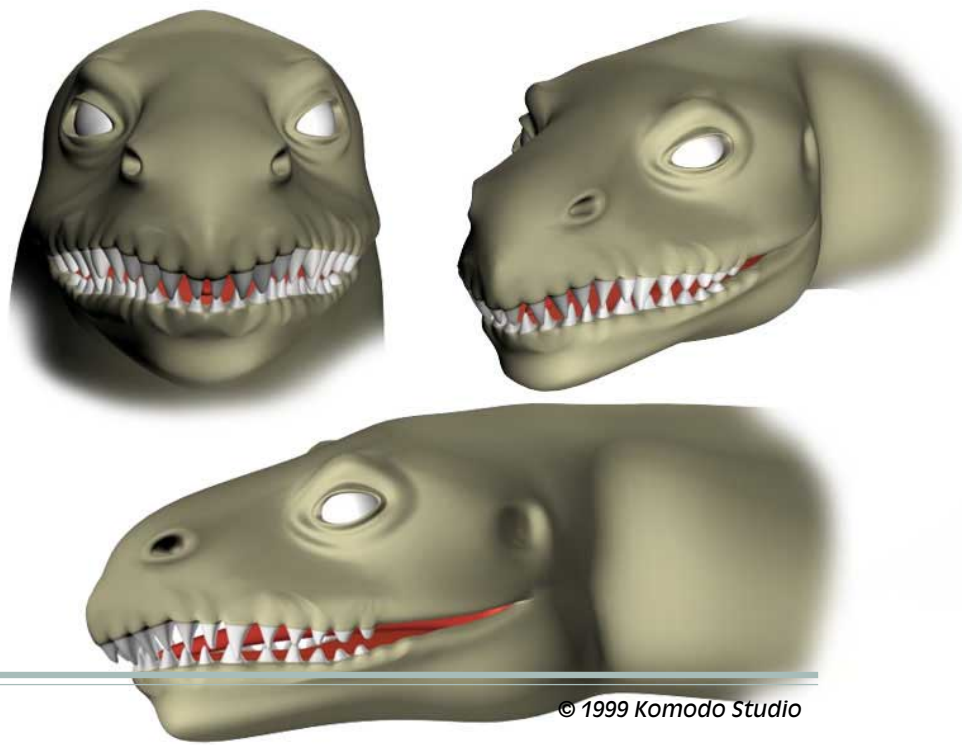
Creating a sea monster

3D StudioMAX/LightWave

~ Nermin Bajagilovic



Introduction

Humankind has always been fascinated by the awesome power of nature and the creatures populating this world. Just thinking about the vast variety of the creatures that are living in this world, I find it impossible not to be inspired by some of the designs of the creatures of this world and not try to create some of my own.

Sea monsters have been around for quite a while. As a matter of fact there are literally hundreds of reported sightings of the sea monsters. According to the legends sea monsters have swum around the margins of the known world since the beginning of the time, from the large Midgard Serpent, which grew so large that it circled the world entirely, to the Kraken, Leviathan and the lesser but still terrifying sea monsters. Even if the sea monsters are not yet accepted by science, they are still considered by many people to be real. Whether you believe in the sea monsters or not I'm sure that you'll find them most fascinating, or else you simply wouldn't be reading this tutorial, now would you? Well you're maybe reading it anyway because you want to learn the techniques that were used to create some of the sea monsters for this tutorial. In any case stick around, there is something for everyone in this tutorial.

Tools

As you already figured out by the title and the introduction, we'll be modeling the sea monster. My choice of 3D package is 3D Studio Max. I would like to point out that techniques used in this tutorial are fully transferable to LightWave.

In order to get most out of this tutorial you'll have to have 3DS MAX 2.5 or LightWave 5.5, since the tools used in this tutorial are only supported by these versions Max and LightWave. Don't worry if you don't have those versions. Yes you won't have access to tools that I used but you'll still be able to complete this tutorial, you'll just have to be more creative in order to achieve the same results offered by tools I'm using.

What tools are we talking about here? Well in MAX we're talking about Slice, Face Extrude and Mesh Smooth tools, while in LightWave we are talking about Knife, Smooth Shift and Metaform. Some of you may already know the respective tools provide the same results in both packages.

Technique

Now that we have established what tools and packages can be used to get the most out of this tutorial, we'll move onto modeling techniques used in this tutorial. As some of you may have already guessed we are not talking about Spline or NURBS modeling here. What are we talking about then? Well, we're talking about technique that by most artists is referred to as a box modeling technique. This technique needs little explaining. Users that are familiar with this technique can jump over this little introduction to box modeling.

By the end of this tutorial I guarantee you'll be box modeling like you never did before. It will take little or no practice before you become a "BoxGod", err I mean

master of the box modeling technique. Ok, sounds great! Let's get on with it… tell us more about this technique!

Box modeling is a very simple and straightforward technique. It's a very "clean" and fast technique that allows you to start simple and add more and more detail as you progress. Basically you start with a simple box or sometimes a sphere and start extruding the faces in order to add more volume to the model that you are creating. When you are done with the basic shape of your model, after all face extruding and point tweaking you end up with low-res mesh that can easily be surfaced and set up for animation. You can also add additional details to the model and it will still be a low-res model. To further increase the level of details you apply Meshsmooth or MetaForm to your model and hopefully you'll end up with a really great model that has an awesome level of detail.

So much for the introduction on box modeling technique, there is more to be said about it but I believe that you'll learn much more by practicing it rather then reading about it, so let's move on!

Design

If you read some of Bill's books like 3D Creature Workshop, you'll already know that Bill's mantra is "Get to know your creature, walk in its shoes, live it's life for a day!". This is one of the most important steps in creature creation. You may have great modeling skills but if you don't invest any time at all into creature design you may end up with a creature that looks cool but totally lacks realism. This rule applies even if you are trying to create fantasy creatures. The most convincing art is made by making sure that your creatures however fantastic in appearance are functional in their own terms in one way or the other. Many of your creatures are likely going to combine attributes from two or more creatures. Don't be afraid to experiment with creature's attributes, just let your imagination run freely, but never forget that the creature in order to look convincing has to look as if it might actually function in one environment or the other.

A mistake that most of us make is that we want to start modeling right away; who wants to think about design, that's boring you may say. Well it doesn't need to be that way, getting to know and understand your creature and the world it lives in can be a lot of fun indeed. Saying that, we are now going to take a look at how we can make sure that we avoid some of the pitfalls that are waiting for us on our way to make fantastic creatures. We are also going to take a look at the process that I went through before I came up with the monsters for this tutorial.

Before I started modeling the sea monster for this tutorial I gathered all the source material that I felt would help me

with design, this includes not only the books and the images on the sea monsters but the other creatures as well. Instead of going through all the material that I found I sat down and drew a simple sea monster. That was all the design I did for my first sea monster. I didn't invest any additional time in design of my creature, just to show you what can happen to your creature if you decide to skip design process.

Now we are going to take a look at what bad design did to my first sea monster. Take a good look at the sea monster in Figure 1 and Figure 2.

Now can you tell me in your opinion what's wrong with this model? Does it look convincing to you? It may look cool, but do you think that a creature like this could actually survive in a hard and competitive environment like sea. Well let's assume it could somehow survive in the sea environment, but it sure would have a hard time doing so. Why, what's wrong with it you might ask, I don't see anything wrong with it, I think it could survive. Well if you look carefully you'll notice that some of the proportions between torso, neck, tail and fins are making it look awkward thus making it harder for it to be a good swimmer. If a creature like this is going to be able to survive in its competitive environment it has to be a good swimmer.

If you take a look at its teeth you'll notice this sea monster is a predator, which is just one of the reasons why it has to be a good swimmer. In order to feed it needs to be faster than its food or else it won't have a good chance of surviving. Not only does my creature needs to be able to feed itself it also needs to be able to protect itself from the other predators, like sharks and other sea monsters. Again the proportions are in the way. Its massive flippers, it's

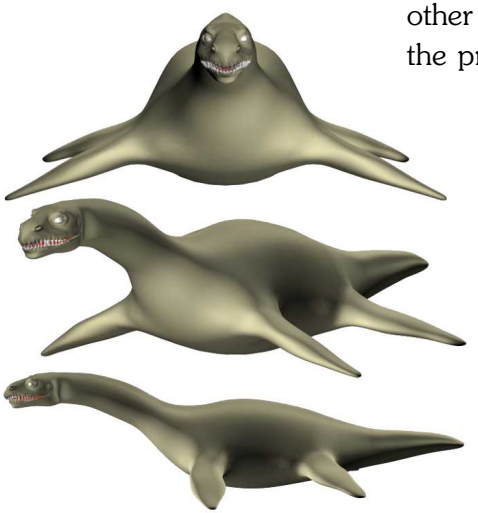


Figure: 1.

Figure: 2.

short tail are only making it hard for it to escape from the other predators that might want to take a bite of it. One other detail that's making this creature less convincing is that its teeth are growing at the wrong place, right out of the edge of the mouth, it seems like there are no lips on this creature. While this may happen in nature by some genetic mistake, it makes my sea monster look less convincing.

Before we move onto the modeling side of this tutorial take a look at Figures 3, 4, 5, 6 and 7. These monsters were made specifically for this tutorial (they are included as support files) and they were made after I did the first sea monster. As you can hopefully see some of these monsters look more convincing than the model we are going to build in this tutorial. Why, because more time was invested into design. During the design I used the source material that I found earlier. Input from the other artists that have seen the first sea monster helped me to focus on the important things, while working on design for the creatures you just saw. We'll be creating a great base model that you can modify to suite your personal interest. That's the great thing about creating a solid base model, it can be used over and over again with some simple, or even complex modifications.

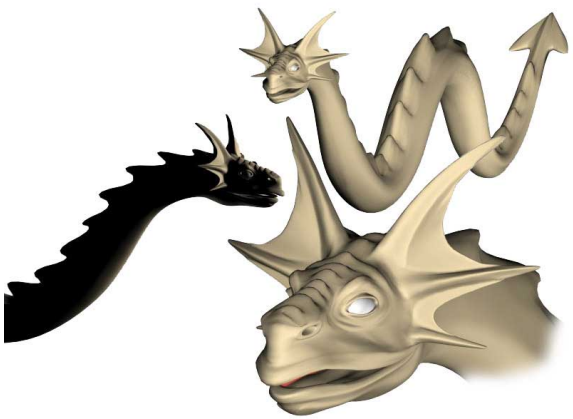
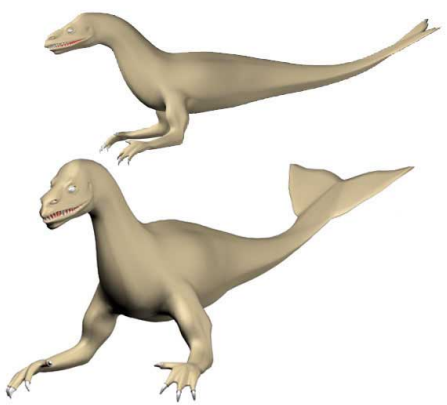


Figure: 3.

If I were hired to work for some of the leading FX studios in Hollywood I wouldn't last long if I wasn't able to create some convincing creatures. If you can't pro-



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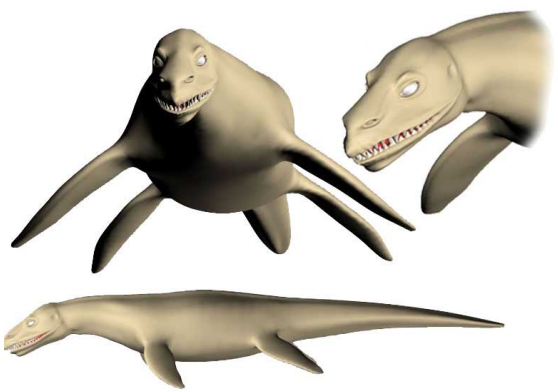


Figure: 5.

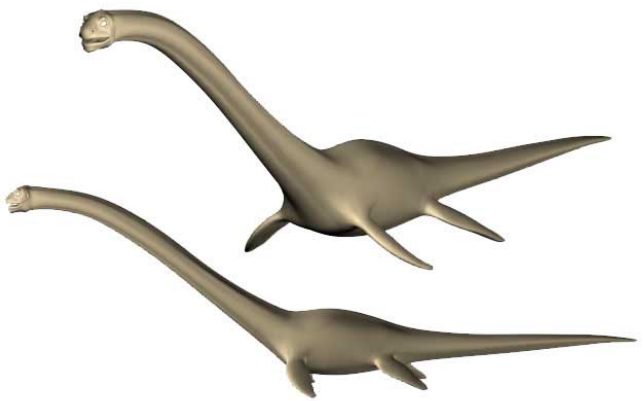
duce acceptable results before the deadline, your carreer as a professional 3D-artist is not going to be a very successful one. If you want your name to be recognized when it comes to creating great and outstanding creatures make sure that you invest all the time you can afford into creature design. Get to know your creature and it's environment better, walk in it's shoes, live it's life for a day and I can guarantee you that your creature will look more cool and convincing than you could ever imagine it would.

Modeling

I'll bet you thought we were never going to get to the actual modeling of sea monster. Yes we are finally here ready to model our little freaky friend. I have made this as easy to follow as possible. There are about 50 screen shots that I will be referring to so that you can understand what is going on. I know it can get complicated sometimes so hang in there.

Now take a look at the sketch that I came up with Figure 8. This is the fellow that you and I are going to be modeling. Artists usually import the original concept of the creature as a template to help them with modeling but we won't be using one since it isn't always necessary, but you are free to do so if you think that it will help you to follow this tutorial.

One more thing, as I already said LightWave users will be able to follow the modeling section of tutorial as well. So remember:



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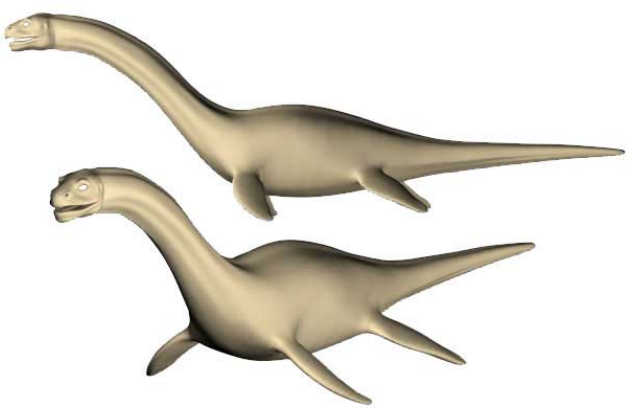


Figure: 7.

(Max)	(LightWave)
Slice tool	Knife tool
Face Extrude tool	Smooth Shift tool
MeshSmooth tool	MetaForm tool

This is the process that we'll go through:

Stage 1:

We'll make the basic shape of creature, no great amount of details here.

- head
- mouth
- tongue
- neck
- torso
- tail
- flippers a bit of point and face tweaking

Stage 2:

Adding details to the basic shape, like eyes, nose, ears, teeth a lot of point and face tweaking.

Stage 3:

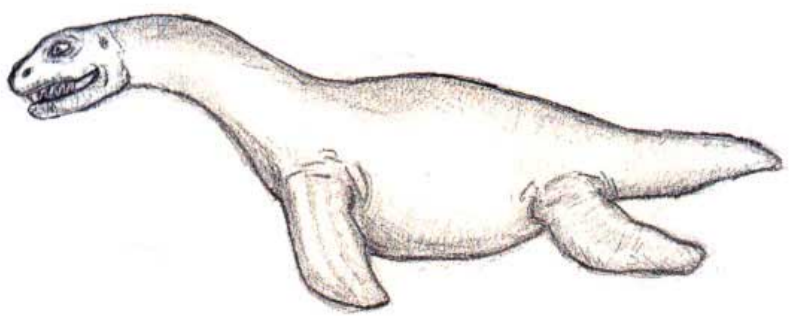
The final touchup with a bit of tweaking and applying proper mapping coordinates to the model.

Ok, let's kick this pig!

Stage 1:

We'll start by creating a simple box. Number of segments on length, width and height should be as in Figure 9.

Next we are going to adjust the basic shape of the box by moving the points around so we end up with something like Figure 10.



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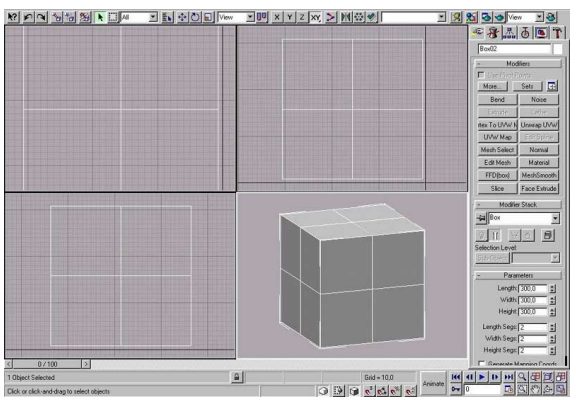


Figure: 9.

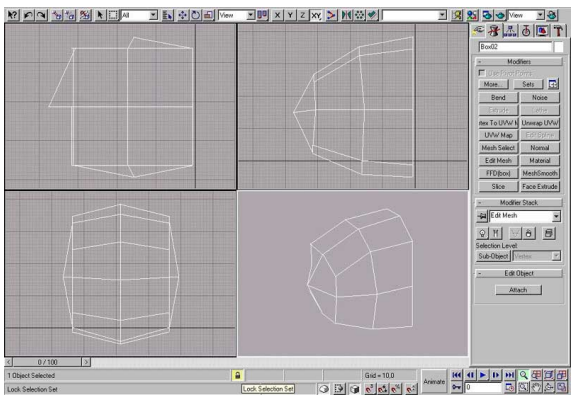
Now we'll use the Slice tool for the first time on this model. It will be used to modify the mesh a bit, which will allow us to create a mouth. So add the Slice tool as suggested in Figure 11.

What happens when you use the Slice tool is that it automatically creates the new faces and points for you. It's not a perfect tool, so sometimes you'll have to weld the points that it created. Take a look at Figure 12. Now select those points and weld them.

We'll need to modify the surface of the model a bit more before we can start making a mouth so Add the Slice tool three more times as seen in Figure 13.

Now we have enough of the working material so we can start working on the mouth. Start by selecting the faces where the mouth opening should be, as shown on Figure 14.

To create the mouth hole you should extrude those faces inward as shown in Figure 15.



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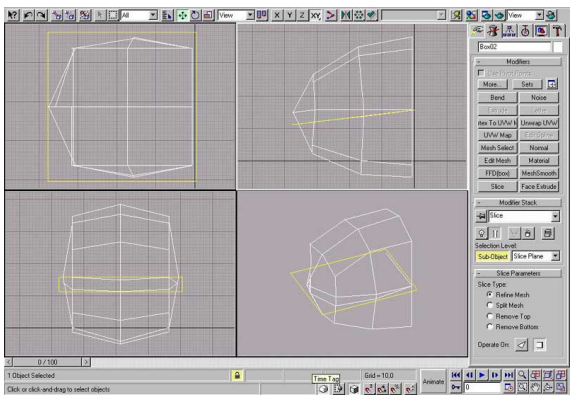

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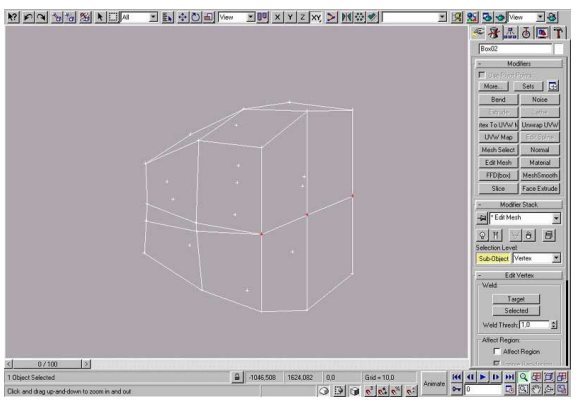

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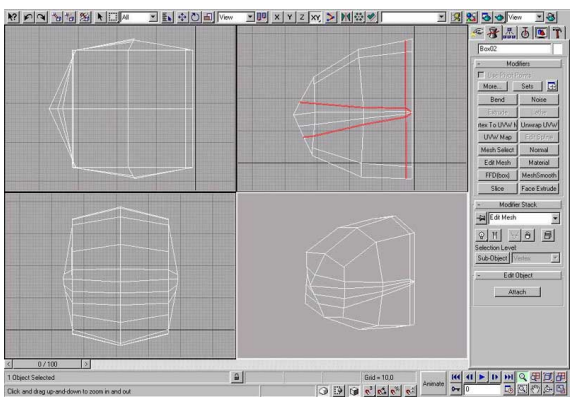
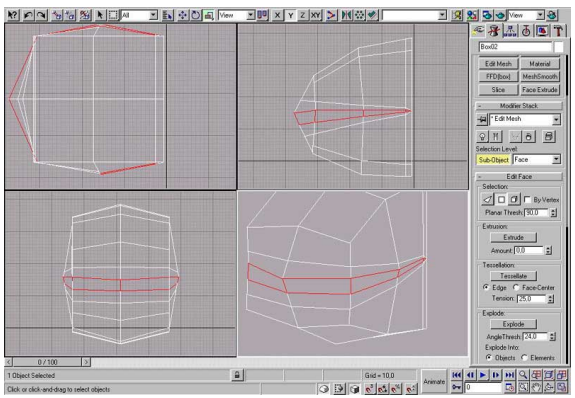


Figure: 13.

Max users that don't' have access to Face Extrude modifier can use the standard face extrude supported by the Edit Mesh modifier. I choose to use Face Extrude since I have access to it and also because it gives me more control of the faces that are being extruded. Usually when I work on the mouth I hide the rest of the model so that I can clearly see what I'm doing. So select and hide all the faces except those that you just extruded as shown in Figure 16.

To create the mouth hole you'll need to extrude several times inward. Start by extruding the selected faces and then tweaking a bit as you extrude. I've extruded three times and after every extrusion I edited the points a bit in order to create lips and rest of the mouth shown in Figure 17.

Now we'll make a tongue. This is rather easy, start by selecting the faces in the middle of the mouth hole where the throat should be in Figure 18. Now extrude those faces about 3-4 times and tweak them along the way as you extrude them. You should end up with something like Figure 19.



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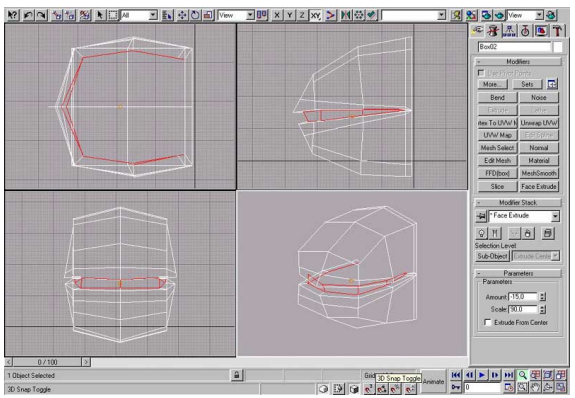

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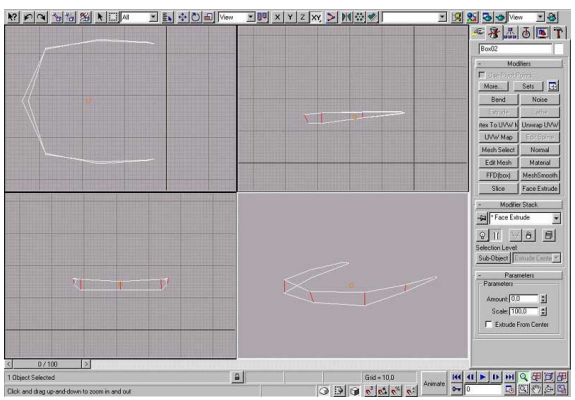

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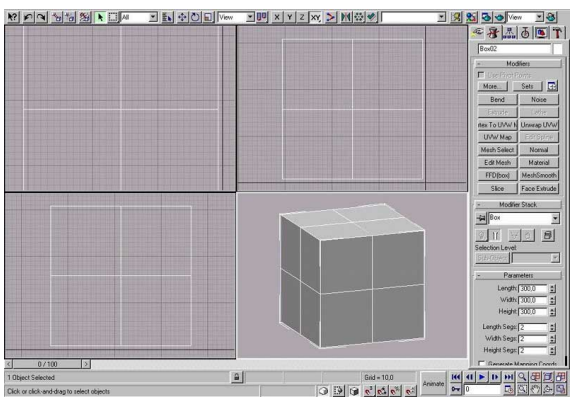


Figure: 17.

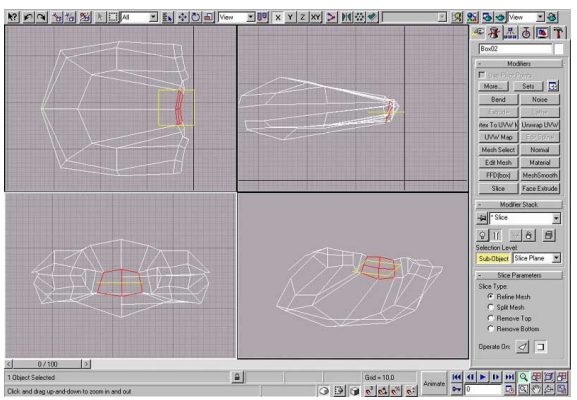
So much for the head for now, let's move on to the neck. You should start by selecting the faces at the back of the head right where the neck should begin as shown in Figure 20. Yes you guessed it right we are going to extrude those faces in order to get material that we'll shape to be the neck. Extrude selected faces until you end up with something like Figure 21.

Don't forget to tweak along the way. If you tweak now you'll have more time for other things later, instead of going back and tweaking later when you are done with extruding.

Now it's time for torso. Select the faces at the end of the neck end extrude them and tweak along the way until you end up with something like Figure 22.

Repeat the same procedure for the tail, extrude and tweak along the way until you have something like Figure 23.

Now that wasn't all that hard, now was it? Now you've got a basic shape that you can work with. You may want to save this model to a separate file. This mesh can later



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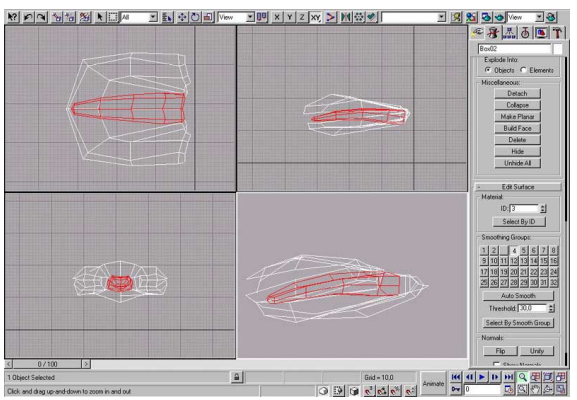

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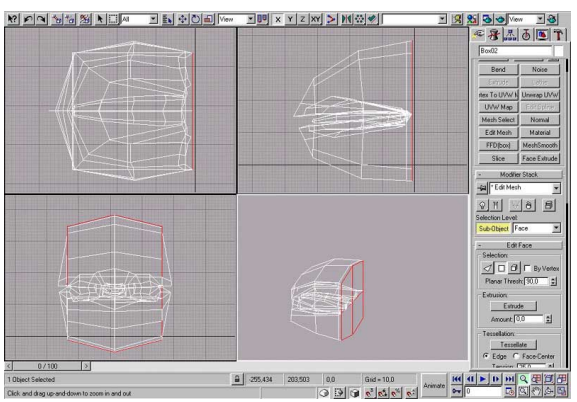

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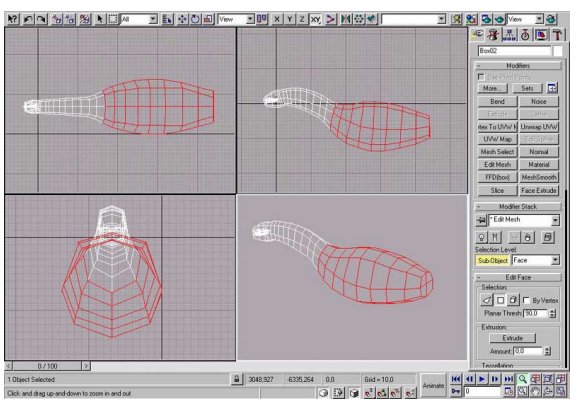
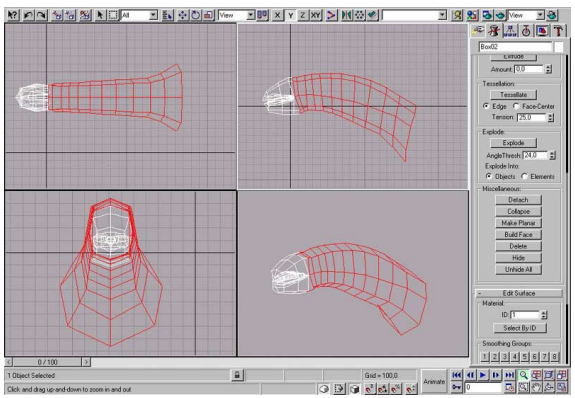


Figure: 21.

be used as source material for new creatures. It's good to build a library of different body parts you can use later. I don't have a large library of body parts, I have a few hands and legs but I'm for sure going to add more to my library. Why, you may ask? Well first it's time saving and second why should you build something you've already built? It's not a good use of time to model the same thing over and over again. What you do is you add it to your library and then when you need it you just load it and then modify it to suit the model that you are working on.

Ok, now let's move on. We are going to add flippers to our creature. This should be easy to follow. First we need to remove one half of our model. Yes we are going to delete it, so select the faces shown in Figure 24.

You may ask why are we removing half of the mesh now. Well you'll have to trust me on this one. If we started building the model with just one half we would run into some small problems when extruding faces, that would take more of our time. That's why we started with the whole model at the beginning. Why are we taking it away



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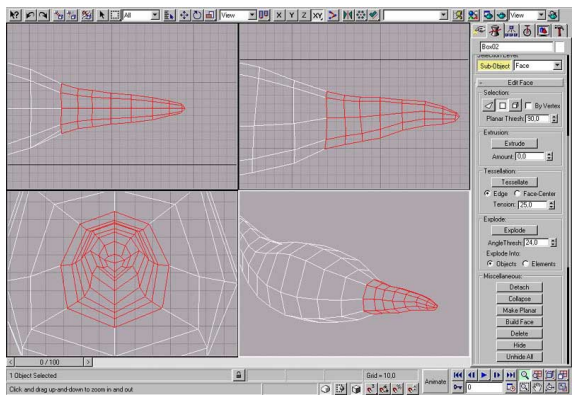

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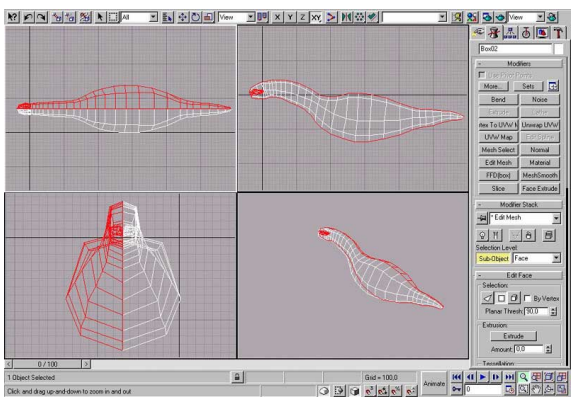

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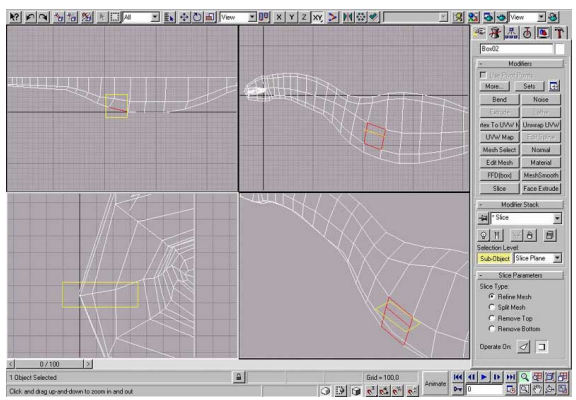
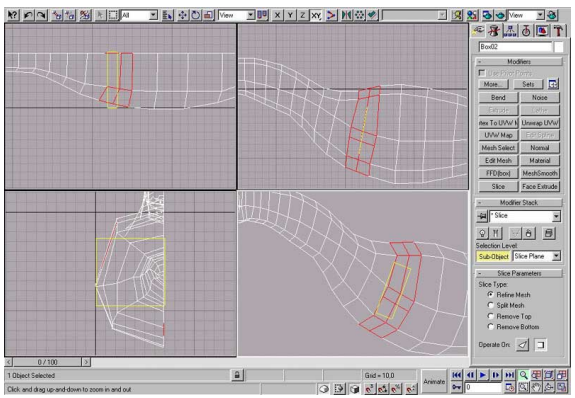


Figure: 25.

now? Because we are trying to save time. If we kept the other half as we add flippers, eyes, ears, and teeth we would just run into some problems that wouldn't be that easy to fix.

