A Cartoon Hand

using Amapi 5.1

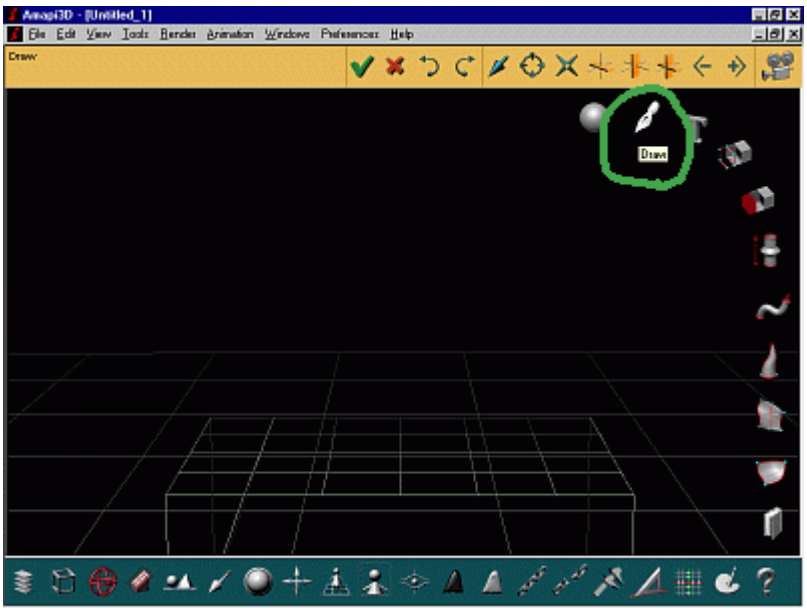
[more tutorials]

by Philip Staiger

Here's a short tutorial on modeling a cartoon character's arm and hand.
I saw this demonstrated the first time at MacWorld in January 2000 by Pierre Bretagnolle and Laurent Billy, but I have no idea who came up with the idea.

Basically, the concept involves building a very rough outline of the arm and hand, then extrude it to give it some thickness. Thereafter, you can apply one of the new smoothing
methods, such as Doo or Catmull. Et voila!

Ok, here we go...

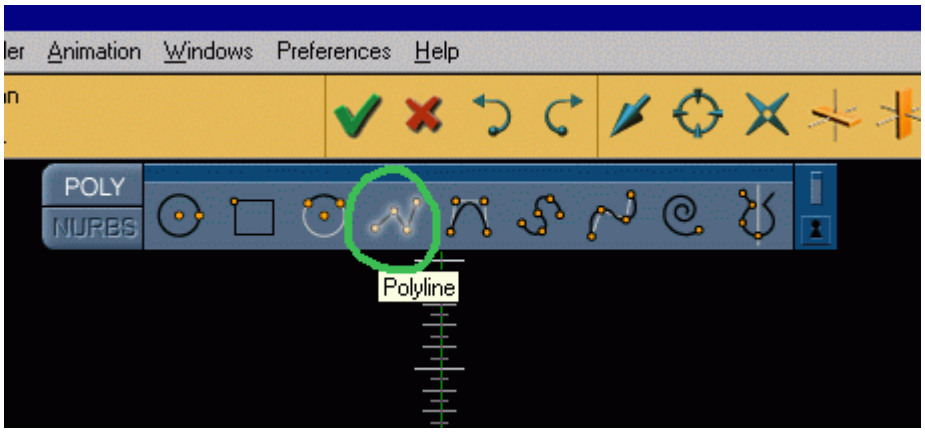


Start with the Natural Design Interface and Basic Wireframe in the workspace. If you often switch modes or background image, assign a shortcut to this with the shortcuts editor (Edit menu > Shortcuts).

Select the **Draw** tool (writing pen) from the construction toolkit.

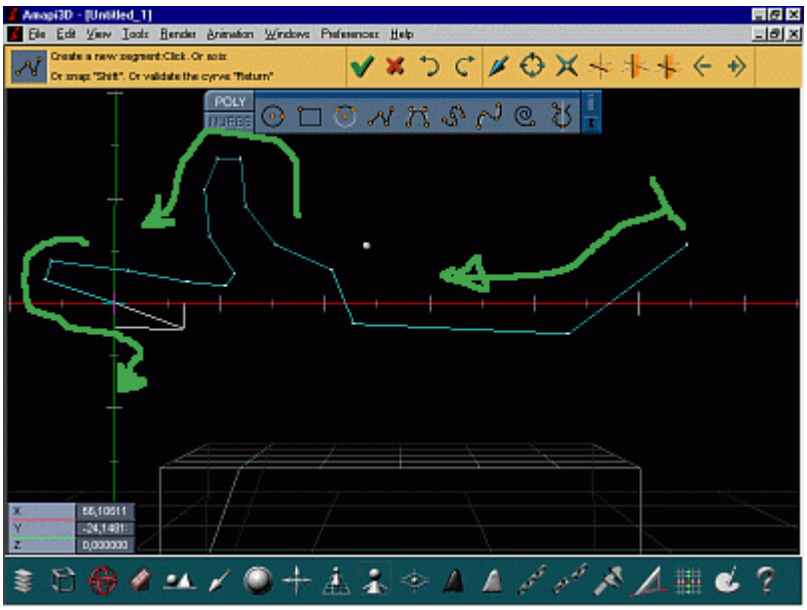
We'll draw a rough outline of the arm's and

hand's profile.

