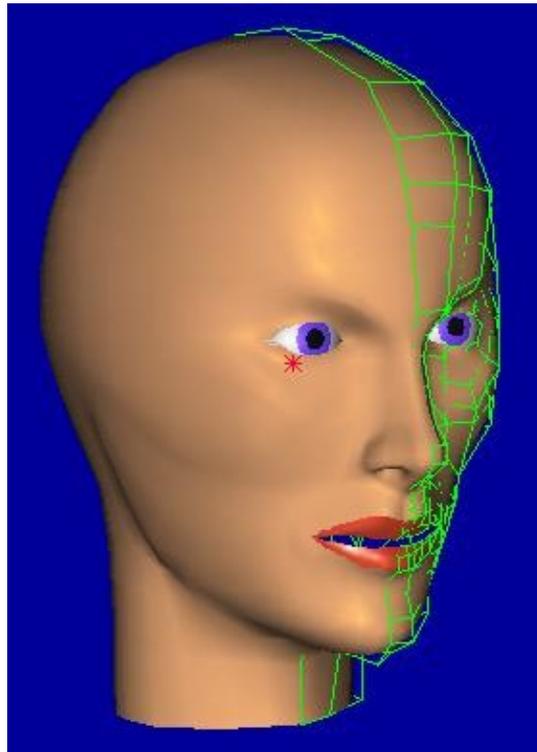
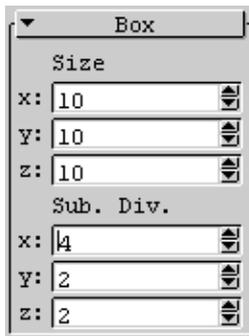


## Modeling a SDS Head with ppModeler



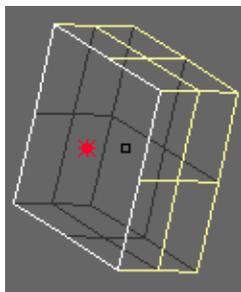
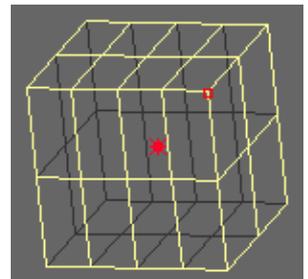
pierre saunier

# Building an SDS Head with ppModeler



Create a cube (menu Object->base Objects->Box, or box tool  in the object toolbox ). Then in the control panel, go to the Box dropdown button, and modify the subdivision parameter according to the picture.

You should see a cube like the picture on the right. Use the arrow keys to move the view, '+' and '-' key to zoom in and out. You can also move the view with the mouse, left clicking on a view while the ctrl key is down.



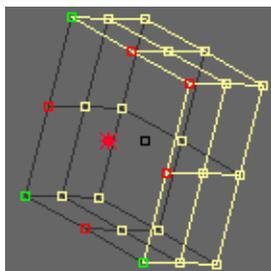
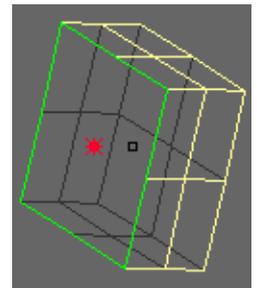
As a face is symmetric, we will use a symmetrical object. In ppModeler, a symmetrical object is an object where the user can work on one half of the object, the other half is updated automatically.

We will first cut one half of the cube. And then mirror it.

Select the cut by a plane tool  in the object tools toolbox . Then cut the cube with the (yz) plane .

The cut tool builds faces in the plane selected to cut the object. We need to remove them before mirroring the object. Select the face toolbox .

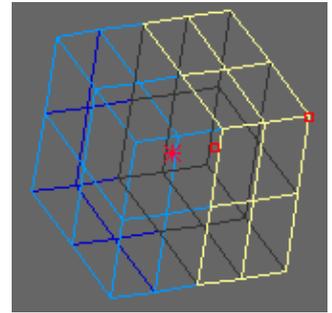
Then select the face in the (yz) plane. The selected face is in green if you haven't change the colours (menu Options->cfg). Remove the face with the del tool .



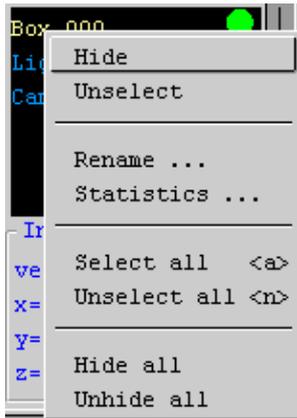
We are now going to build the symmetrical cube. Select the mirror tool  in the object tools toolbox . **ppModeler** needs three vertices to define the mirror plane.

Select three vertices of the (yz) plane by clicking on them. The other vertices that belong to the mirror plane are drawn in red. Use the picture on the left as a guideline.