Now that you have deleted one half of the model, select the faces shown in Figure 25 and use the Slice tool on them as shown on the same figure. Now select the faces in Figure 26 and "slice" them as shown on the same figure. Now take a look at Figure 27 and slice those faces. The reason we are slicing this much is we need material to work with. Since there are none there we create some by using Slice tool.

Figure 28 shows faces that we are going to extrude in order to create the flipper. As you see faces have been modified a bit so that they define the general shape of the flipper. Now start extruding and tweaking a lot along the way, until you create a flipper like Figure 29. It's not a perfect flipper, but you can certainly add more detail later if you desire.



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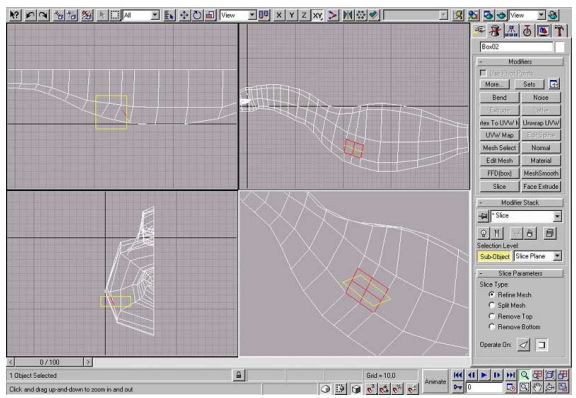

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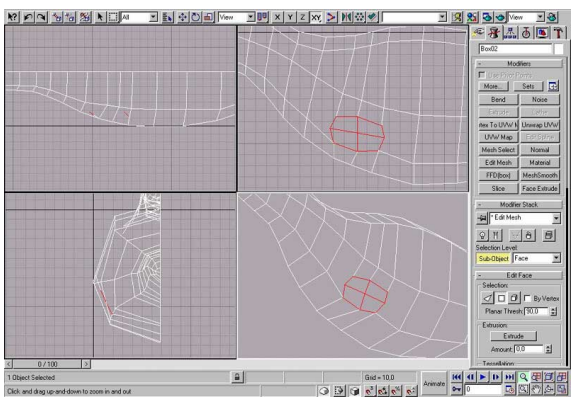

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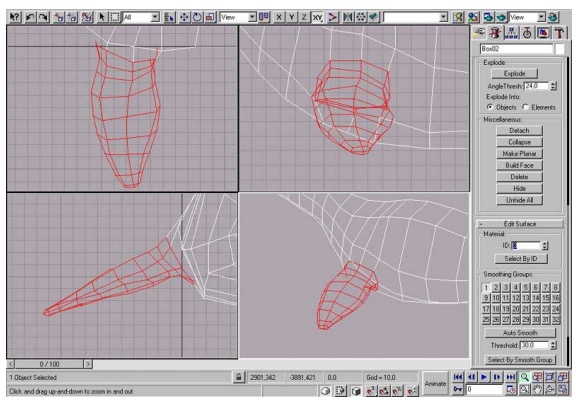


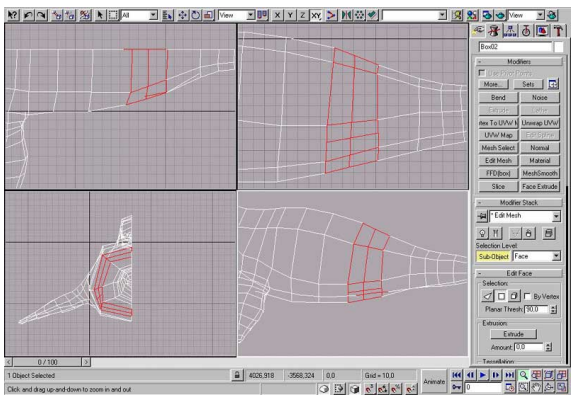
Figure: 29.

Same procedure is used for second flipper. Take a look at Figures 30, 31 and 32. Before we move on be sure to select each flipper and add the different material numbers to them. I used 4 and 5 for the first and the second flipper. Also select the mouth, then the tongue and finally assign different material numbers to them as well. I used 2 for the mouth and 3 for the tongue.

Stage 2:

Let's go back to the head in Figure 33. We are going to tweak and modify it a bit so that it looks more like a predator head. After you modified it you should have something like Figure 34. Now we are going to slice it a bit as shown in the same figure. I marked where the Slice tool should be placed.

Note: before you add the Slice tool, you may want to select the faces you want it to affect.



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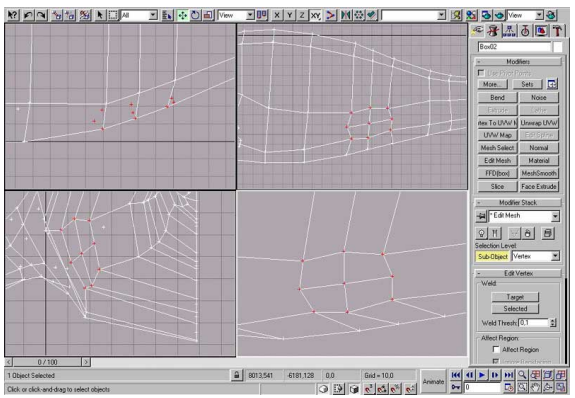
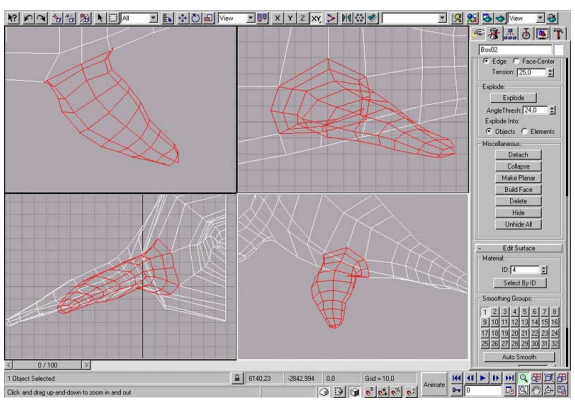


Figure: 31.



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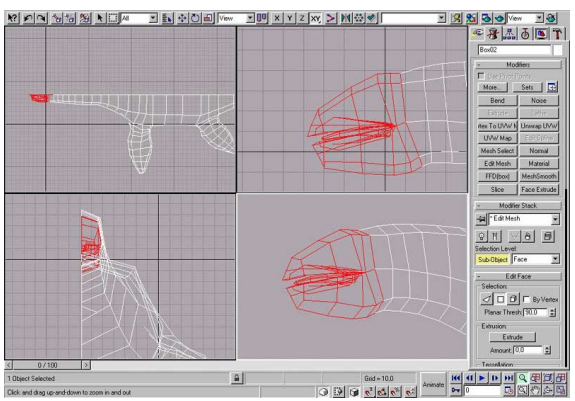


Figure: 33.

Now that you have added more material to the head you should tweak and modify it again till you have something like Figure 35.

Now comes the big challenge, we are going to make the eye. Okay, it's really not as hard as you might think. It's rather simple. We extrude some faces then tweak them and extrude again and tweak and so on. Follow me! Select the faces shown in Figure 36. Now extrude those faces about 4 times, until you have something like in Figure 37. The eye is not completed yet. We need to extrude more in order to get those details you expect to see on the creatures like this. So extrude the faces about 3 more times, so you end up with something like Figure 38.

Now the eye must be completed? Well not yet, take a look at Figure 39, the perspective view (the picture has been modified if you noticed that something was strange). This is what we get when we apply Mesh Smooth to our model. Not a very convincing looking eye you may notice. This is not strange, since we didn't do much tweak-

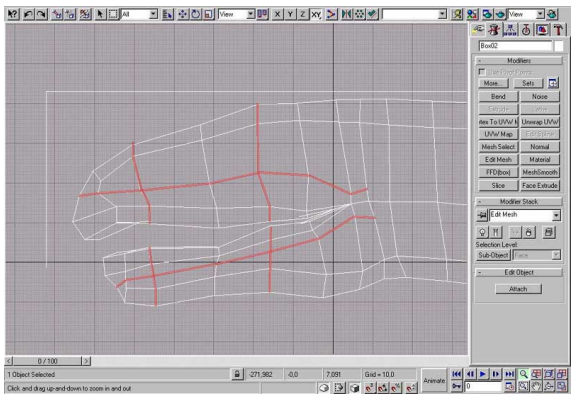


Figure: 34.

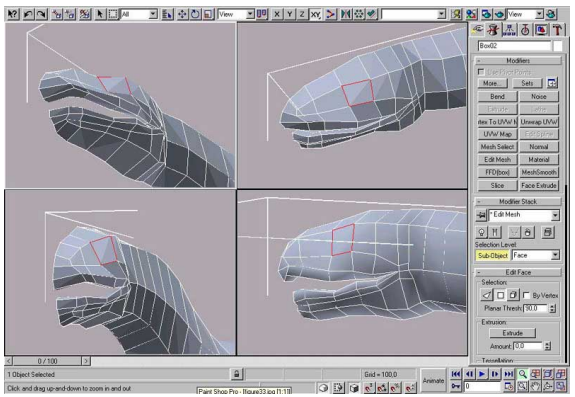


Figure: 35.

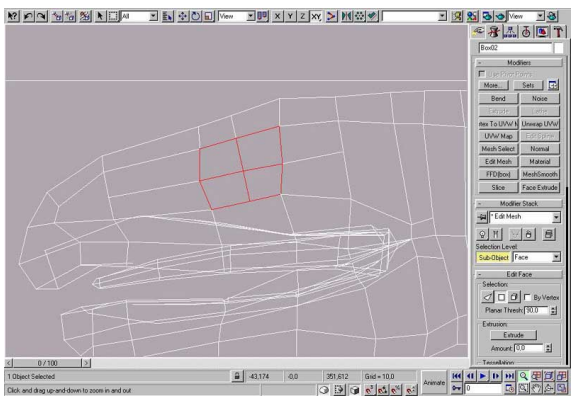


Figure: 36.

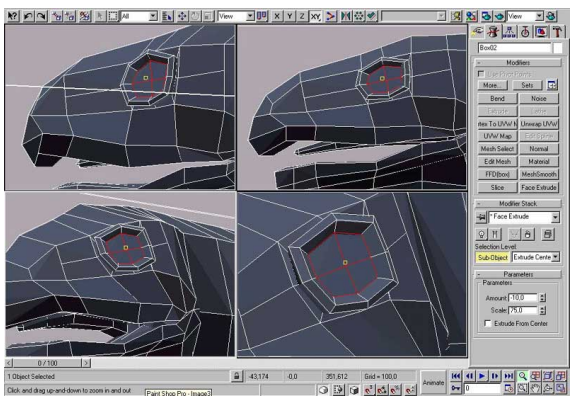


Figure: 37.

ing on the eye after we extruded it. A bit of point moving and tweaking is all it takes to create the eye like that shown in Figure 40. Don't worry if you don't get it right first time. This needs a little practice. Nobody gets it right first time, not even Bill, right Bill? ;)

Oh, yes I almost forgot, don't forget to create the actual eyeball and try to place it in the eye socket and see if it fits the eye. If it doesn't you'll need to shape the eye socket so it does.

Next we'll do the nose. Everybody is having their nose done these days so why shouldn't we? It's cheap and it looks better. Joking aside we are going to add the nose to our creature. Take a look at Figure 41. Can you see the face where the nose will sit? Well, you guessed it right.

We'll start by extruding the nose outward from the head. I extruded three times as seen in Figure 42, don't forget to tweak along the way. Next you'll have to extrude inward about two times. Tweak and scale along the way, as shown in Figure 43.

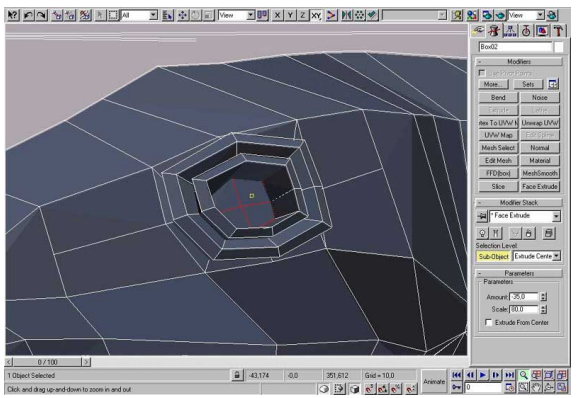
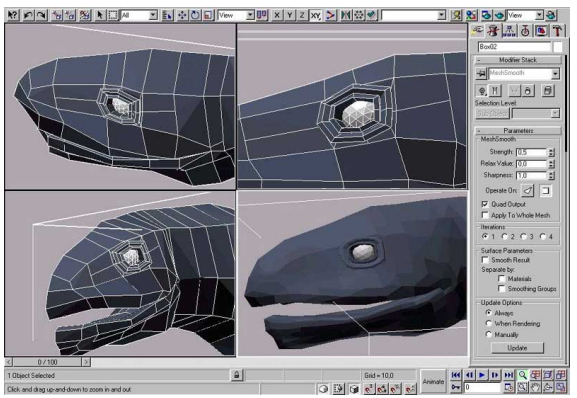


Figure: 38.



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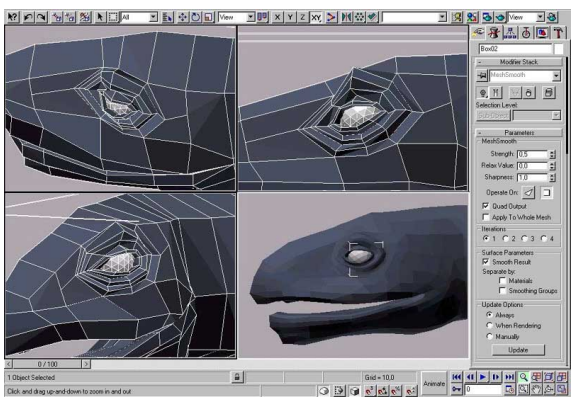


Figure: 40.

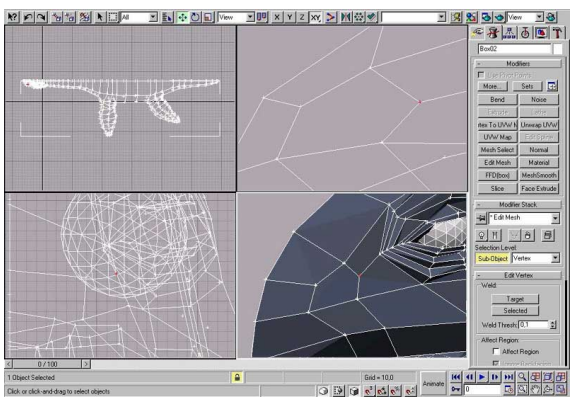


Figure: 41.

Ok, now that we have the eye and the nose, how about the ear? We are going to add one. If you came all this way you should already know what's going to happen next. First we select the faces where we believe the ear should sit. Then we slice those faces as shown in Figure 43. Then we extrude them once outward and once inward as you can see in Figure 44. So much for the ear, that should do it.

Let's see now something is still missing. What could it be? Oh, yeah the teeth are missing. How about adding some? Let's do that! As you will see this won't be that hard, it's rather easy. Remember what I told you, at the end of this tutorial you'll be a pro at box modeling.

Ok, now take a look at Figure 45. In order to create the teeth we need to create some material to work with. Let's do that, select the faces shown in Figure 45 and slice them twice. We are going to build our first tooth together, so select the faces in Figure 46 and slice them once. Now you'll have to deselect the upper face and keep the lower selected. Extrude the selected face, it comes right out of the

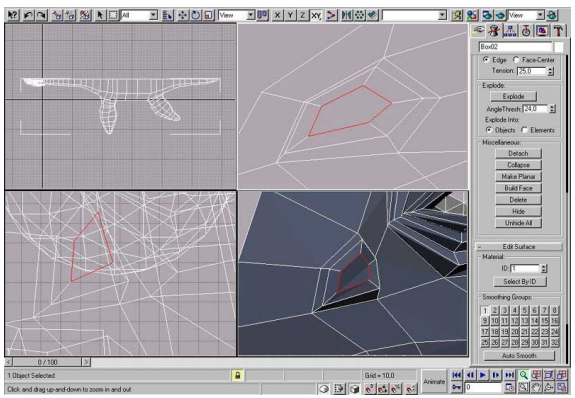


Figure: 42.

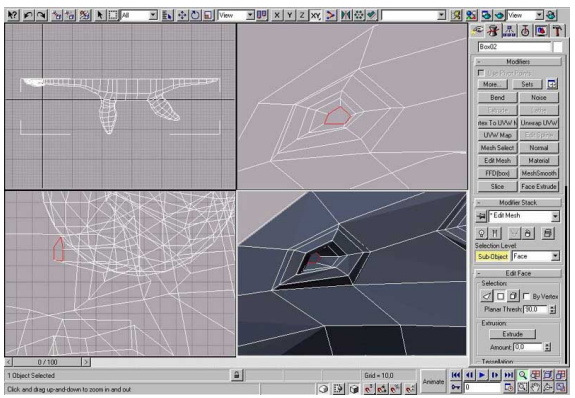


Figure: 43.

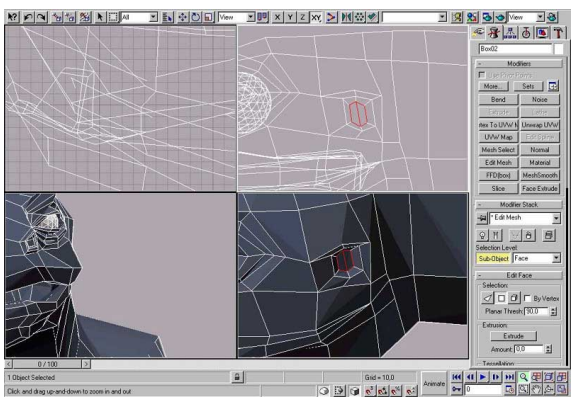


Figure: 44.

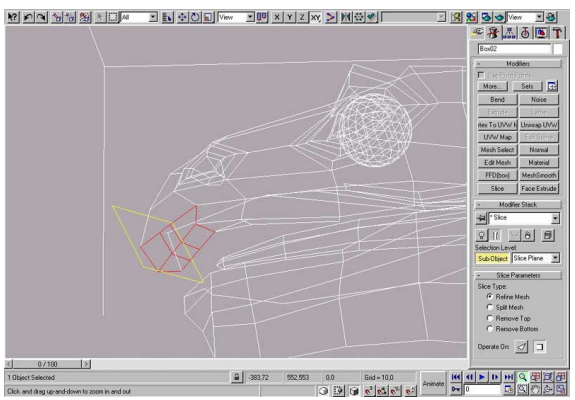


Figure: 45.

lip of our creature. Extrude about four times, so you end up with something like Figure 47. Now I leave it to you to do the rest of the teeth. When you are done you will end up with something like Figure 48.

Stage 3:

Okay, this is the last stage. We are going to increase details a bit and assign the proper surfacing to our model so let's get started and add some additional details to our model. We are going to slice it so take a look at Figure 49. In order to give more determined shape to the neck, torso and the tail, you'll have to add two slices. This will give you more control of how your model's body is shaped. Before you move on be sure to tweak the model a bit, so those new faces and the points that the Slice tool created for you are sitting right.

I'm sure you have been wondering how we're going to assign the proper mapping coordinates to our model so that the textures maps don't stretch to much when we

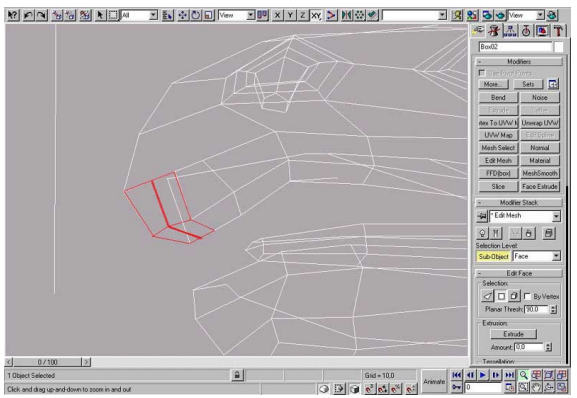


Figure: 46.

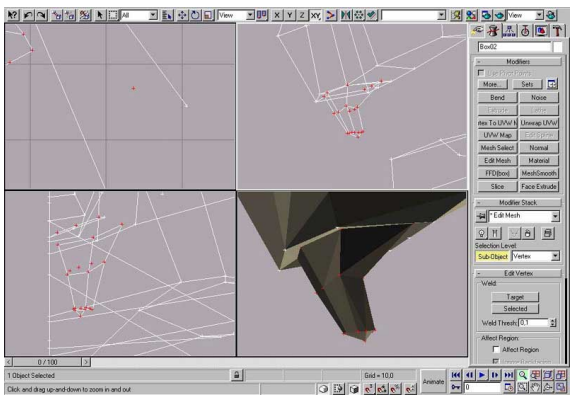


Figure: 47.

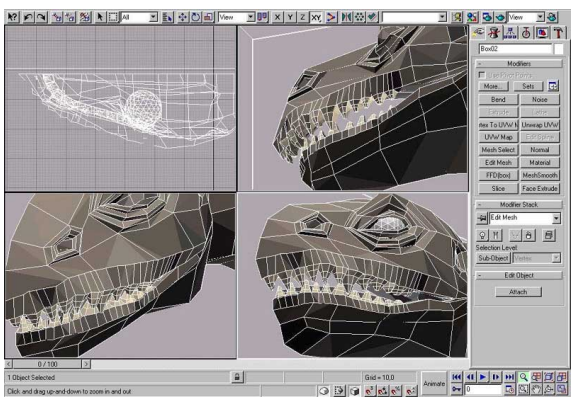


Figure: 48.

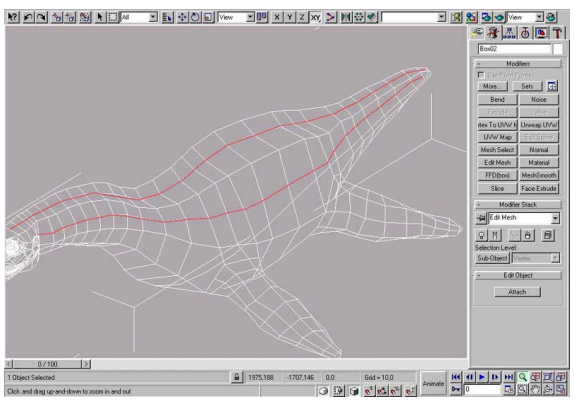


Figure: 49.

apply them. There are numerous of ways that this could be done. We are going to use a simple technique that will give you an almost perfectly mapped model that you are looking for. Take a look at Figures 50 and 51. In Figure 50 you can see our monster looks quite different then the last time we saw it. What has happened to it? Well I pulled out those faces and points so I could use planar mapping on the model. As you can see the mouth, teeth, tongue and the flippers are hidden from the planar mapping, so it doesn't affect them at all. We are going to use a different kind of map for them.

Now what I want you to do is to start working on your model, pull out those points until you have something like Figure 50. Now you may ask yourself how are we going to get back to our original model that we see on Figure 51. Well, before you start modifying your model you should make a copy of it. Don't modify the copy since it will be used as a morphing target, so you can get back to the original shape of the model.

Now once again take a look at Figure 51. Do you see any difference between the two models shown there. Both have planar mapping coordinates, but only the model at the bottom has the right planar mapping coordinates assigned to it's surface. This is our model that we have modified, applied planar mapping to it in modified state and then morphed back to the original shape. The one on the top as you already may have guessed has not been modified at all before assigning mapping coordinates so is surface map stretches unnaturally. Now that was a nice trick wasn't it?

Now let's apply mapping to our flippers as well. Take a look at Figure 52. Just use cylindrical mapping as shown in the figure, no morphing required here. Now do the same for the second flipper.

We are almost done with our model, we just have to mirror clone it in order to get the second half of the model.

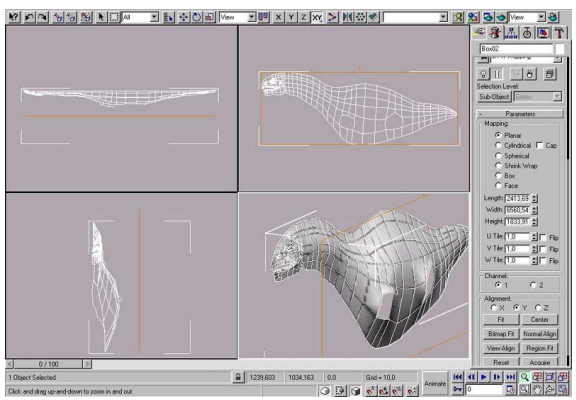


Figure: 50.

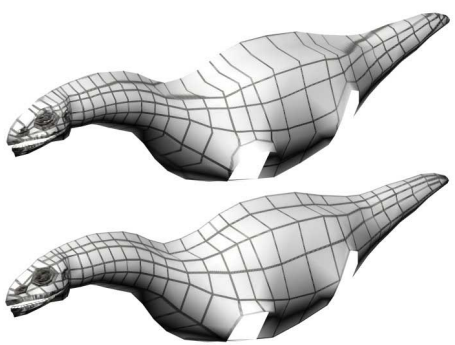


Figure: 51.

Let's do that, make a mirror clone of your model and then attach two meshes to each other. Don't forget to weld the middle points of the model. If you don't weld them Mesh Smooth won't work properly.

Before we Mesh Smooth we have to add the mapping coordinates to the mouth and the tongue. I used box for the mouth and cylindrical for the tongue. I didn't use any mapping for the teeth, since it would be quite a job to add mapping coordinates to each single tooth. It's up to you if you want to add mapping coordinates to each tooth.

Now we are definitely closing in. Let's add Mesh Smooth to our little sea monster. We should have something like in Figure 53.

That's it, we are done, well at least I'm done weeks ago by the time you are reading this. Anyway here we are. Our little sea monster just as I promised. I hope you had fun during this tutorial, I sure didn't. It was a pain making it, but it was worth it. My fingers are aching after all this typing.

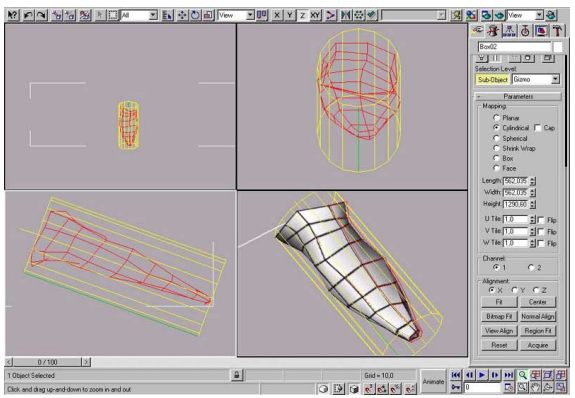


Figure: 52.

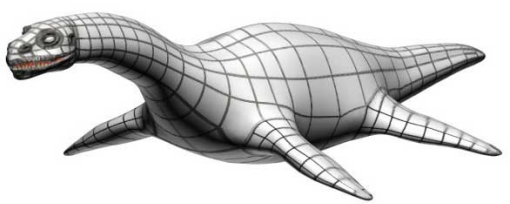


Figure: 53.

Wrap-Up

In this tutorial we took a look at the box modeling technique and learned how to control it. We also talked a bit about design and the role it's playing when it comes to creating convincing creatures. Hopefully we all came up with convincing and cool looking sea monsters. Hollywood is our next stop... Don't hesitate to drop us a line with the URL to sea creatures that you created after you read this tutorial. I would be delighted to see some of the creatures that you come up with after you mastered this tutorial.

You can be sure we are going to see each other next month and the next month and so on to the end of time or space or tutorials. I feel like this could be the beginning of a great friendship. So be sure to stick around and tell your friends about us. We have more goodies coming for you!

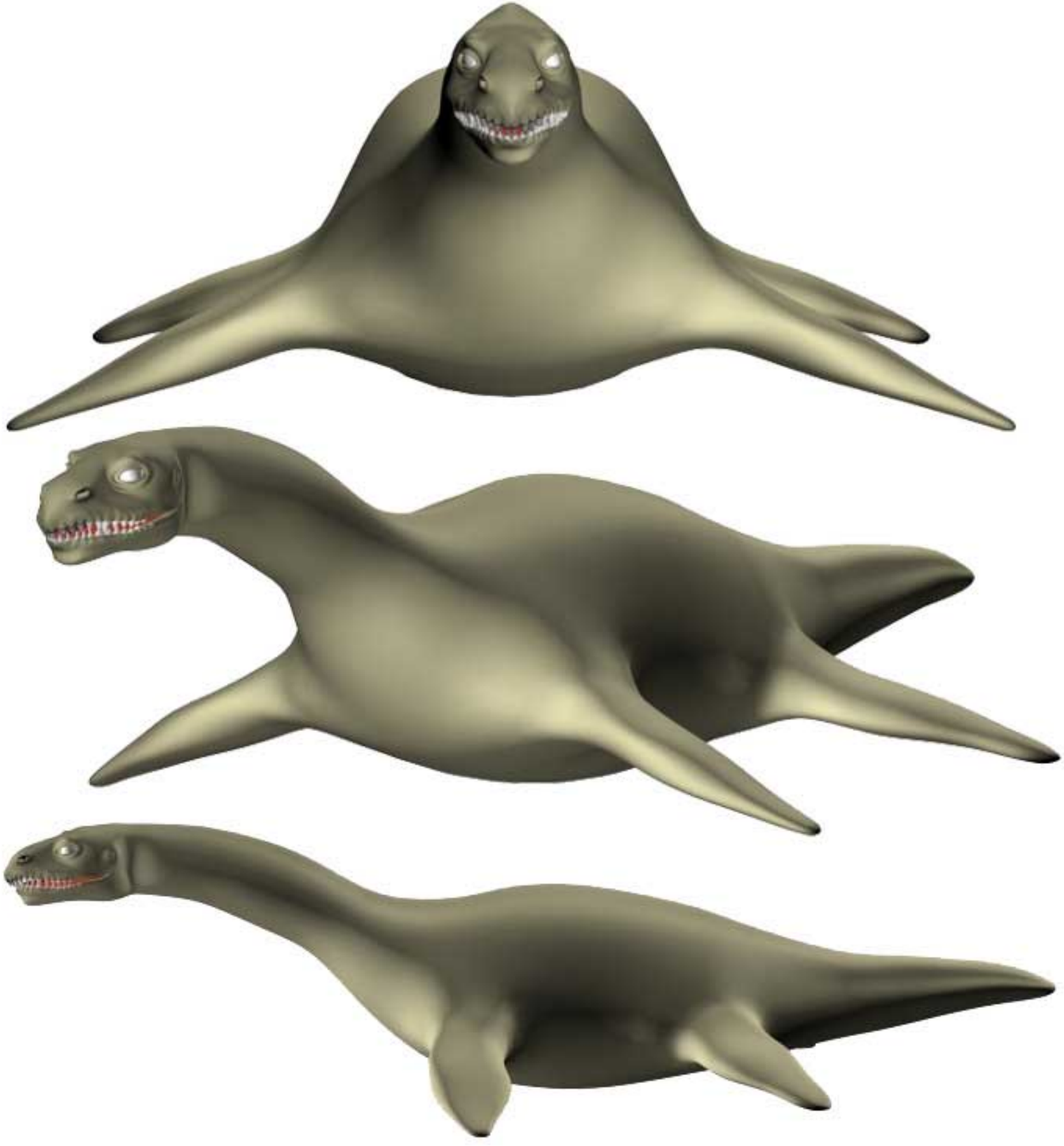
Have a good time!