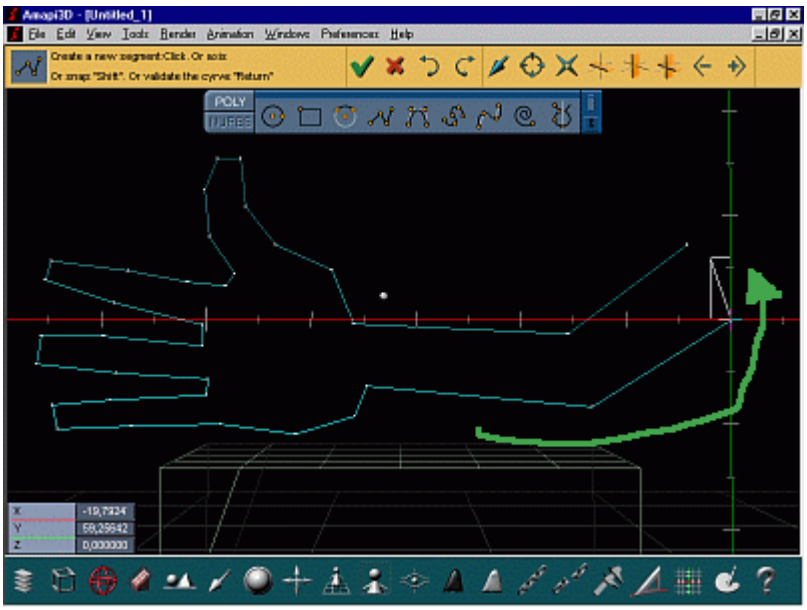


Select the **Polyline** tool (between Arc and Bezier).

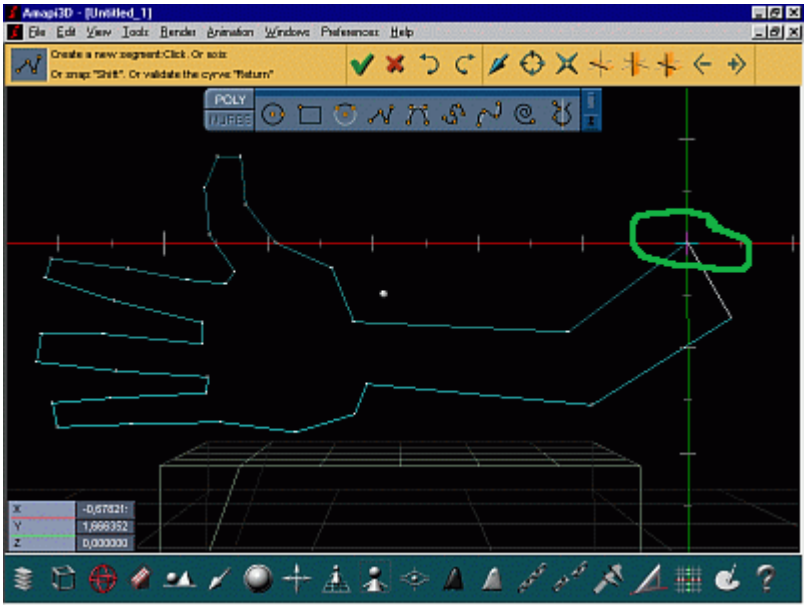
Note that here, we're not using **Nurbs** mode - the '**POLY**' string is highlighted, indicating polyline/polygonal mode instead of Nurbs mode.



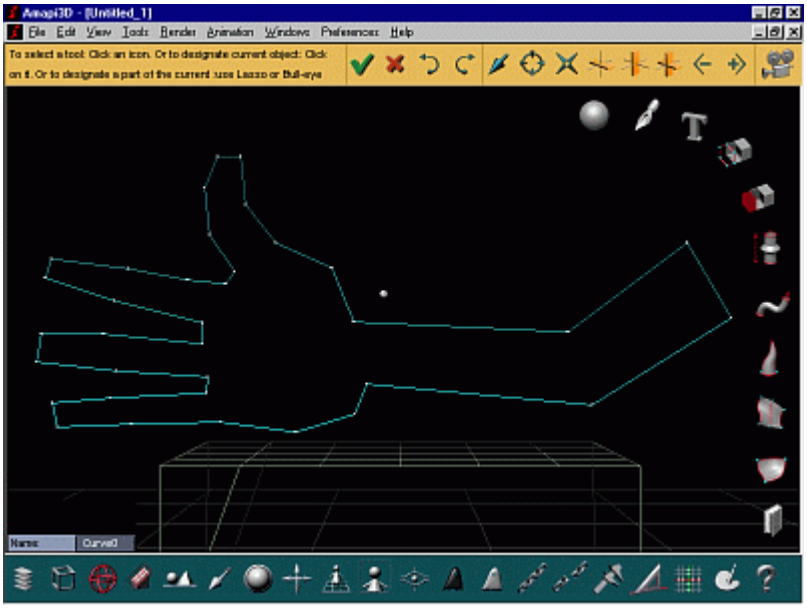
Start drawing the shape, like from the upper right corner where the arm/elbow is, and over to the wrist into the hand and thumb, then the index.



Remember it's a cartoon hand, so keep it to only 3 fingers plus a thumb, 4 fingers total.



Hold the **Shift key** down while moving the cursor to the starting point in order to be sure we're **snapped** to it and close the curve by clicking on that first point.