When the vertices are selected, press the Ok button . **ppModeler** asks if you want to mirror the object or to create a symmetrical object. Create a symmetrical object. The object should look like the one on the right. The white part will be the one we work on, the blue part will follow the change we will make on the with the control panel.



Before saving the first part, we will rename the box object. Right click on the box name in the content panel (just bellow the control panel). Select rename in the popup menu and enter the name you want to give to that object.



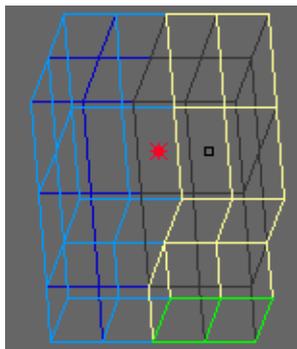
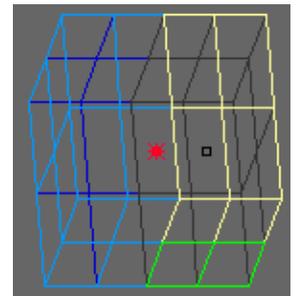
You can now save the object (menu File->save, the save button in the top toolbar, or the F2 key).

**ppModeler** integrates a numbering function for files. In order to have all your version following this numbering, end the file name with a two digits number (ex: head01.3de).

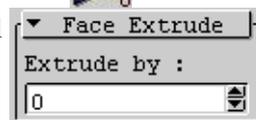
Each time you want to create a new version, use the 'save incremental' function (menu File->save incremental, the save incremental button in the top toolbar, or the F4 key). **ppModeler** will save the current scene with an incremented number (head02.3de, head03.3de, head04.3de...).

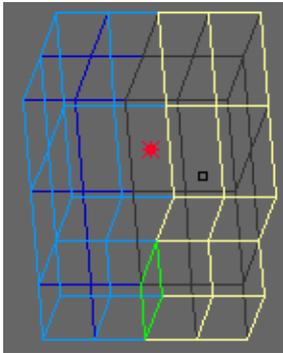
It's a good practice to add a preview to a file. To do so, before saving, set the drawing mode to filled flat shaded or filled textured in one of the views. Then move the point of view in order to have a relevant point of view on the model and to fill the view with the model. Then, right click in the view, and select 'Set as scene icon' from the popup menu 'View'. The captured image can be seen in the control panel when the object toolbox is opened and at least one object is selected.

Select the two back bottom faces.

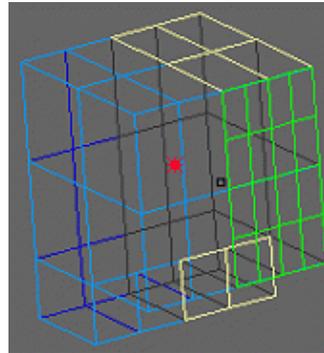


Select the extrude face tool . Extrude the faces with the mouse horizontal drag or in the control panel





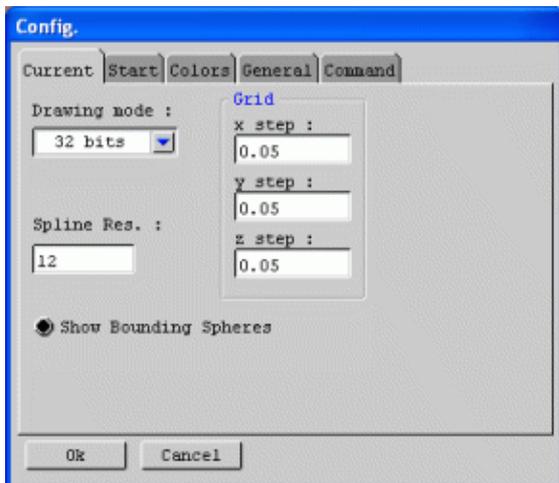
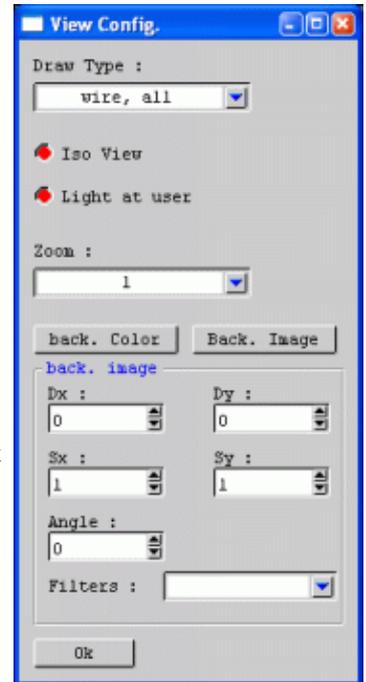
Select the inner face of the neck and delete it.