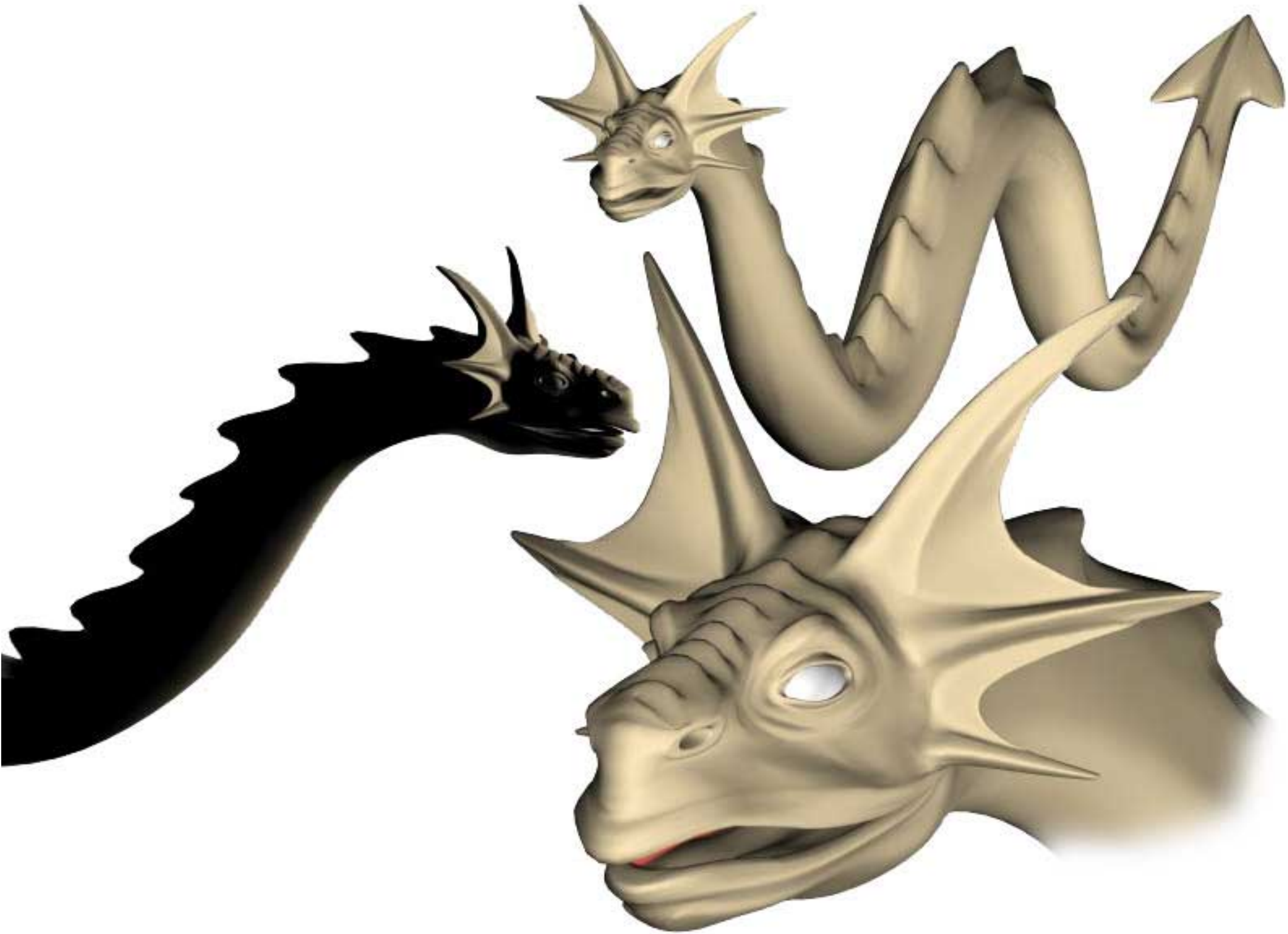
Artist s Acknowledgments

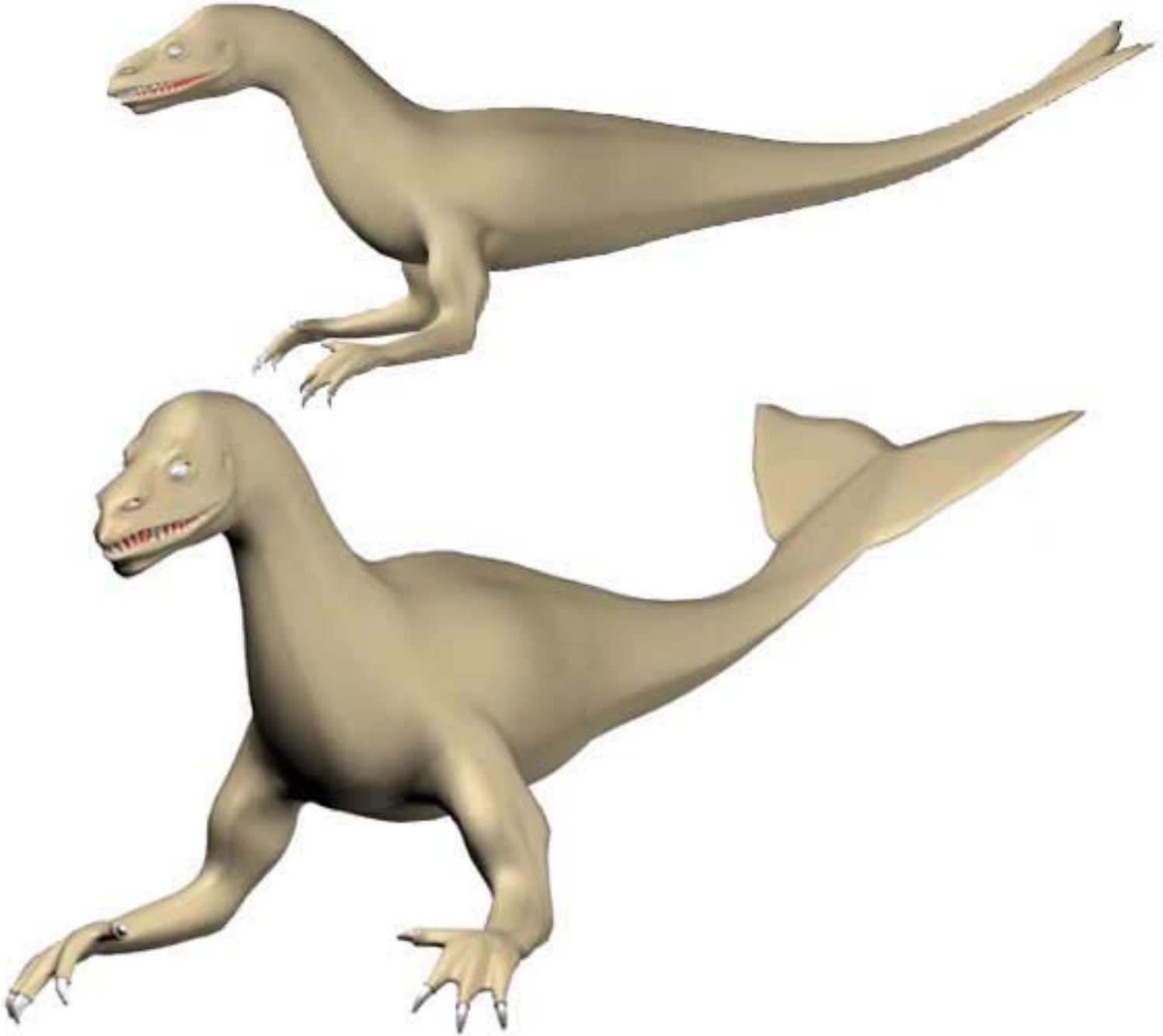
First of all I would like to thank Bill Fleming for recognizing my skills and giving me a chance to write for the 3DCW. Thanks Bill! I would also like to give credits to all the artists that criticized my work and thus helped me to improve it. Thanks goes to Gilles Iung Lancrey (email:gil@idenao.com), Adger (email: adger@nwn.de) and all the other artists that didn't write back to let me know if I could use their name (you know who you are).

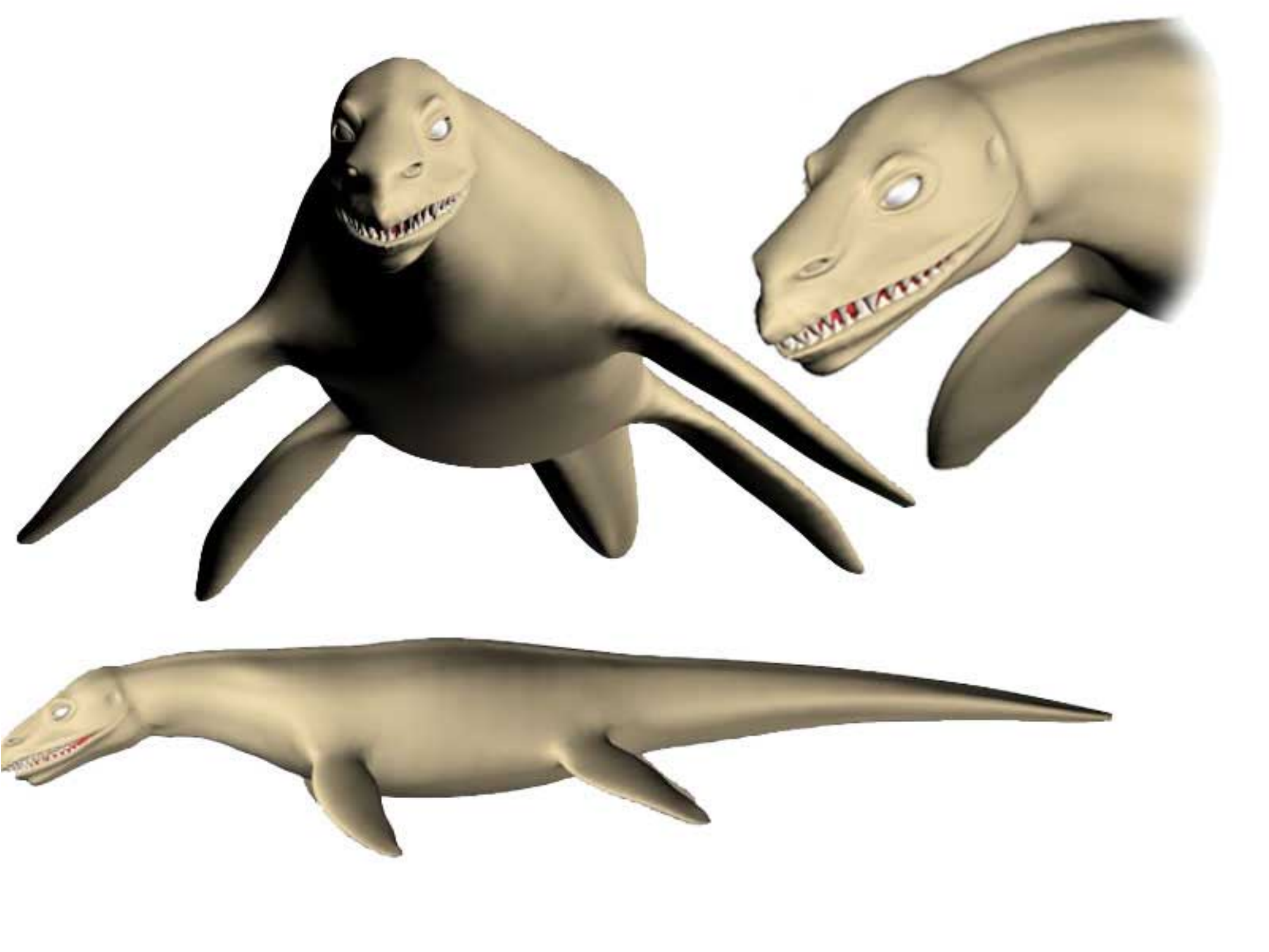
Biography

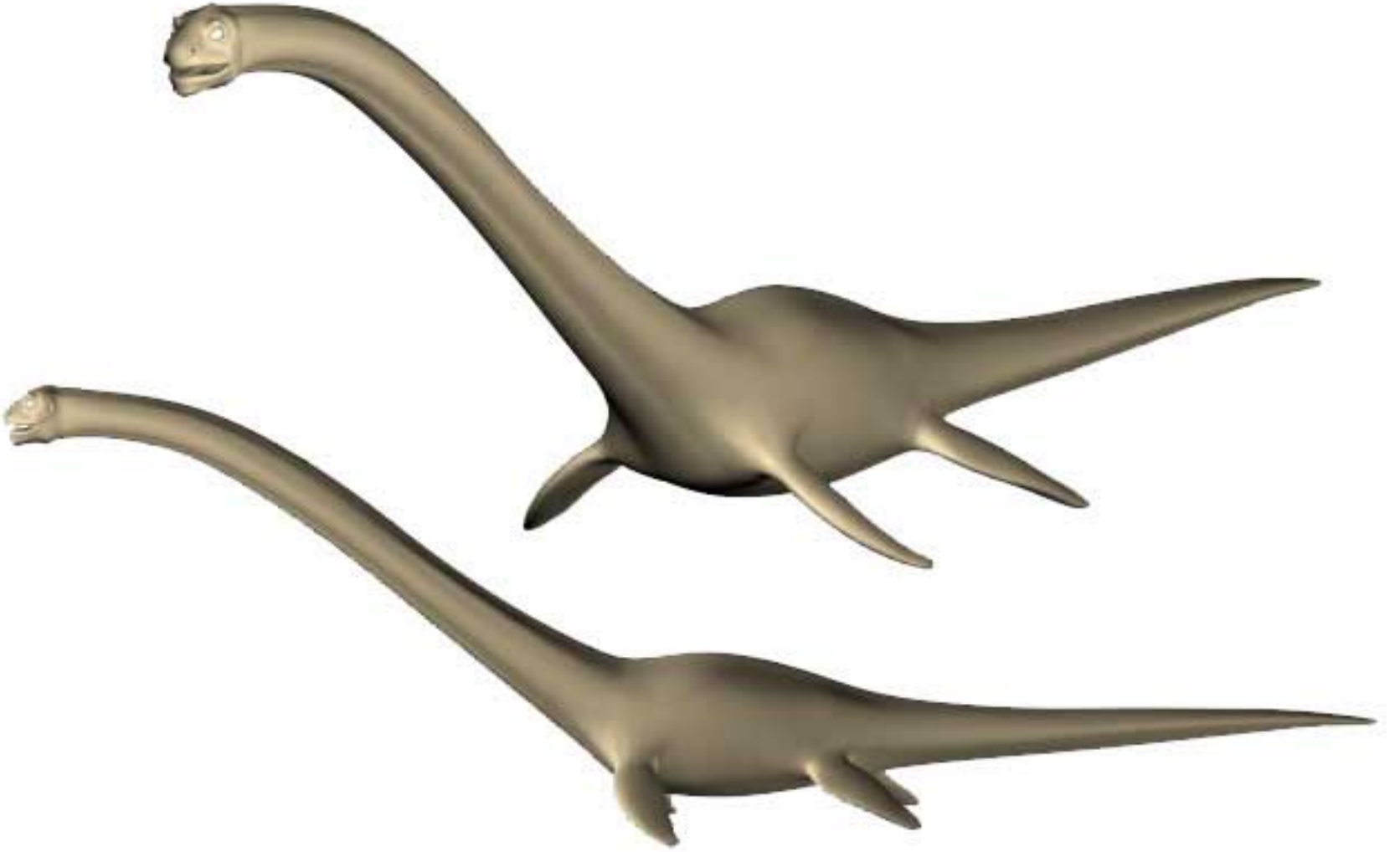
Real name: Nermin Bajagilovic
Online name: Cosmo
I'm 22 years old and would like it to stay that way. I've lived in Sweden since I was 7. For me 3D started as a hobby, but as it seems now it's becoming more than a hobby. I guess that I'm a freelancer now. Yeah definitely I'm a freelancer now. My hopes are that one day I'll reach the sky and finally get that job as a professional digital artist and get paid for my work. That's all folks!
site: http://www.morfish.nu
email: fisher@telia.com

