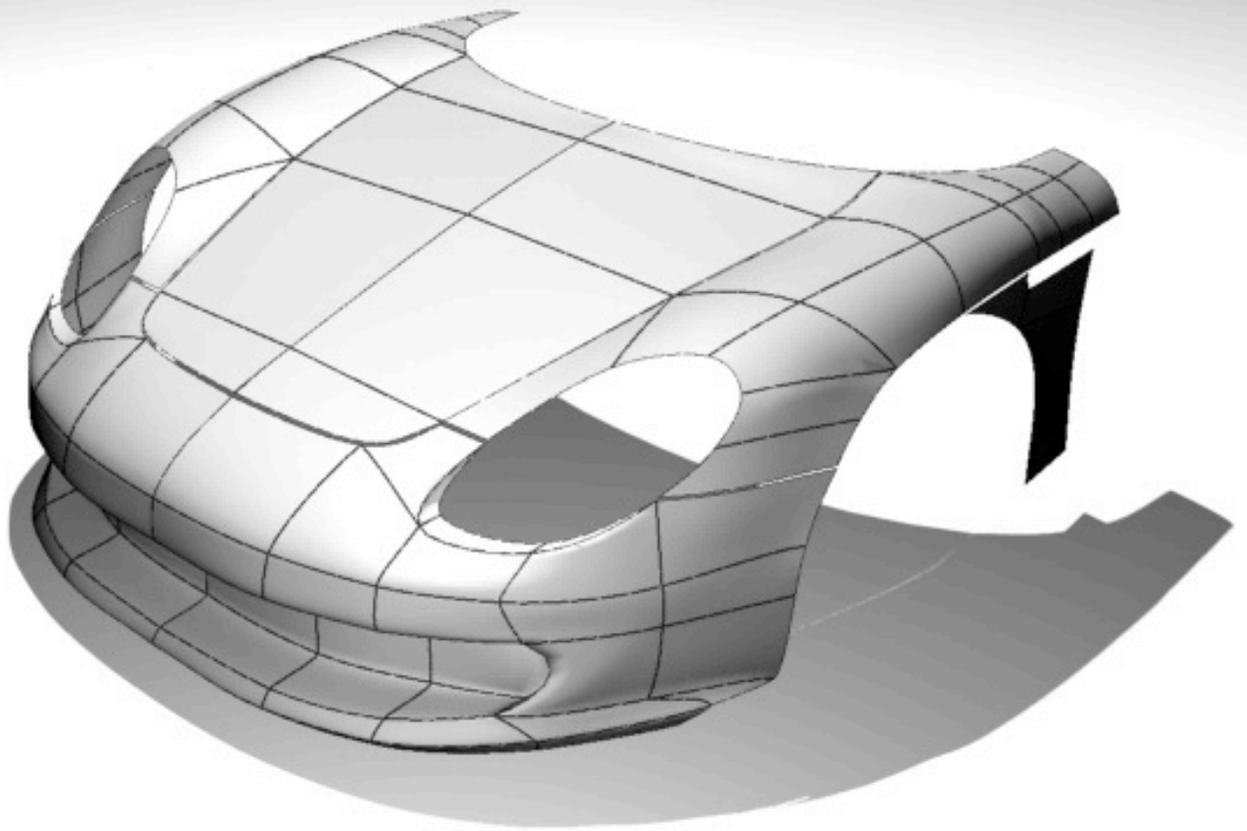




Porsche 911GT

3D modeling tutorial - by Nimish



In this tutorial you will learn to model a car using Spline modeling method. This method is not very much famous as it requires considerable amount of skill & frustration to get it done right. But mastering it would be a plus point for your future 3d modeling projects.

Hello friends, I am Nimish Rajwade & just like you I am also very much interested in car modeling. I am writing this tutorial to help newbies understand the concept of 3d modeling in a systematic way. My approach in explaining you the concept would be step by step & hence easy to understand.