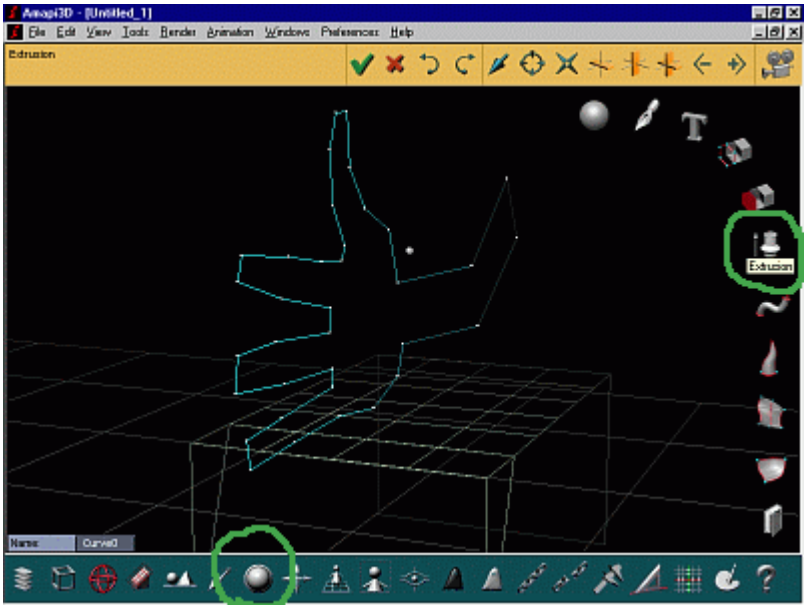
Use the **Stretch** tool if necessary to adjust a few points.

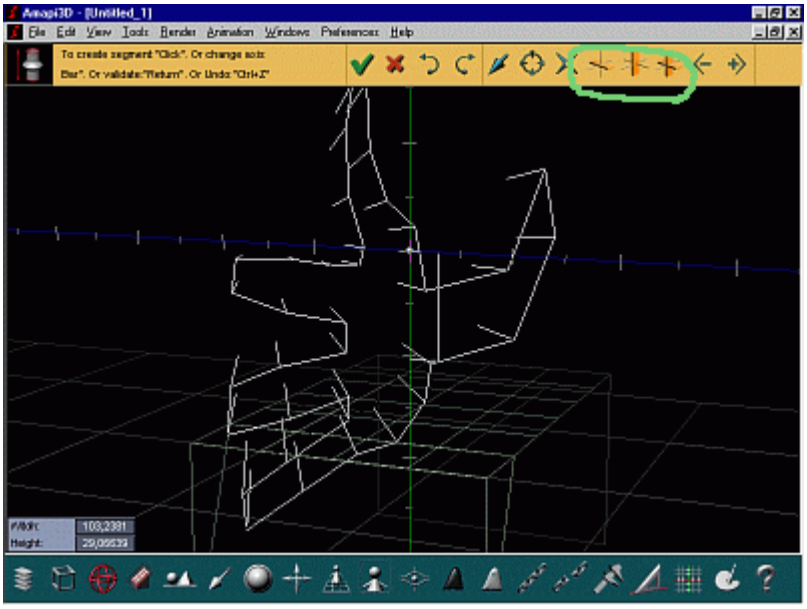
Or use the **Tesselate** tool to insert points here or there if you feel it's got too little detail.

Use the '**Delete Faces**' tool to remove excessive points.

You can also use the **Weld** tool to weld two or more points into a single point.

Next, use the **Arrow keys** or the **trackball** at bottom (**control panel**) to rotate the view to the side, and select the **Extrusion** tool





Click the curve again to indicate that's the one you want to extrude.

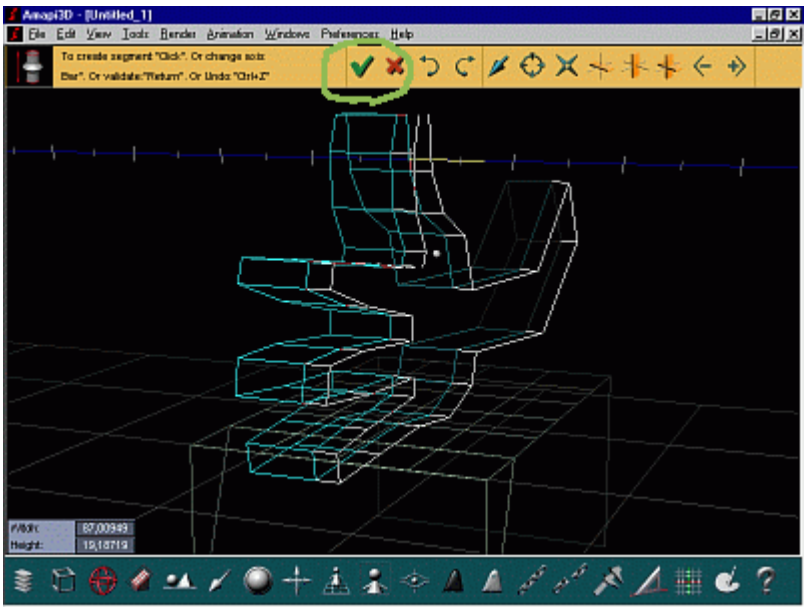
At first, it lets you extrude in either direction (green and blue axes here).

Red for X axis, green is for Y, blue for Z axis.