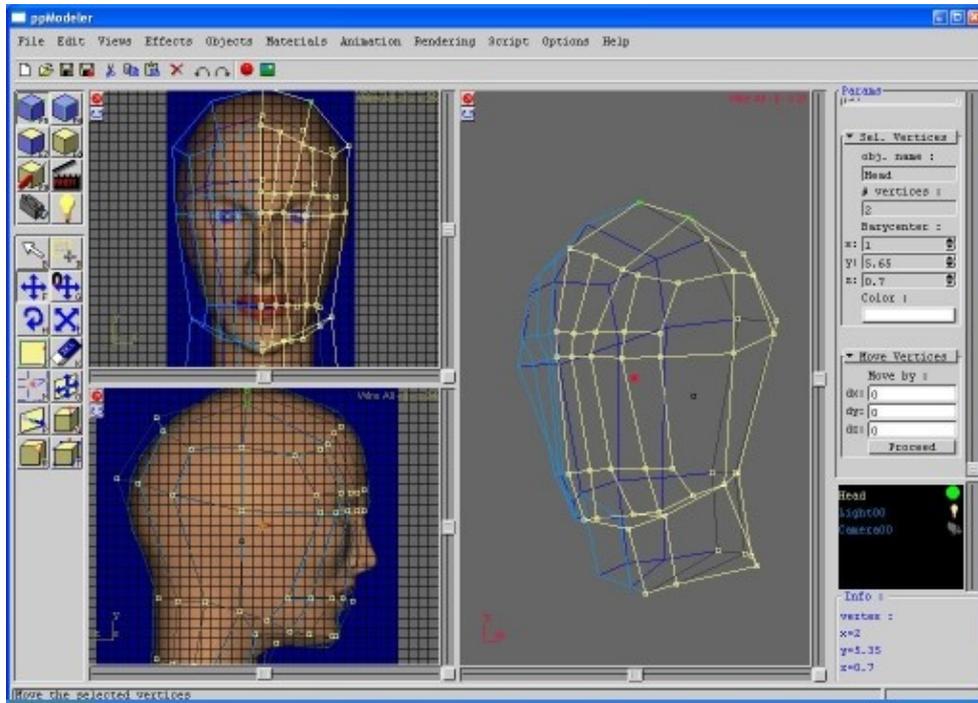
Select the four front faces (face toolbox) and run the subdivide selected faces tool .

Now, we set the background image, a guide in the modelling process. Open the view configuration window ('O' key, or the  button). Select a background image with the 'Back. image' button.

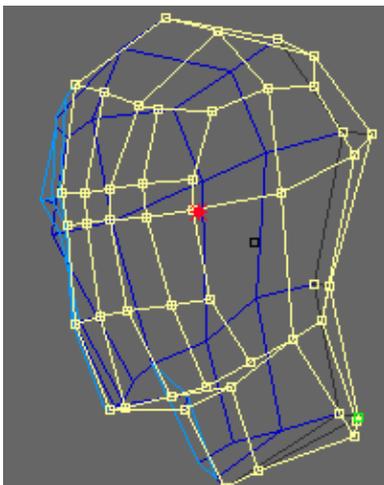
The image can be moved inside the view with the 'Dx' and 'Dy' inputs. The image can be resized with the 'Sx' and 'Sy' inputs'. The image can be rotated with the 'Angle' input. Additionally, some filter can be applied on the image (soften, sharpen, lighter, darker, invert colors ...). The image in the background of a view is visible only in wire frame modes and it doesn't move with the point of view.



Another parameter that can be changed is the default grid step. This parameter is in the menu 'Options->cfg...'. The window shown on the left is opened, where the grid step can be configured. The default values are 0.1.



Now, we will move the vertices to obtain a raw shape of head. It's easier to work with 3 or 4 views (menu Views→4 std views or menu Views→3 views, vertical).



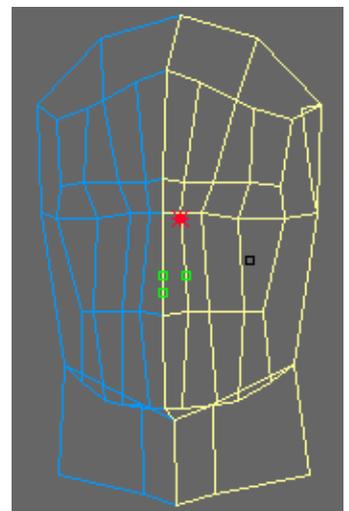
Select the vertex toolbox .