Ever asked yourself in which fields car modeling is done? Well, I shall tell you. Car modeling is done in the fields of design, illustration, gaming, animation & special effects, & the list will go on mounting with creativity & ideas. But yes, modeling in different fields is done differently as per the requirement. Take for example; in games, low-poly models are used & most of the detailed effects are left to the textures. This helps faster & smoother game play. But if you are talking about design for manufacturing, then solid modeling is the preferred technique as it yields better results (smooth surface) in the manufactured product.

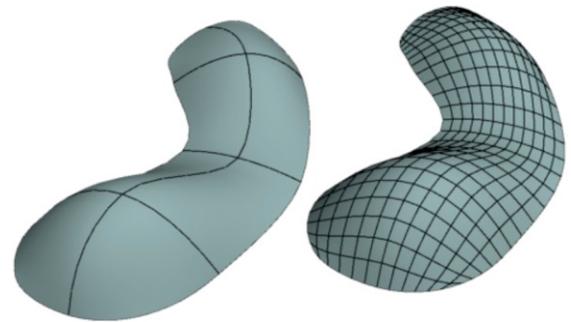
I am using 3dsMax software & I hope you are already thorough with the basics of viewport manipulation; I mean the zooming, panning, rotating, & more things related to it. And yes, do make a point to use the shortcut keys. That will help you save lot of time. If you don't know the hotkeys, don't worry; just go to Help > Hotkey Map & you will get to know many of them. And yes, do not ignore to learn those hotkeys if you don't know them.

In this tutorial I shall try to explain the concept of SPLINE-modeling while going about modeling the 'Porsche Carrera 911 GT'. In the previous line I used the word 'try' as some of the readers might find this tutorial less explanatory. Whatever your thoughts may be, please feel free to contact me if you have any doubts or suggestions. Mail me at nimish.rajwade@gmail.com

Now lets get to what you actually wanted to devote your time for, that is learning to model a car.

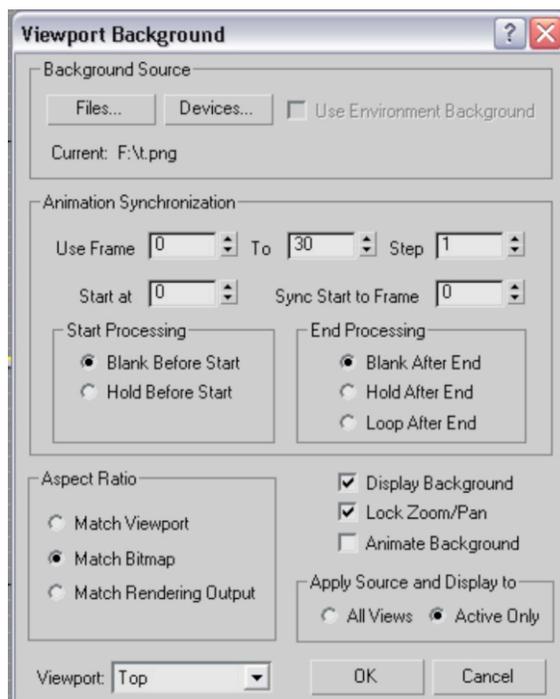
1 Surface:

There are various methods of creating a surface. In this tutorial I am using spline modeling method for creating the body surface of the car. Don't know what a spline is? No worries: I shall give you an overview of the same. In the adjoining picture you can see 2 peanut-shaped surfaces. The one on the left is created using spline modeling & the one on right, by using polygonal modeling. So now you might know that spline modeling requires you to deal with far less number of vertices than polygonal modeling. And since the 911 GT has curvy surface a lot, I decided to stick to spline modeling.

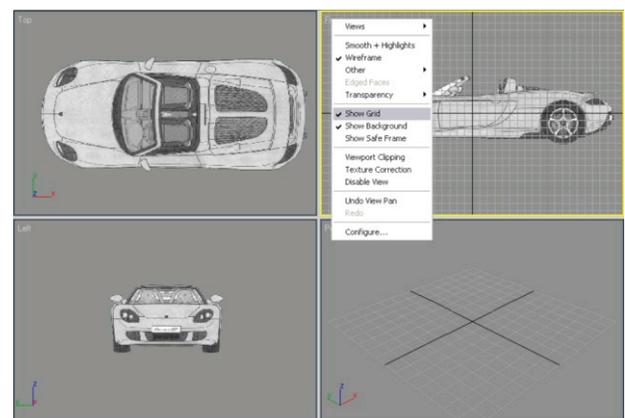


2 Setting up the viewports:

In the viewports we need blueprints of the car for reference & hence I am setting up viewport background.