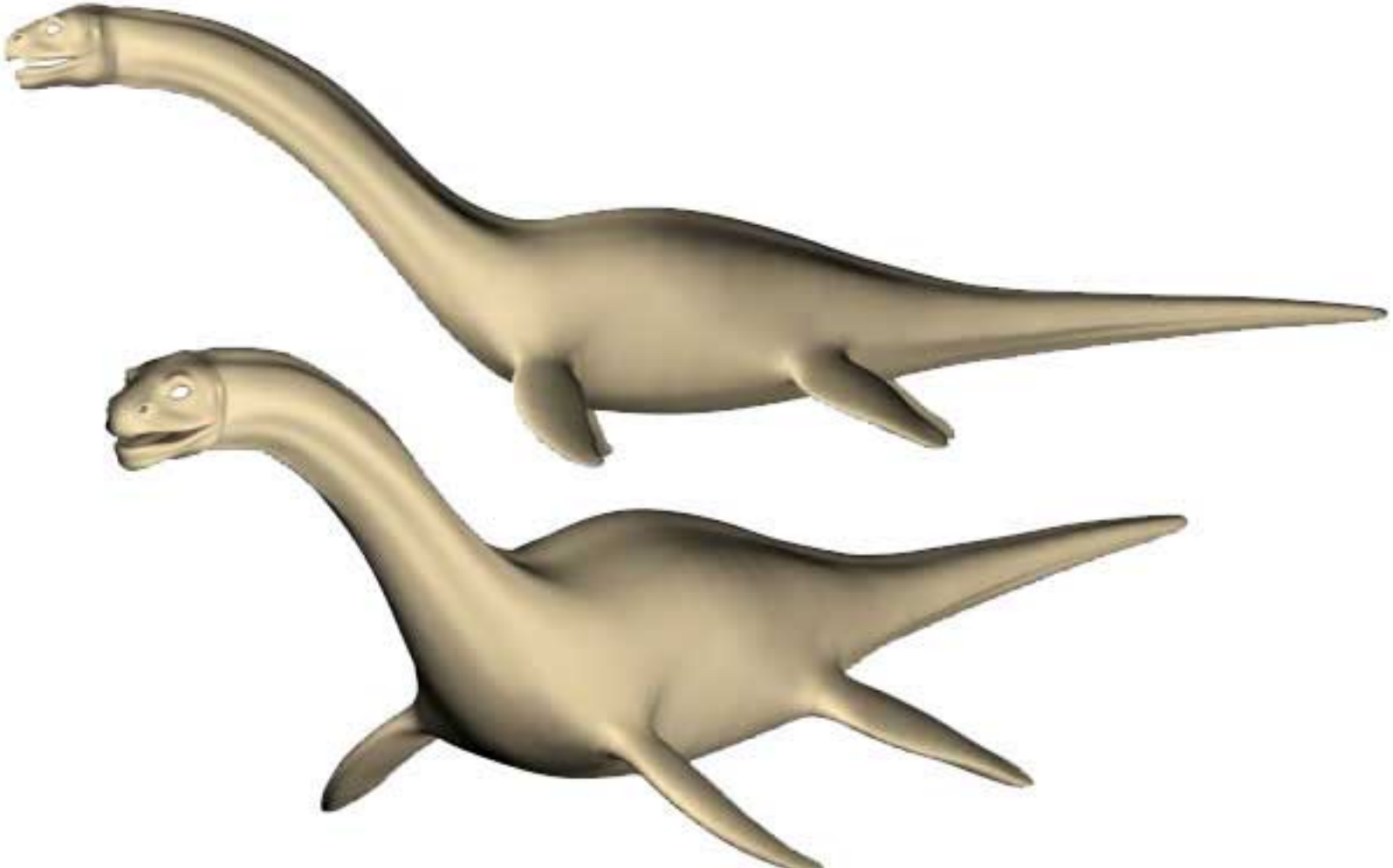


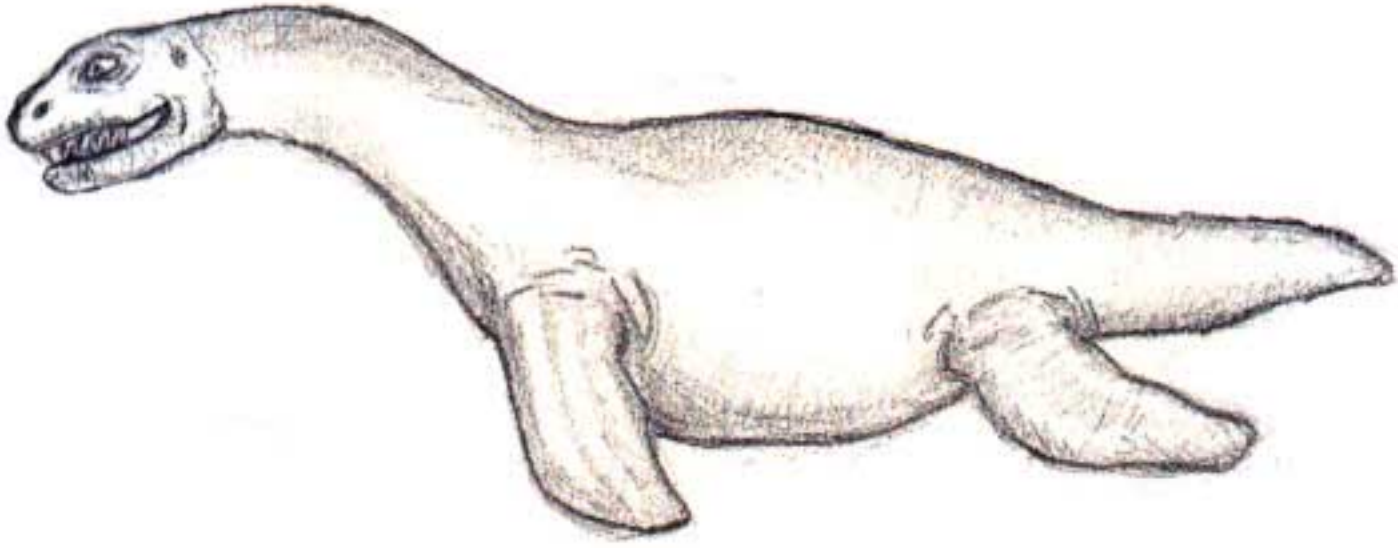


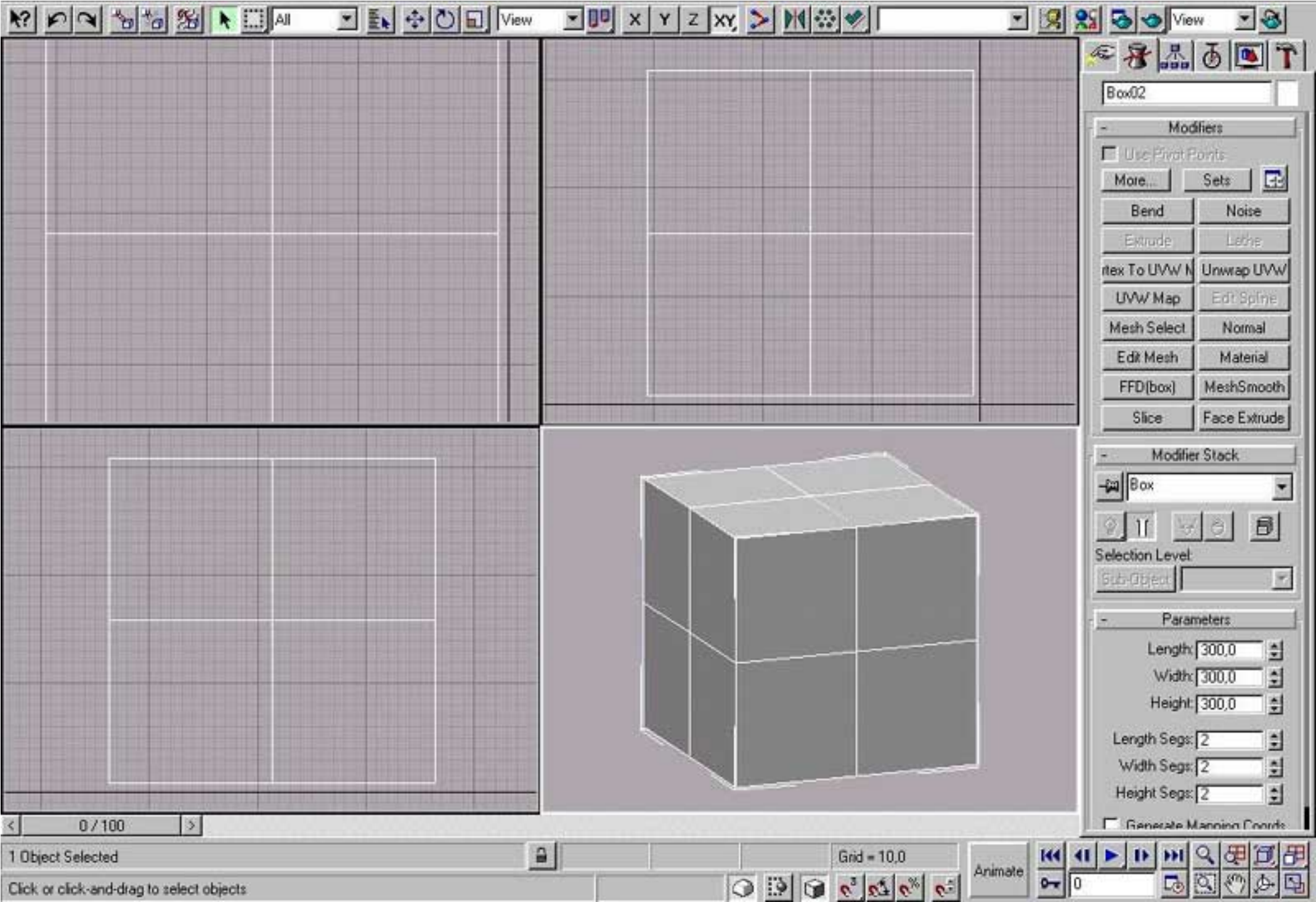








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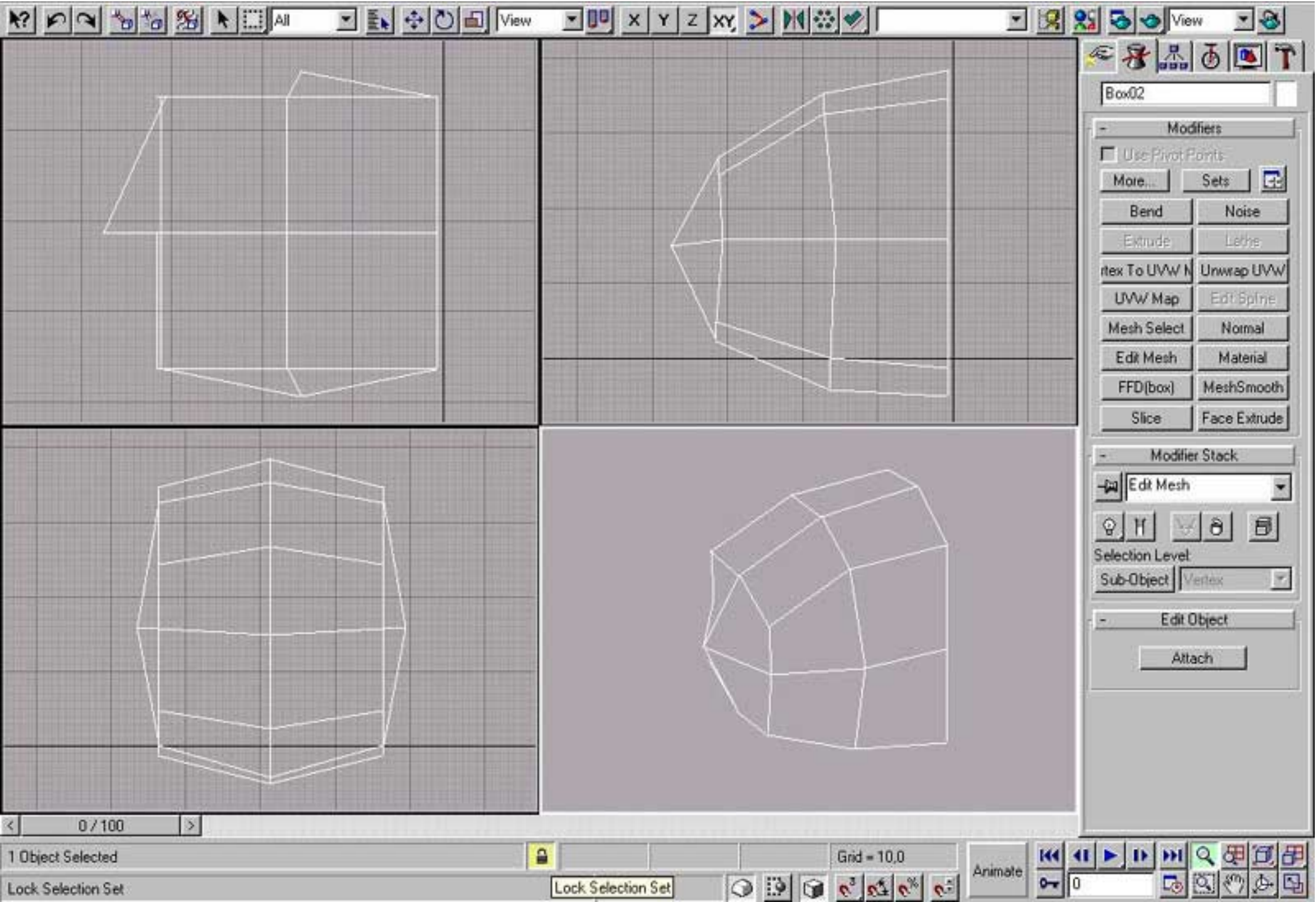
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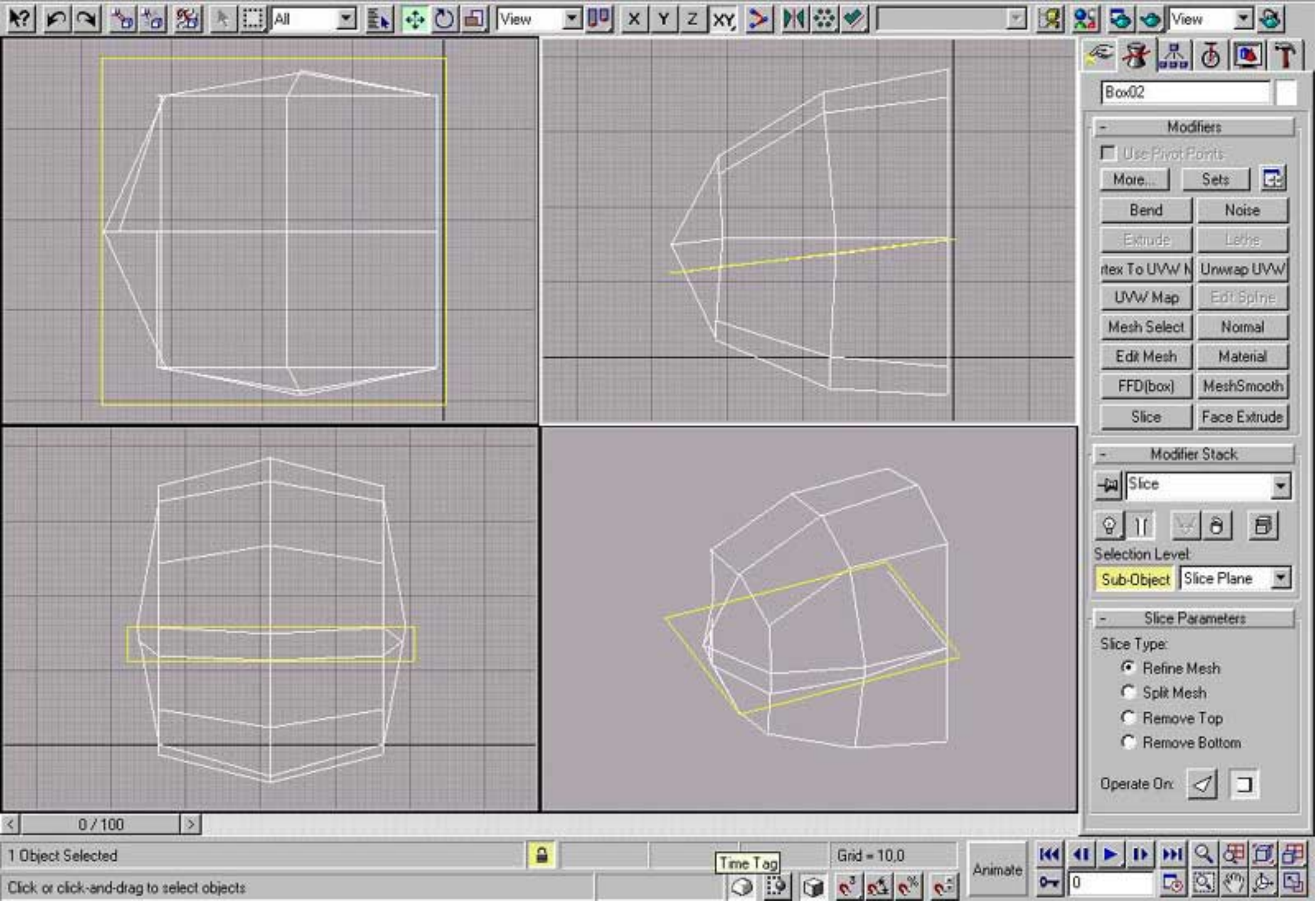
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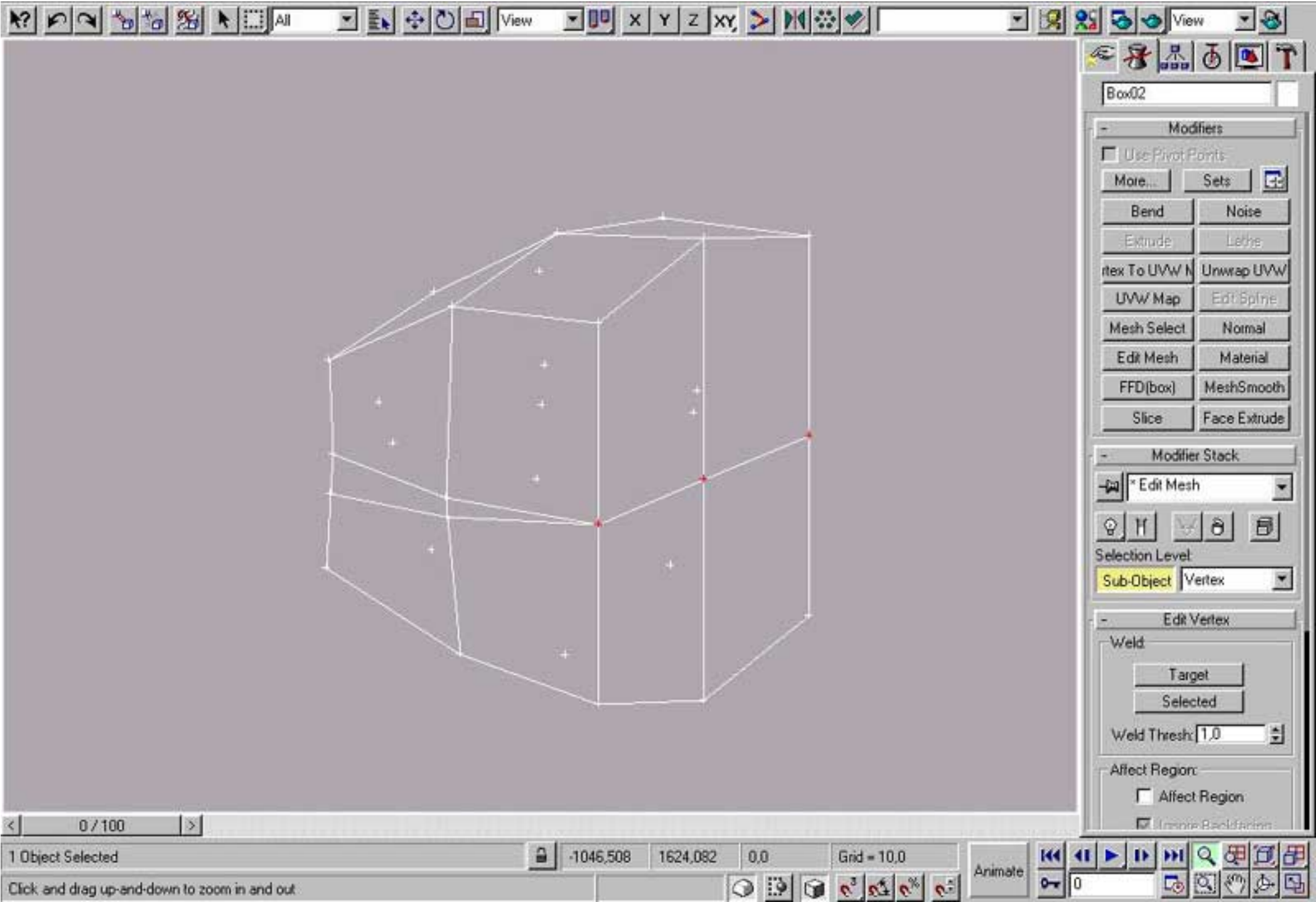
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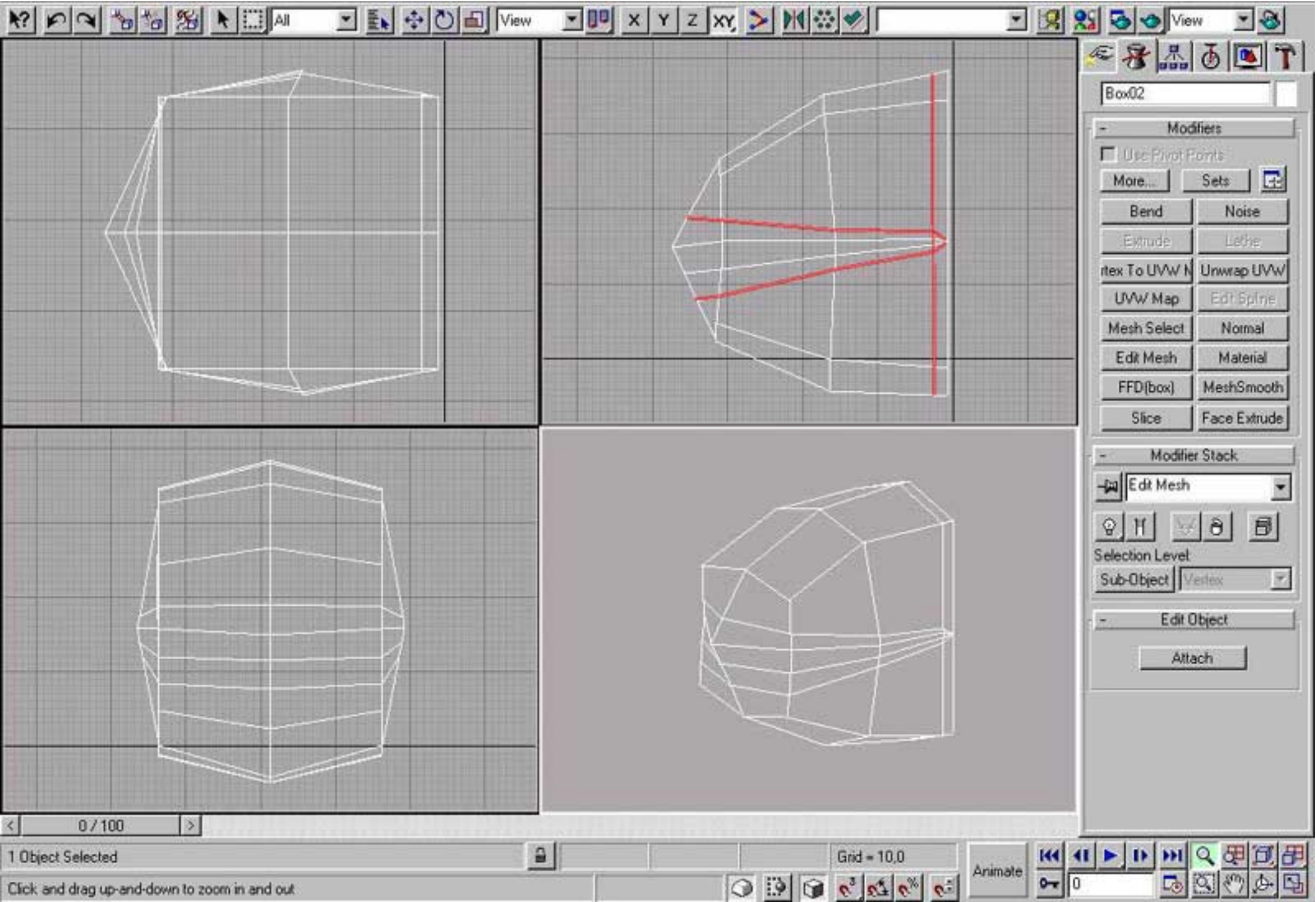
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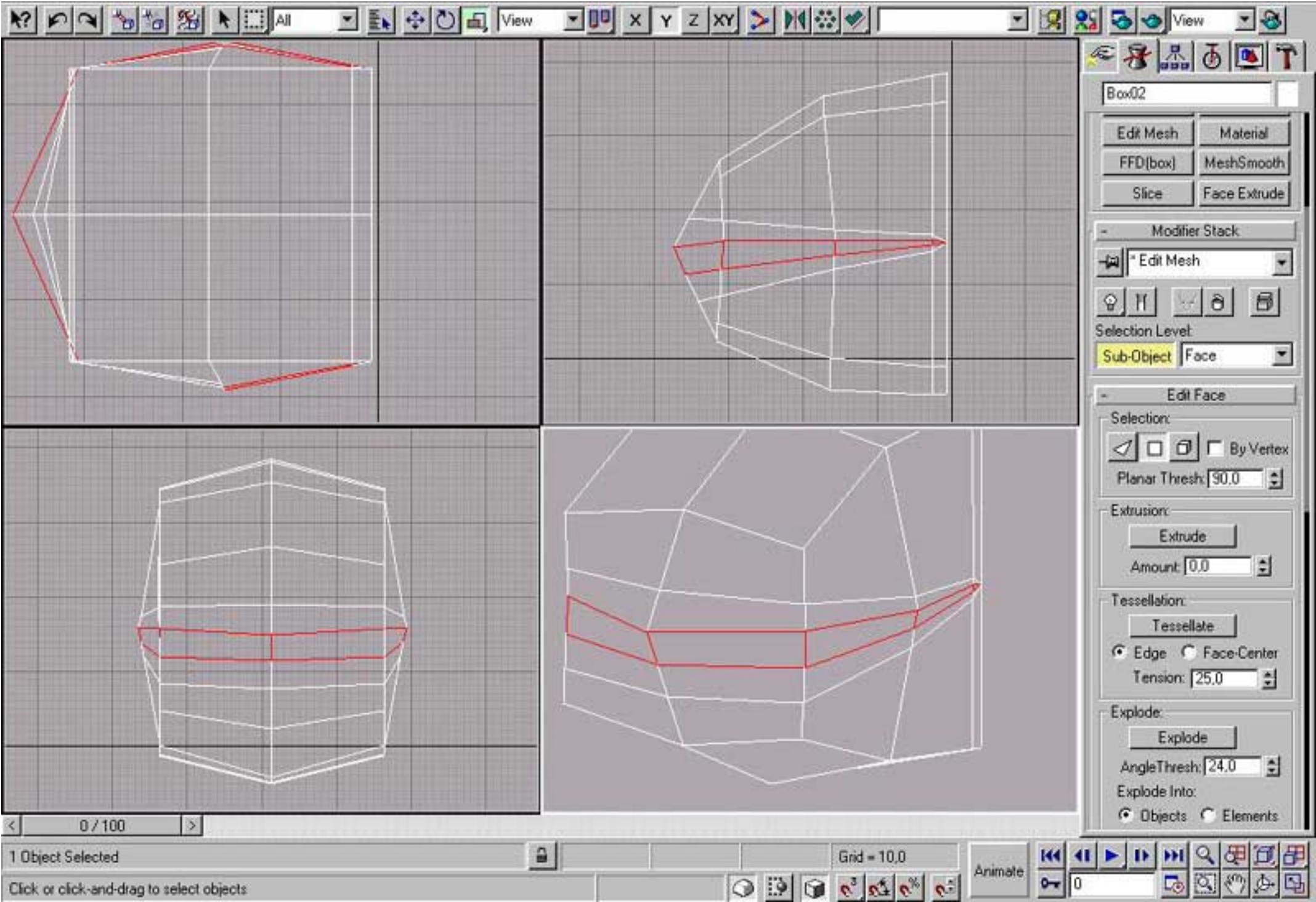
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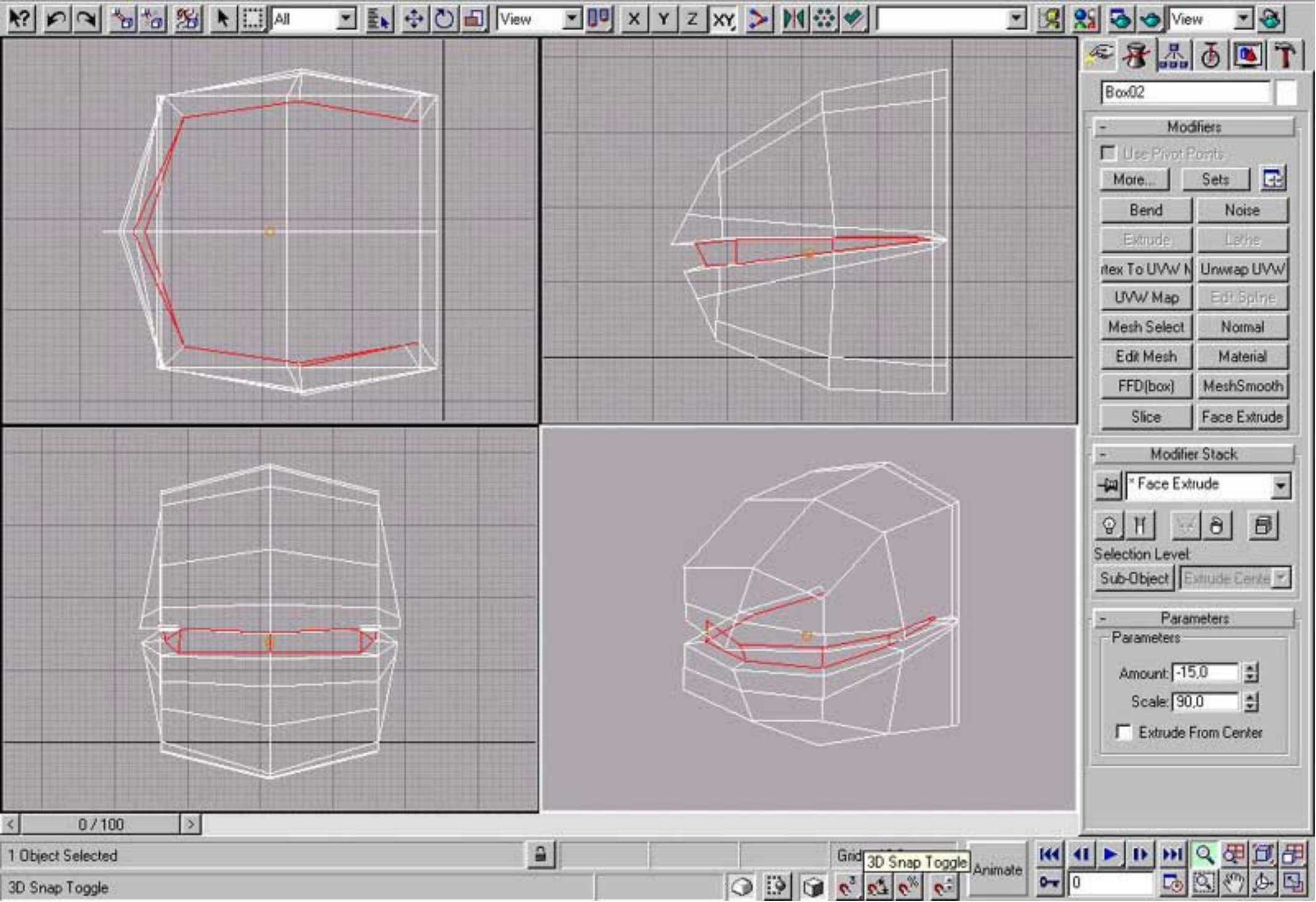
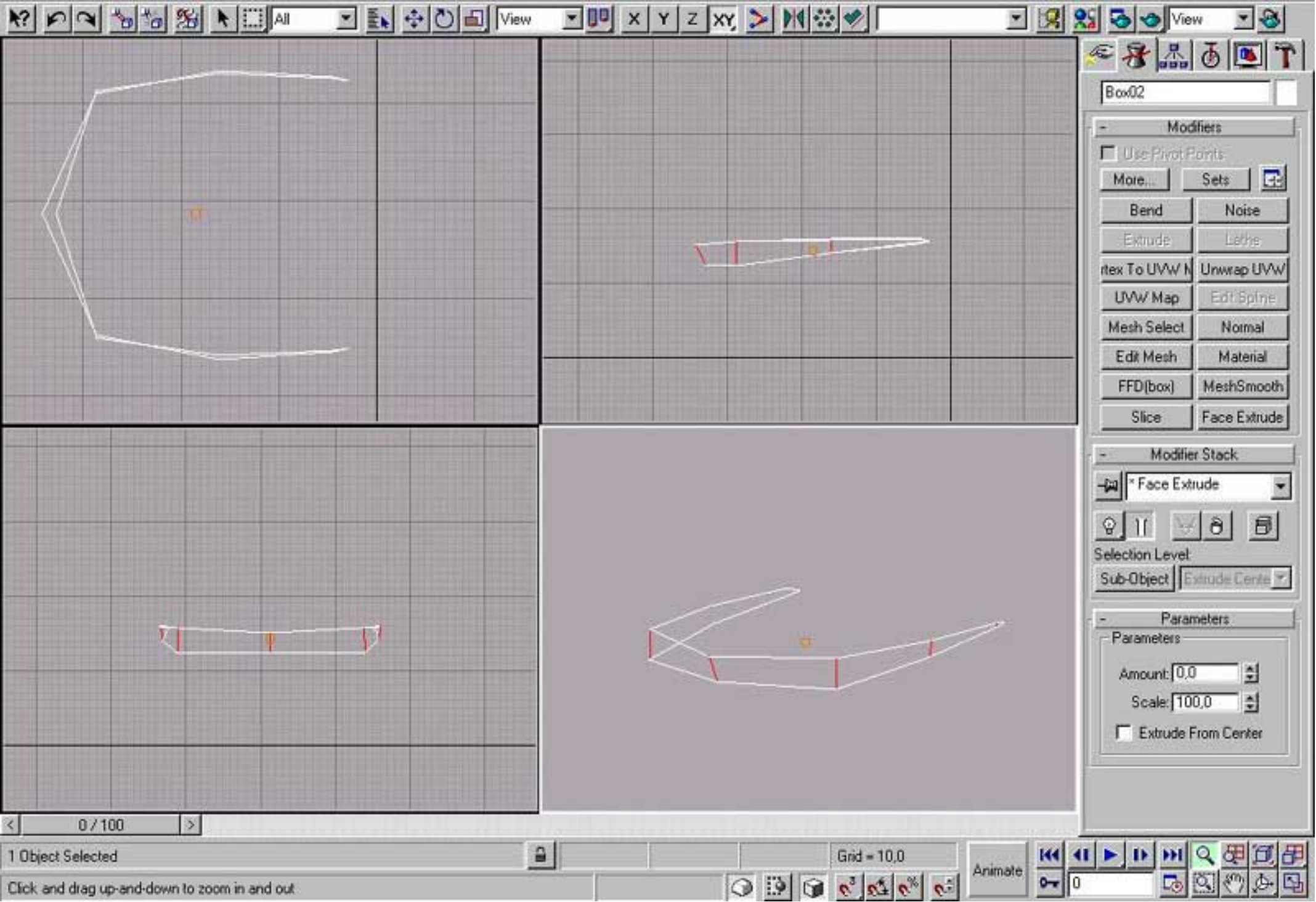
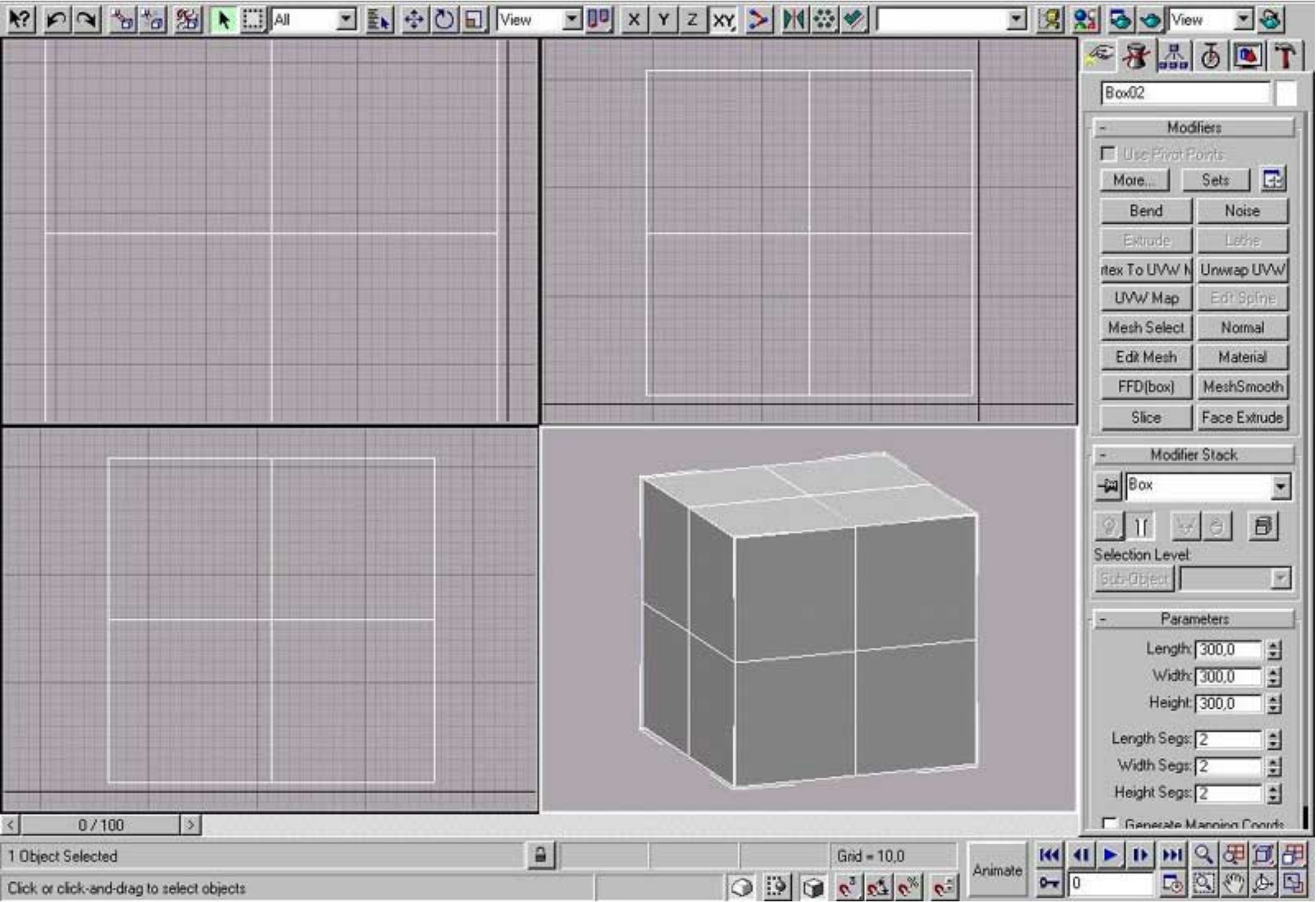
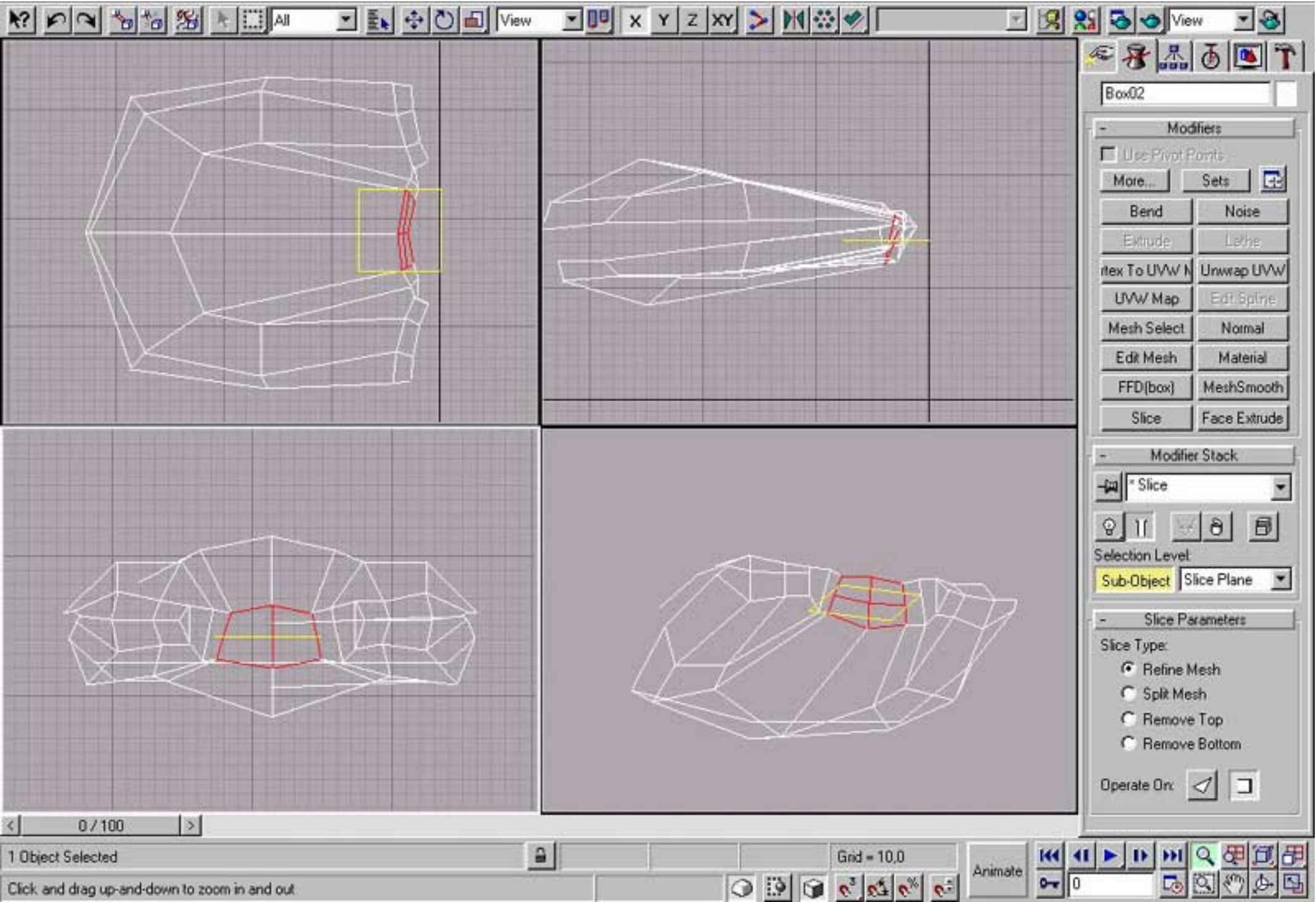
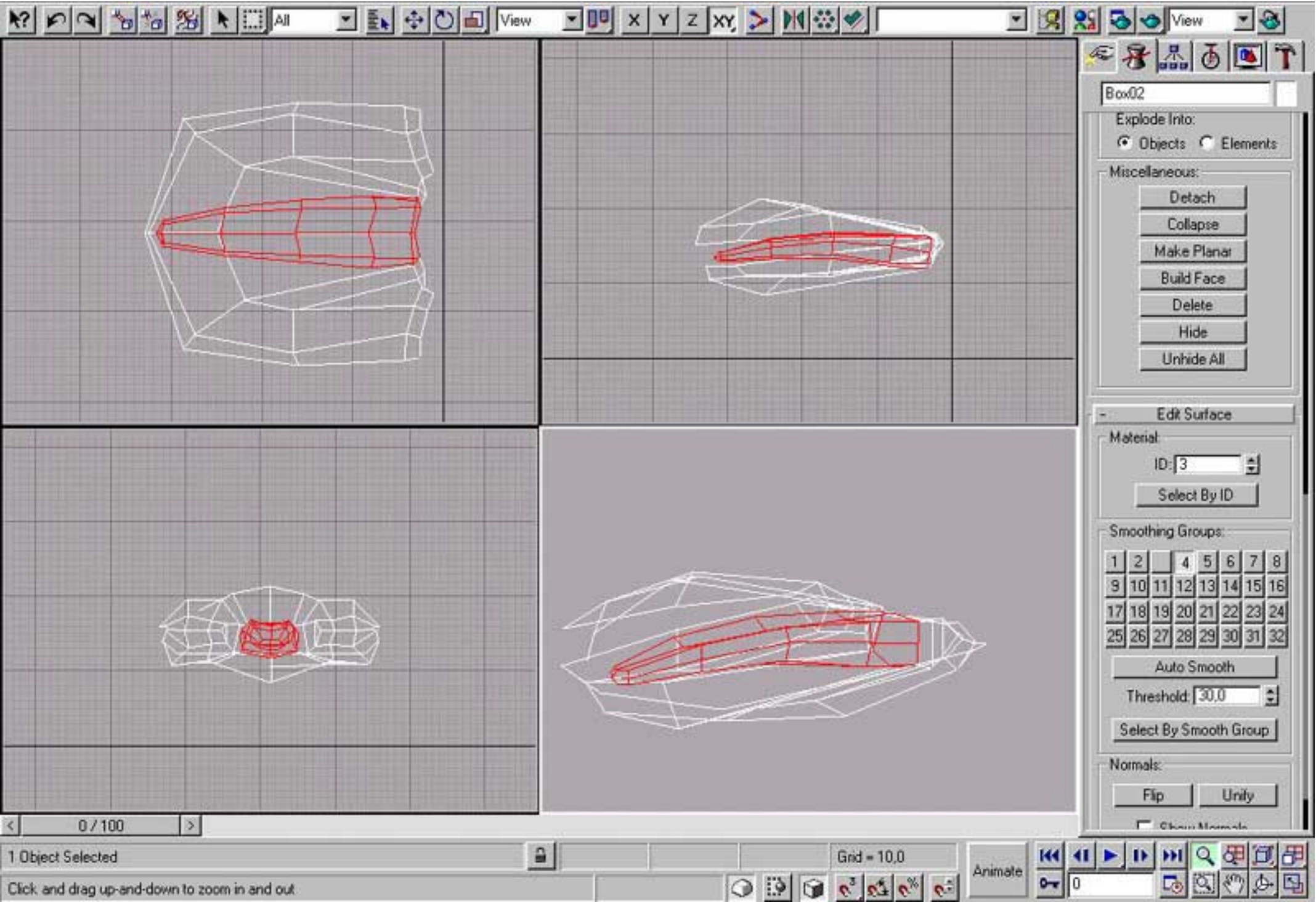
Explode Into:
Objects
Elements
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click or click-and-drag to select objects
0

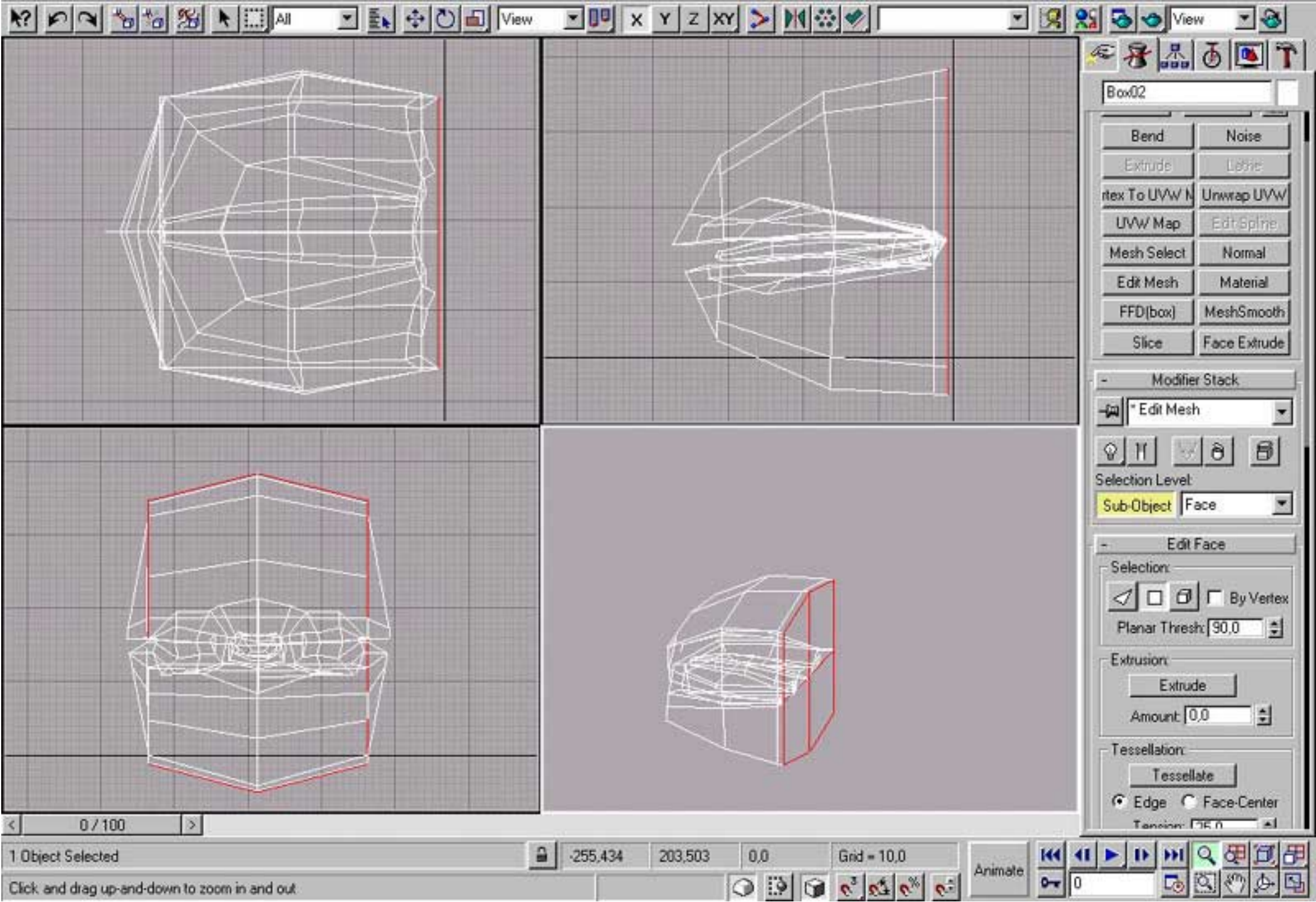

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Face Extrude
Selection Level:
Sub-Object
Extrude Cente
Parameters
Parameters
Amount: -15,0
Scale: 90,0
Extrude From Center
0 / 100
1 Object Selected
Grid
3D Snap Toggle
Animate
3D Snap Toggle
0

