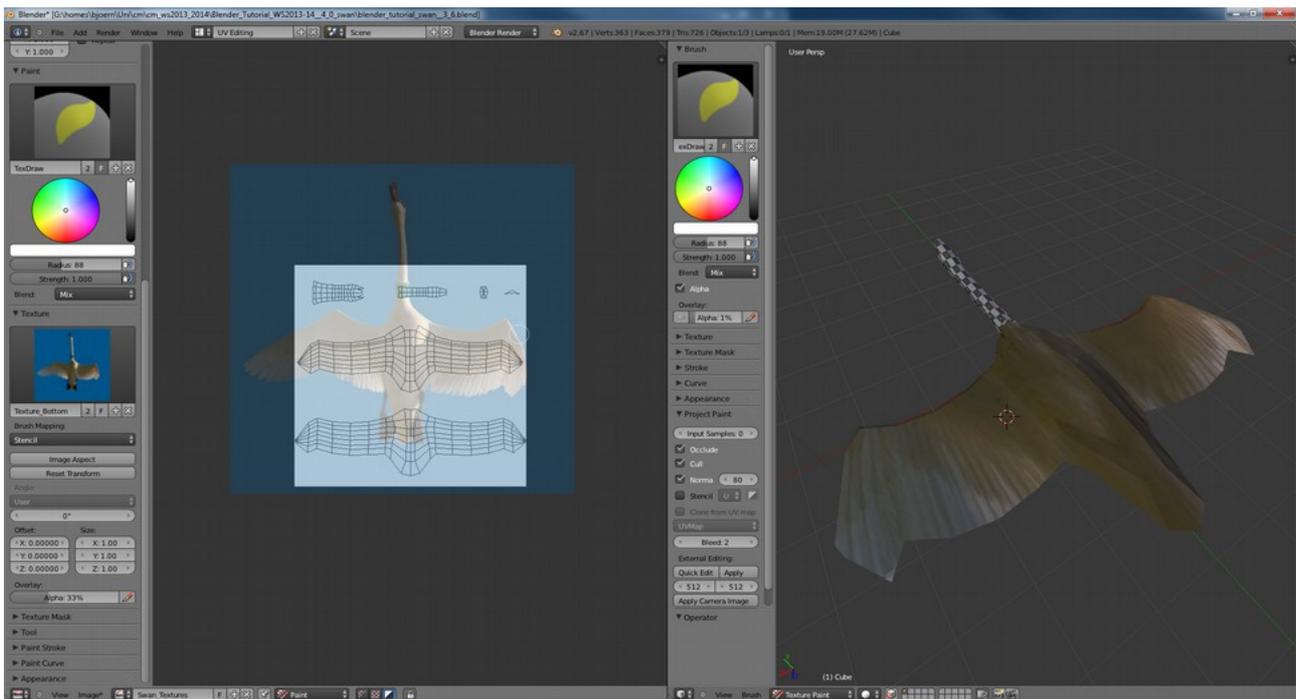
[FE,FF]

Select now the texture for the bottom and select the “Stencil mode”!



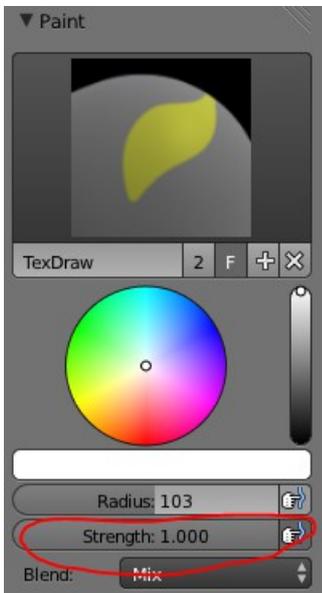
[FE]

If you move the mouse pointer inside the window of the UV Editor, a stencil-like image will appear. You can position this image with *RM*.



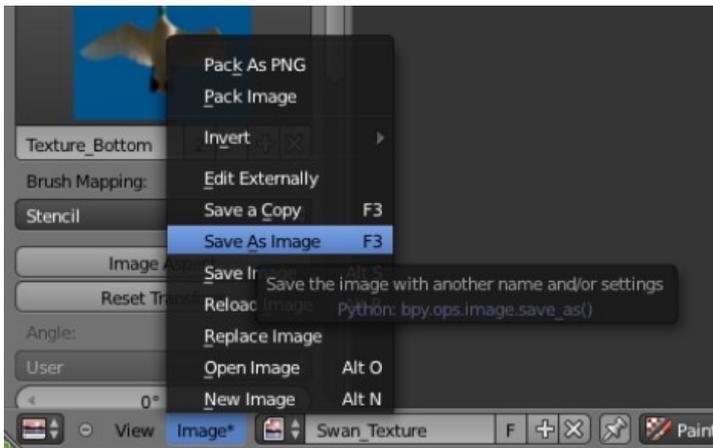
[FE]

Make sure that the strength of the painting is set to 1, otherwise a semi-transparent texture will be drawn:



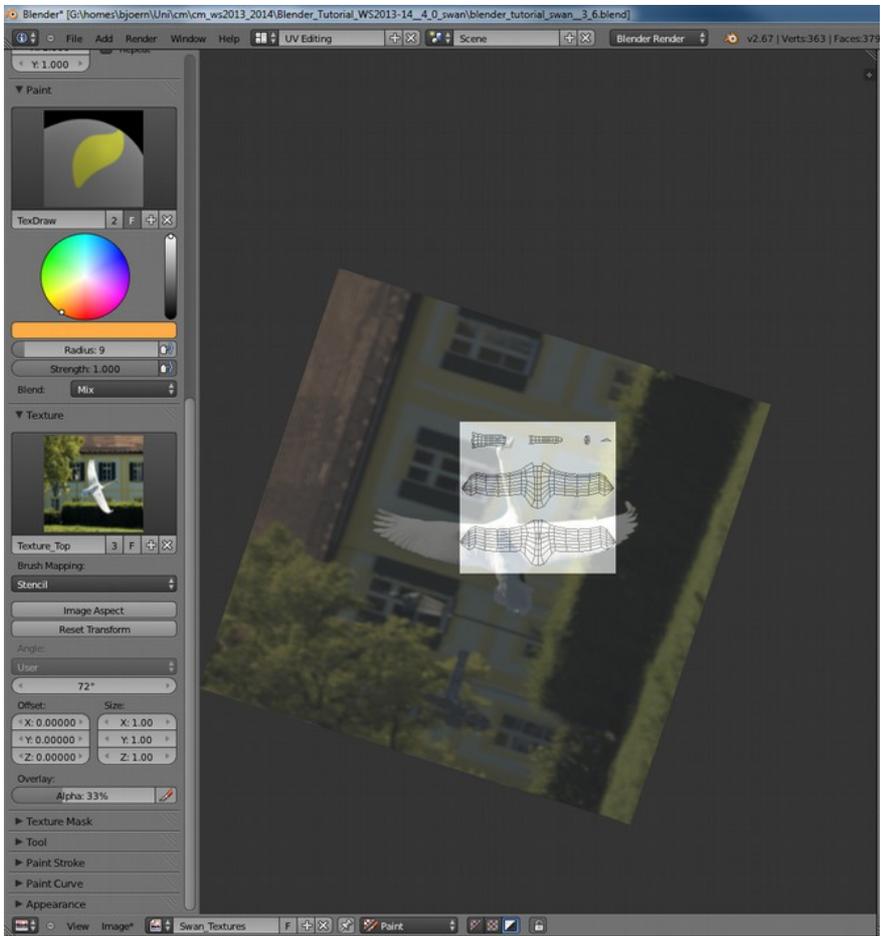
You can also use the same methods in the 3D View. So, after you have painted the complete bird from the top view, you should examine the swan from different perspectives in the 3D View and maybe extend the textures with the stencil.