To set that, go to views > viewport background (alt + b). Do that for the 4 required viewports. The adjacent image shows the dialog-box that invokes when you are setting up the background. The image below shows the background set for viewports except the perspective. Also I am hiding the grid as it will be more clear to view the reference background images & will give us a clean working environment. To hide/unhide the grid press 'g'. Once the viewports are set up we can proceed to begin our modeling work.

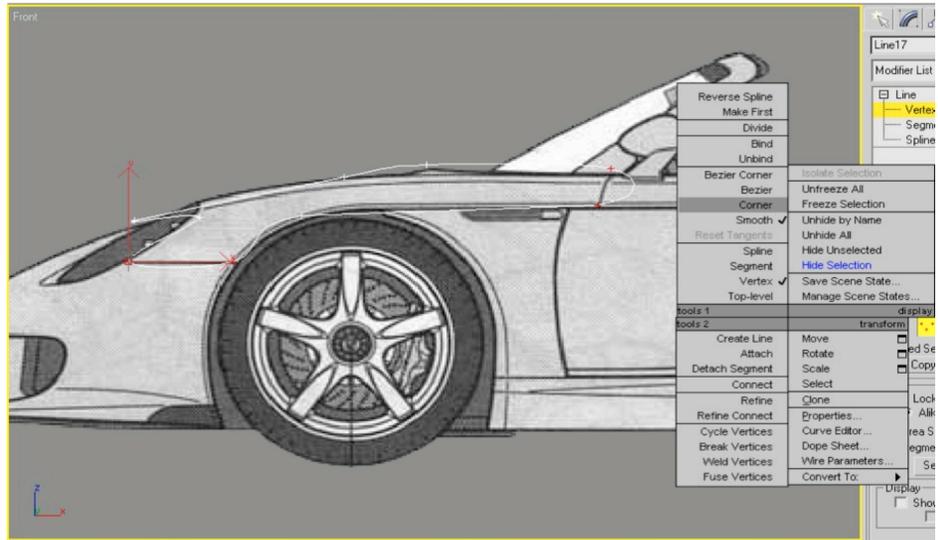


3 Drawing Splines :

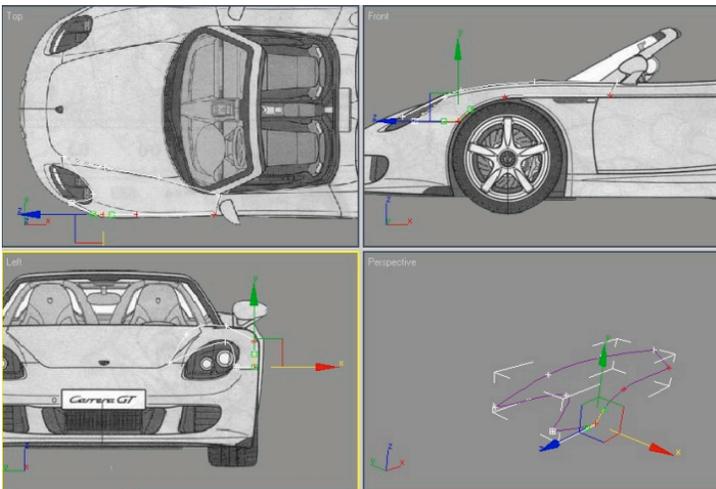
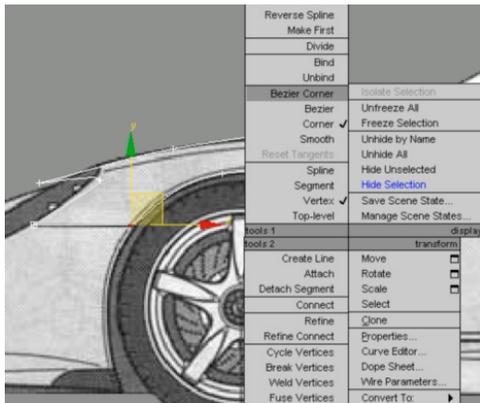
Yes, that's exactly what one would do to start with spline modeling. Now what is a SPLINE? In simple words it can be described as a curve. Interconnected curves set up at various positions onto 3 mutually perpendicular planes define the skeleton of the object being modeled. And placing patches of surface over the skeleton makes the object visible as a model. And that's what we will be following in this tutorial.