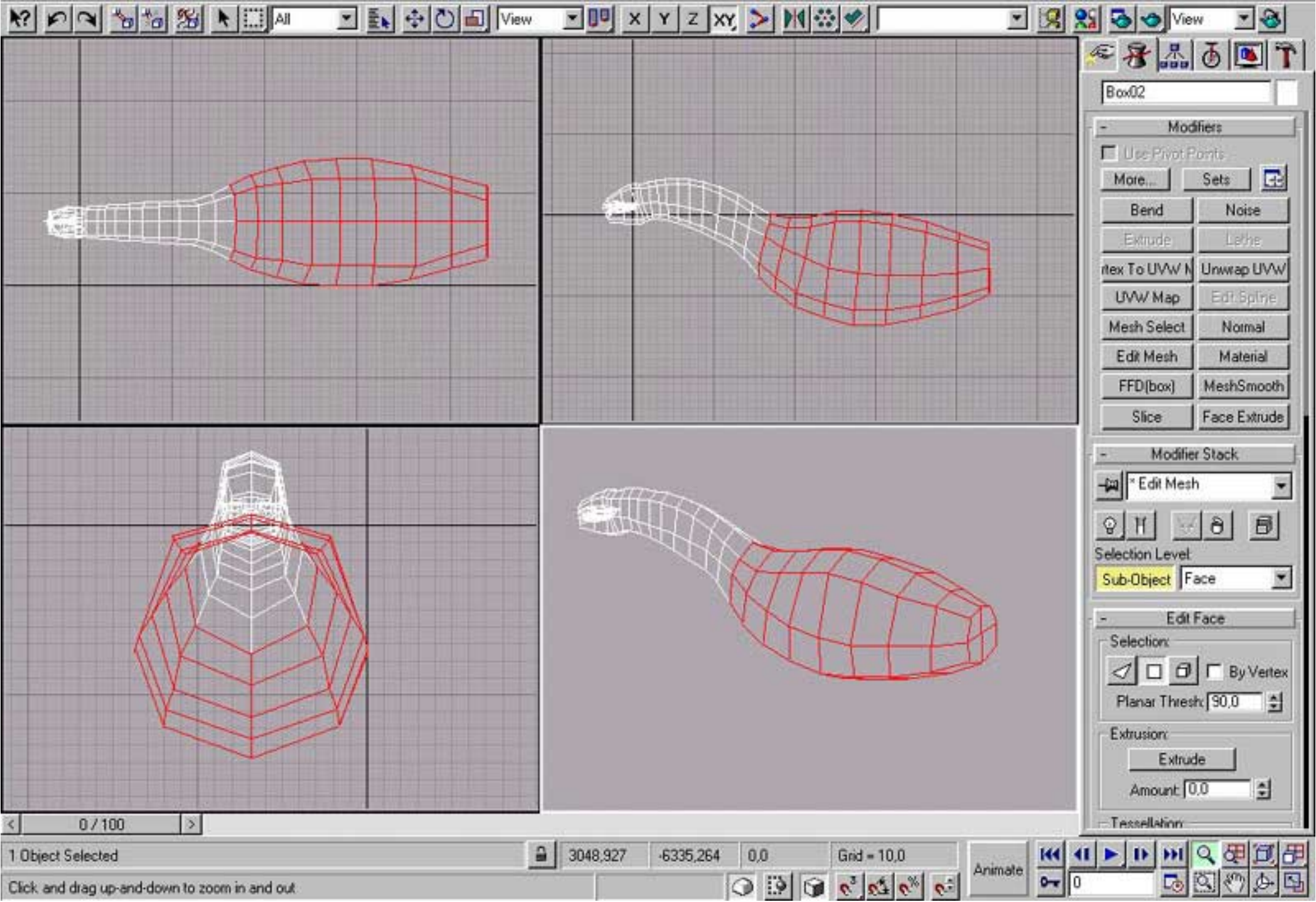

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Face Extrude
Selection Level:
Sub-Object
Extrude Cente
Parameters
Parameters
Amount: 0,0
Scale: 100,0
Extrude From Center
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

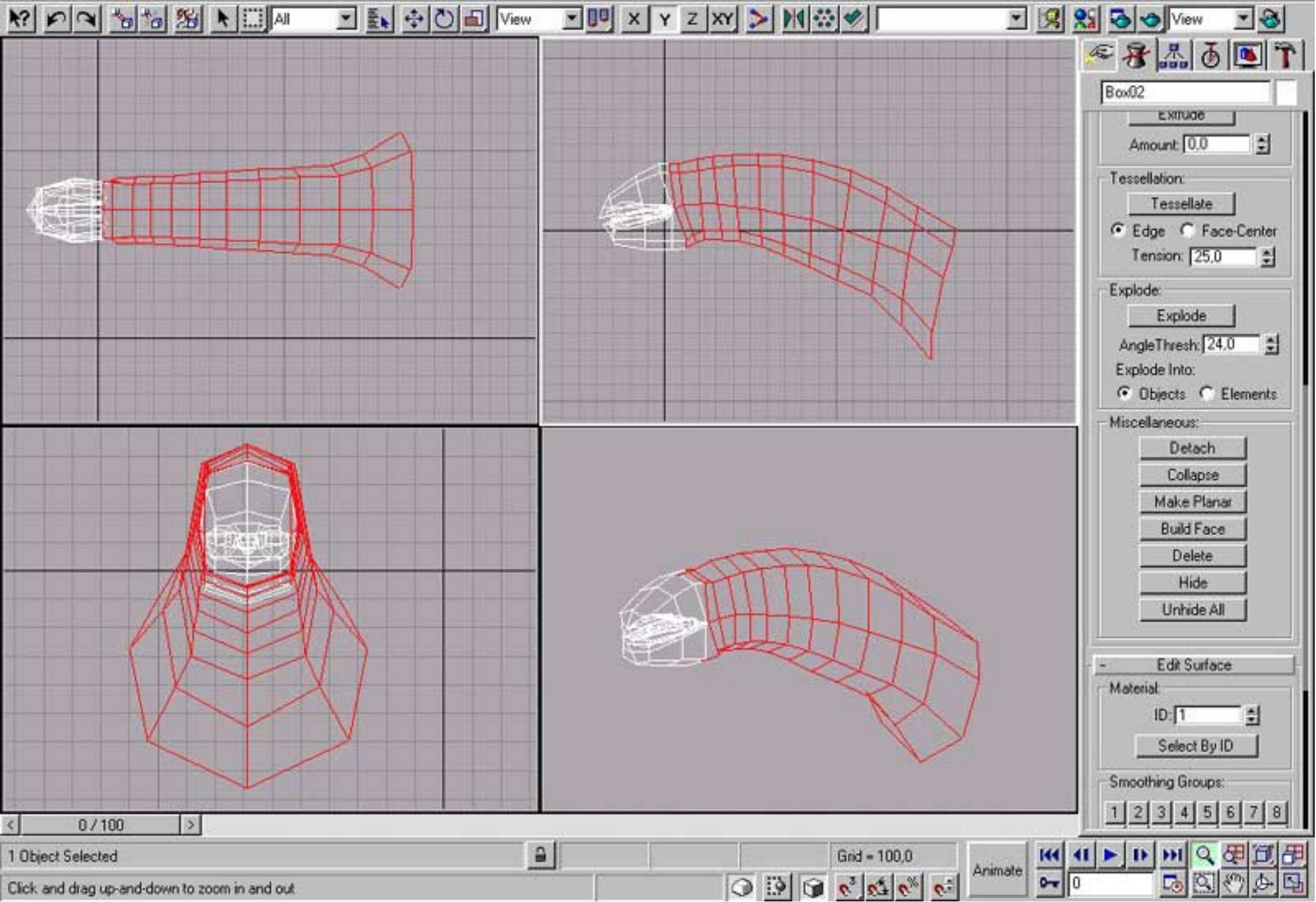

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Box
Selection Level:
Sub-Object
Parameters
Length: 300,0
Width: 300,0
Height: 300,0
Length Segs: 2
Width Segs: 2
Height Segs: 2
Generate Mapping Coords
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click or click-and-drag to select objects
0

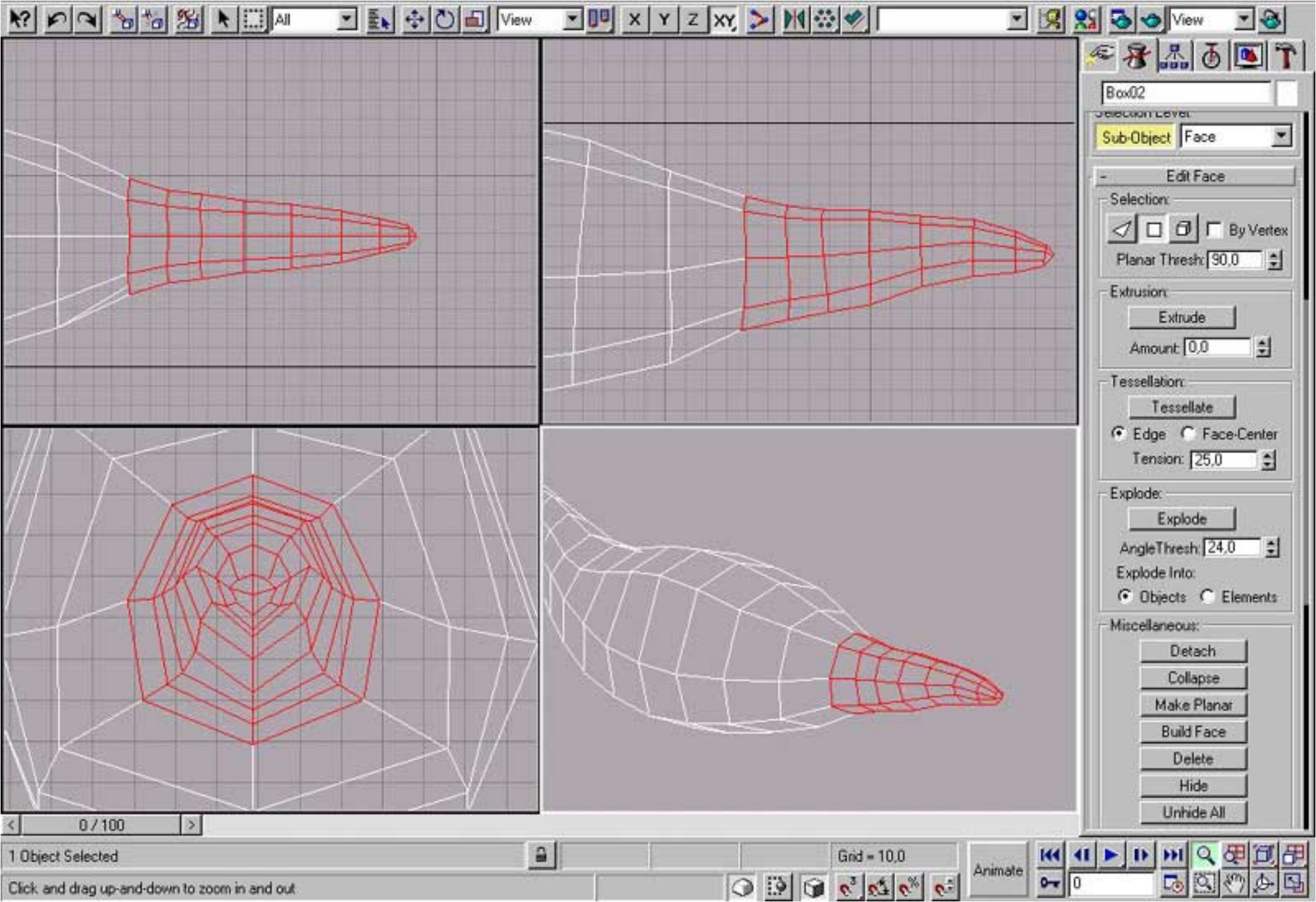

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Slice
Selection Level:
Sub-Object
Slice Plane
Slice Parameters
Slice Type:
Refine Mesh
Split Mesh
Remove Top
Remove Bottom
Operate On:
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

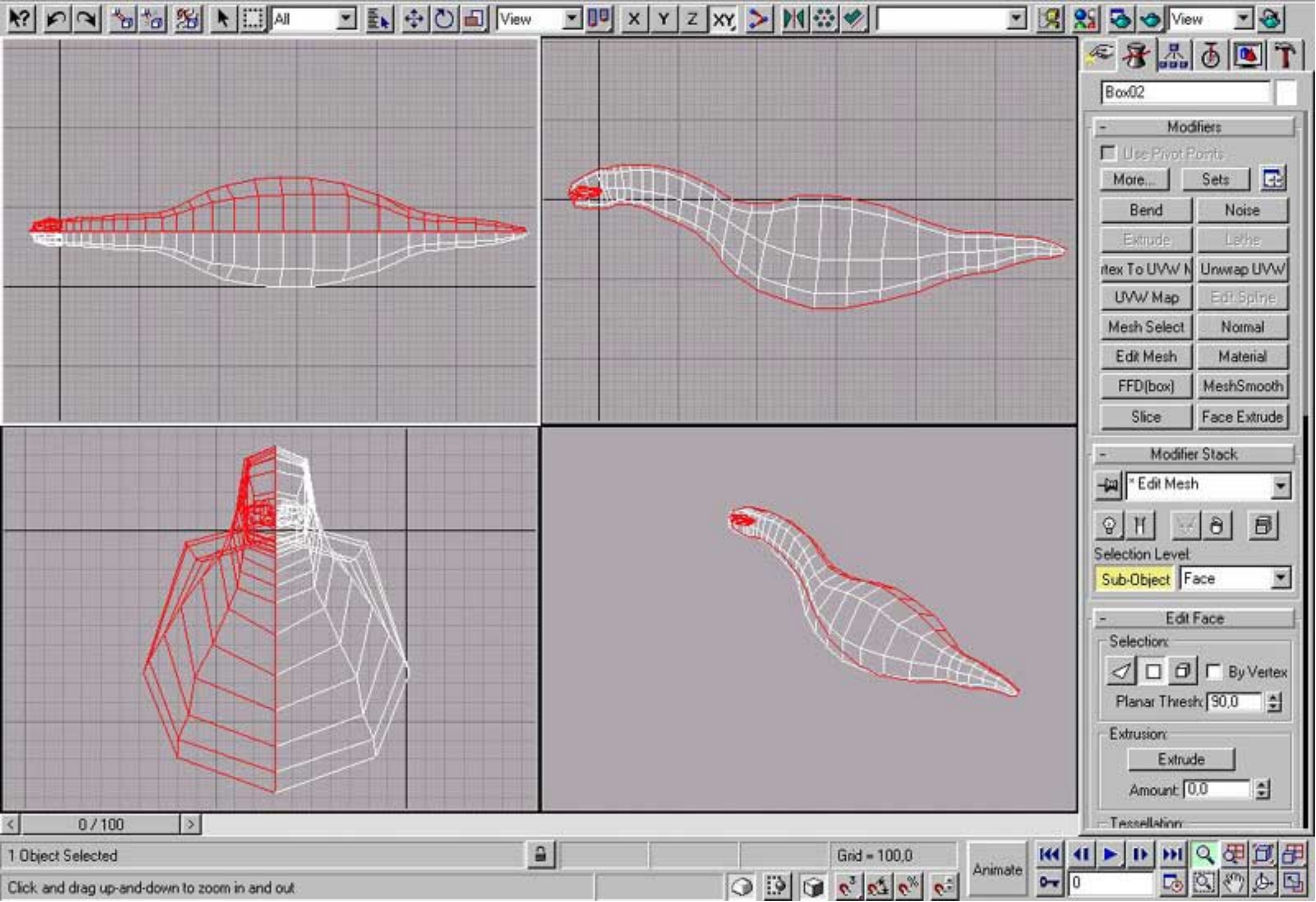

All
View
X
Y
Z
XY
View
Box02
Explode Into:
Objects
Elements
Miscellaneous:
Detach
Collapse
Make Planar
Build Face
Delete
Hide
Unhide All
Edit Surface
Material:
ID: 3
Select By ID
Smoothing Groups:
1 2 4 5 6 7 8
9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
Auto Smooth
Threshold: 30,0
Select By Smooth Group
Normals:
Flip
Unify
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

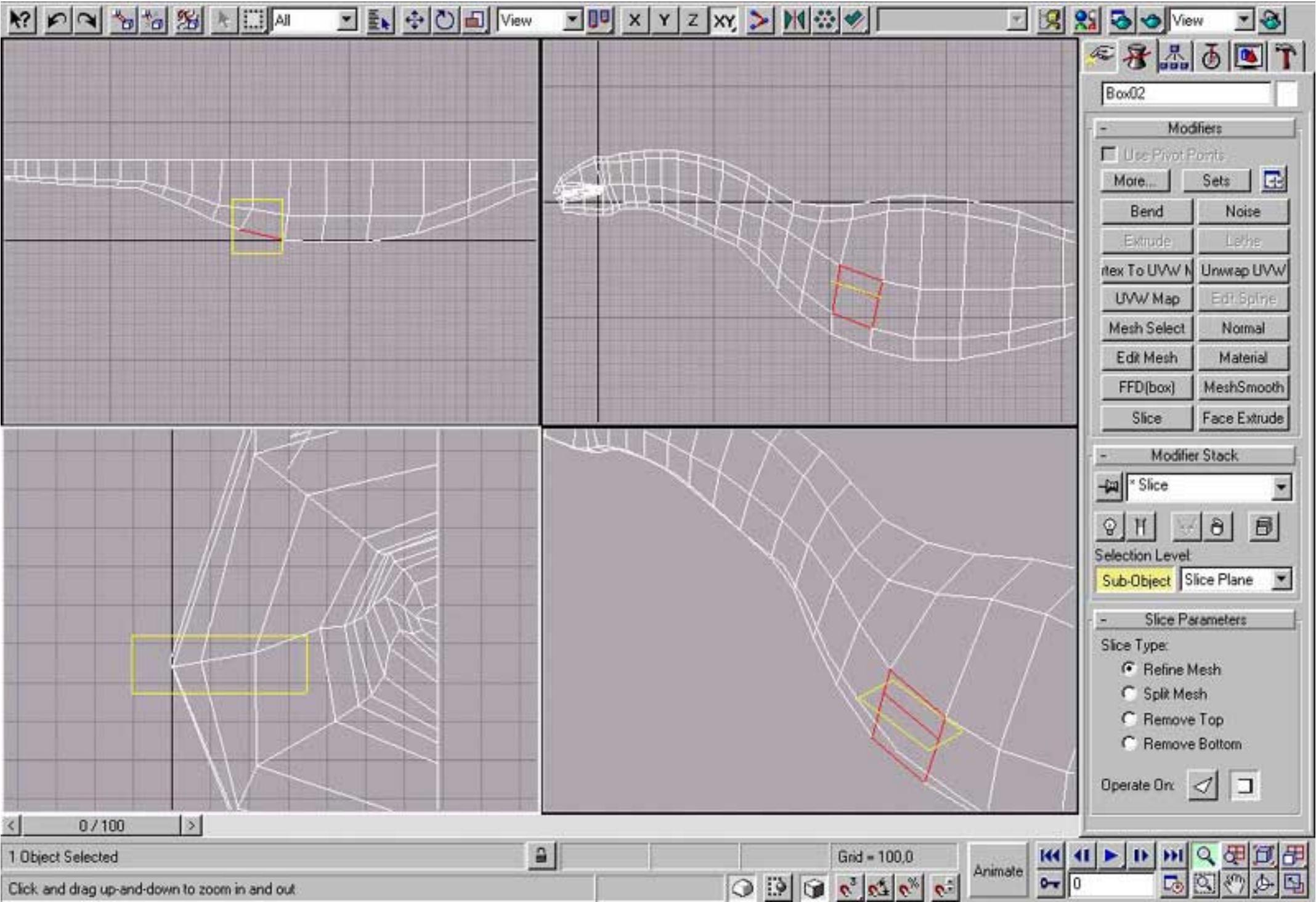

All
View
X
Y
Z
XY
View
Box02
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh: 90,0
Extrusion:
Extrude
Amount: 0,0
Tessellation:
Tessellate
Edge
Face-Center
0 / 100
1 Object Selected
-255,434
203,503
0,0
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out

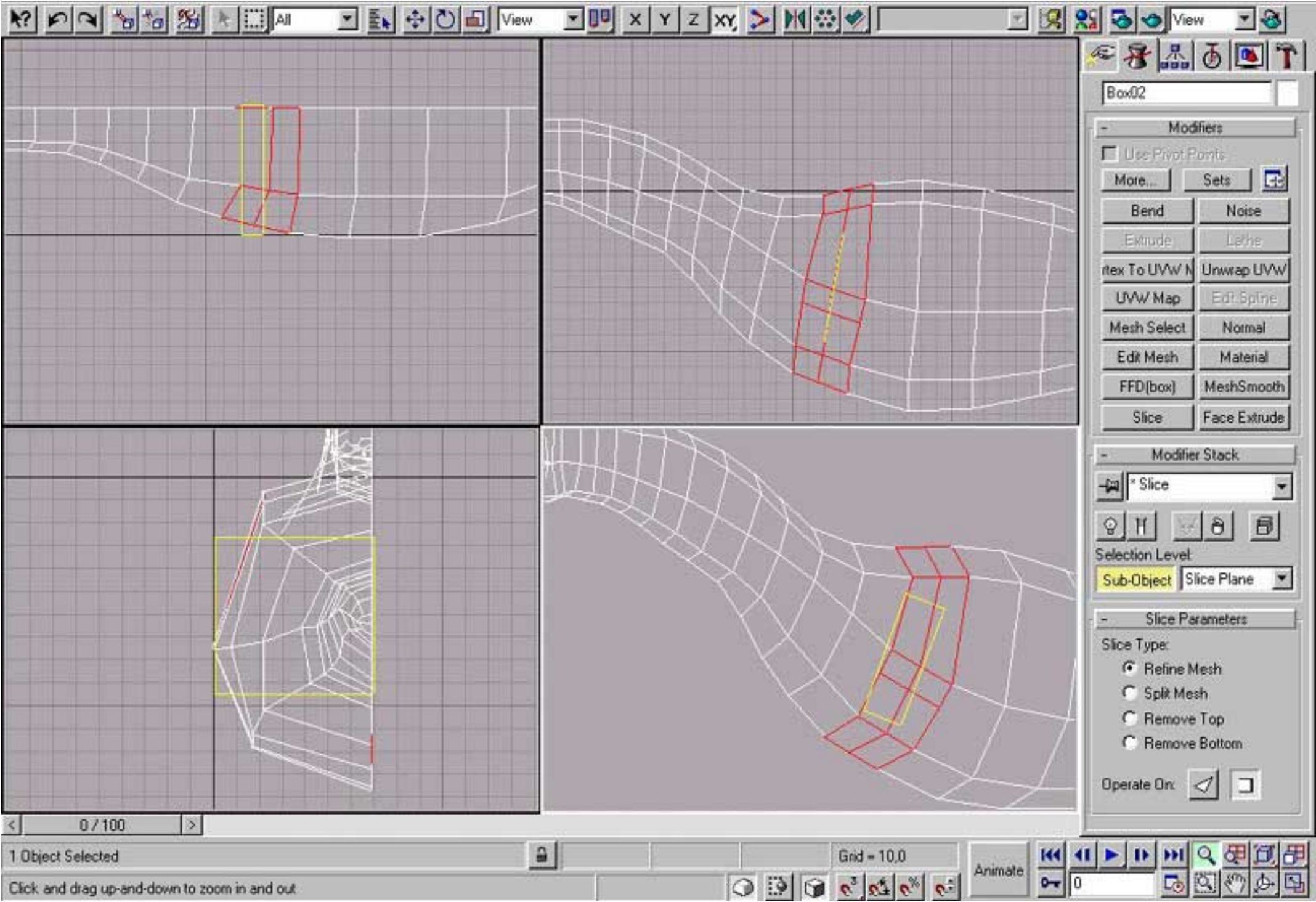

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
0 / 100
1 Object Selected
3048,927
-6335,264
0,0
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

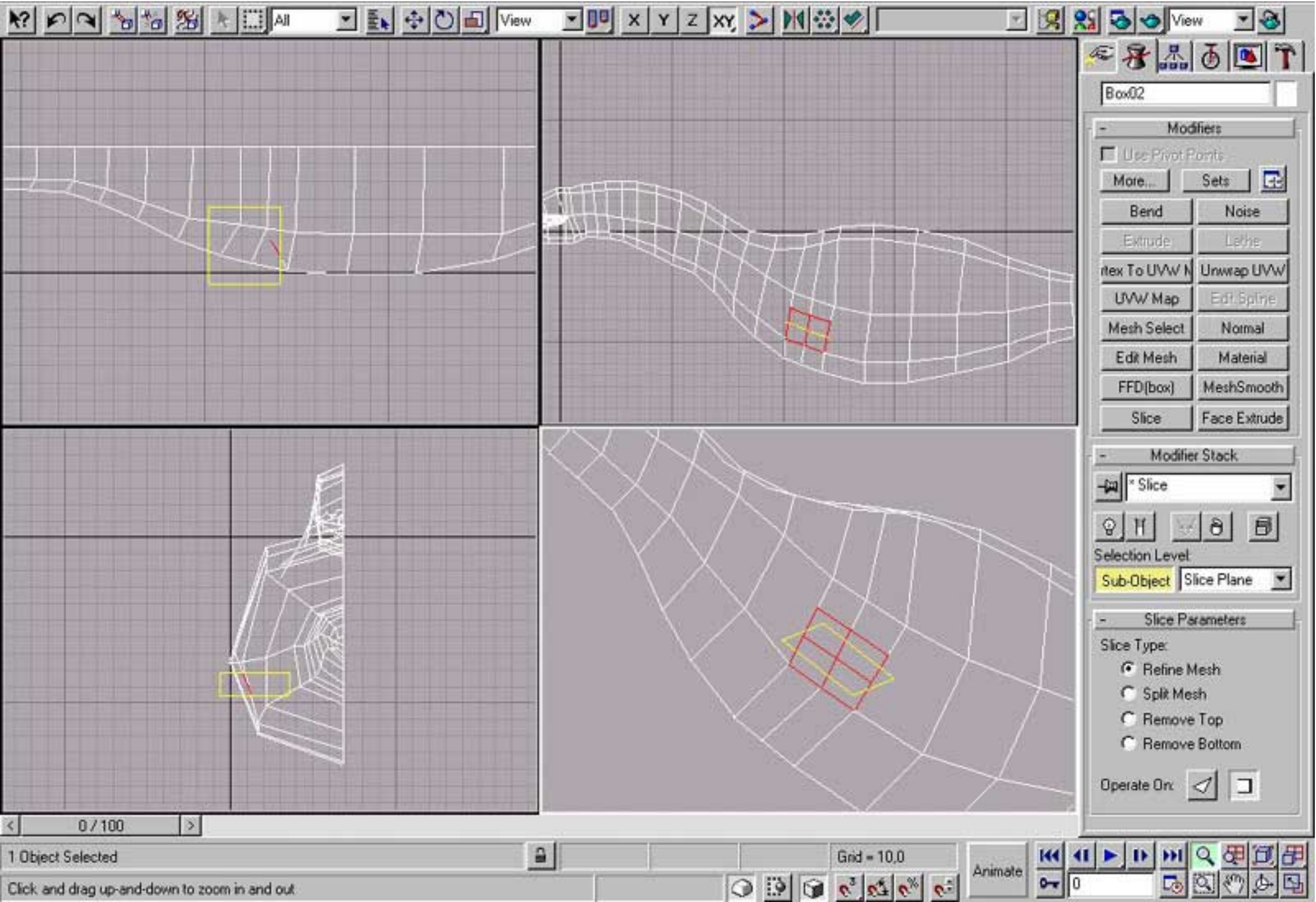

All
View
X
Y
Z
XY
View
Box02
Extrude
Amount: 0,0
Tessellation:
Tessellate
Edge
Face-Center
Tension: 25,0
Explode:
Explode
AngleThresh: 24,0
Explode Into:
Objects
Elements
Miscellaneous:
Detach
Collapse
Make Planar
Build Face
Delete
Hide
Unhide All
Edit Surface
Material:
ID: 1
Select By ID
Smoothing Groups:
1 2 3 4 5 6 7 8
0 / 100
1 Object Selected
Grid = 100,0
Animate
Click and drag up-and-down to zoom in and out
0

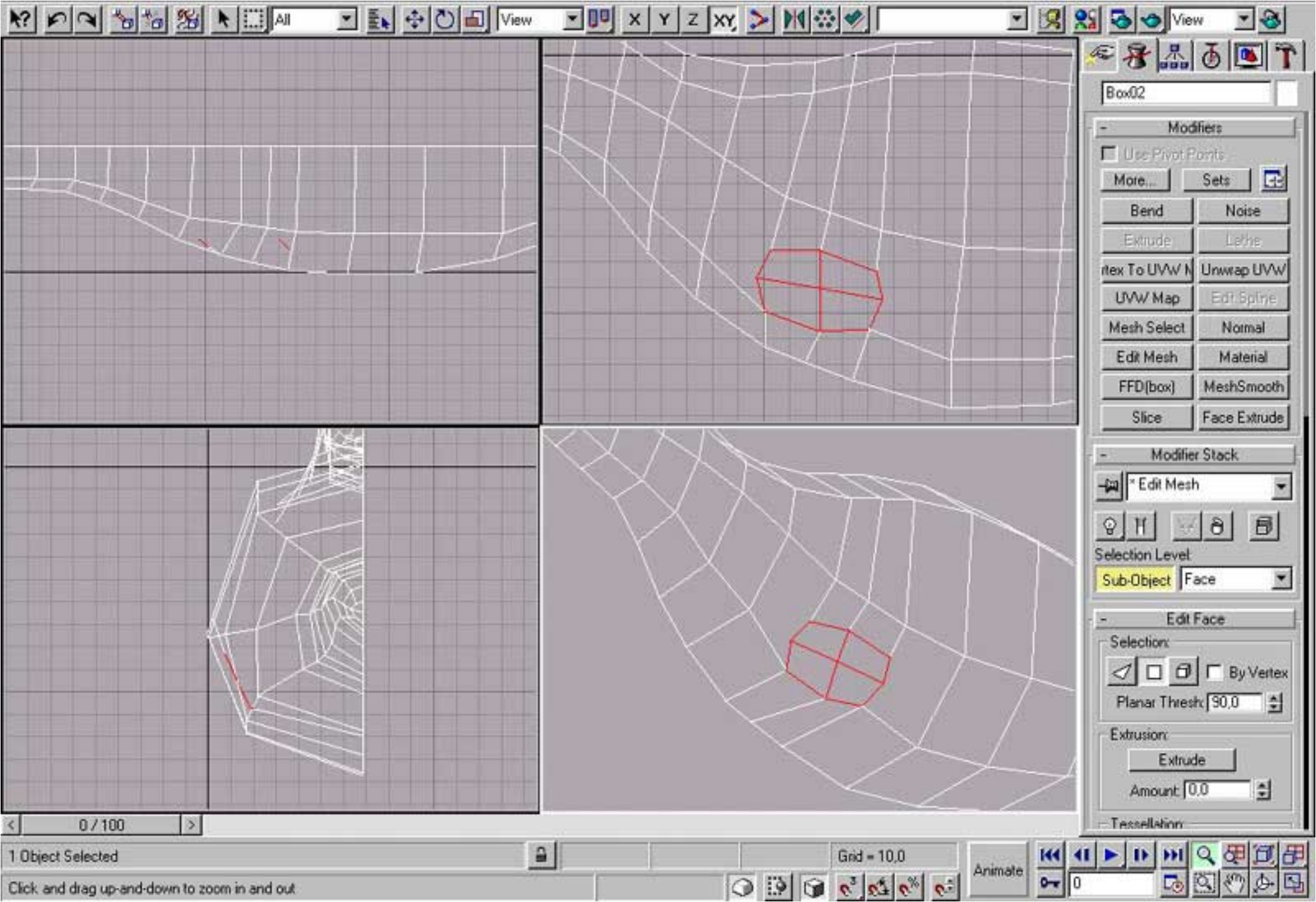

All
View
X
Y
Z
XY
View
Box02
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh: 90,0
Extrusion:
Extrude
Amount: 0,0
Tessellation:
Tessellate
Edge
Face-Center
Tension: 25,0
Explode:
Explode
AngleThresh: 24,0
Explode Into:
Objects
Elements
Miscellaneous:
Detach
Collapse
Make Planar
Build Face
Delete
Hide
Unhide All
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