Very important: save the image. Otherwise, all your results will be lost after you close the project:

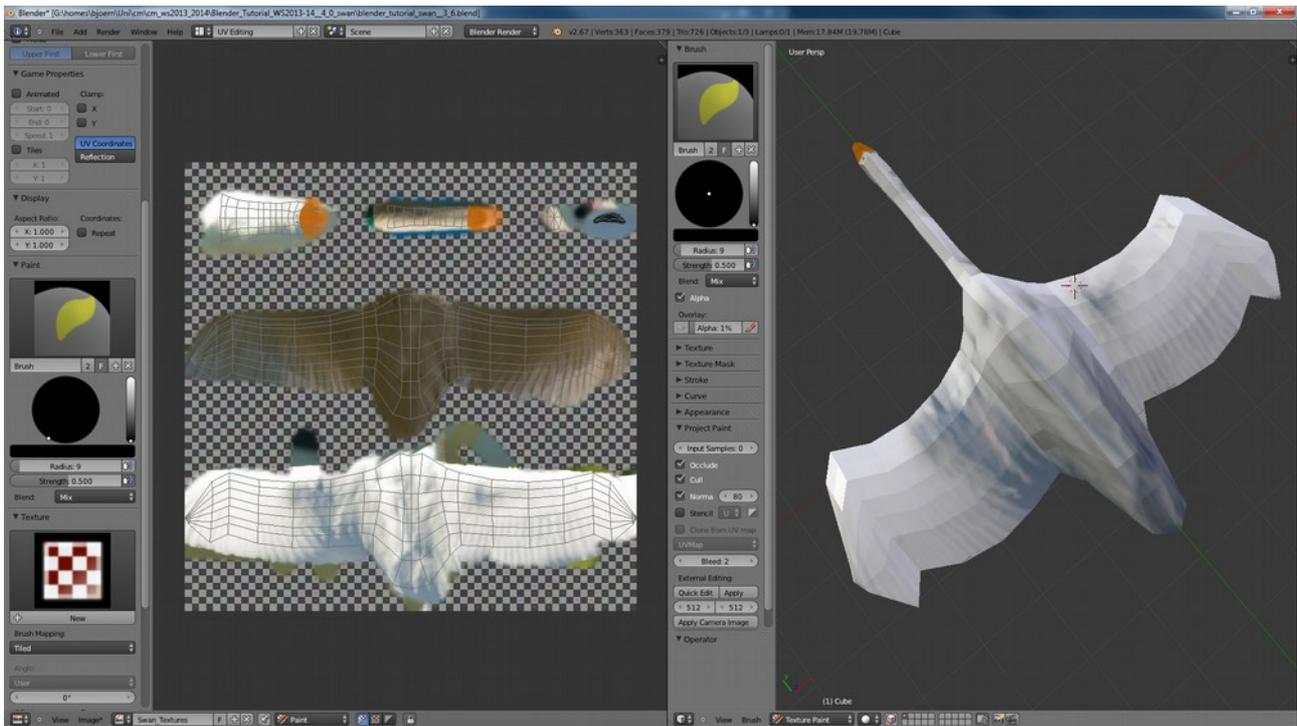


[FE]

Now do the same thing for the upper part of the swan. Choose another texture for the top. You can also change the size and the rotation of the texture, if the original image is not aligned correctly to the mesh. Here, the rotation of the stencil image was changed:

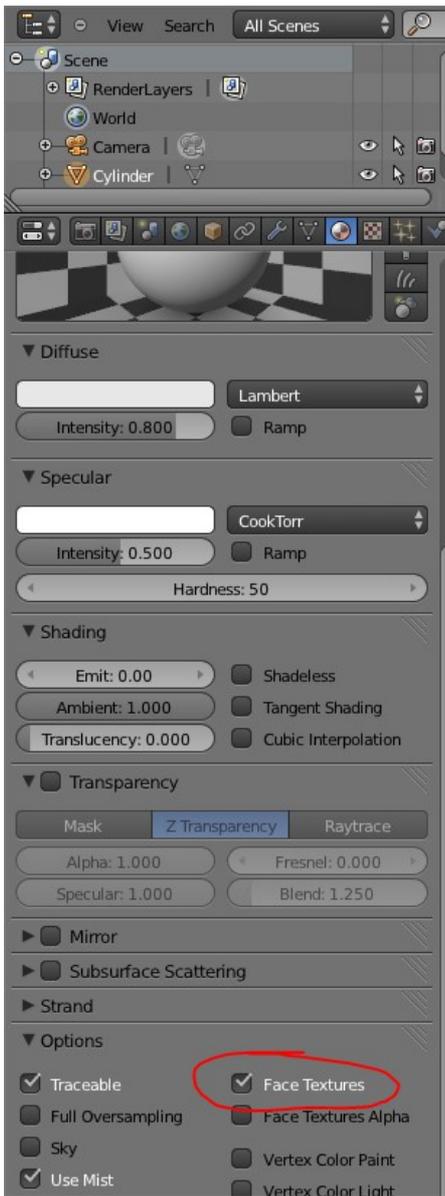


[FF]

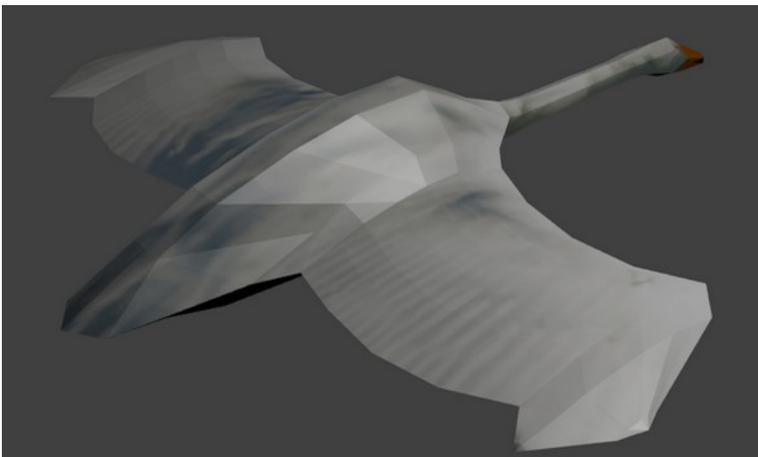


Still, something is missing. Press *F12* to render your scene – what do you see now? A swan, yes, but still, it is naked. Scandalous!

To come out of this awkward affair, we have to tell the swan mesh that the texture should be used during the rendering process. For this purpose, go back to Default mode. Go to the Material Editor, find the “Options” category and activate “Face Textures”:



And now, press *F12* again:



And here is your swan!