Now in the Command Panel go to Create>Shapes>Splines>Line. On the Creation panel > Creation Method rollout, set both Initial Type and Drag Type to Smooth. This will help set the base profile, given the curved nature of the Porsche 911 GT. Click to create a contour for the 911. Try to model part by part; that is model different sections of the vehicle, (hood, boot, fender etc') differently. When modeling a part, do take into account that it should be continuous with the other parts you model later. Keep in mind that this kind of modeling does not require a lot of detail, so try to keep the number of vertices to a minimum. You will adjust them later. The first part that I have selected to model is the left fender of the car & as you can see I have zoomed in onto the fender in the background reference image. I shall be drawing the splines from the side. Its not a custom to do so, but a convenience. Although you can choose to draw the splines from the top, with the 911, I find it more comfortable from the side.

To begin with, first draw a border around the fender. Make sure you close the spline by clicking the starting point. Go to the Modify panel. On the Selection rollout, click Vertex. Adjust the positions of the vertices around the shape of the fender. Select the vertices which represent the corner as shown in the adjacent figure & set their property to Corner by right-clicking & selecting Corner from the quad menu. Make sure to align every corner point precisely & for that you can switch between different viewports.



Right-click and choose Bezier Corner from the quad menu. Use the Select And Move tool to adjust the vertex handles so that the profile fits the reference image better. Repeat this till the profile of the spline fits the reference image. The spline should look as if it has been bordered around the object; in this case, the fender. Again, try switching between different viewports to get a clear look at what you are doing. The bordering of the spline profile should be such that it should appear to merge with the background image reference, no matter from whichever viewport it is viewed from. Sounds difficult eh? Yes, as for a newbie it might seem difficult but not impossible. And believe me, with practice you will start to know that it is not that tough it used to be earlier. So just stick to your frustration.

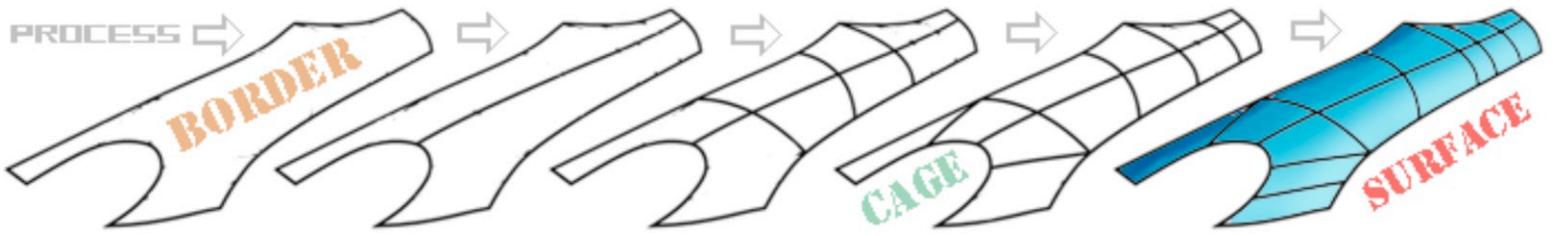


Once you get the grip of it you are off with the next process. Do not haste, be cool & just try to concentrate & experiment to solve any problem you might incur. If any step goes wrong, do not start it all over again in haste. Instead, try to solve the problem in the entangled state & who knows, you would end up finding a solution. And if not one, you might at least learn a bit.