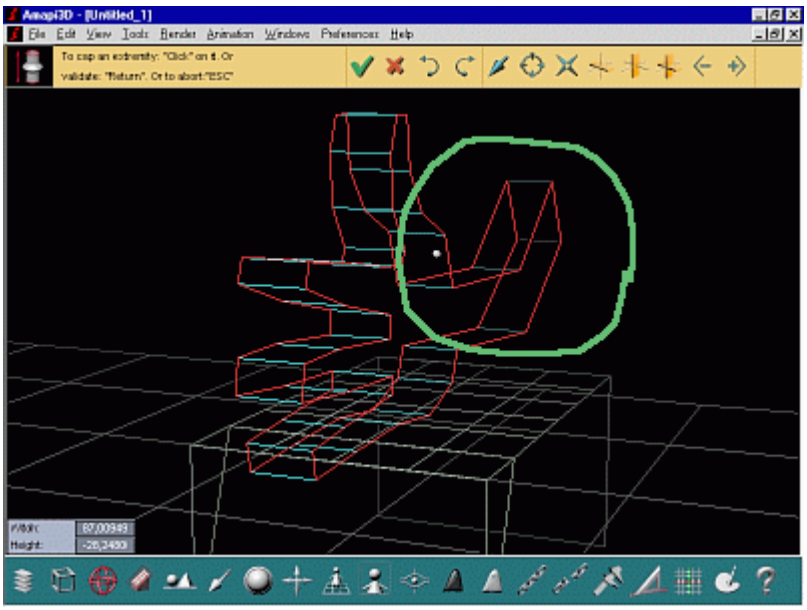
Hit the **SPACEBAR** to toggle between the axes. Select the horizontal axis.

Click the mouse again when you have the desired extrusion depth.

When you are doing designs with precise dimension requirements, you can hit the



TAB key instead, and enter the numeric values in the window at lower left.



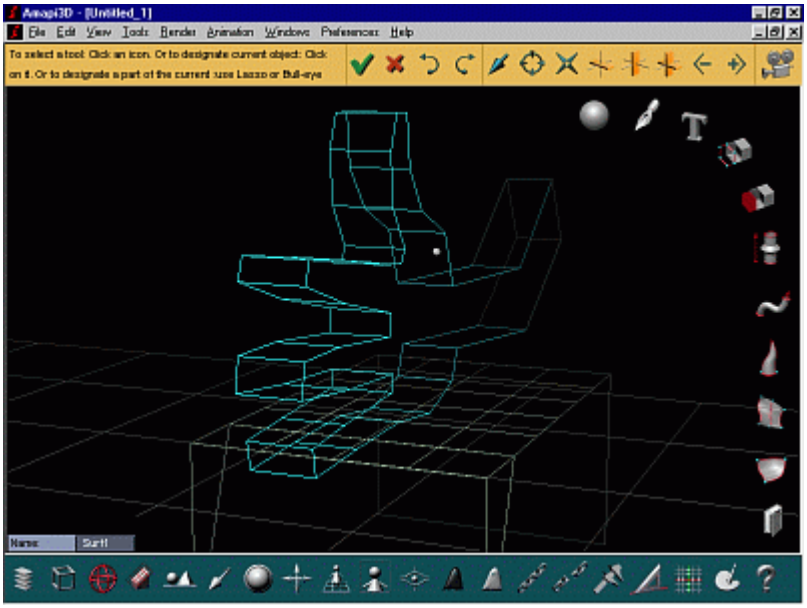
Hit **Enter**. You'll see the open areas on either end of the extrusion highlighted in red.

Amapi allows you to click either end to cap it. If you hit Enter, all openings are capped. If you swipe away, you're done and any openings remain open.

Be sure to close all open areas. Click them both.

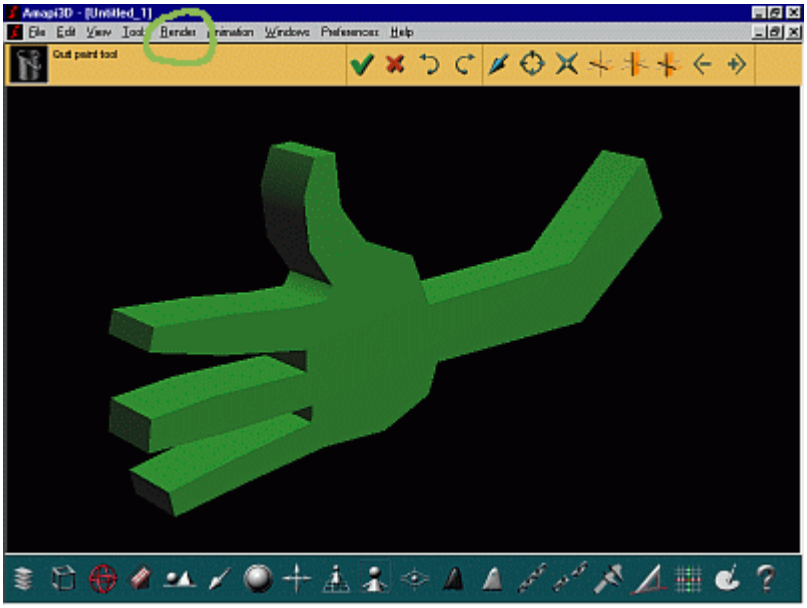
Voila.

You can consider this like some sort of a control cage. Even though it's polygonal in nature (not Nurbs), once we apply smoothing to it then the original coarse cage seen here



remains available for editing, as we'll see soon.

Hit Enter to see a quick rendering.