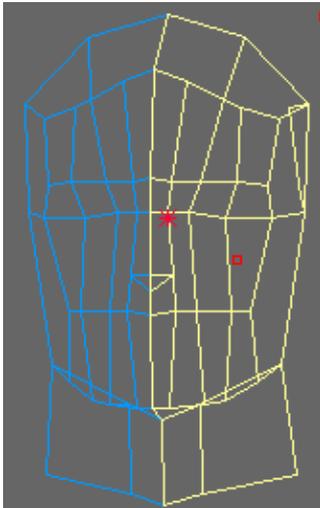
In one of the view, select a vertex or vertices with the select vertex tool , or the select vertices by rectangle tool . Then move the tool in the front and side views with the move selected vertices tool .

You can use the toolbox to change the selected tool, or use the shortcuts, or use the right mouse button and the associated popup menu. A quicker way to move one vertex is to select it. Now, when the mouse is over the selected vertex, the mouse cursor change, and the user can drag the vertex. When only one vertex is selected, it is also possible to enter its coordinates in the control panel.

Now, we will add the nose. We need more vertices. Select the add vertices tool , in the vertex toolbox . Add three vertices by clicking on the edges.

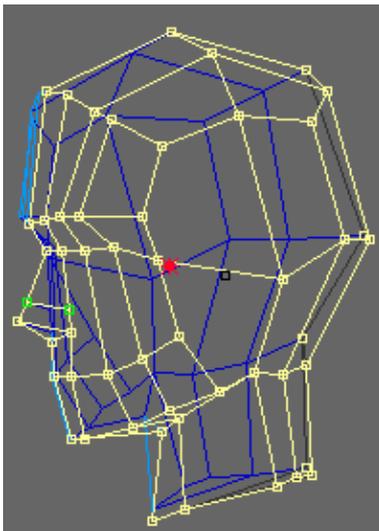
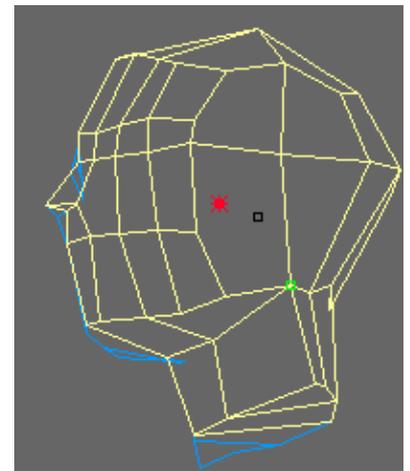
You don't have to be precise here, these vertices will be moved later.





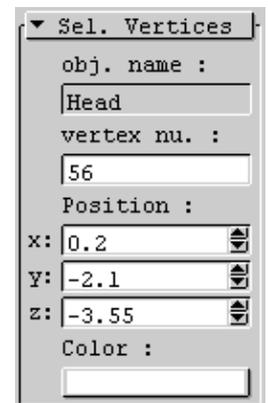
We will build the bottom face of the nose by adding three edges. Select the add edge tool  in the edge toolbox . Add the three edges : Click on one of the vertex of the new edge. Once a starting vertex is selected, the possible ending vertices are drawn in green. Drag the mouse to the other vertex, and release the mouse button. The edge is added.

Now, we can move the new vertices to build the shape of the nose.

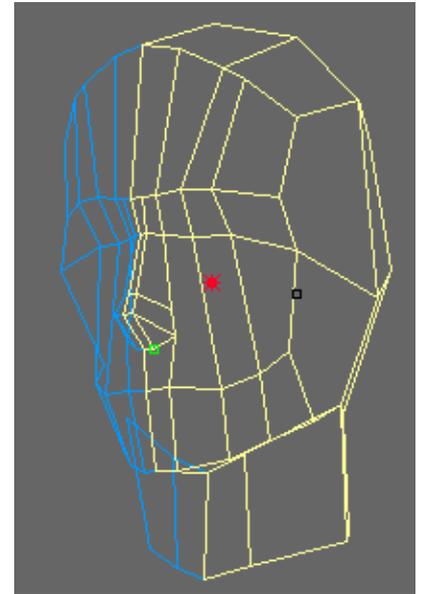


Now, we will add details to the nose. First, select the two edges of the nose. Then, activate the cut edge tool  in the edge toolbox . A dialog window ask for the number of parts: keep 2, the minimum. All the two edges are cut in two parts. Then, use the add edge tool () to connect the two added vertices.

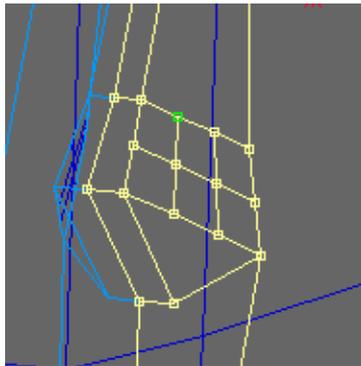
The vertices can be move in the vertex toolbox. Select one vertex, and move it with the mouse, or with the control panel.