So now that we have build the border, we will refine the inner space of the border. This inner section defines the surface layout of a model.

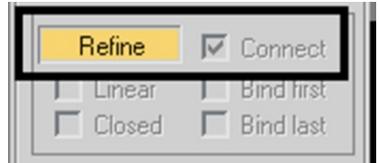
4 Create the inner spline cage :

In this process we will build a cage-like chassis that will help as a base for the surface that we will put onto it. The whole process is depicted in the picture below.



You will start adding detail inside the boundary of the fender. Do note in the above picture I have kept each polygon a quadrangle. That's essential for the surface modifier to work.

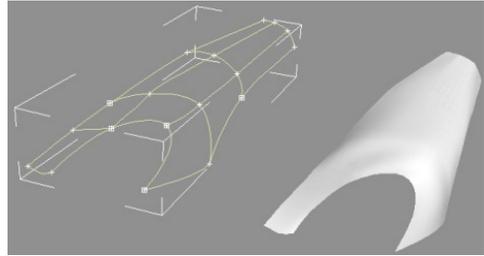
On the Modify panel > Geometry rollout, turn on Connect and then click Refine. Refine adds vertices to a spline. If the Connect option is on, all inserted vertices will be connected by segments in the order they were created. Click the vertex at the top of the headlamp and the Refine & Connect dialog opens. If you haven't put a vertex at the top of the headlamp while drawing the boundary, do not worry. Just click there and the vertex will be inserted & the Refine & Connect dialog wont show. This dialog points out that there is already a vertex where you clicked. You still have the option to refine the spline, adding yet another vertex very close to the existing one, or you can simply use the existing vertex and connect it to others you will be inserting. Typically, use the Connect Only method when this warning appears. Turn on the "Do not show this message again" option and click Connect Only. Click on the segment of the spline nearer to the A-pillar of the 911GT. Right-click to finish the command. You now have an additional segment going from the top of the headlamp to the base of the A-pillar. Use Refine/Connect to add lines of detail dividing the previously drawn line. Look at the above picture of the modeling process for reference.



use the existing vertex and connect it to others you will be inserting. Typically, use the Connect Only method when this warning appears. Turn on the "Do not show this message again" option and click Connect Only. Click on the segment of the spline nearer to the A-pillar of the 911GT. Right-click to finish the command. You now have an additional segment going from the top of the headlamp to the base of the A-pillar. Use Refine/Connect to add lines of detail dividing the previously drawn line. Look at the above picture of the modeling process for reference.

5 Create the surface :

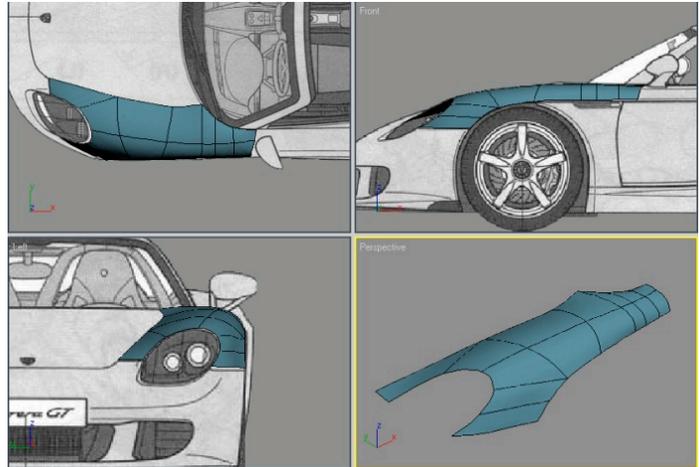
The picture to the right shows the completed cage along with a separate fender with surface modifier on. Now once you have completed building the cage, you will place a Surface Modifier above the Line Modifier in the stack. The Surface modifier places a 3D surface over each set of three- and four-sided polygons formed by the splines.