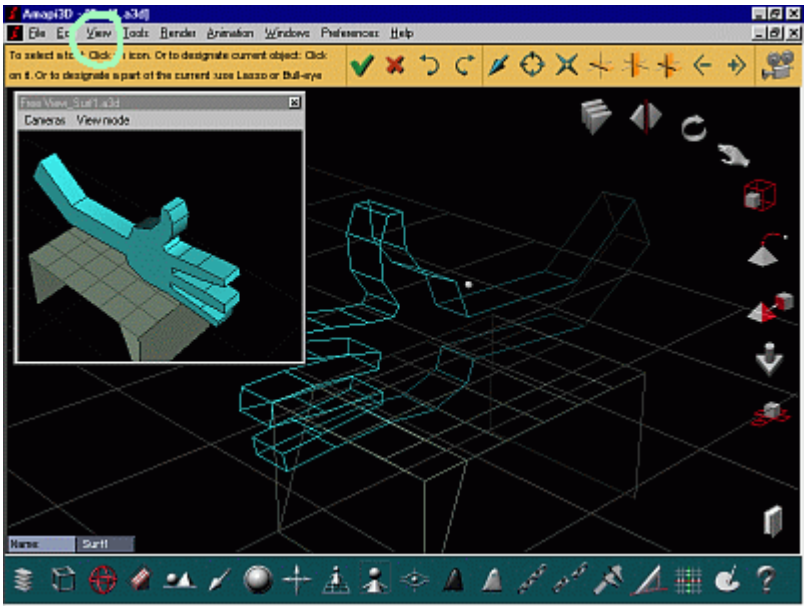


After that, swipe the cursor away to the right to return to the wireframe mode.

If you have a very complex scene or shader and rendering takes too long, you may want to render just a subset or selection. Choose the 'Render Selection' option from the Render menu.

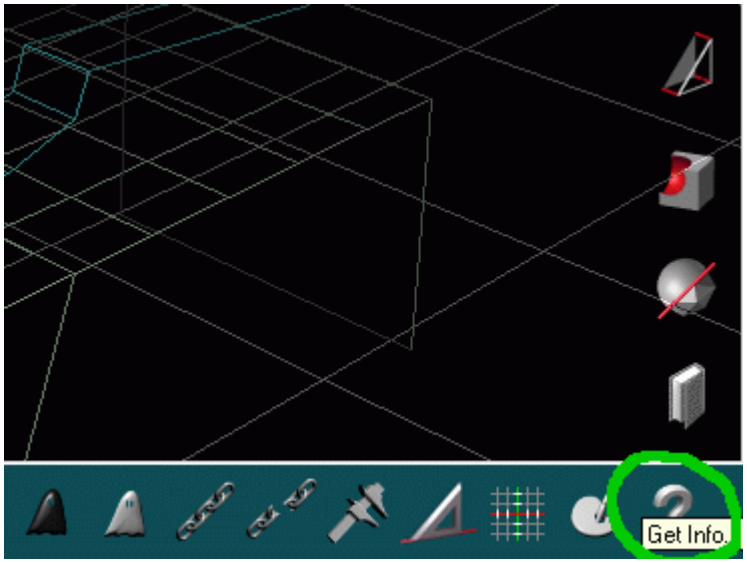
You will probably want to do this often, so once again, assign a shortcut to that feature with the Shortcuts editor.

In the **View** menu, you can find '**New View**' and therein another submenu, and



select '**Free View**'. This lets you open a free floating viewer in which you can select various display modes for interactive inspection. Click the left button and drag the mouse to examine the part. The right button moves you in/out and left/right.

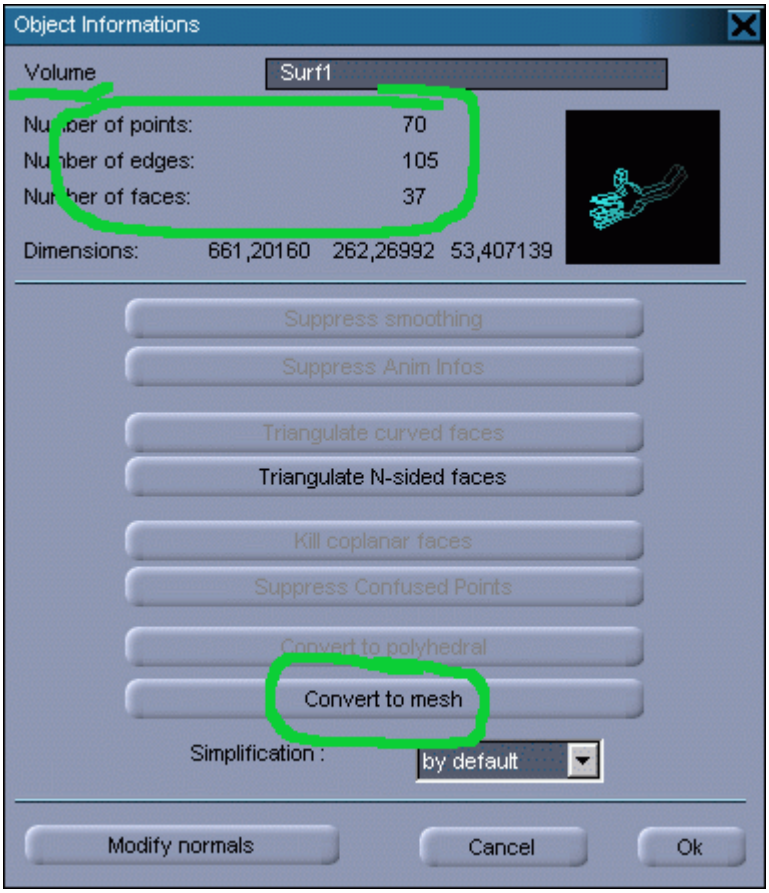
If you have a camera in the scene, you can attach it to the free floating viewer. As you edit the camera position or target and angle, the free viewer will then immediately show you what the camera sees.