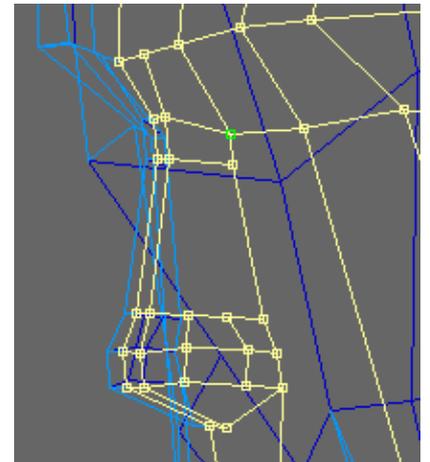
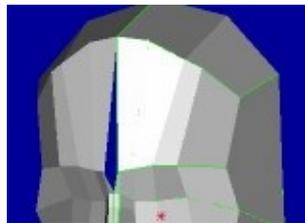
Now, we will add the top of the nose. Use the add vertex tool, or the split edge tool. Add the five vertices and join them with the add edge tool. Then move the vertices as shown.



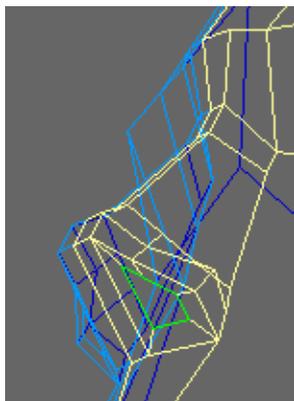
Split the vertices in two and three parts and add the edges. Then move the vertices to give its form to the nose and Add two edges at the top of the nose as shown on the left.



During the model creation process, Check that the vertices in the mirror plan all have the same x coordinate, otherwise the symmetrical process will create a hole:



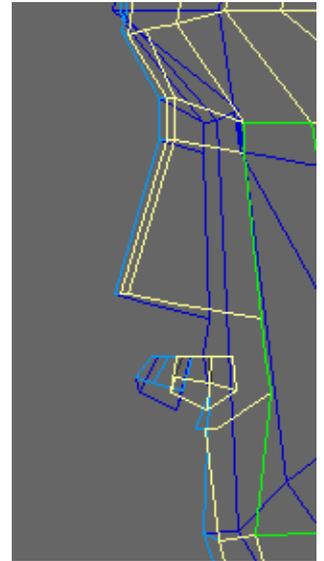
It is also possible at any time, to go back to the object toolbox and use the 'Effects->no more symmetrical' menu item. The symmetrical property is removed and can be set again with the mirror tool.



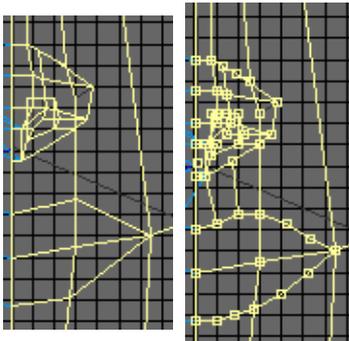
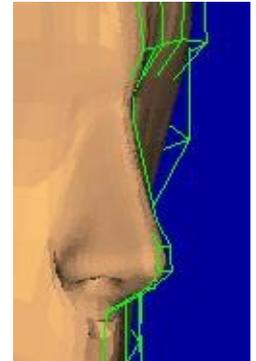
Opens the face toolbox, and select the base of the nose. Then activate the small face tool () and drag the mouse horizontally (on in the control panel) in order to set the size of the added face.

Then, extrude the small faces inside and move the points in one plane. In order to move the point, it could help to hide exterior faces. Select the faces to be hidden and press the hide faces tool () . The hidden faces can be unhide with the unhide

faces tool () , or with the menu edit->show all faces.



Now, add some details in the bottom of the nose. Two vertices are added. Then an edge is created to join them. An edge is deleted, and another one is created. SDS can be activated to view the nose finished. Activate the object toolbox, and press Ctrl-S, or use the 'Effect->use as SDS control' menu item.