The polygons must be completely closed in order for the Surface modifier to make the 3D surface. By trying out the Surface modifier now, you can correct any "holes" in the surface. If the surface doesn't appear in the viewport, in the Parameters rollout, try turning the Flip Normals option on or off until the fender appears.

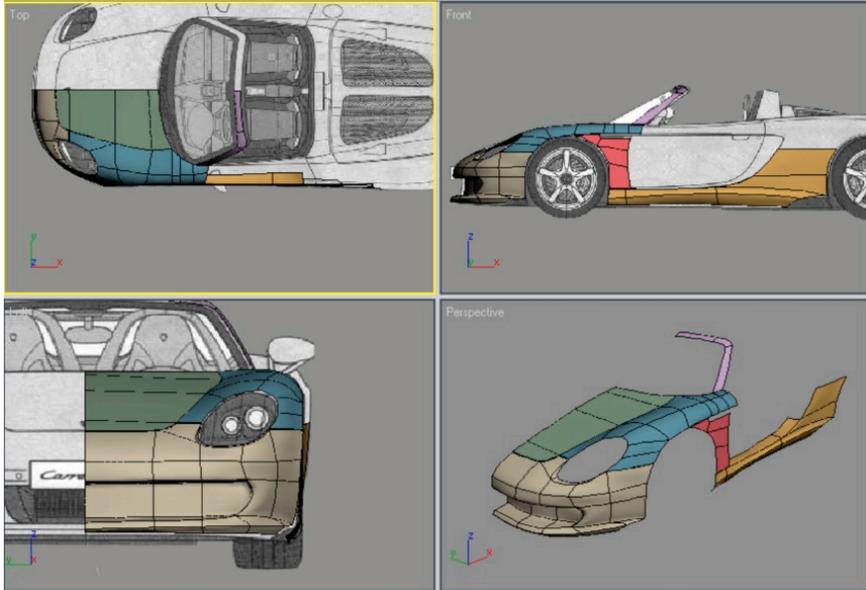
Now you might think that's it, but wait. The fender is still raw and needs some fine tuning. In the above image you can see 2 fenders & can even identify which one is better. So try adjusting the vertex handles of the vertices by right-clicking & selecting Bezier Corner from the quad menu.

The image to the right shows the completed fender in all four viewports. Look at how well it has merged with the reference image.