→ [blender_tutorial_swan__3_6.blend](#)

Bones to the Feathers

Let us add now bones. First, add a bone by using:

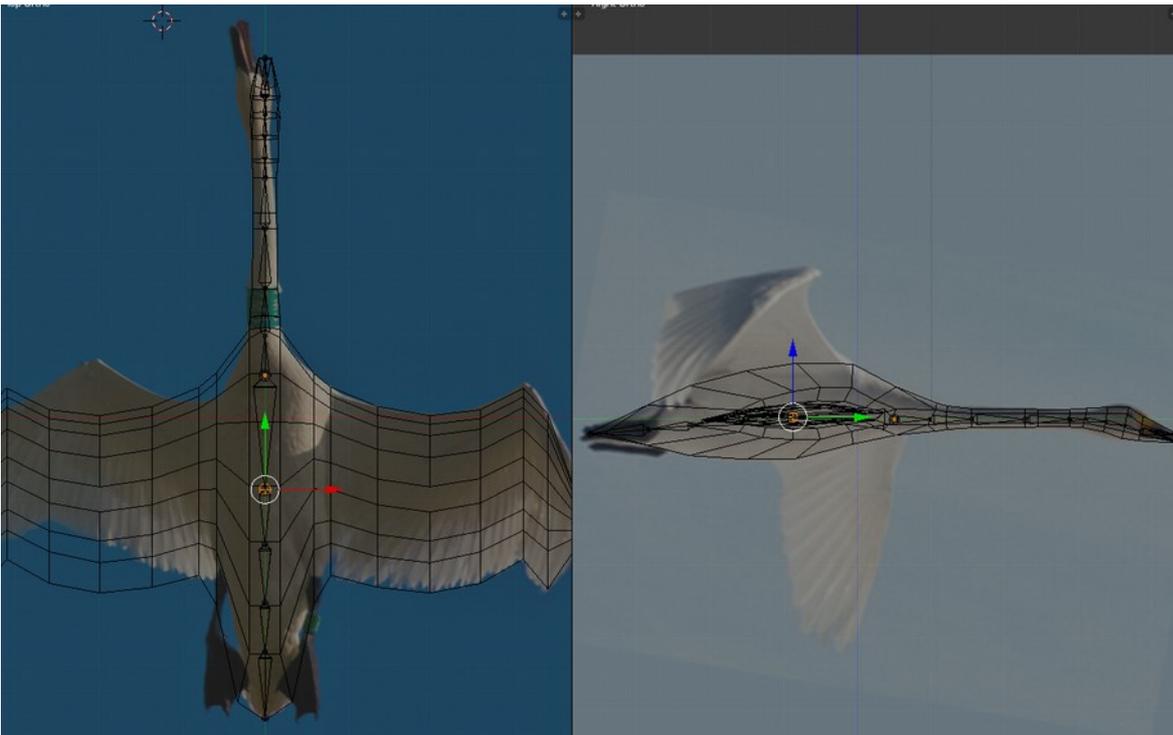
Add → Armature → Single Bone

Place and scale it like shown here:



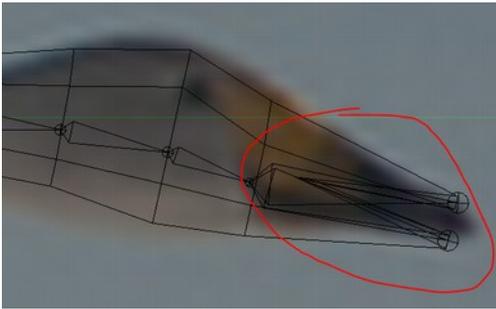
[FB,FF]

Go to Edit Mode and select the joint of the bone, as the one selected in the previous image, and press *E* for extend. It is a good idea to press *CTRL* during the extension process, because the placement of the joints is restricted to the grid and it is easy to keep the joints in the center of the image. Pay also attention that each joint is beneath an edge of the mesh. This is important for the movement later. Do this until the whole base of the body and the neck include the skeleton.



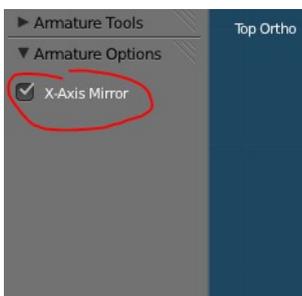
[FB,FF]

If you added a beak, you might want to add a second bone to the beak of the swan:

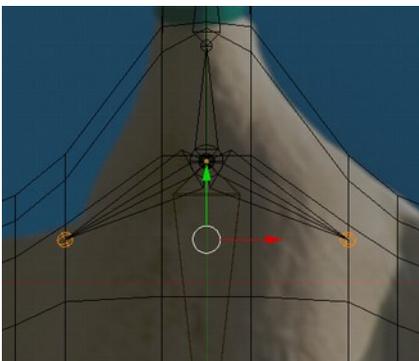


[FB]

Now, we want to add the bones for the wings. For this purpose, we want to save time by using again the mirror modifier. In the “Armature Options” (usually on the left side of the window), select “X-Axis Mirror”:

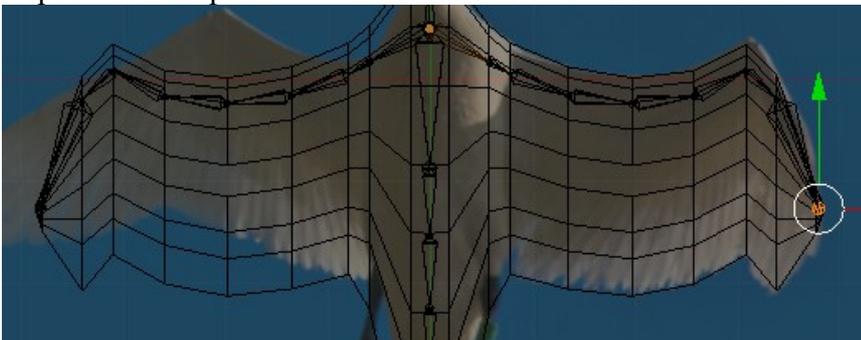


Select now the joint of the initial bone, and while holding *SHIFT* press *E*. Now, the added bone is mirrored on the left side:



[FF]

Repeat these steps until it looks like this:

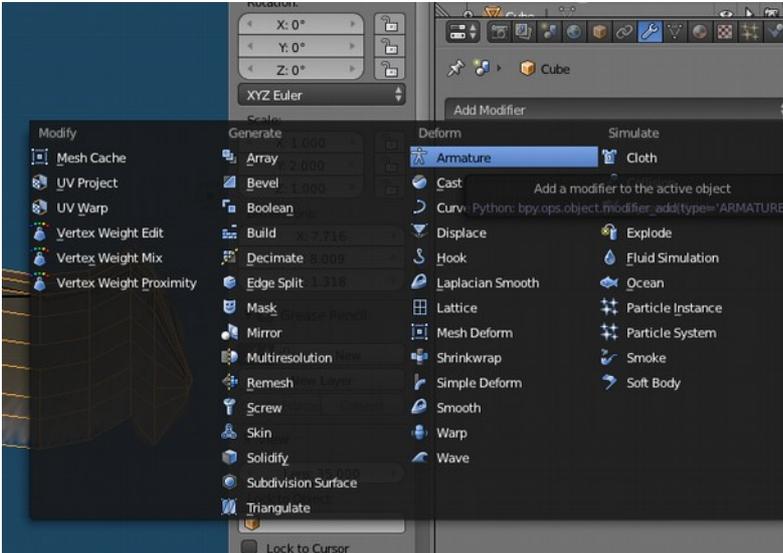


[FF]