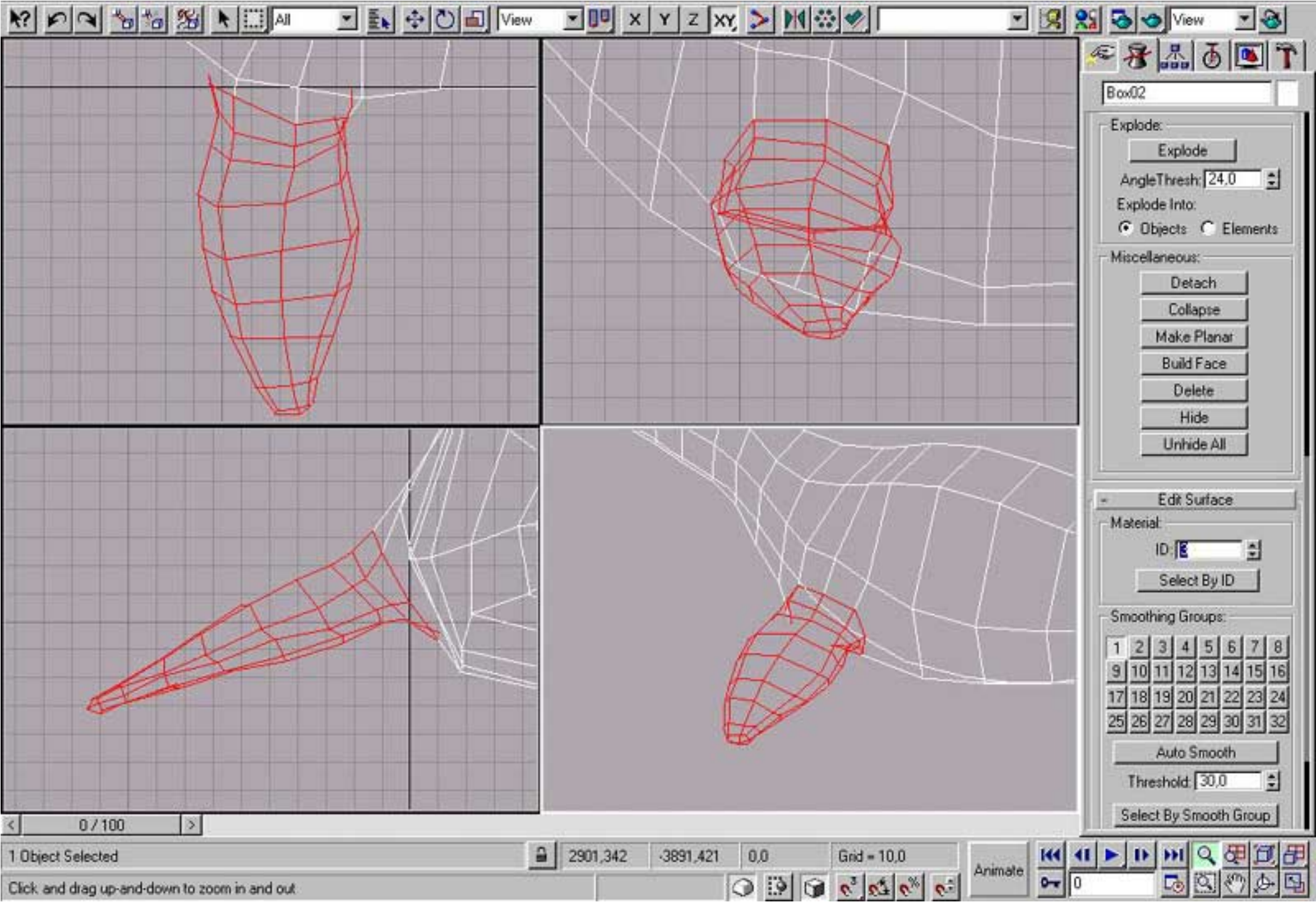

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
30,0
Extrusion:
Extrude
Amount:
0,0
Tessellation
0 / 100
1 Object Selected
Grid = 100,0
Animate
Click and drag up-and-down to zoom in and out
0

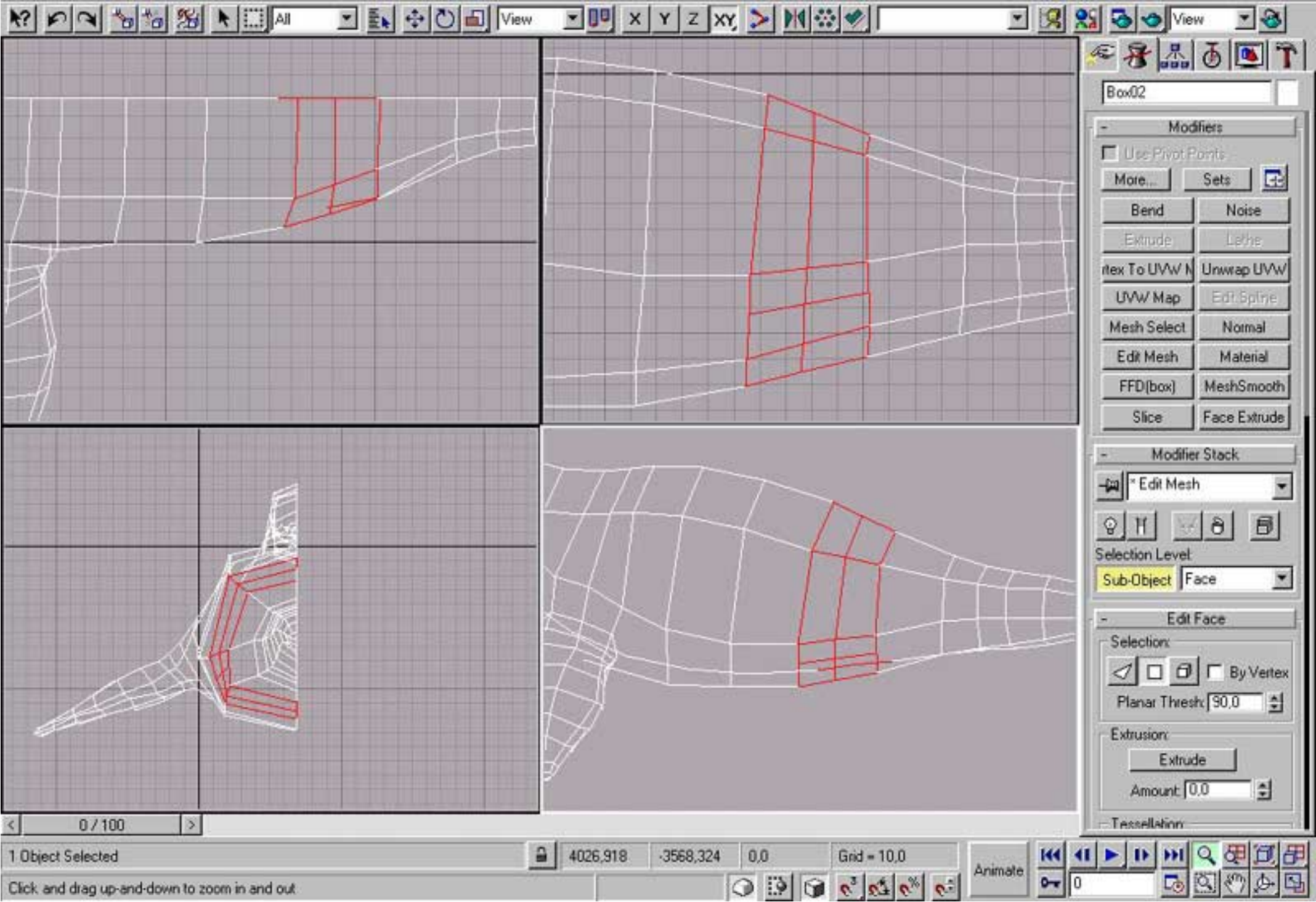

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Slice
Selection Level:
Sub-Object
Slice Plane
Slice Parameters
Slice Type:
Refine Mesh
Split Mesh
Remove Top
Remove Bottom
Operate On:
0 / 100
1 Object Selected
Grid = 100,0
Animate
Click and drag up-and-down to zoom in and out
0

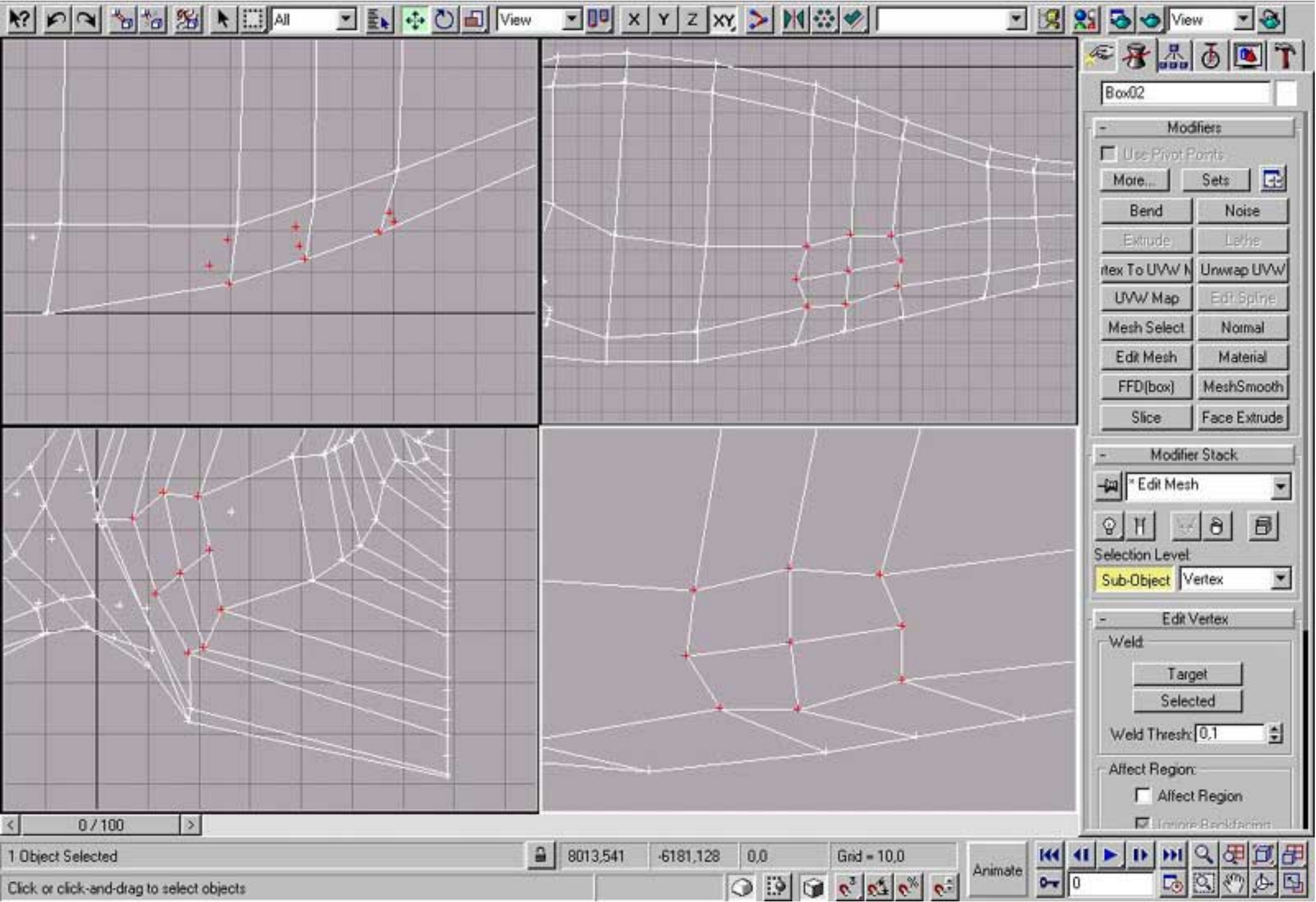

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Point
More...
Sets
Bend
Noise
Extrude
Lathe
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Slice
Selection Level:
Sub-Object
Slice Plane
Slice Parameters
Slice Type:
Refine Mesh
Split Mesh
Remove Top
Remove Bottom
Operate On:
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out

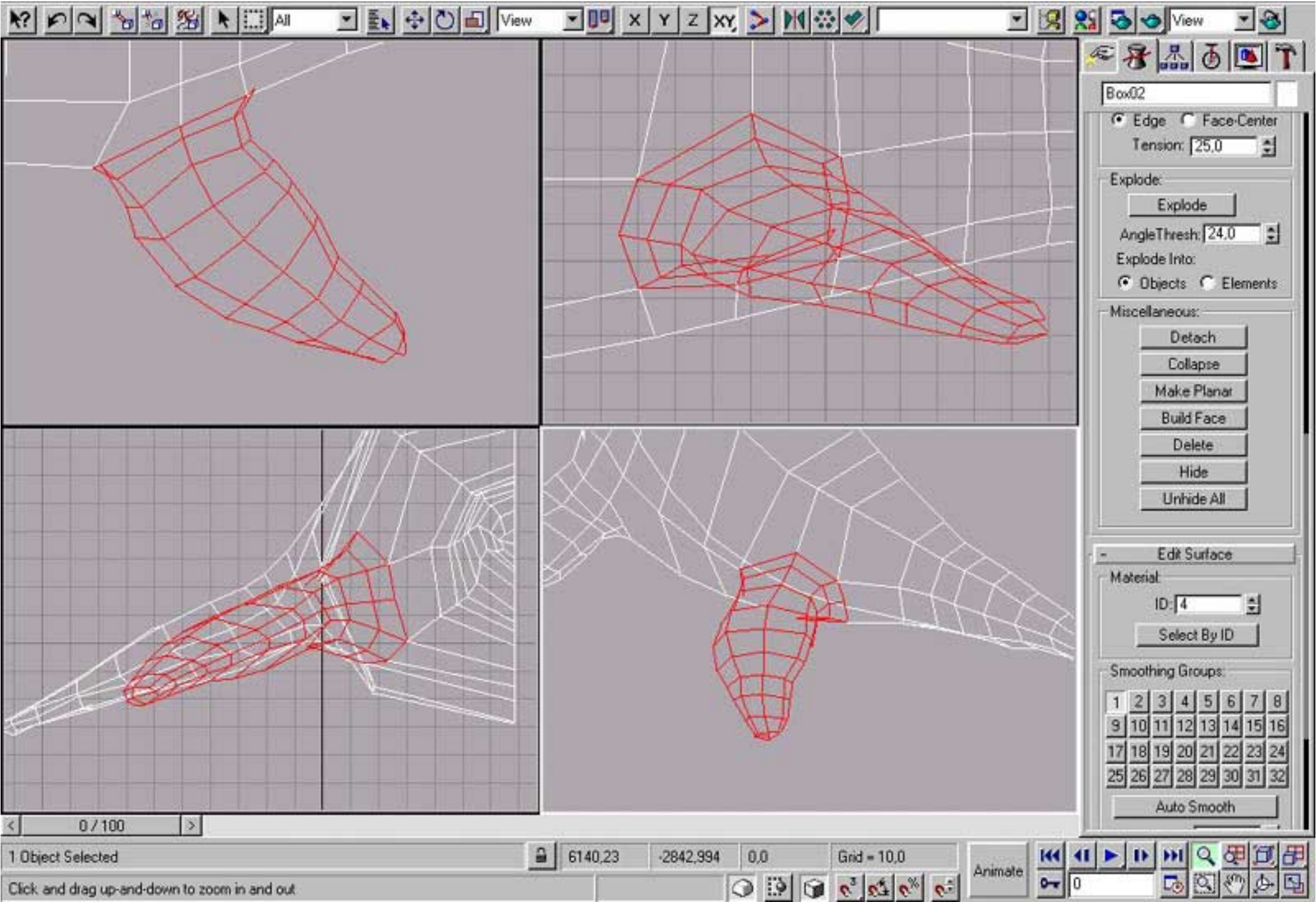

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Slice
Selection Level:
Sub-Object
Slice Plane
Slice Parameters
Slice Type:
Refine Mesh
Split Mesh
Remove Top
Remove Bottom
Operate On:
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

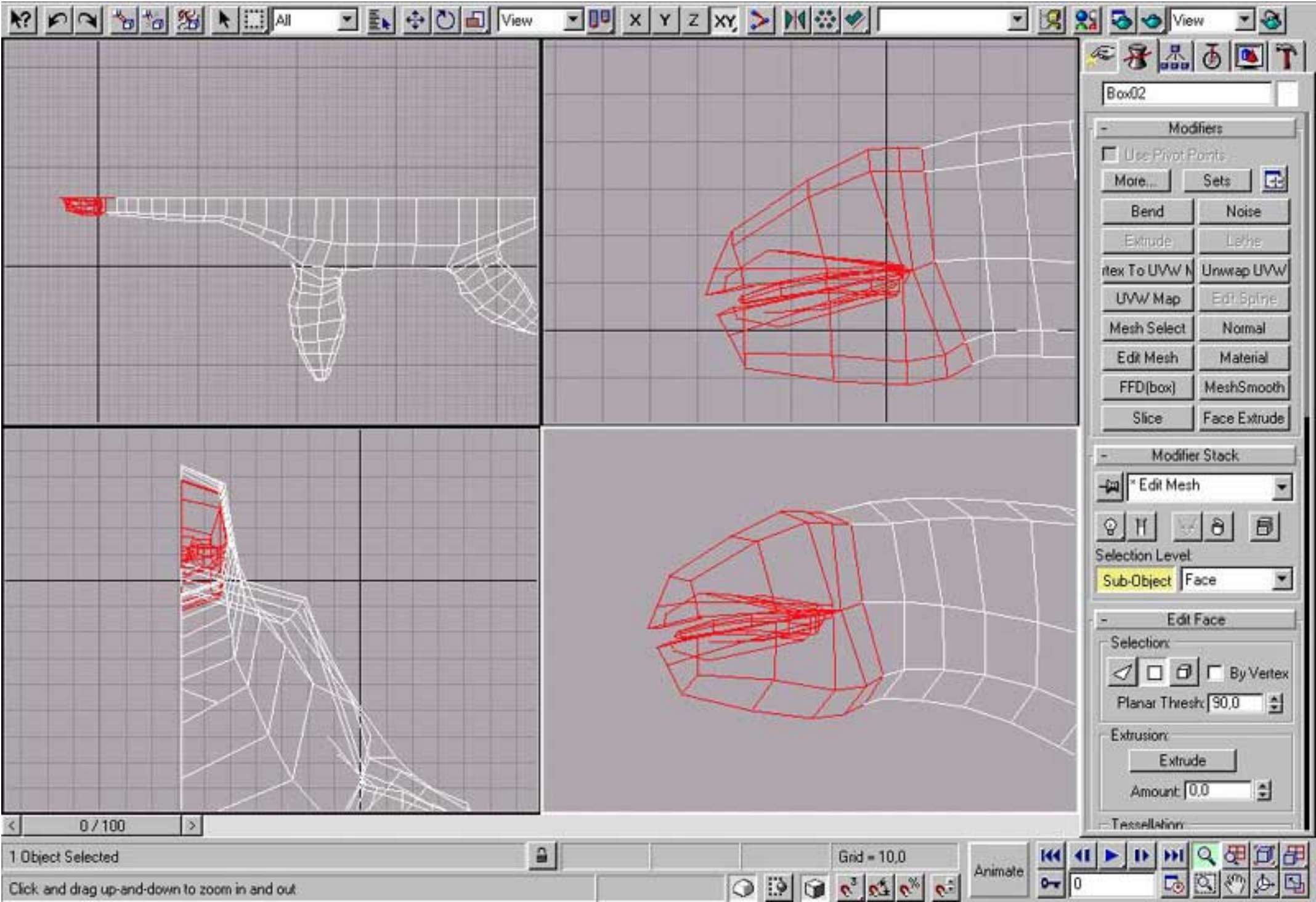

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

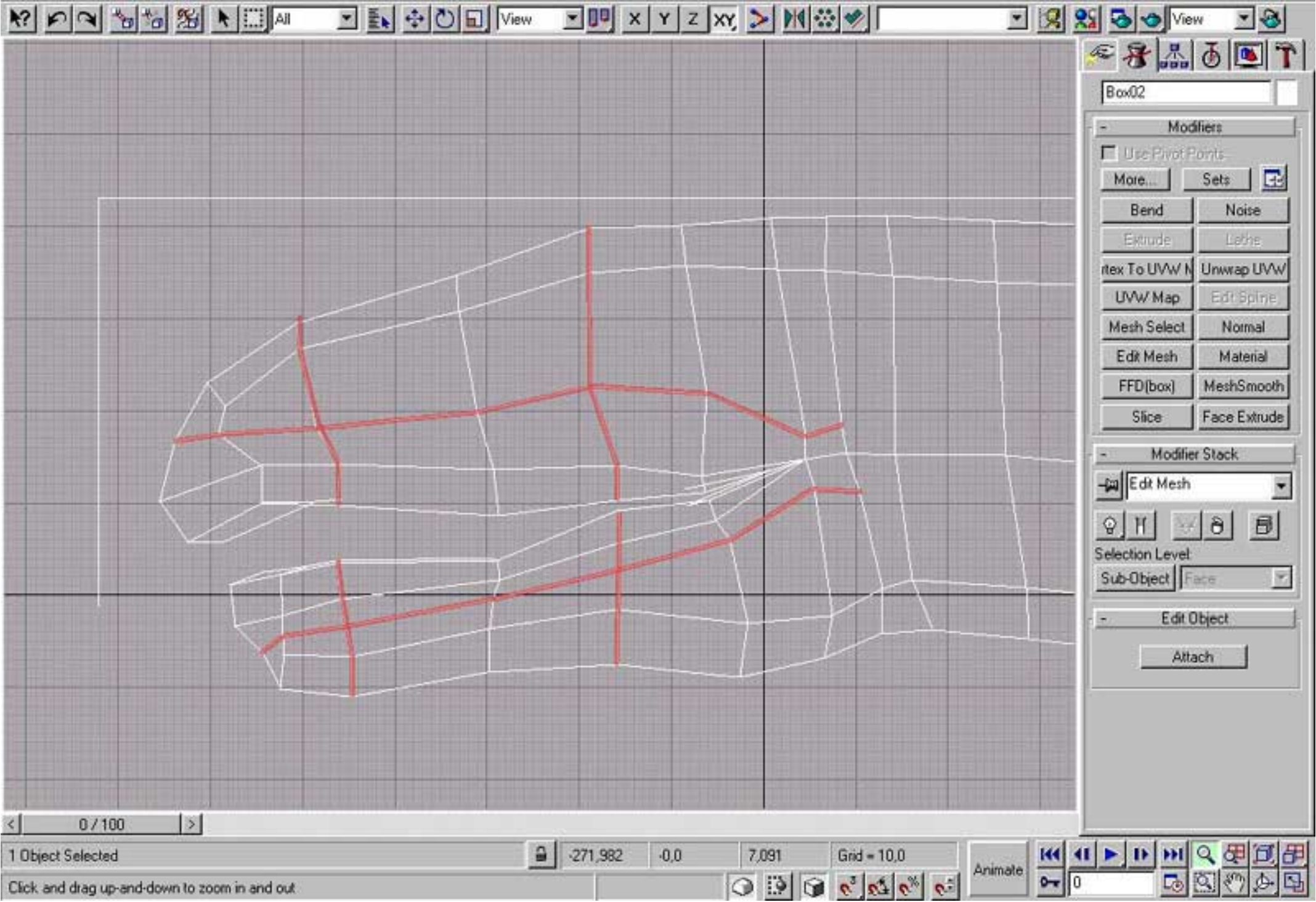

All
View
X
Y
Z
XY
View
Box02
Explode:
Explode
AngleThresh: 24,0
Explode Into:
Objects
Elements
Miscellaneous:
Detach
Collapse
Make Planar
Build Face
Delete
Hide
Unhide All
Edit Surface
Material:
ID:
Select By ID
Smoothing Groups:
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
Auto Smooth
Threshold: 30,0
Select By Smooth Group
0 / 100
1 Object Selected
2901,342
-3891,421
0,0
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out

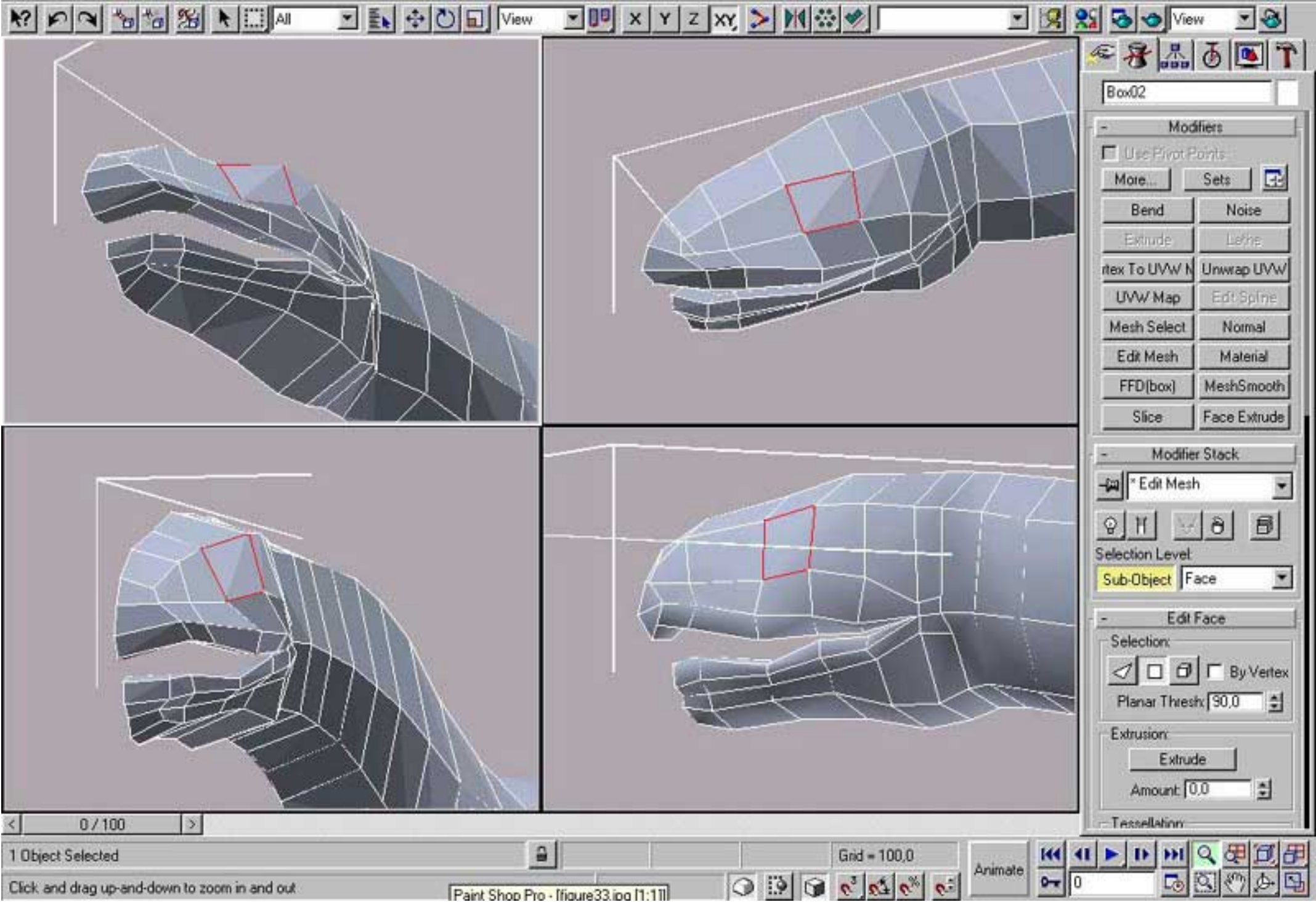

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
Tessellation
0 / 100
1 Object Selected
4026,918
-3568,324
0,0
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

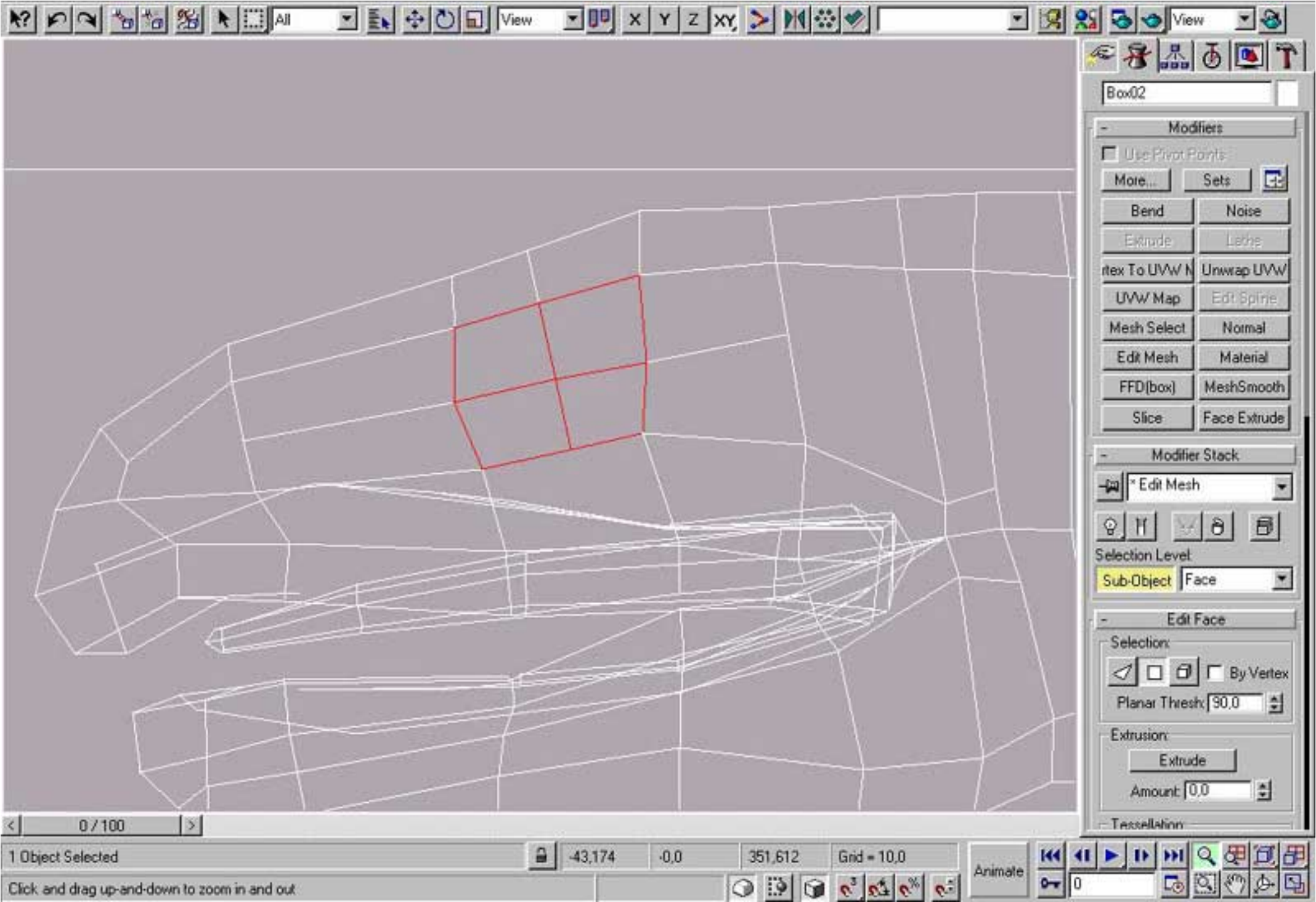

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Vertex
Edit Vertex
Weld
Target
Selected
Weld Thresh: 0,1
Affect Region:
Affect Region
0 / 100
1 Object Selected
8013,541
-6181,128
0,0
Grid = 10,0
Animate
Click or click-and-drag to select objects
0