Let's get some details about the object's topology.

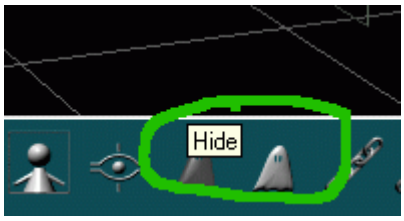
The question mark in the lower-right corner (Get Info...) does the same as if you double-click the part. It displays an info panel, which shows what type of object it is (e.g. a Volume, i.e. a closed surface in this case).

You can also see how many vertices and facets it contains.

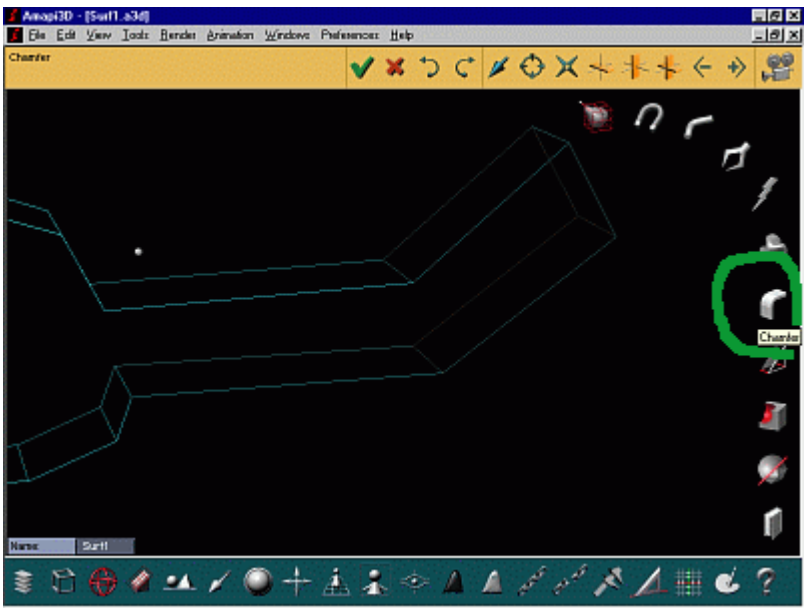


This is important when doing polygonal models for time- and rendering-sensitive game content.

Sometimes, you might want to convert the data to mesh format, which in complex cases or large models can significantly speed up the interaction as well as make files smaller when you export the 3D data.



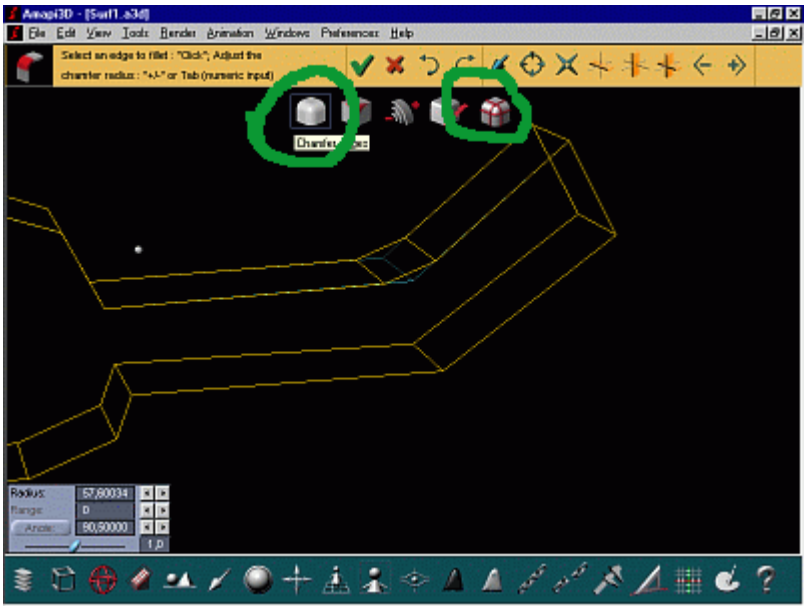
If you don't want to see the workbench or the ground floor grid, use the dark ghost (Hide tool) and click the parts you want to hide. Then swipe the cursor away.



Quite often you'll want to introduce a few more control points (anchor points).

If you need additional segments you could use the **Tesselate** tool.

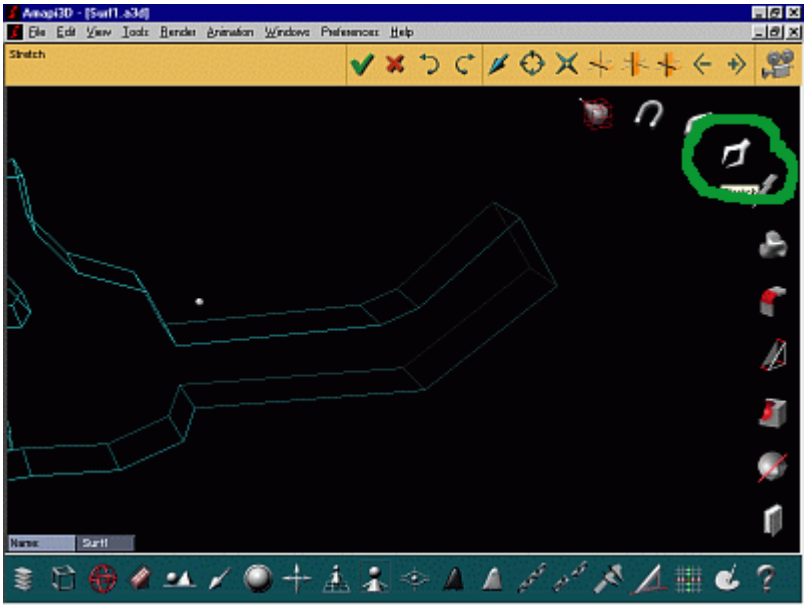
Another great tool for this is the **Chamfer** (**Bevel**) tool, where you can select the edges to filet.