6 Create other parts :

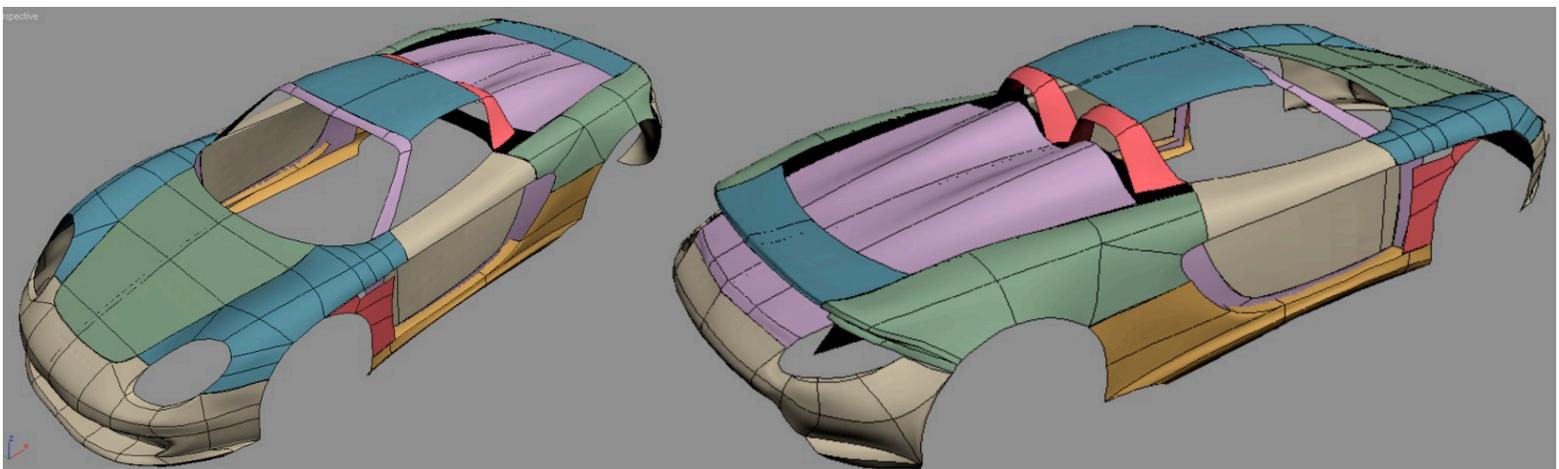
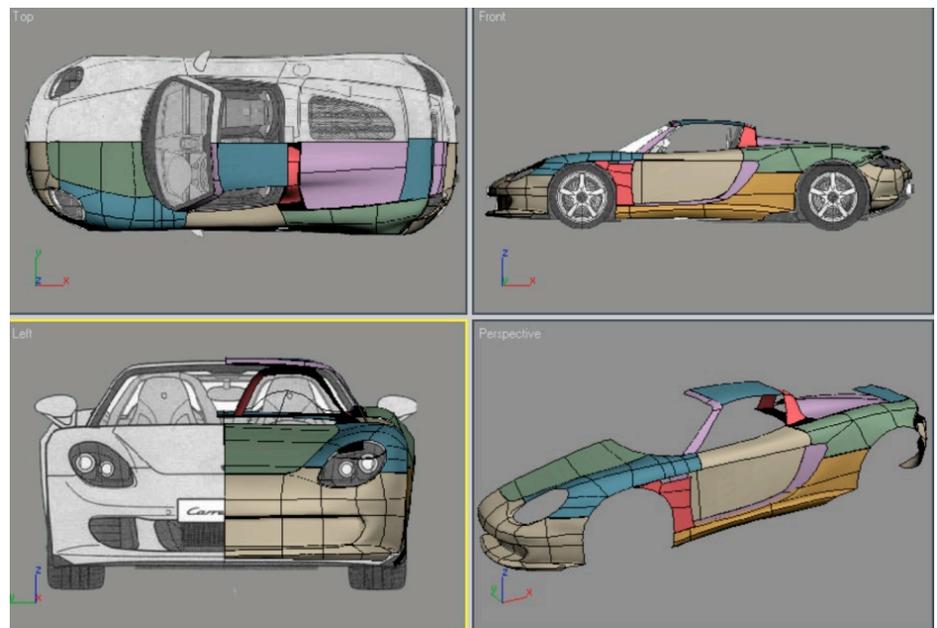
Now that you have created the fender, you can go on to create other parts of the 911GT. Remember to maintain a constant flow of surfaces adjacent to each other. Now you might think which part to make next. You can take any part so long as you are confident to keep the smooth flow of surface at intersection. I chose to make the part adjacent to the fender, then the bumper, the hood & so on till all the metal surface parts of the 911GT were completed. Make use of different viewports that suite the part to draw the border spline.



The picture to the left shows the parts adjacent to the fender, modeled. And you might also notice that I have only modeled the left half of the car. That's because the right half of the car can be created by mirroring the left half about an axis running from the hood to the boot. I haven't mentioned the axis X, Y or Z as it depends on how your car is oriented. Note the front bumper in the left picture & you will find that I haven't modeled the fog-lamp holder. That's because it can be modeled as a separate part although in reality it is integrated with the front bumper

The picture to the left shows the completed left half of the 911GT. At this stage the distinct surface features of the 911GT are clear enough for anyone to tell that it's a Porsche 911GT. Although its half, on a computer you can always create the other half within seconds; or should I say milliseconds.