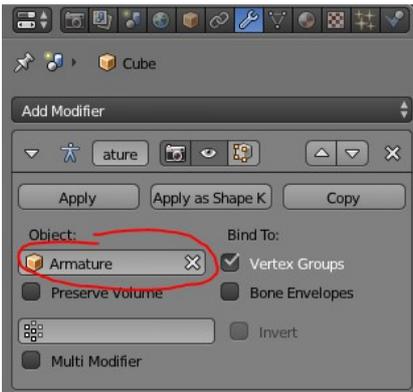
→ [blender_tutorial_swan__3_7.blend](#)

Feathers to the Bones

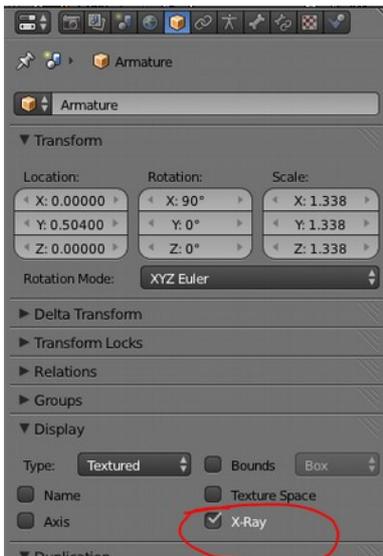
Now the bones have to be connected to the body. Select the mesh in Object Mode and add the Armature to the swan by adding the modifier “Armature”:



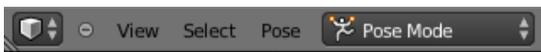
And now, select in the modifier the Object the mesh has to be connected to, called “Armature”:



Now, select the bones again and select: “X-Ray” in the Object Settings:



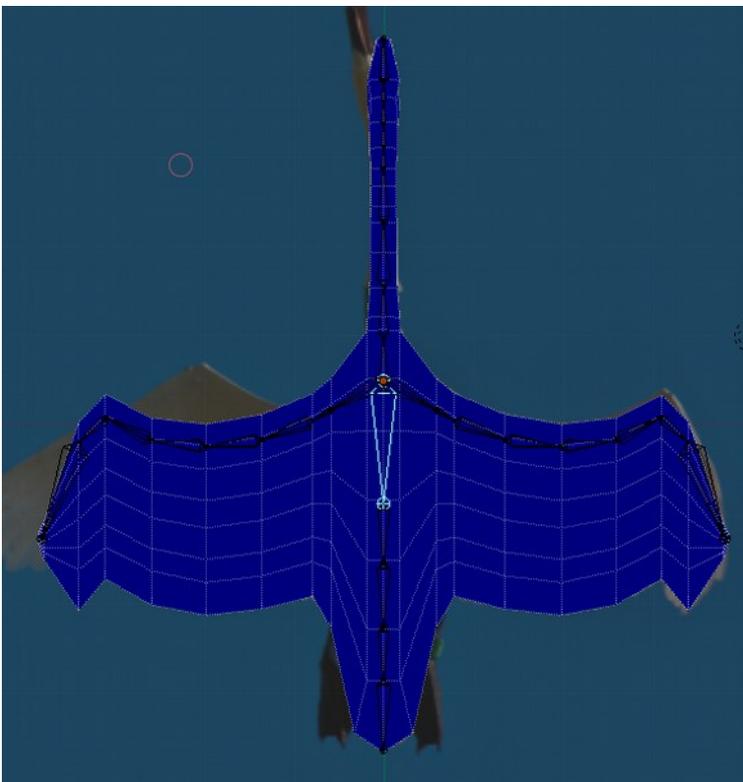
Then, switch the bones to “Pose Mode”:



Select the mesh again and switch them to “Weight Paint” Mode:



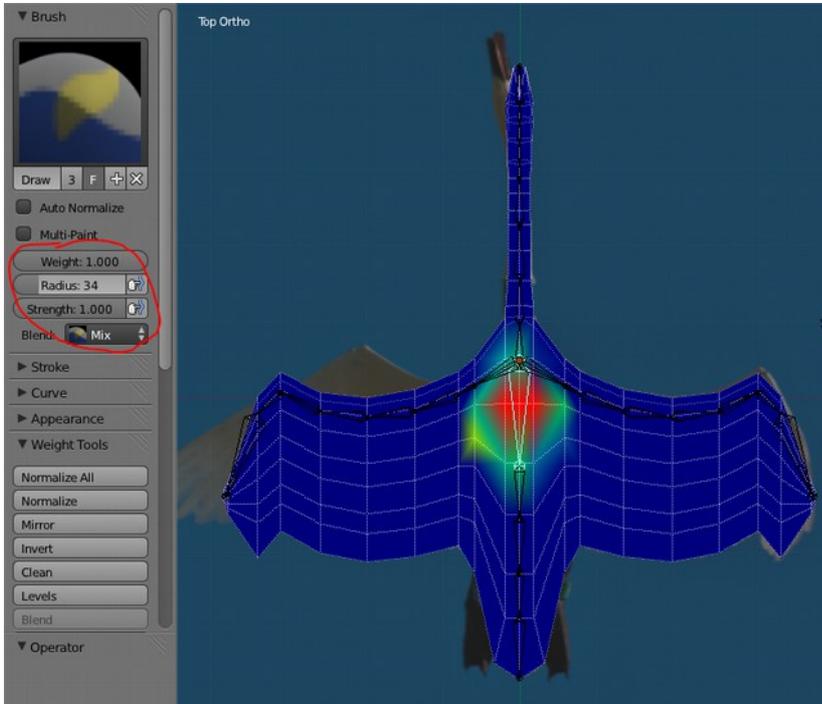
Now, it should look like this from the top (*NUM 7*):



You should deactivate the “limit selection to visible”:



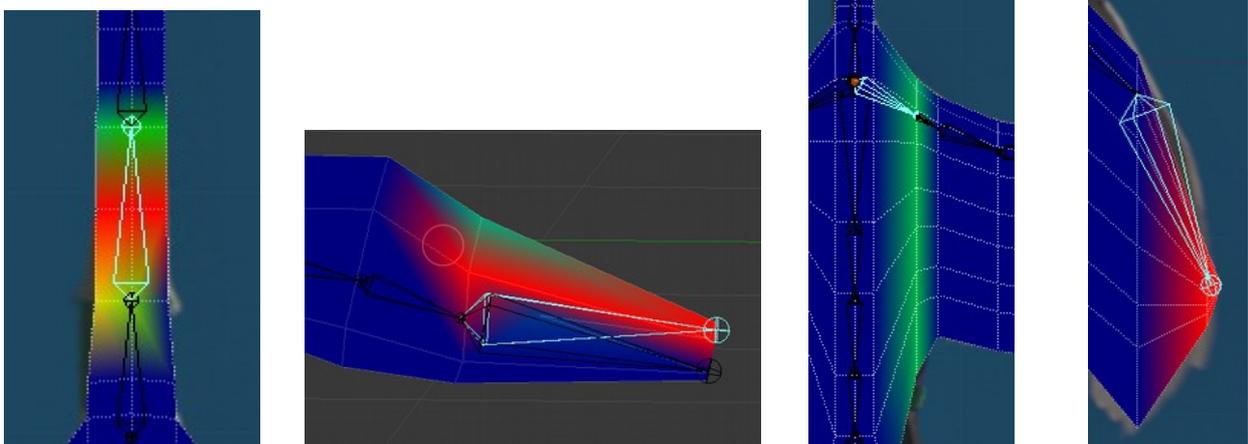
By using only the top view, select the first bone with RM, and the use LM to paint an area. Paint only the neighboring area. Because we deactivated the “limit selection to visible” mode, now the top and the bottom mesh are connected to this bone:



Use the options in the red circle to change the way the mesh is painted (e.g. the size of the brush). Do this now for every bone and make sure, that in the end the complete mesh is attached to a bone.

To test, if the mesh was attached correctly to a bone, just rotate the bone by e.g. using *R*. If some awkward behavior is noticed, you have to correct the attachment.

Examples for a bone inside the neck, at the top part of the beak, a part of a wing and the wing's end:



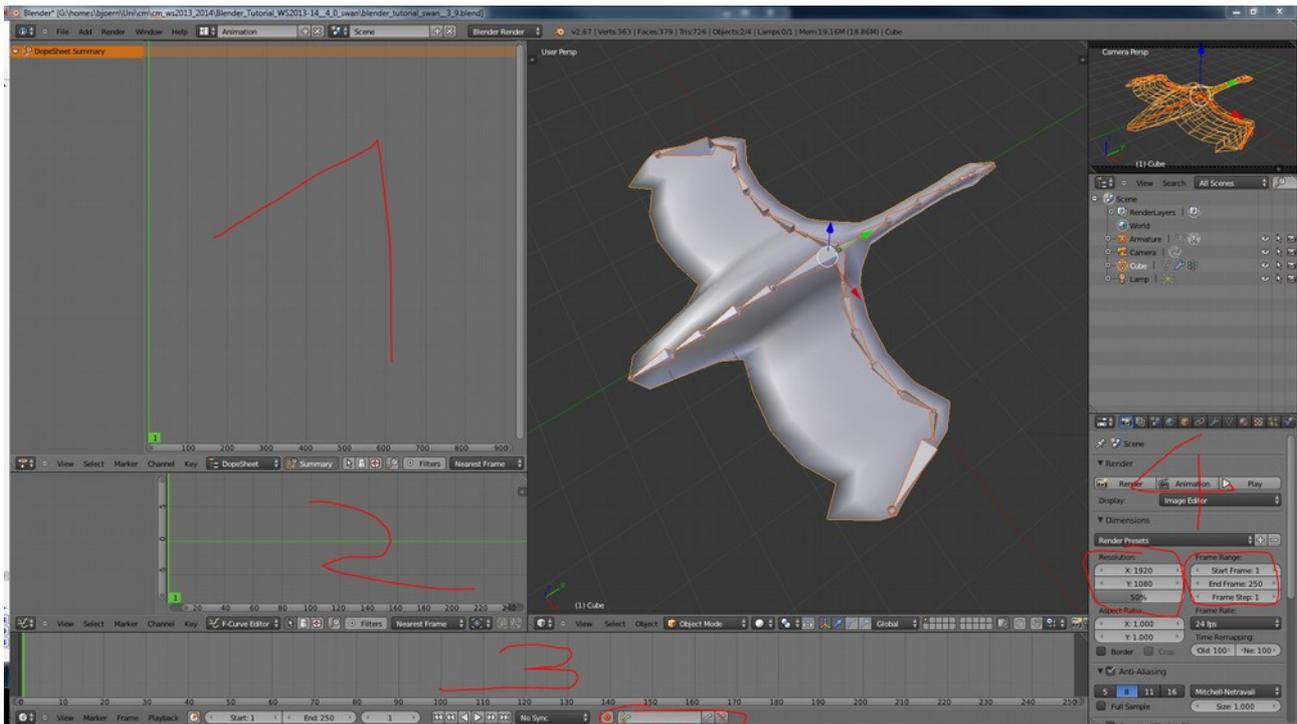
→ [blender_tutorial_swan__3_8.blend](#)

Animating the Swan

Now, leave the weight paint mode of the mesh, switch it to object mode. And then, choose the screen layout “Animation”:



It should look now like this:



The window #1 shows the Dope Sheet editor which we will now use to make the animation of the movement. The idea here is, to define a small segment of a wing flap which can then be repeated multiple times.

The window #2 shows the F-Curve Editor which can be used as an alternative way to change the values of the animation – e.g. coordinates – by using curves. We will not use it in this tutorial.

The window #3 is well-known to you, because you always see this time line. This time line is used in the end to create the basic animation, e.g. move the swan from one position to another one. The button in the circle we will use in the next step.

The window #4 is used to define the length of the animation, here the animation lasts from frame 1 to frame 250. The size of the rendered image is 50% of 1920X1080, so 960X540. Just press *F12* or the “Render” button and the output is being rendered.

Now we have to tell the program that we want to record the Locations and Rotations of the bones. We do so by just selecting this option at the bottom of window #3 (see also red circle there):



Make sure that you are at the first frame of your animation:



Select all bones of the swan by pressing *A* and then press  and you just created your first frame.

Now we have to think about the length of the animation. Let us say, we want to make a movement of different wing flaps for ca. 200 frames. Our end animation, where the swan is moving from one point to another one, will need 400 frames. Because we have 200 frames for one basic movement, we will make a time point at every 20th frame during the following animation.

But how is the swan moving? Thanks to photographer Smudge 9000/flickr.com, we have this very nice picture of a swan's takeoff:



Photo: © Smudge 9000/flickr.com

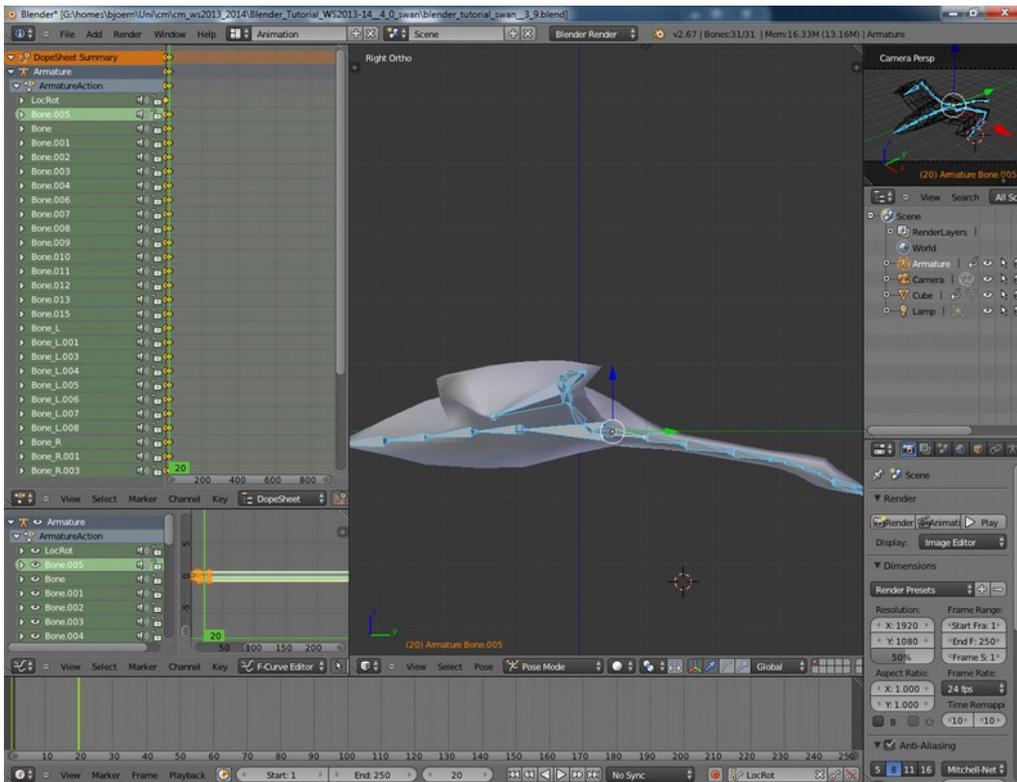
We see: the swan is flapping, and then it is gliding! So we will take this into account during the animation process.

First of all we can see that the neck is not in parallel to the body during the flight. But during the gliding process (while the wings are extended), it is nearly in parallel.

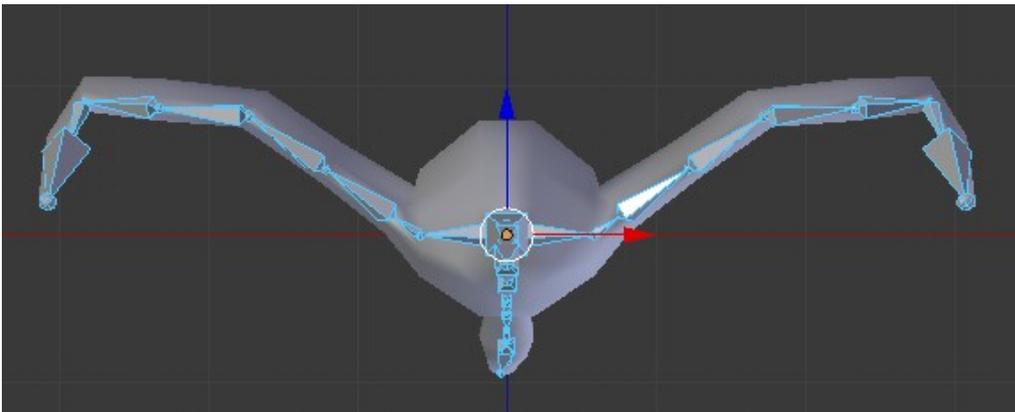


Go now to the frame 20. Change now the rotation of the different bones moving the wings and the first bone of the neck – as shown in the photo above at the first position – and press then



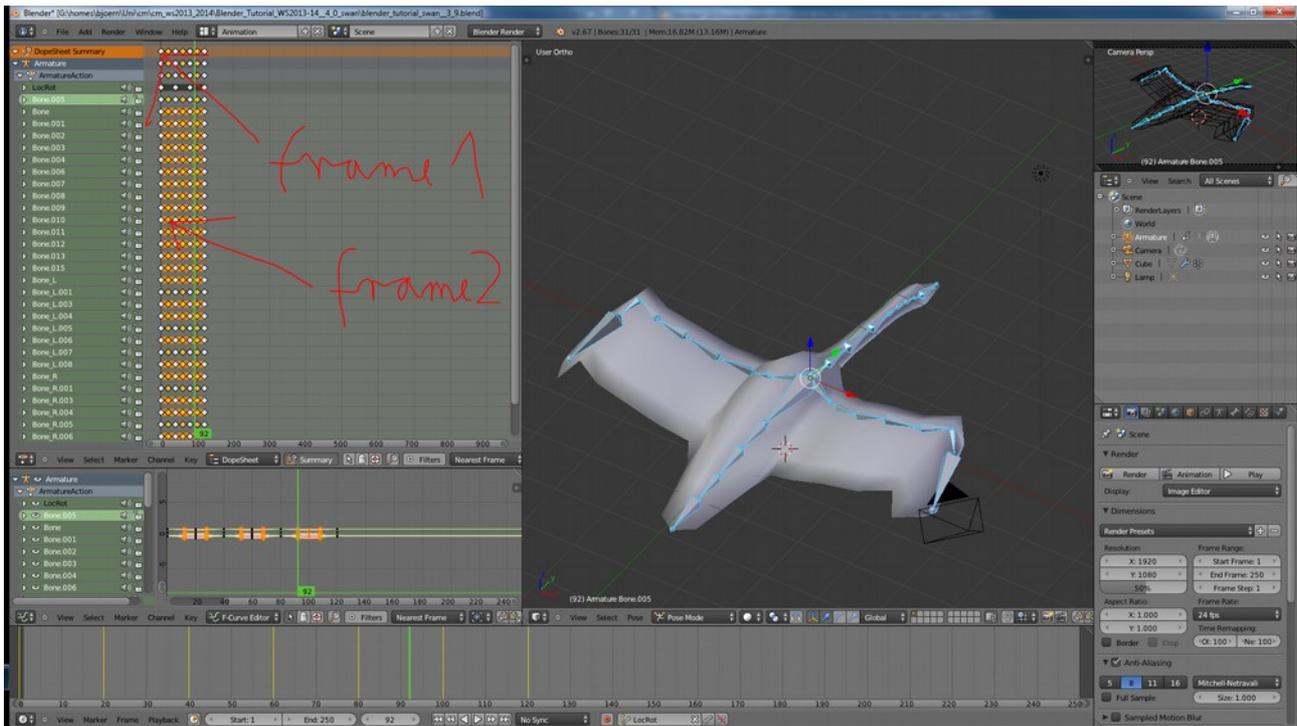


From the back:

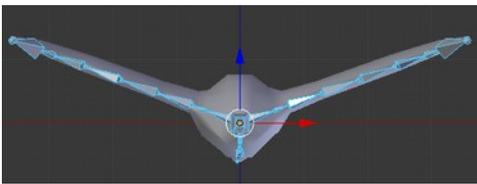


If you move now the slider in time line(window #3) backwards from frame 20 to frame 0, you see the wing movement. We want to copy this wing movement 3 times – in that way, that the swan flaps three times the wings. Go back to frame 0, select in the DopeSheet (window #1) with right click onto one of the first markers the whole frame and press *CTRL+C* (for the position of the markers see the arrows on the following image). Go now to frame 40 and press *CTRL+V*. Do the same at frame 80 and 120. Now go back to frame 20, select again one of these markers and then copy it to frame 60 and 100.