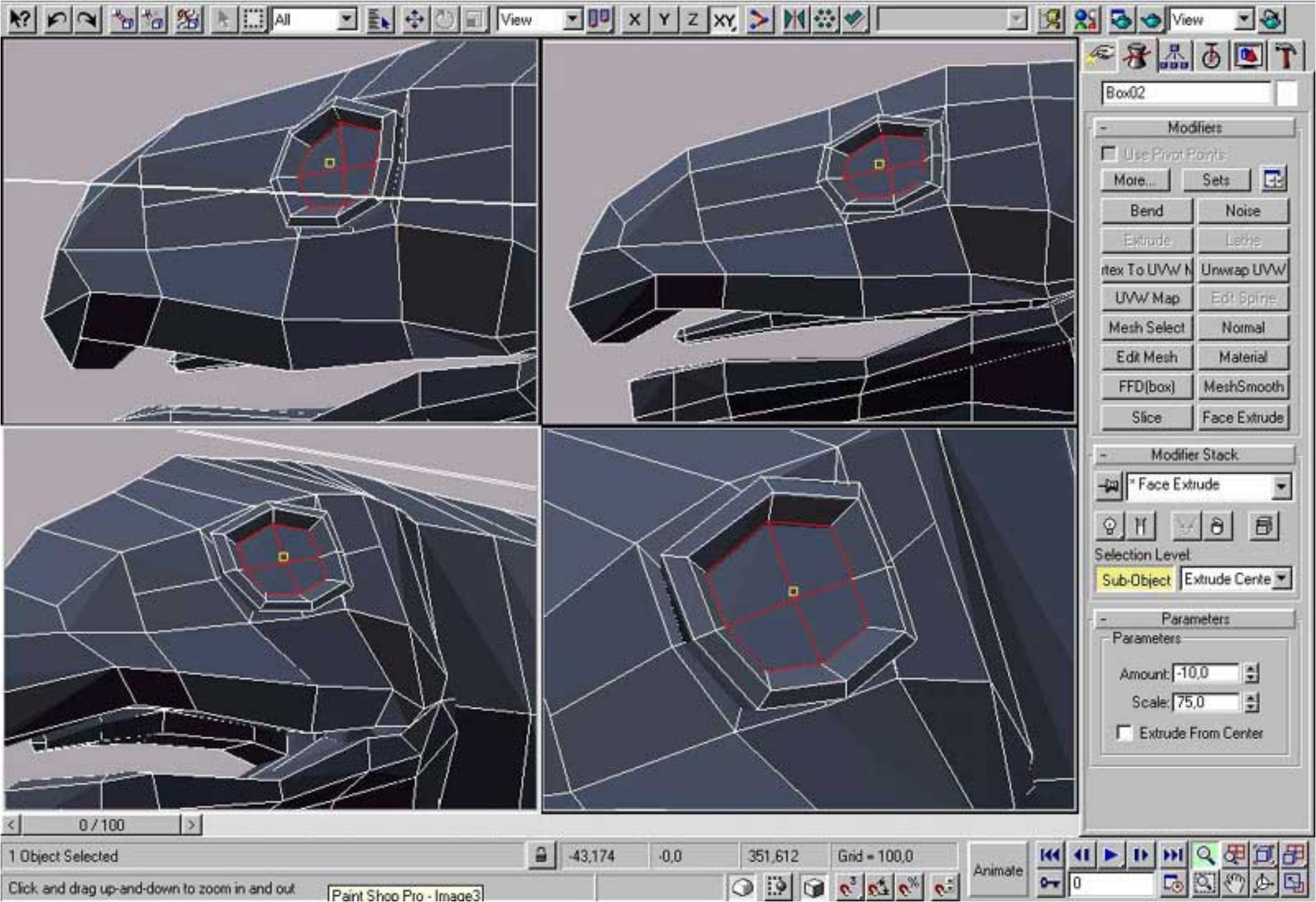

All
View
X
Y
Z
XY
View
Box02
Edge
Face-Center
Tension: 25,0
Explode:
Explode
AngleThresh: 24,0
Explode Into:
Objects
Elements
Miscellaneous:
Detach
Collapse
Make Planar
Build Face
Delete
Hide
Unhide All
Edit Surface
Material:
ID: 4
Select By ID
Smoothing Groups:
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
Auto Smooth
0 / 100
1 Object Selected
6140,23
-2842,994
0,0
Grid = 10,0
Animate
0
Click and drag up-and-down to zoom in and out

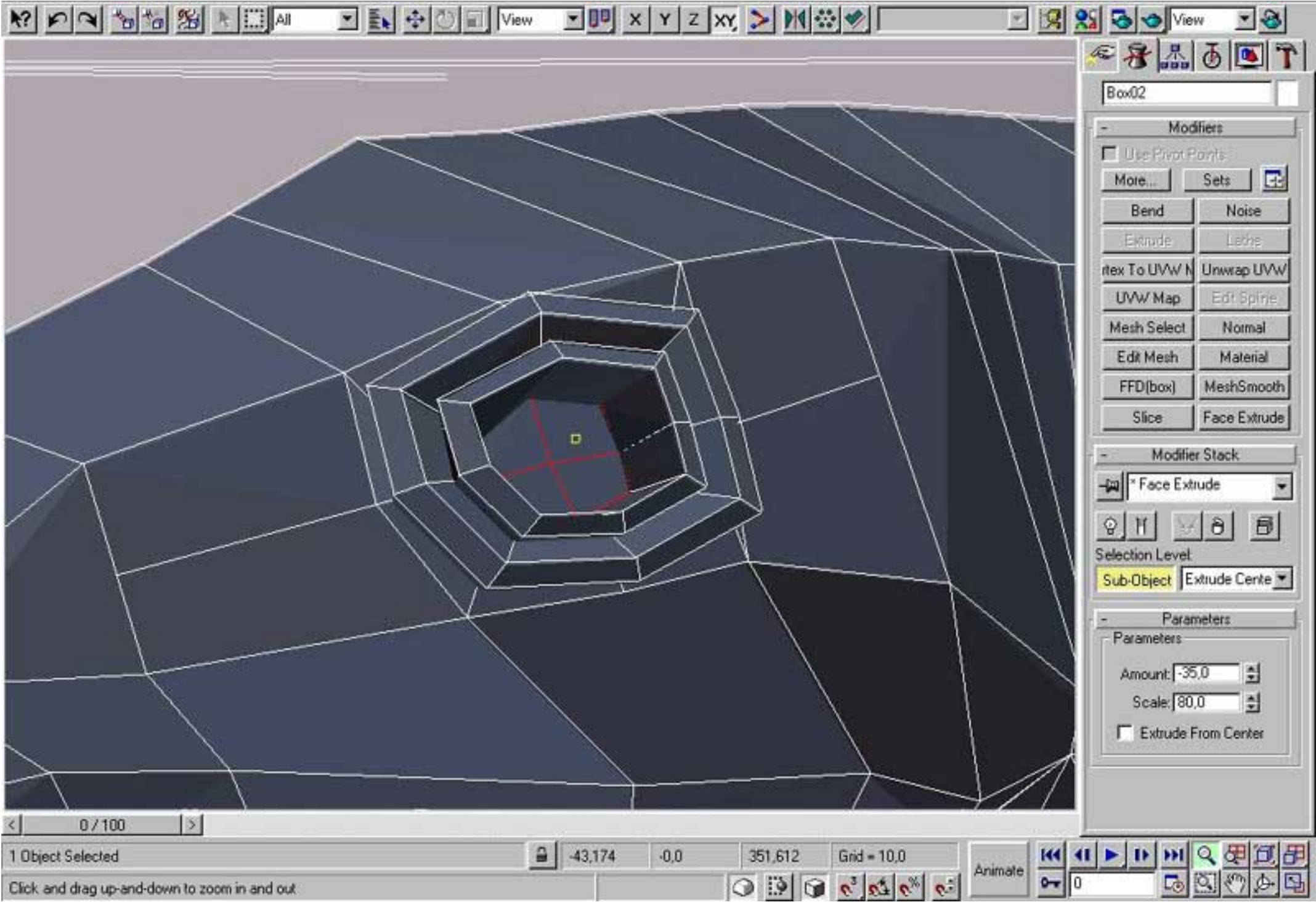

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Point
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
Tessellation
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out

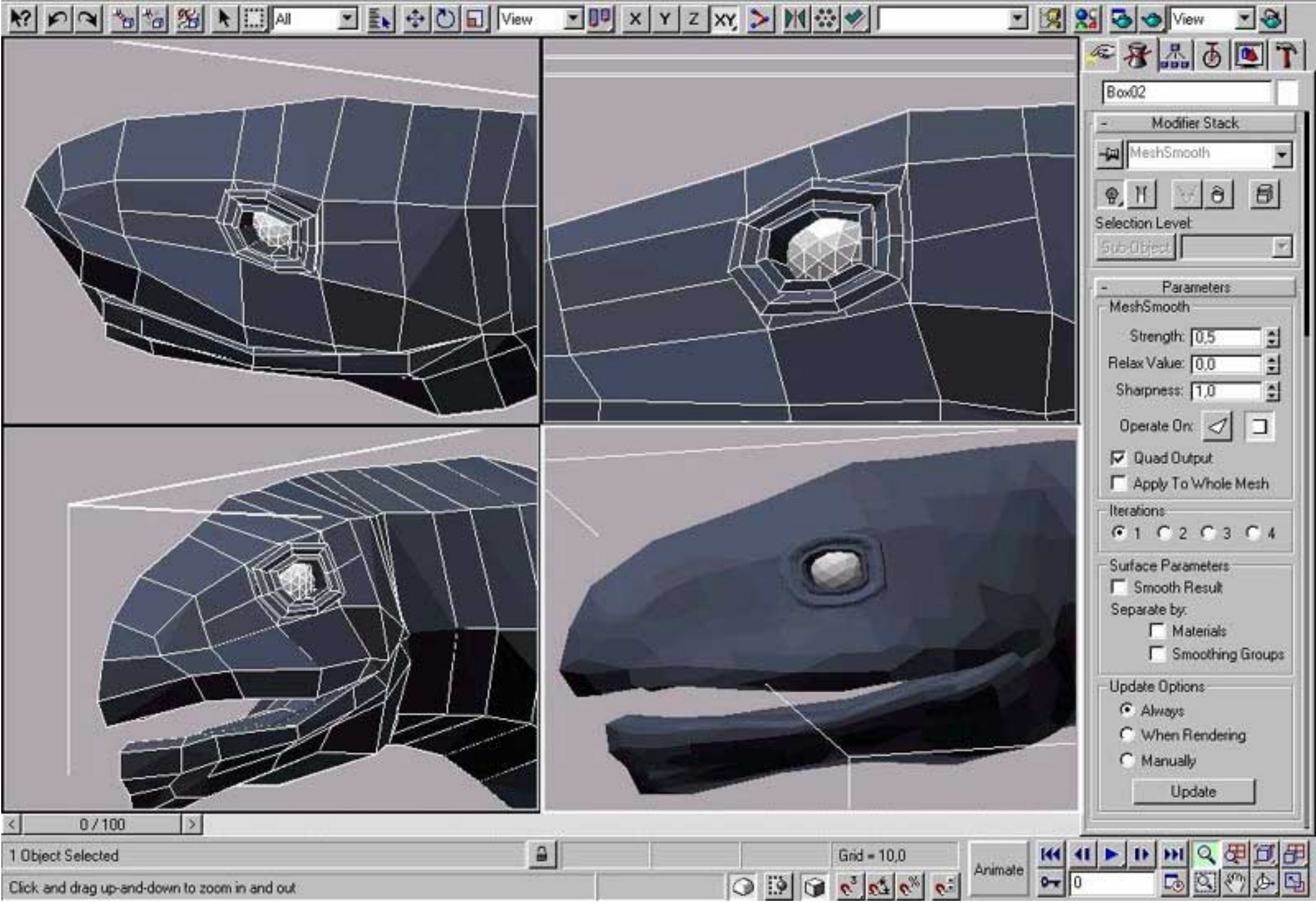

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Face
Edit Object
Attach
0 / 100
1 Object Selected
-271,982
-0,0
7,091
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

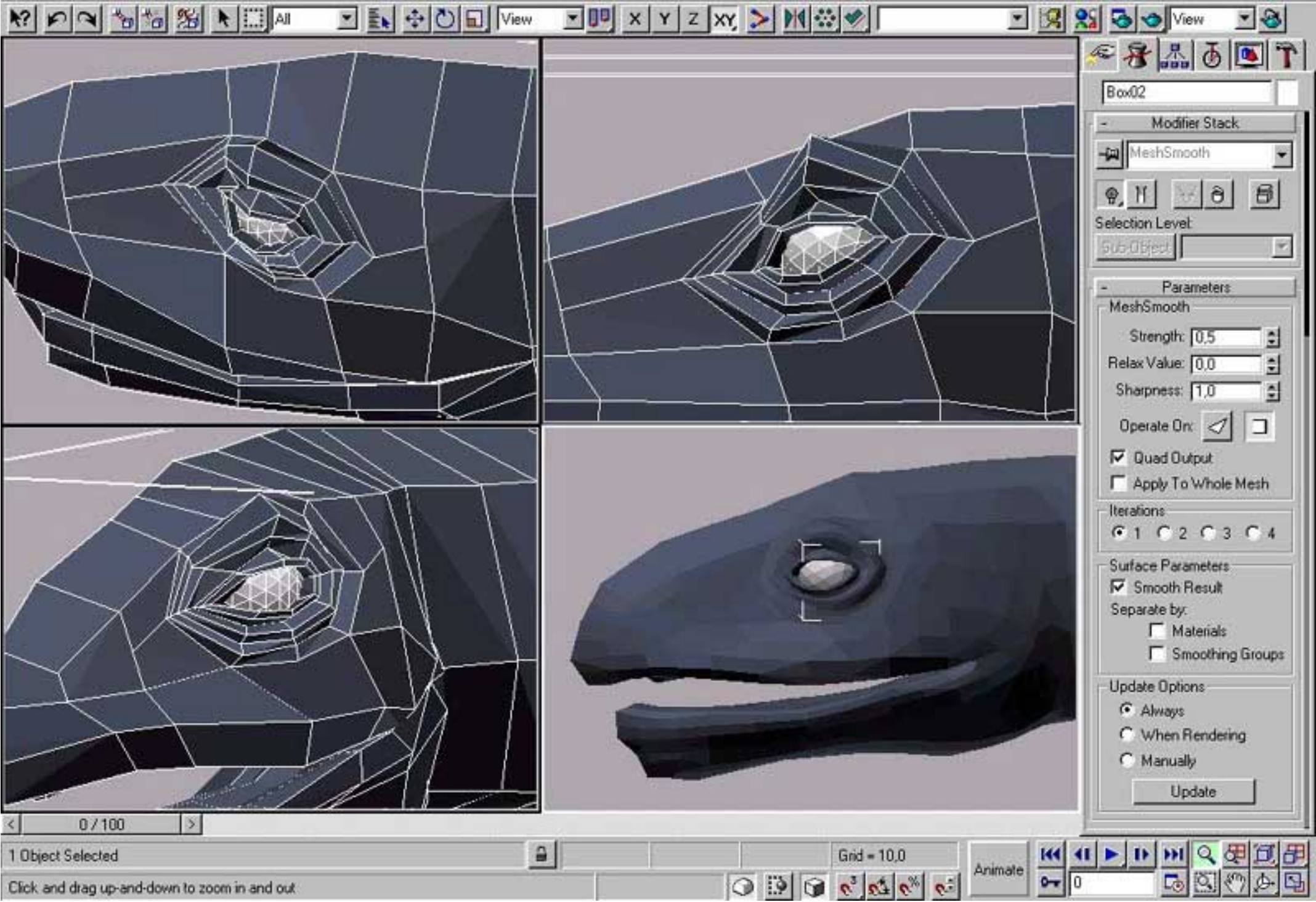

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
0 / 100
1 Object Selected
Grid = 100,0
Animate
Click and drag up-and-down to zoom in and out
Paint Shop Pro - [figure33.jpg [1:1]]

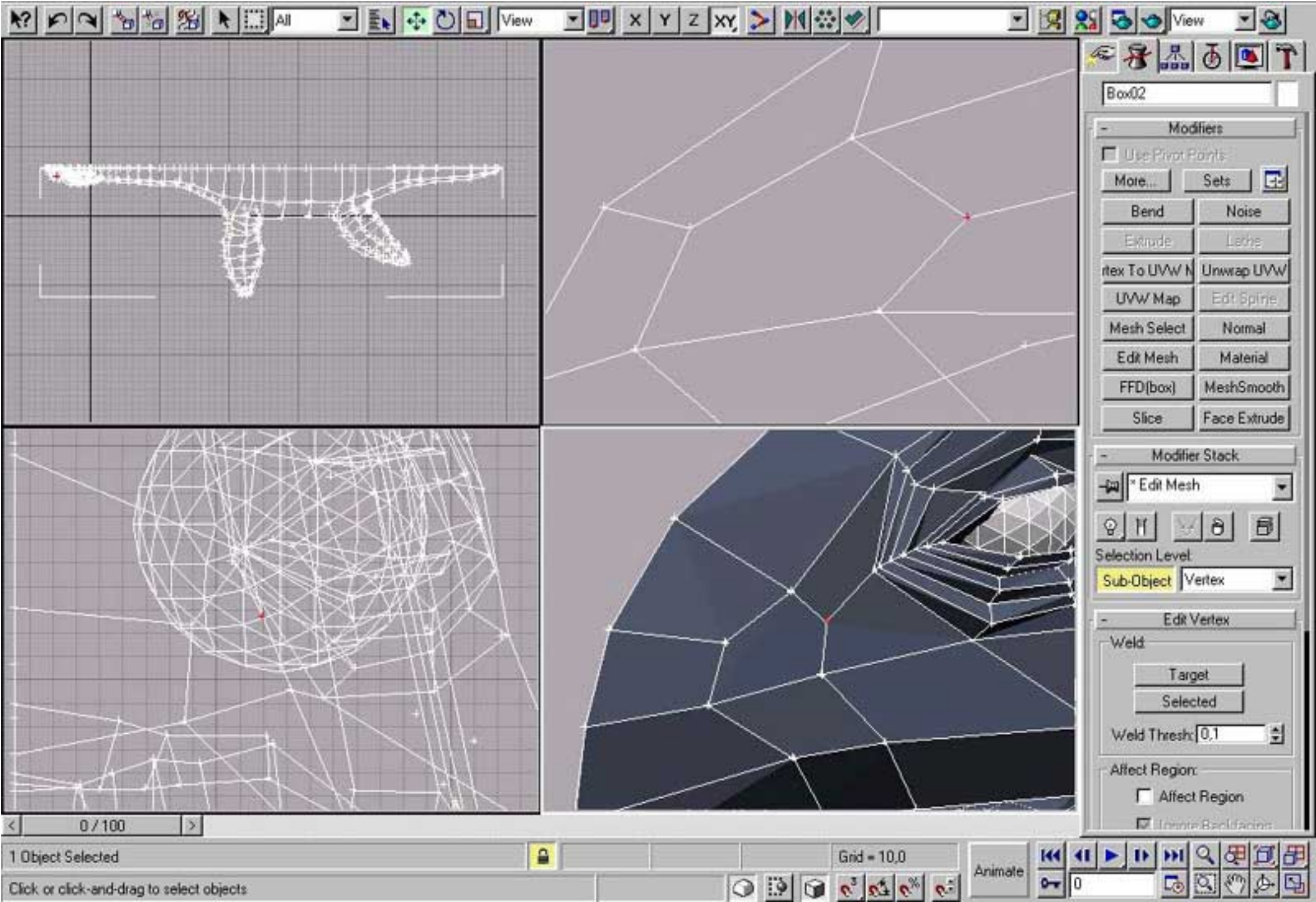

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
Tessellation
0 / 100
1 Object Selected
-43,174
-0,0
351,612
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

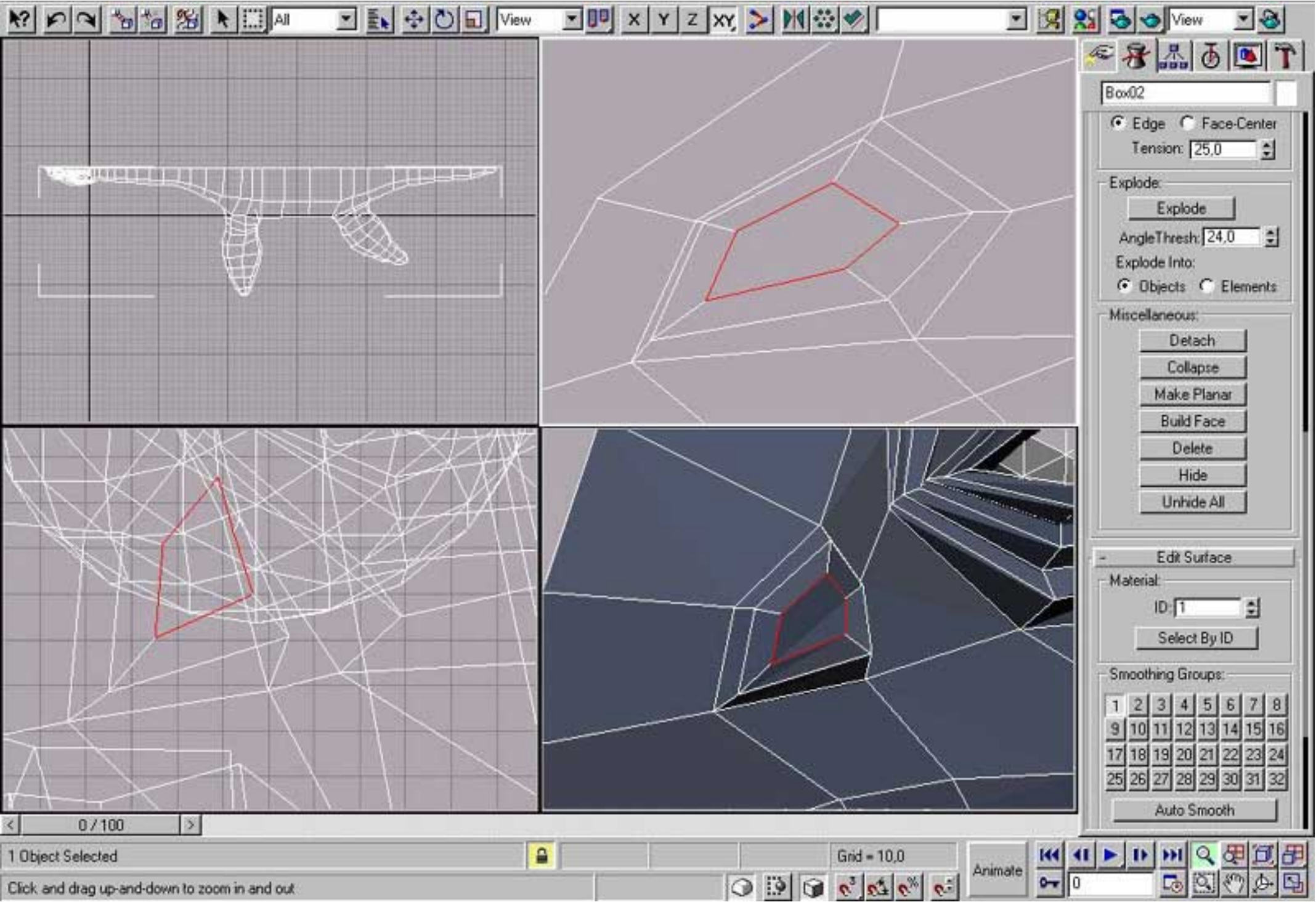

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Face Extrude
Selection Level:
Sub-Object
Extrude Cente
Parameters
Parameters
Amount: -10,0
Scale: 75,0
Extrude From Center
0 / 100
1 Object Selected
-43,174
-0,0
351,612
Grid = 100,0
Animate
Click and drag up-and-down to zoom in and out
Paint Shop Pro - Image3
0

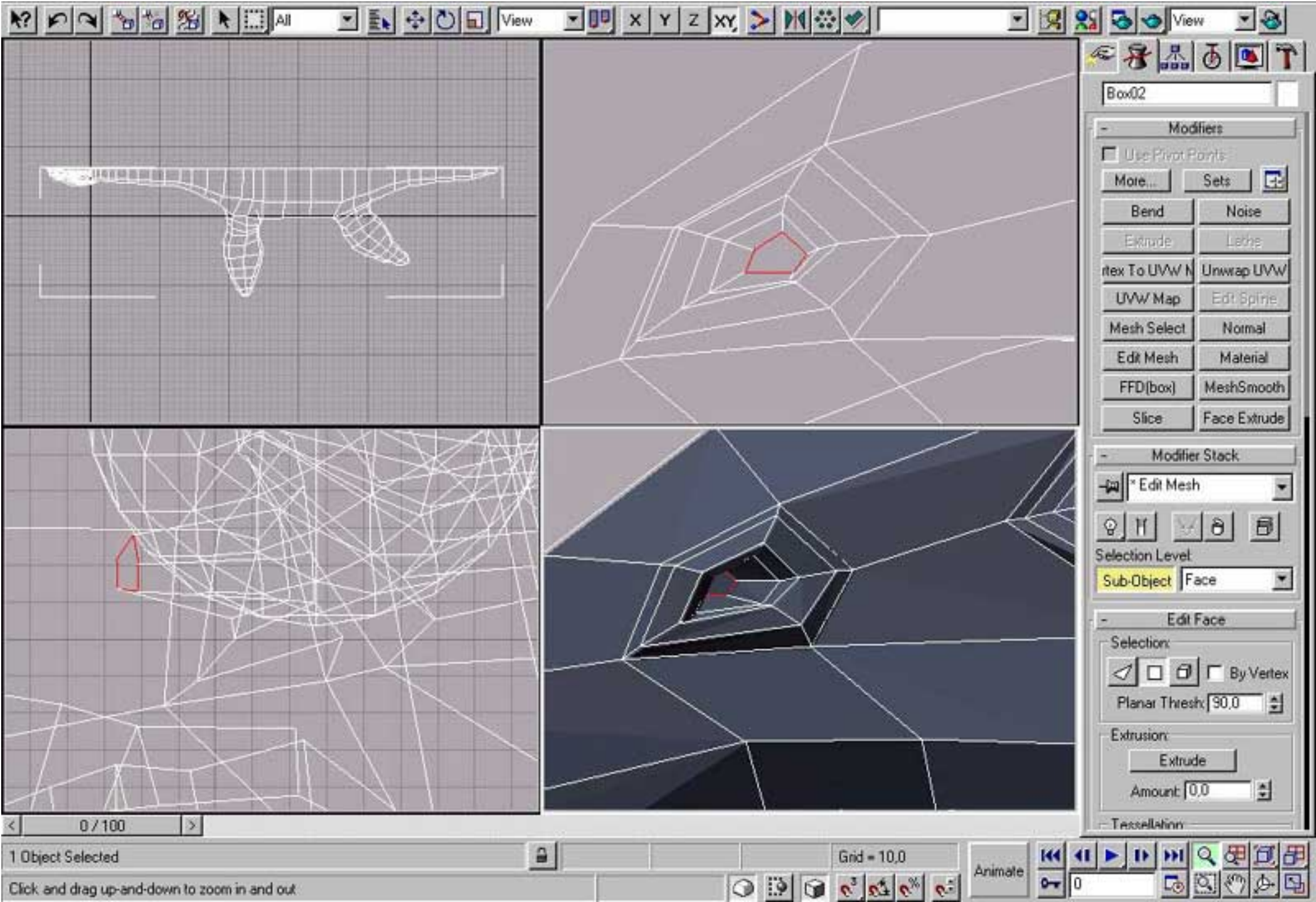

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Face Extrude
Selection Level:
Sub-Object
Extrude Cente
Parameters
Parameters
Amount: -35,0
Scale: 80,0
Extrude From Center
0 / 100
1 Object Selected
-43,174
-0,0
351,612
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

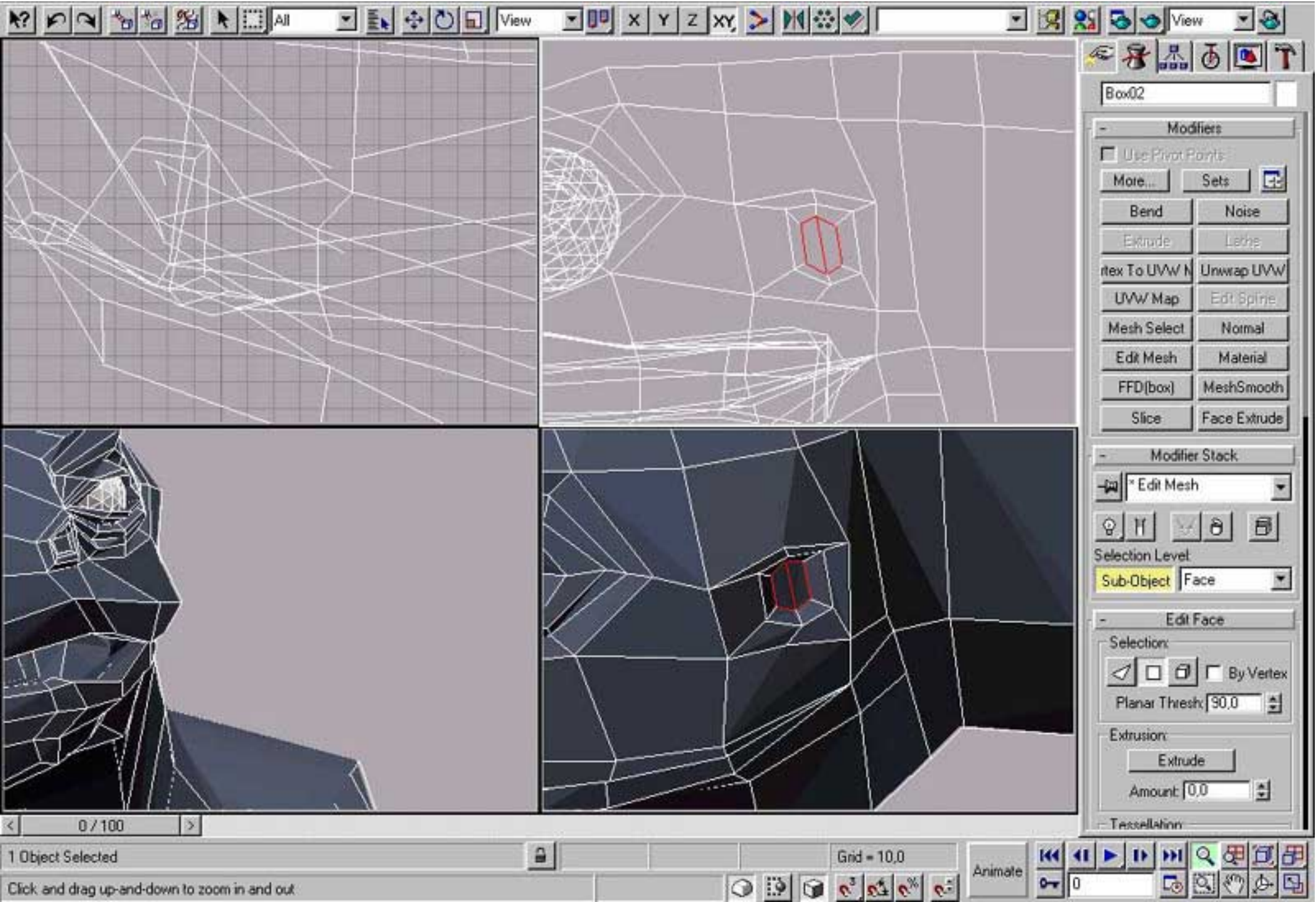

All
View
X
Y
Z
XY
View
Box02
Modifier Stack
MeshSmooth
Selection Level:
Sub-Object
Parameters
MeshSmooth
Strength: 0,5
Relax Value: 0,0
Sharpness: 1,0
Operate On:
Quad Output
Apply To Whole Mesh
Iterations
1 2 3 4
Surface Parameters
Smooth Result
Separate by:
Materials
Smoothing Groups
Update Options
Always
When Rendering
Manually
Update
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out