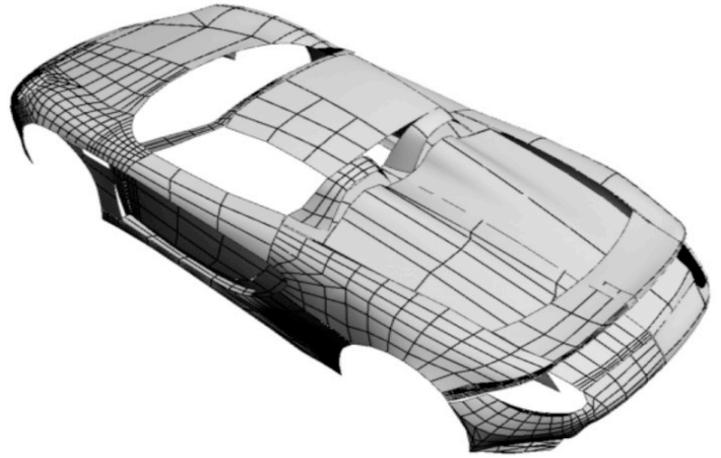
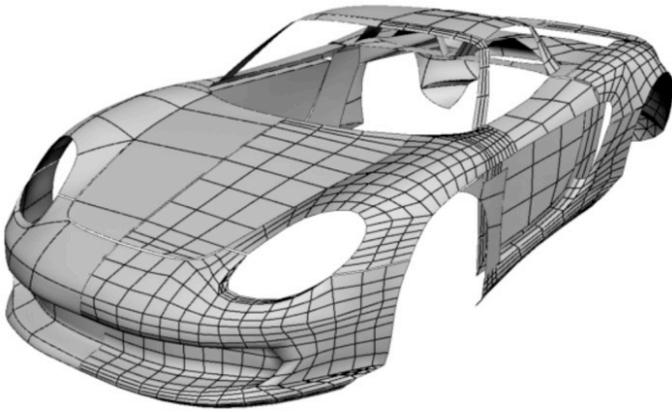
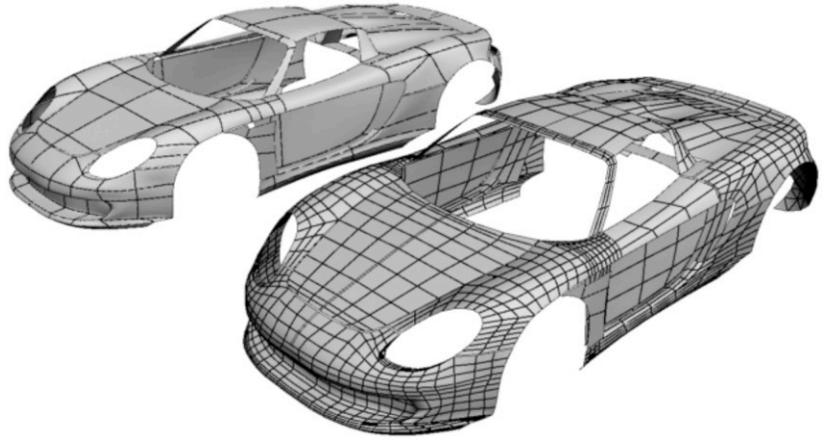
The image at the bottom show the body surface of the 911GT after mirroring the left half. After mirroring do make the surfaces on either side of the mirroring-axis appear continuous. This can be done by adjusting the vertex handles of the vertices at the axis.



7 What you achieved :

There is nothing to tell as all is revealed by the following pictures.

The image to the right demonstrates the difference in spline modeling & polygonal modeling. As I had mentioned earlier, spline modeling has less number of vertices to deal with but requires perfect placing & orientation of the vertex handles in the 3D space. And that is the most difficult thing to do even though you can get that right with practice. But once you have mastered the skill of handling the vertex handles its fun to work with. It even saves considerable amount of time over the polygon modeling method. And in the field of 3D modeling, time is crucial; it has a price.



Well, I hope you enjoyed this tutorial & learned a lot from it. Don't say you learned not even a bit as for that my reply would be - Every person is a student from cradle to grave. Learn as much as you can from the time you have. Oops, sorry, the reply came out to be an advice.

If you have any questions, doubts, criticisms, etc please feel free to contact me.

Mail me at nimish.rajwade@gmail.com

Anyways, don't worry, be happy.

Thanking You,
Nimish