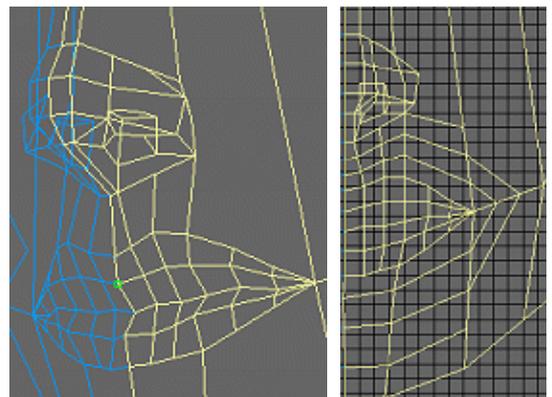


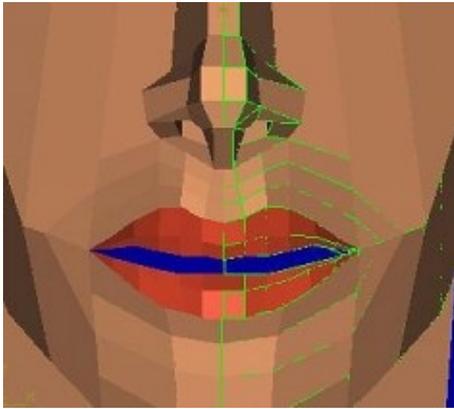
Add vertices on the lips borders, edges to join them as shown on the right. Divide the newly created edges in three parts and add edges to join the lips and the nose. Move the vertices to give the lips its final form.

Select the two middle edges and divide them in three parts. Then join the vertical edges (6 for the upper lip and 6 for the lower).

Select these 12 edges and divide them in 2. Joins the created vertices and move the vertices to give the lips there rounded form.

Now, add two loops around the lips. This will help when you will have to animate the face.



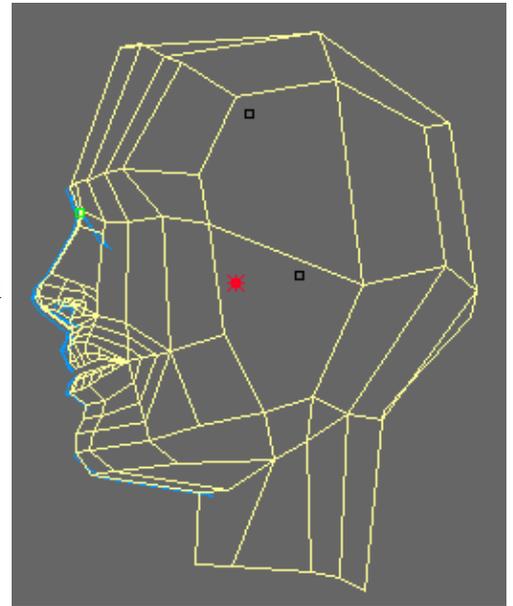


Now, we will open the mesh's mouth. This will be done with the 'hole on edge' tool ( ).

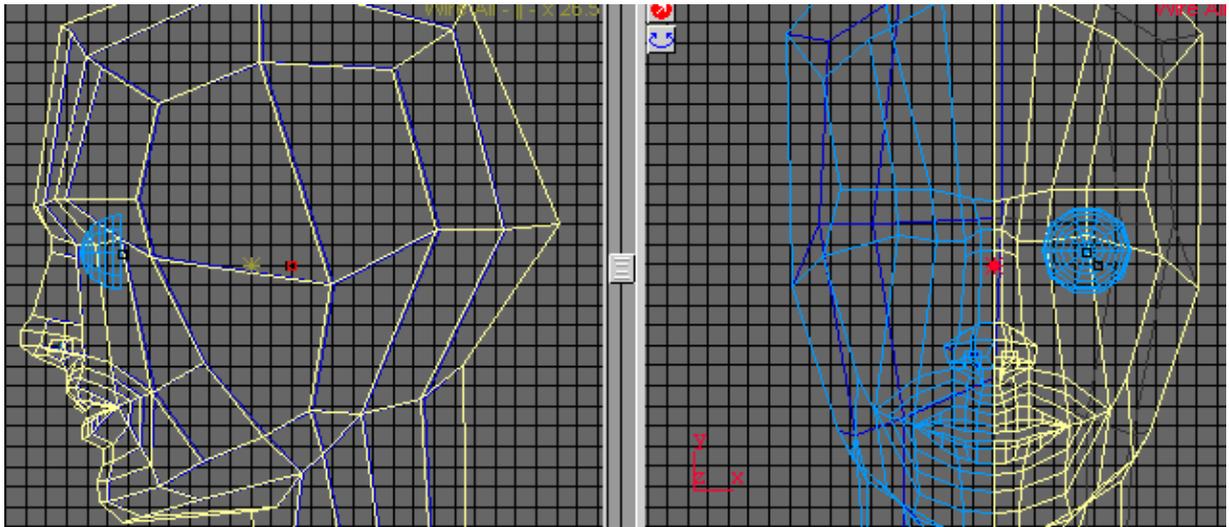
Start by selecting the 6 edges in the middle of the lips. Activate the tool. A hole is created between the selected edges. Move the mouse horizontally to adjust the hole size.

The center of the lips still joins. Add a vertex and an edge and remove the central face.

At the end, you should have something like the picture on the right.