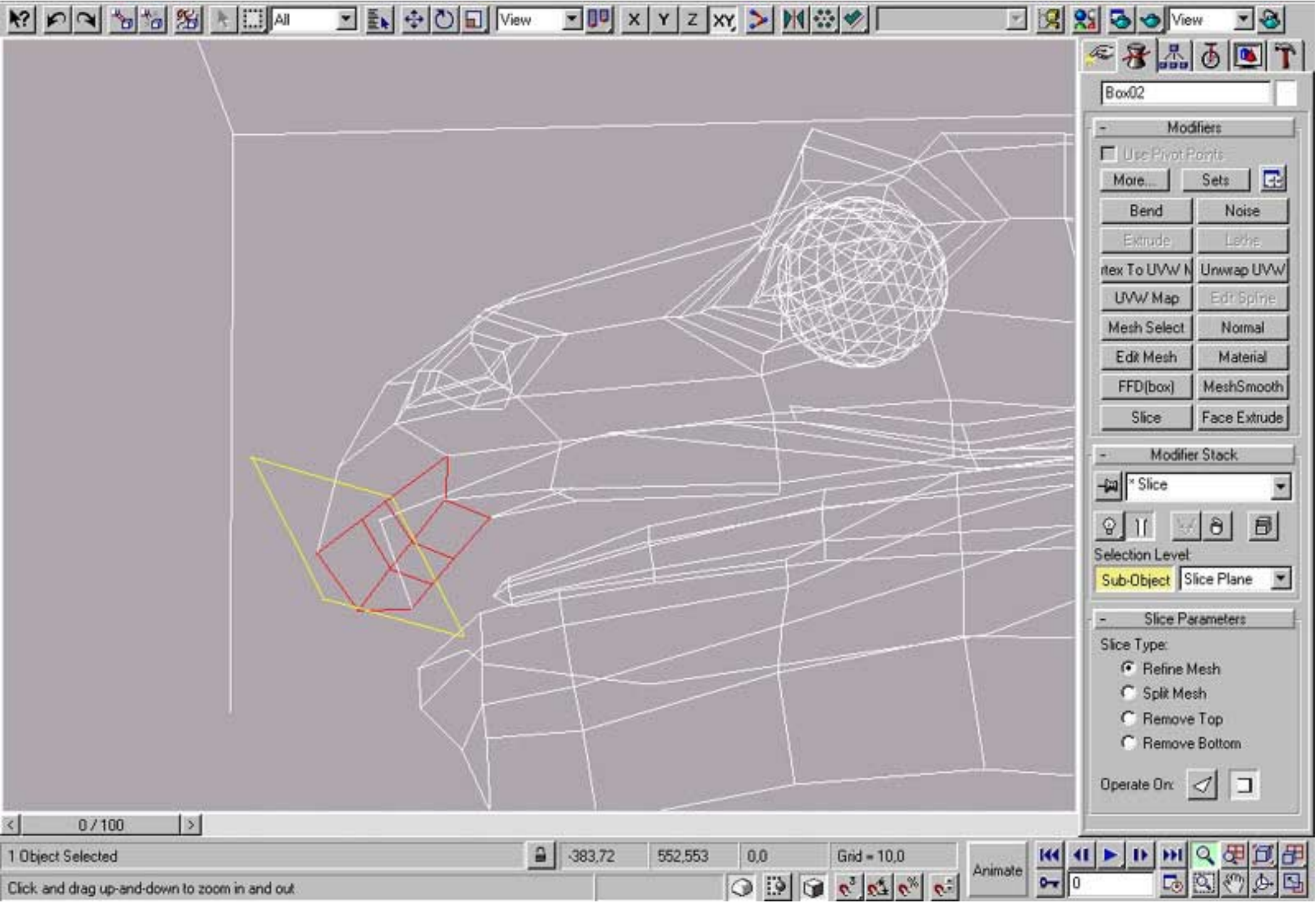

All
View
X
Y
Z
XY
View
Box02
Modifier Stack
MeshSmooth
Selection Level:
Sub-Object
Parameters
MeshSmooth
Strength: 0,5
Relax Value: 0,0
Sharpness: 1,0
Operate On:
Quad Output
Apply To Whole Mesh
Iterations
1 2 3 4
Surface Parameters
Smooth Result
Separate by:
Materials
Smoothing Groups
Update Options
Always
When Rendering
Manually
Update
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out

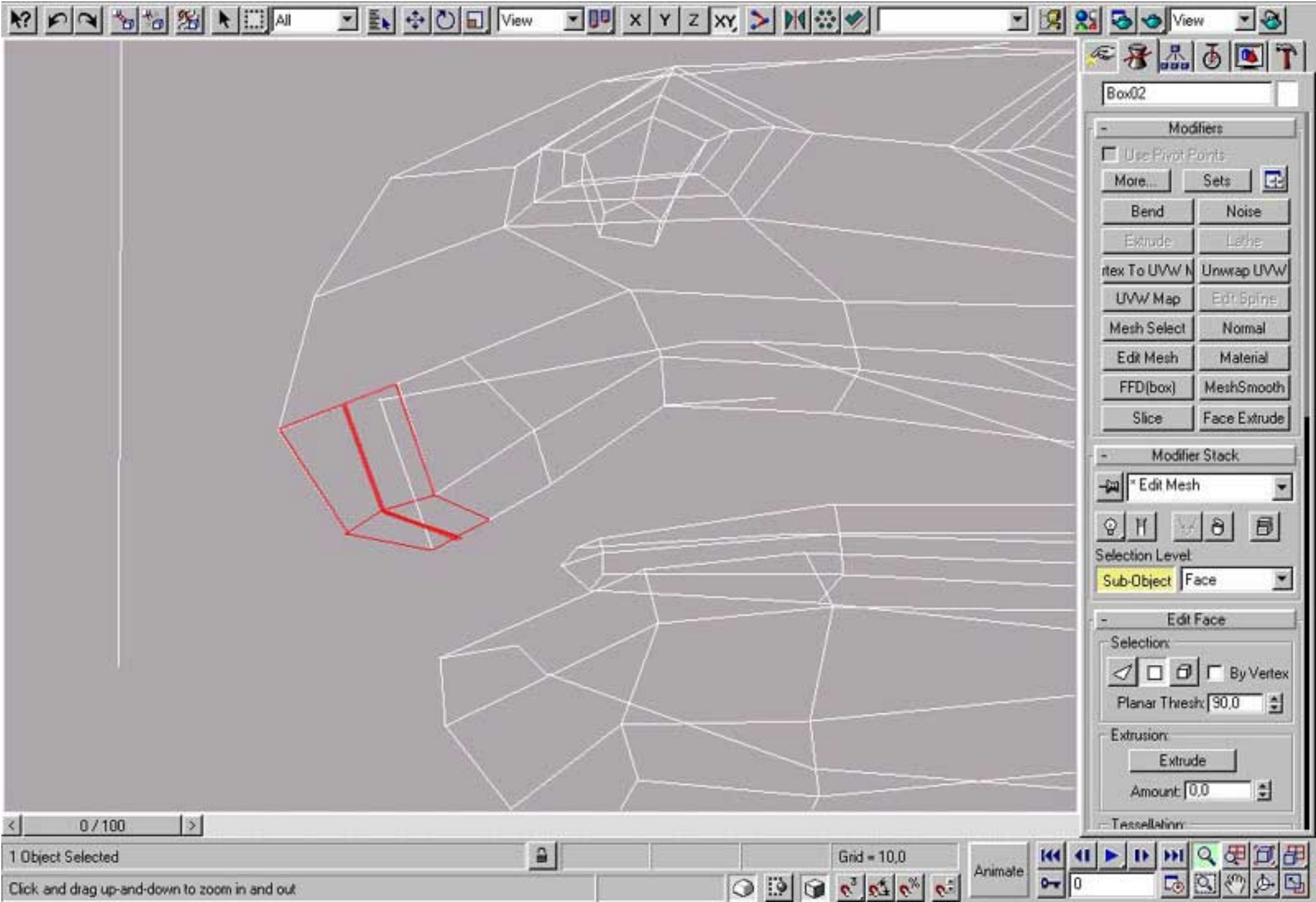

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Vertex
Edit Vertex
Weld
Target
Selected
Weld Thresh: 0,1
Affect Region:
Affect Region
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click or click-and-drag to select objects
0

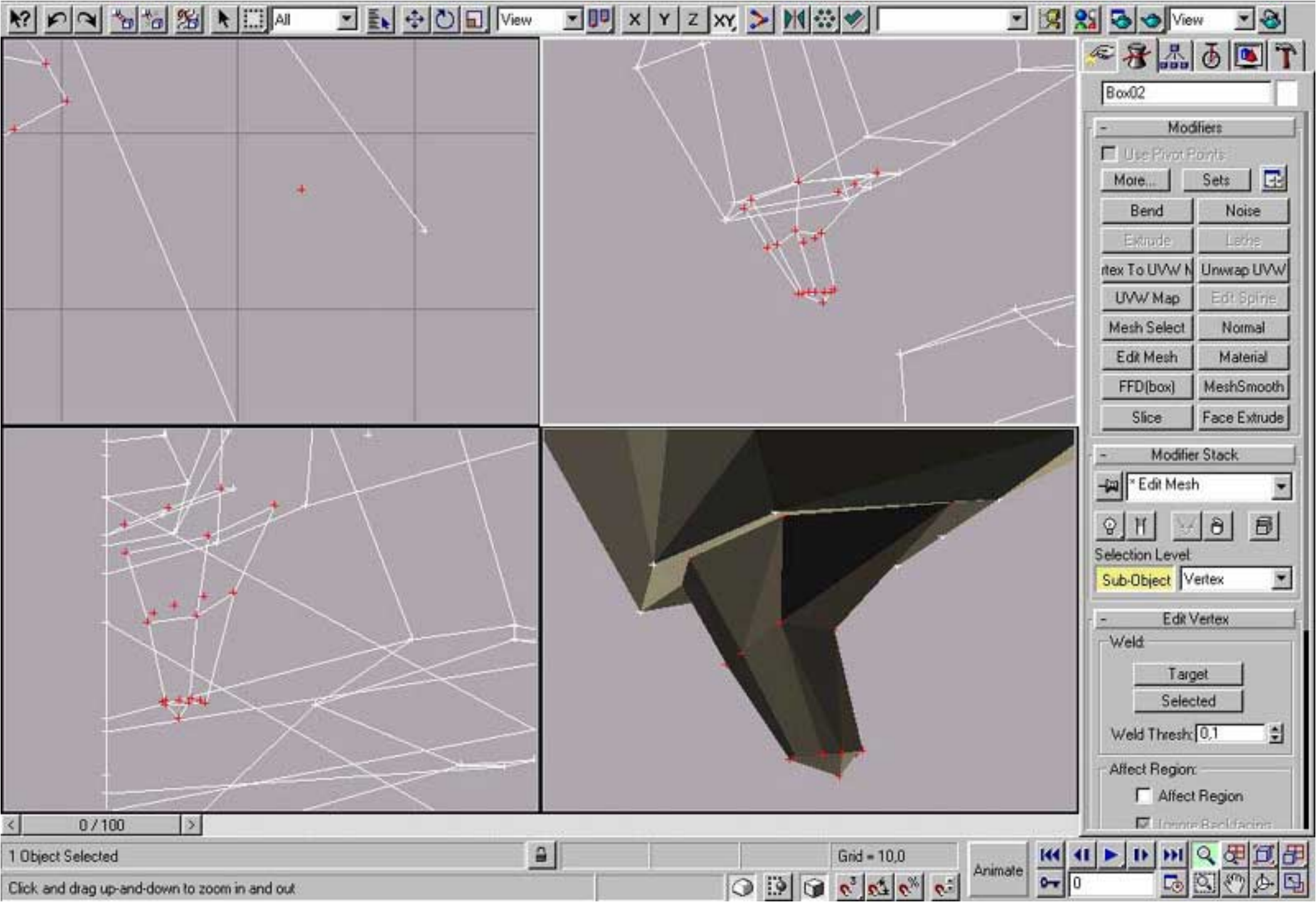

All
View
X
Y
Z
XY
View
Box02
Edge
Face-Center
Tension: 25,0
Explode:
Explode
AngleThresh: 24,0
Explode Into:
Objects
Elements
Miscellaneous:
Detach
Collapse
Make Planar
Build Face
Delete
Hide
Unhide All
Edit Surface
Material:
ID: 1
Select By ID
Smoothing Groups:
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32
Auto Smooth
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

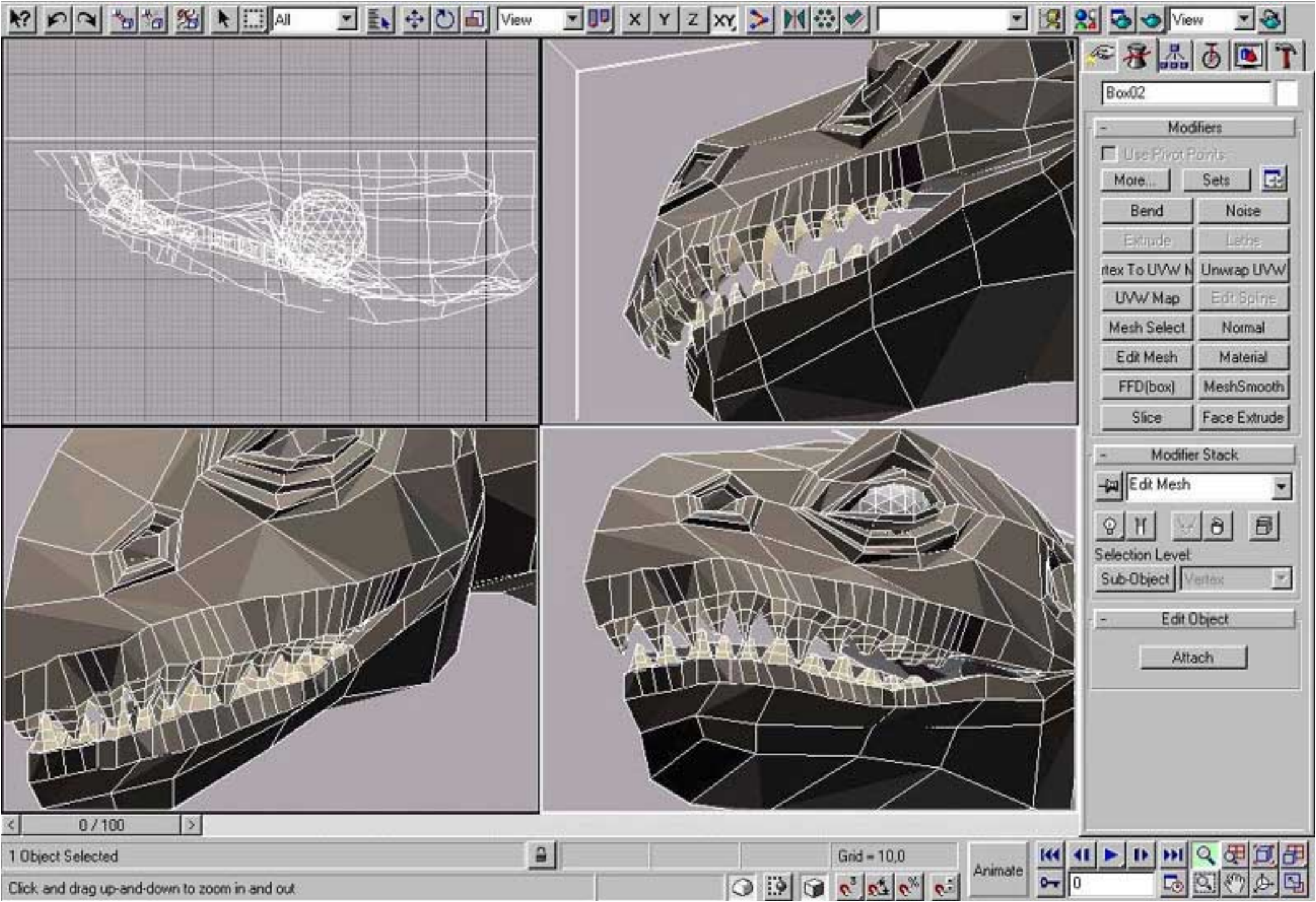

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
Tessellation
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

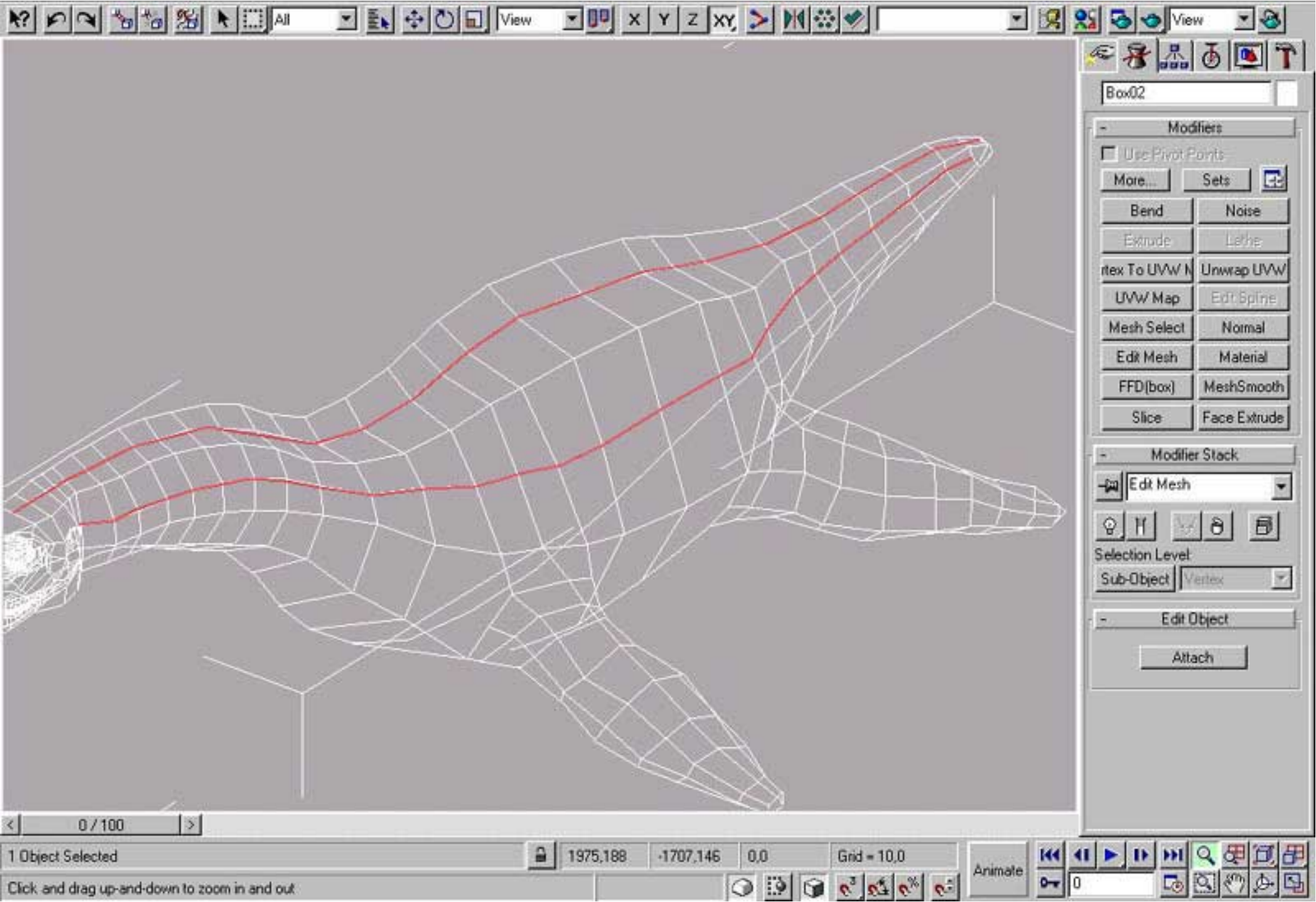

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
30,0
Extrusion:
Extrude
Amount:
0,0
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

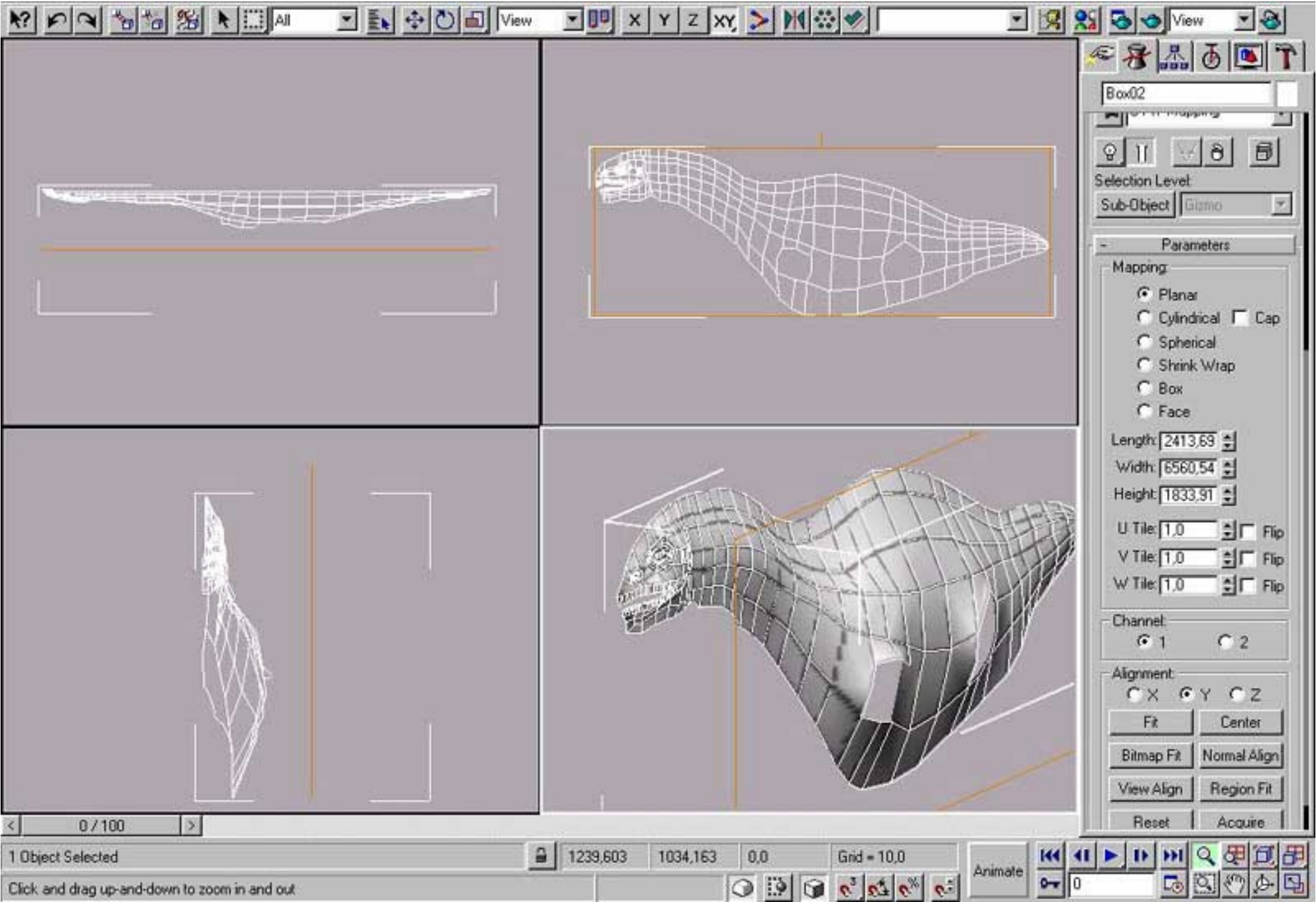

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Slice
Selection Level:
Sub-Object
Slice Plane
Slice Parameters
Slice Type:
Refine Mesh
Split Mesh
Remove Top
Remove Bottom
Operate On:
0 / 100
1 Object Selected
-383,72
552,553
0,0
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

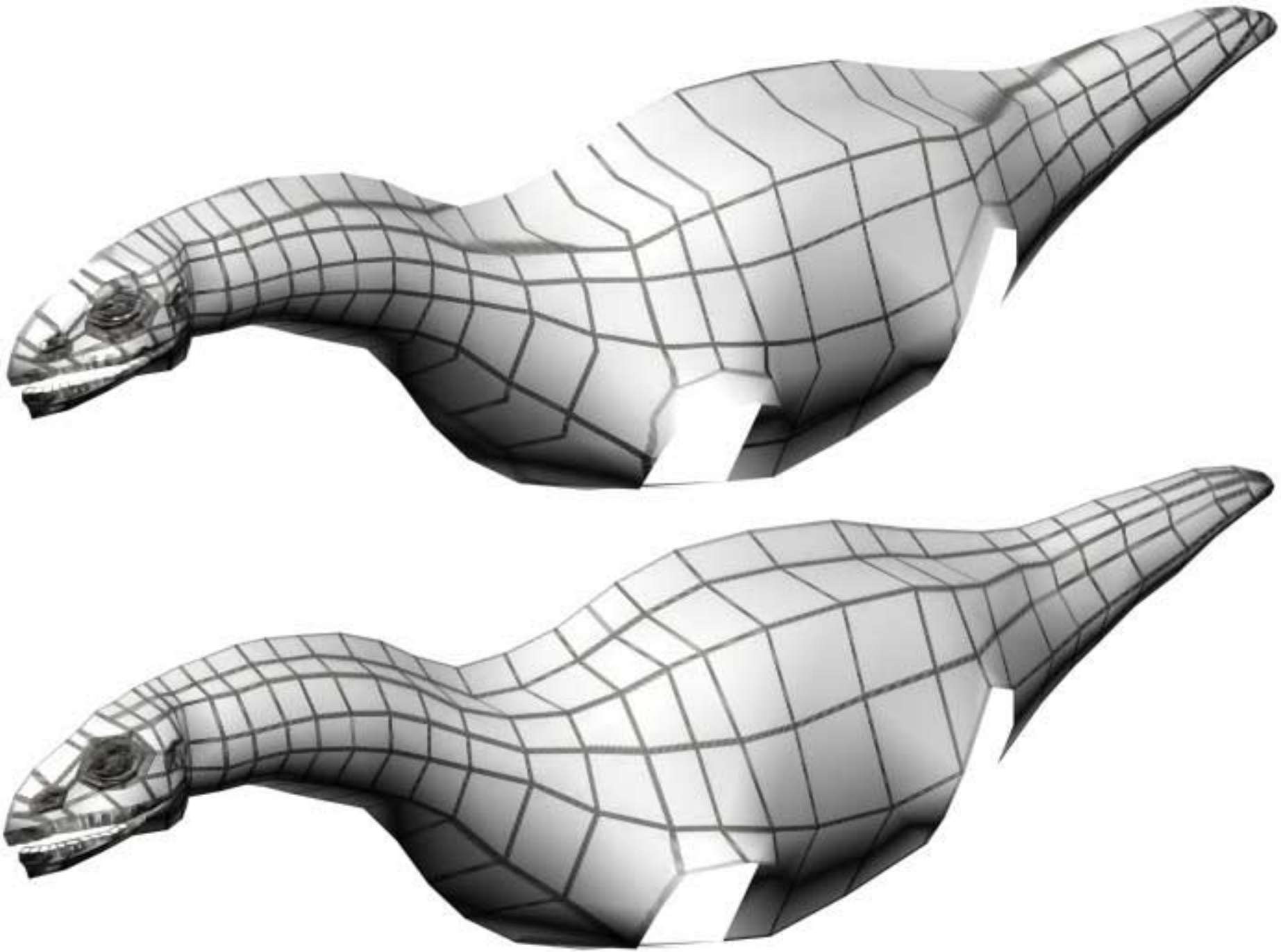

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
rtex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Face
Edit Face
Selection:
By Vertex
Planar Thresh:
90,0
Extrusion:
Extrude
Amount:
0,0
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0

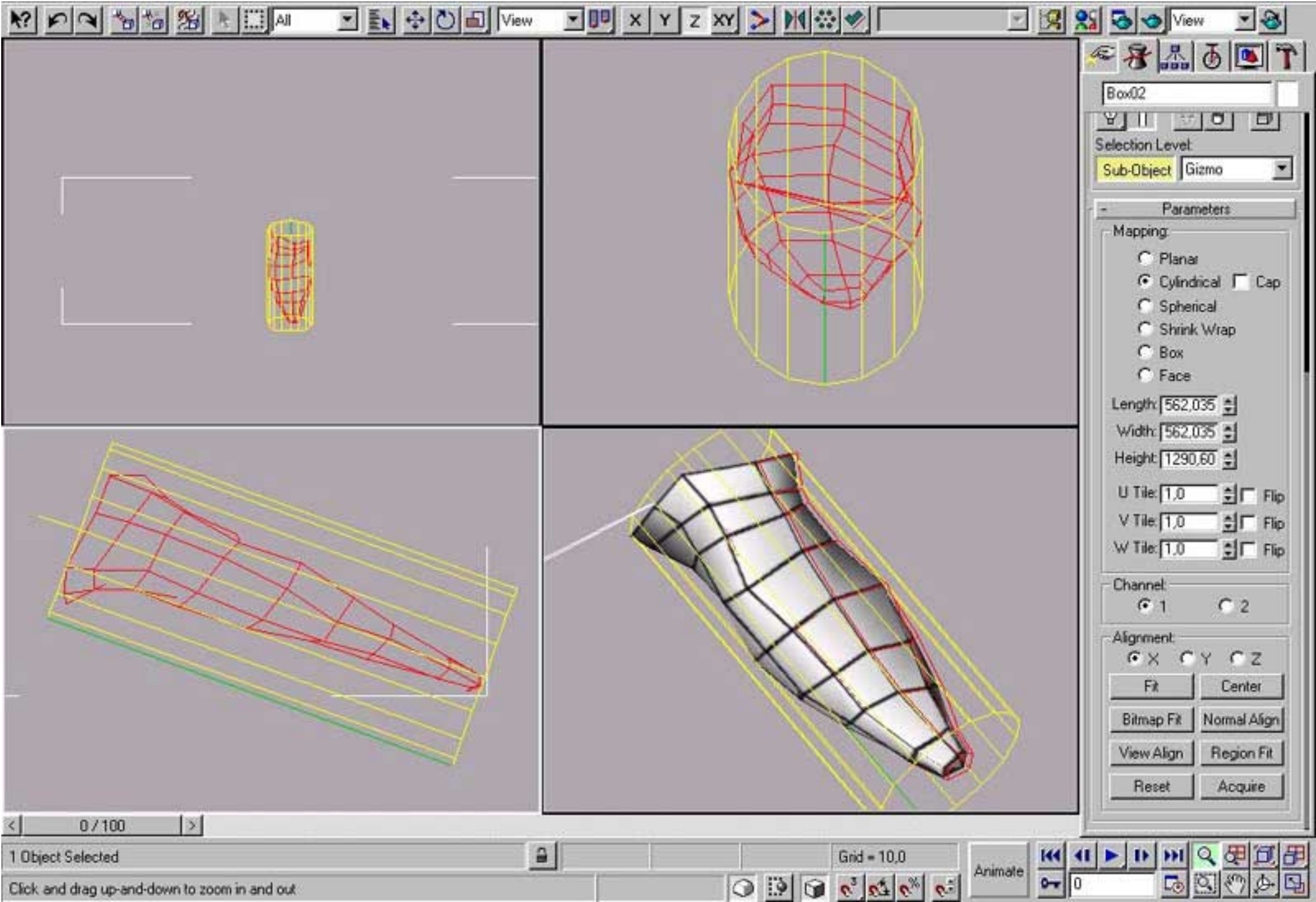

All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
* Edit Mesh
Selection Level:
Sub-Object
Vertex
Edit Vertex
Weld
Target
Selected
Weld Thresh: 0,1
Affect Region
Affect Region
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0


All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Vertex
Edit Object
Attach
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0


All
View
X
Y
Z
XY
View
Box02
Modifiers
Use Pivot Points
More...
Sets
Bend
Noise
Extrude
Lathe
itex To UVW M
Unwrap UVW
UVW Map
Edit Spline
Mesh Select
Normal
Edit Mesh
Material
FFD(box)
MeshSmooth
Slice
Face Extrude
Modifier Stack
Edit Mesh
Selection Level:
Sub-Object
Vertex
Edit Object
Attach
0 / 100
1 Object Selected
1975,188
-1707,146
0,0
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0


All
View
X
Y
Z
XY
View
Box02
Selection Level:
Sub-Object
Gizmo
Parameters
Mapping:
Planar
Cylindrical
Cap
Spherical
Shrink Wrap
Box
Face
Length: 2413,69
Width: 6560,54
Height: 1833,91
U Tile: 1,0
V Tile: 1,0
W Tile: 1,0
Flip
Flip
Flip
Channel:
1
2
Alignment:
X
Y
Z
Fit
Center
Bitmap Fit
Normal Align
View Align
Region Fit
Reset
Acquire
0 / 100
1 Object Selected
1239,603
1034,163
0,0
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0




All
View
X
Y
Z
XY
View
Box02
Selection Level:
Sub-Object
Gizmo
Parameters
Mapping:
Planar
Cylindrical
Cap
Spherical
Shrink Wrap
Box
Face
Length: 562,035
Width: 562,035
Height: 1290,60
U Tile: 1,0
Flip
V Tile: 1,0
Flip
W Tile: 1,0
Flip
Channel:
1
2
Alignment:
X
Y
Z
Fit
Center
Bitmap Fit
Normal Align
View Align
Region Fit
Reset
Acquire
0 / 100
1 Object Selected
Grid = 10,0
Animate
Click and drag up-and-down to zoom in and out
0