Click the right mouse button or the left-most icon in the Chamfer tool palette which pops up when you click the Chamfer tool.

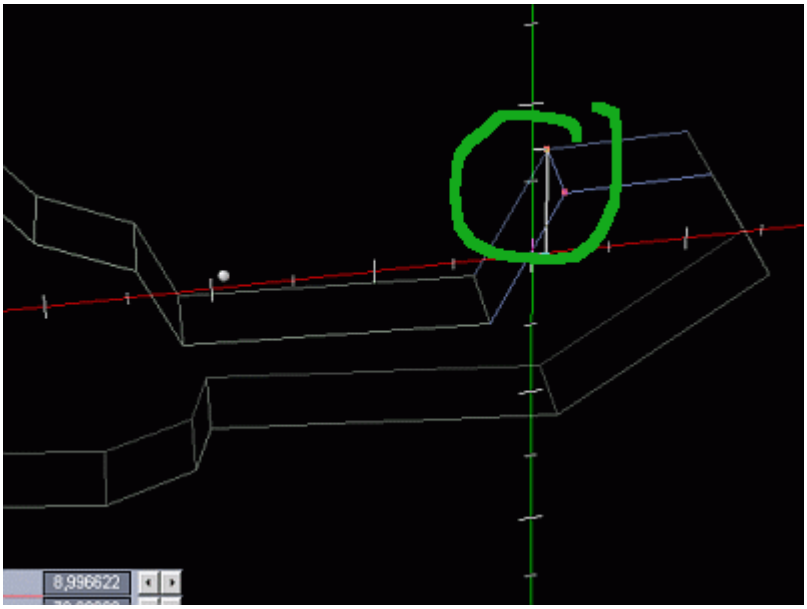
Click the right most icon as well to preview the actual bevels.

Hit the TAB key to enter numeric values, such as for the number of steps. (set to 0 in this example, default is 2)

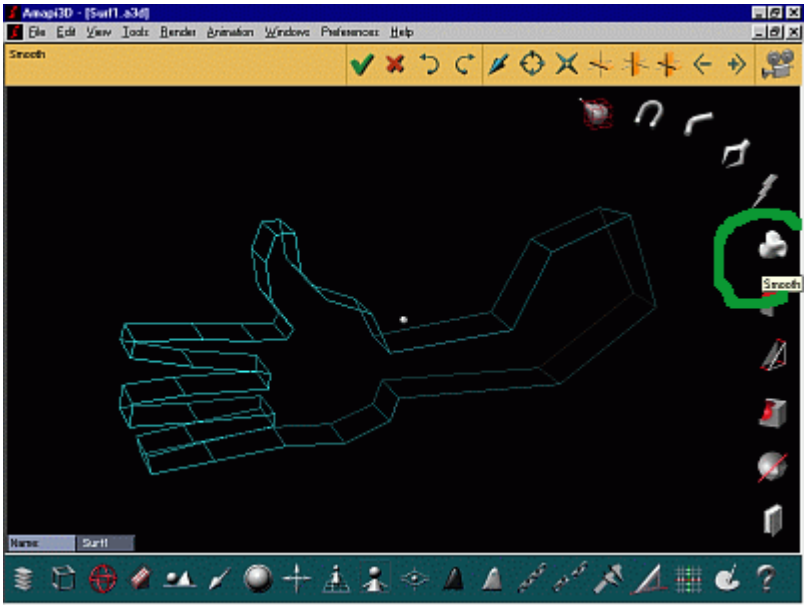


Use the Stretch tool to adjust the position of some points.

In order to move two or more points in tandem, be sure to right-click and select the points, or click the bull's eye cursor located in the top assistant palette



next to the lasso cursor.



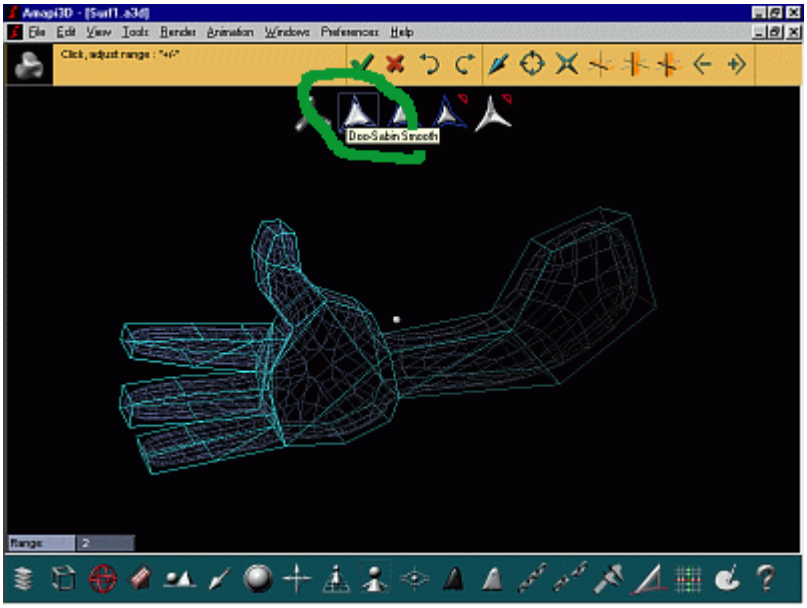
After you're done, if the previously selected points still remain selected (as shown by the red dots on the vertices), simply click the part again to kill the current subset selection and return to the entire part.