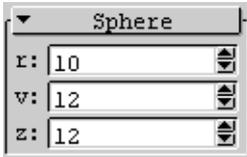


Now, will add details on the jaw. Divide edges and join the created vertices. You should have a new line to smooth the

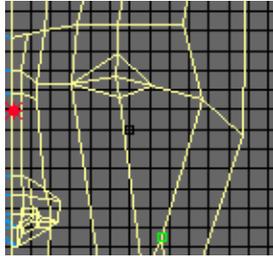


It's now the turn of the eyes.

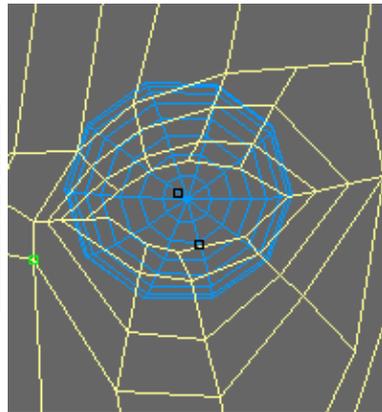
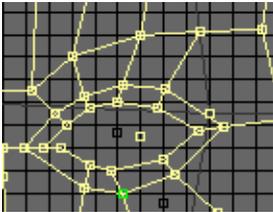
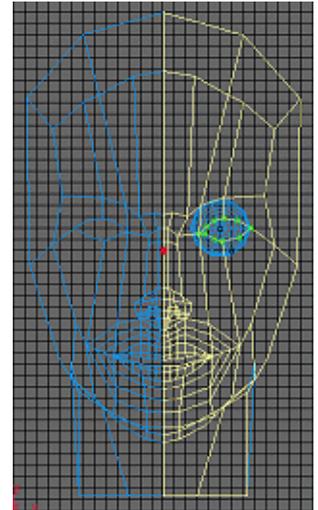
Add a sphere for the eye. You can drag the sphere center of the sphere to move it. Use the control panel to change the radius of the sphere, and the subdivision parameters:



When finished, select the back faces of the sphere and remove them. The back of the eye won't be seen, so there is no need to keep it. Note that as soon as you removed the faces (or work on edge or vertices) the object is converted to mesh and the parameters of sphere are no more available.



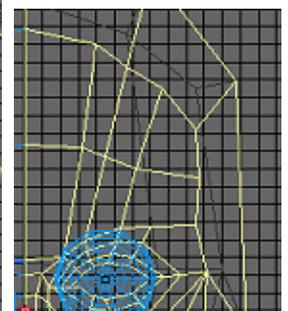
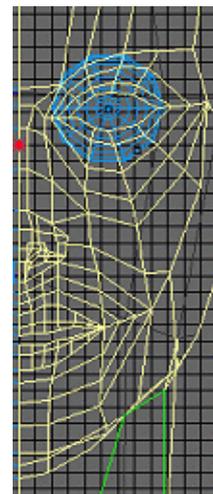
Add 3 vertices around the eye shape. Connect them with 4 new edges. Then, these new edges will be divided on 2 parts for the outer edges and 3 parts for the inner edges. Move the vertices to have the shape of the eye. Now, with the face toolbox, select the 4 faces inside the eye and remove them.



Now, add a loop of edges around the previously created eye's shape with the 'add vertex' and 'add edge' tools. Then repeat the operation with another edge loop. Move the vertices to meet the form the eye lids. Use the eye sphere as guide.

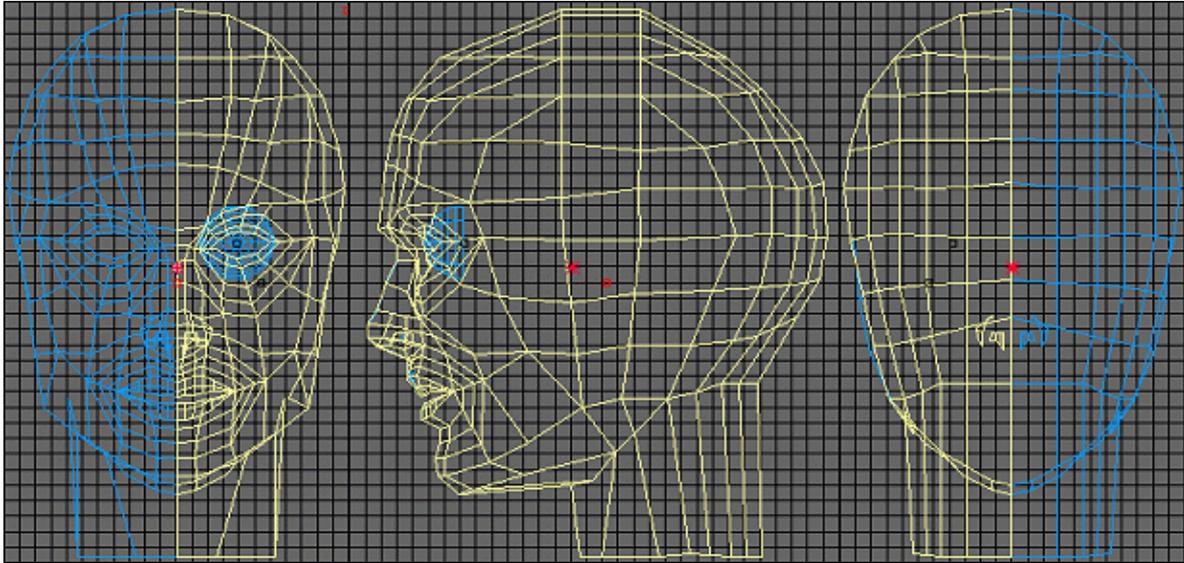
Now, Divide the straight part of the nose in 2, and link the middle of the nose to the cheek.