Your window should look like this now:



Now our bird should be gliding some time with nearly now wing movement. Go to frame 140 and move the wings like this:



You might also want to change the position of the neck a little bit again. Again, select all bones and make a key frame. And repeat the process for frame 160 and 180. Here, you should keep the wings in a similar position but change the rotation a little bit so that it looks like gliding.

Now we want to make a loop of this movement. Select in the DopeSheet (window #1)

View → Auto-Set Preview Range

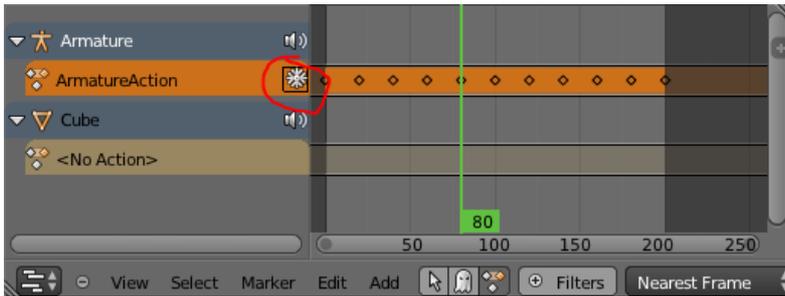
(You could also press *P* to set the Preview Range manually). It should look this now:



and if you press play , the animation runs now in a loop.

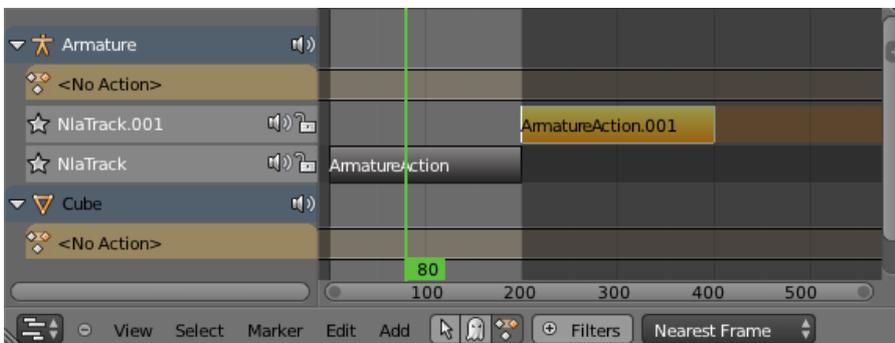
→ [blender_tutorial_swan_3_9.blend](#)

The swan is animated, now we want to repeat the flapping process multiple times. Change from the DopeSheet (window #1) to the NLA Editor.



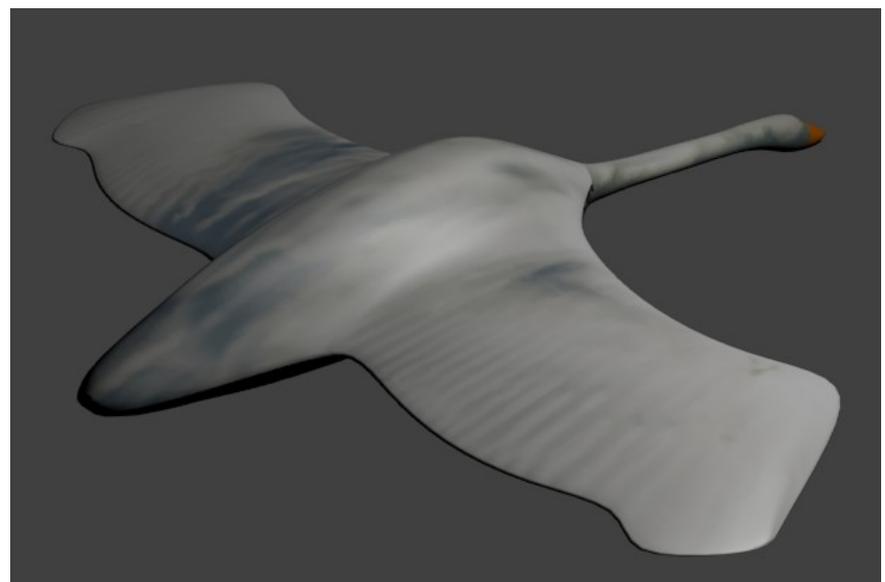
Press now the snowflake (red circle).

Select the box with *RM* entitled “ArmatureAction” and press *SHIFT+D* to duplicate it and move it with the mouse to frame 200:



We have now 400 frames of swan animation. It is now no problem for to extend it for 1,000 frames, but for now, 400 frames are enough.

If you want to smooth the mesh of the swan, you might want to add the “Subdivision Surface” modifier to the mesh:



→ [blender_tutorial_swan__3_10.blend](#)

Let the Swan fly now!

We have finished now the basic animation process. Now we could start to model an environment – but why should we do this? We have already our environment from Tutorial 2 (grass landscape) and 3 (stereo camera).

Make sure your swan is saved and open the last version of your landscape now.

Now go to

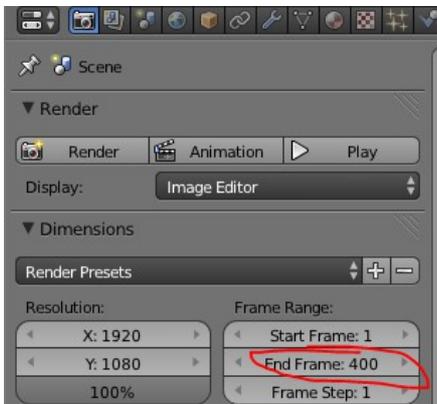
File → Append ...

and select the last version of your swan file, in our case here, it is “blender_tutorial_swan__3_10.blend”. If you click on this file, you see a number of folders. Select the one names “Object” and then select the mesh and the bones (your names might differ):



You do not need other objects, now click “Link/Append from Library”. Your swan should appear now in the center of your world.

Now first remember to adjust the length of your animation to 400:



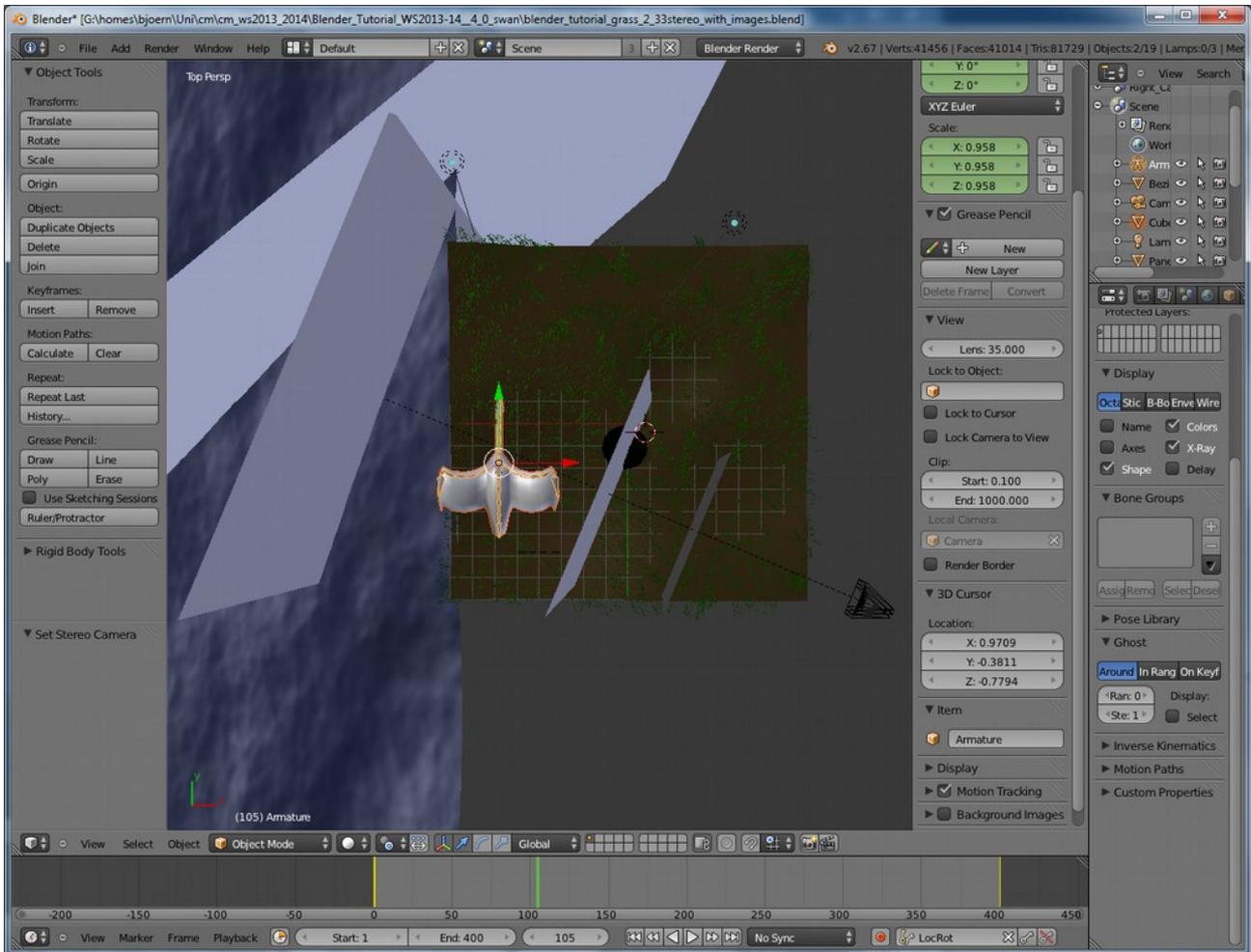
Note: If you have past the previous tutorials, check this:

- If you have used the Ocean effect, remember that you have created a key frame for the “Time” variable, move this now to frame 400 by using e.g. the DopeSheet editor or just make another key frame for “Time”.
- If you have used the grass effect, the cache might be limited to the old end frame. Change this one to 400 and bake it again. In my case, the previous animation was limited to 250 frames.)

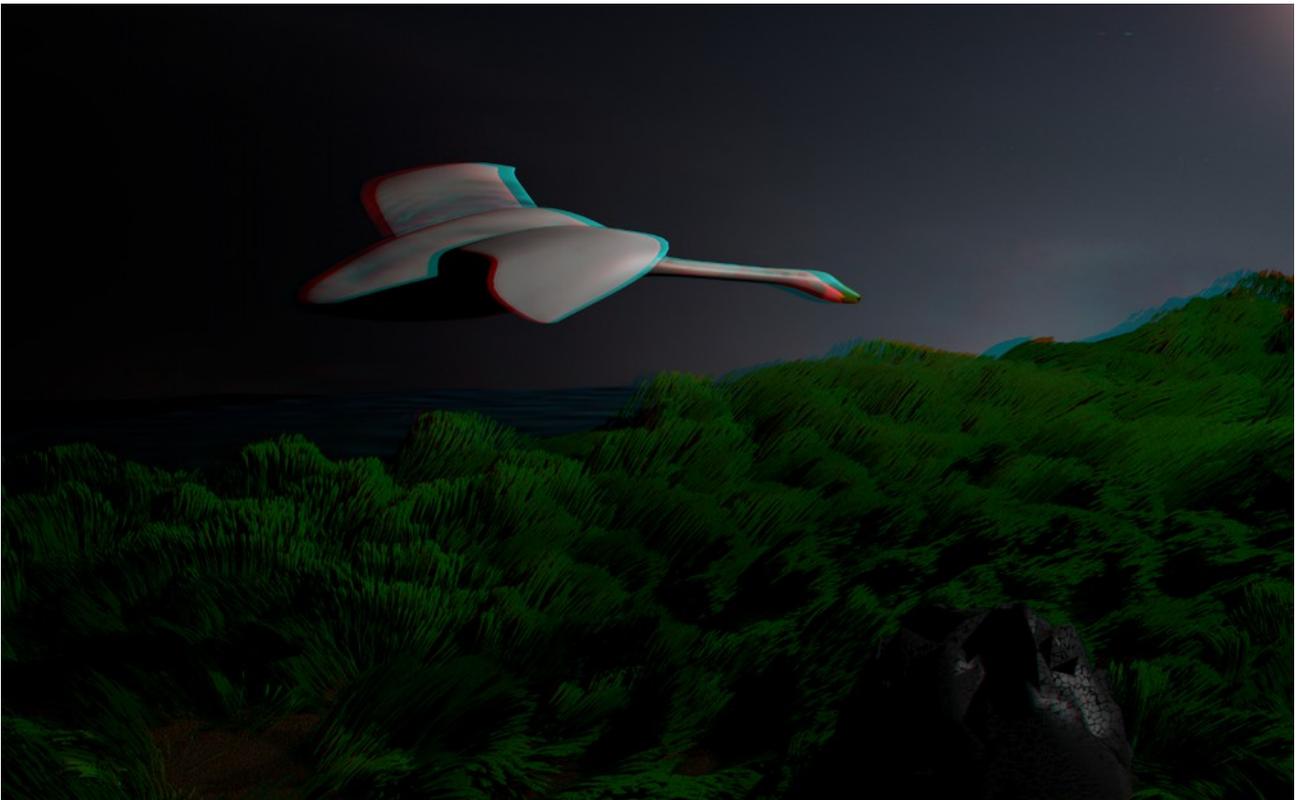
Now your environment is prepared. Let us animate now the swan, this will be very simple now. Select the mesh of the swan and the bones/Armature.

Check now, if the relation environment/swan is okay or if you have to change the scale of the swan, just use *S* to change the scale.

Place the swan at the starting point and press  . Make sure that “LocRot” is chosen. Make also sure that mesh and bones are still selected, otherwise you will run into problems! And if you are using Schneider's Stereo Camera, make sure that the swan does not come into the area between the near and projection plane (in the following image the two right planes in front of the camera).



→ blender_tutorial_grass_2_33stereo+blender_tutorial_swan__3_10.blend



References/Images

Thanks go to the following photographers:

[FB] Photo: © Byrant Olsen/flickr.com

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

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A nice texture tutorial:

Blender-Tutorial - Texture Painting (AgenZasBrothers)

<http://www.youtube.com/watch?v=I06iV1TSWm4>