Now, we will set the top of the head. Begin with the forehead. Subdivide the forehead in two and move the vertices.



Finish with the back of the head. Add vertices and edges. Move vertices. Clean the mesh in order to avoid faces with more than 4 vertices and not almost planar faces. This is a necessary but time consuming task. The

result can be shown below, with front, side and back views.



Cleaning the mesh can be done in the following way:



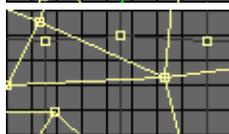
Let's say we want to remove this vertex in the edge toolbox.



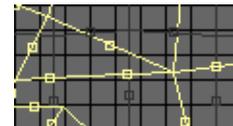
Select the vertex in the vertex toolbox.



Select the edge.



Remove the vertex.



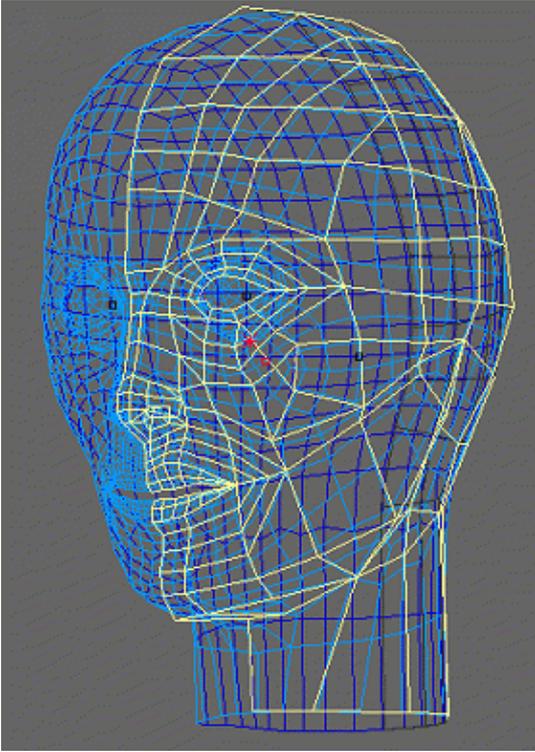
Remove the edge.



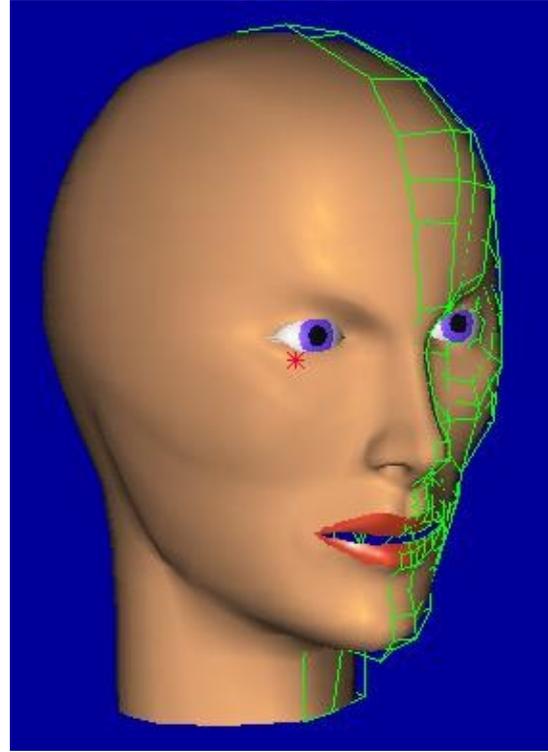
Add an edge in the vertex toolbox.



Here is the result of deleting directly the vertex with in green the added edges.



The finished SDS head in wireframe mode.



The finished SDS head in textured mode, with only basic materials.