And now for a little bit of magic:

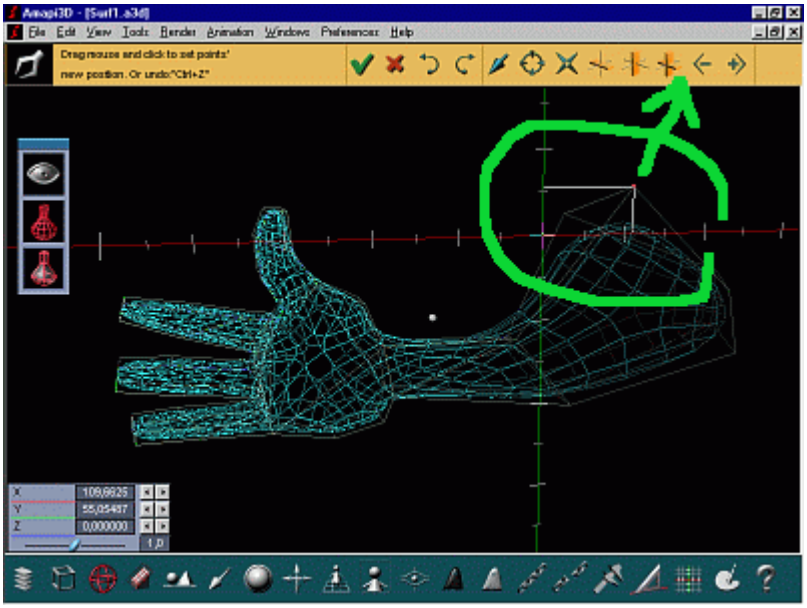
select the **Smooth** tool

Select the second icon from the left in the Smooth palette which appears. It is the Doo-Sabin method.

Use the + / - keys to change tesselation count. Go easy on this one, this very



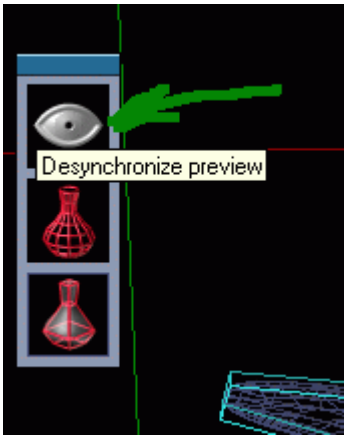
rapidly increases the count to high numbers.



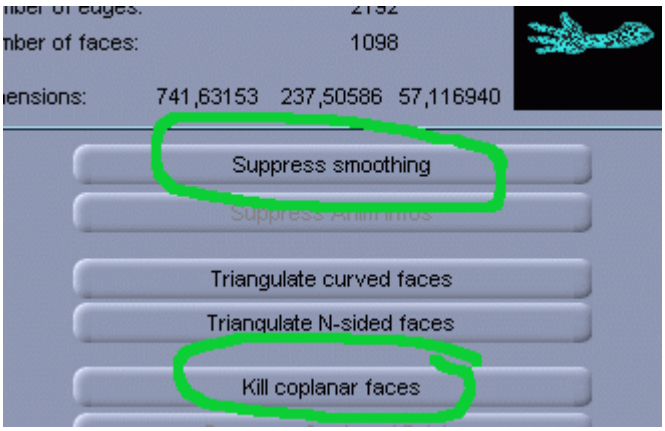
If you use the Stretch tool again, you'll be able to edit the control points of the original, coarse hull which was created by the extrusion of the profile curve. It somewhat mimics a Nurbs cage and the underlying smoothed Nurbs surface.

At left, a few icons appear in the control palette. The bottom level is the current, default one. If you want to edit the fine mesh vertices of the smoothed surface instead, click the next icon up.

The 'eye' at the top enables or disables dynamic preview as you move and drag a



picked point. This is great when working on a slower machine. On faster machines, keep the dynamic preview enabled.



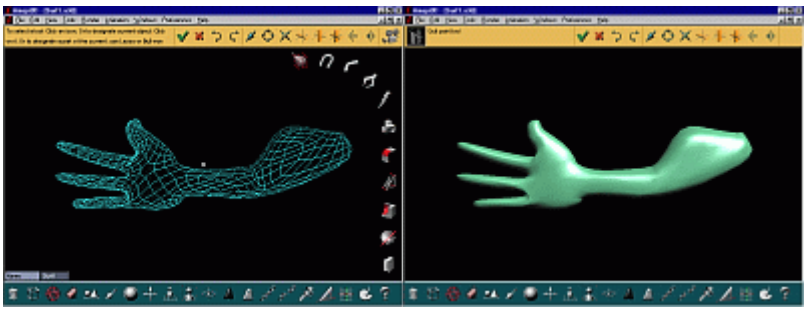
Back to double-clicking to get the Info: If you want to kill the smoothing and return to the original coarse surface alone, use the top button in the info panel:

Suppress smoothing

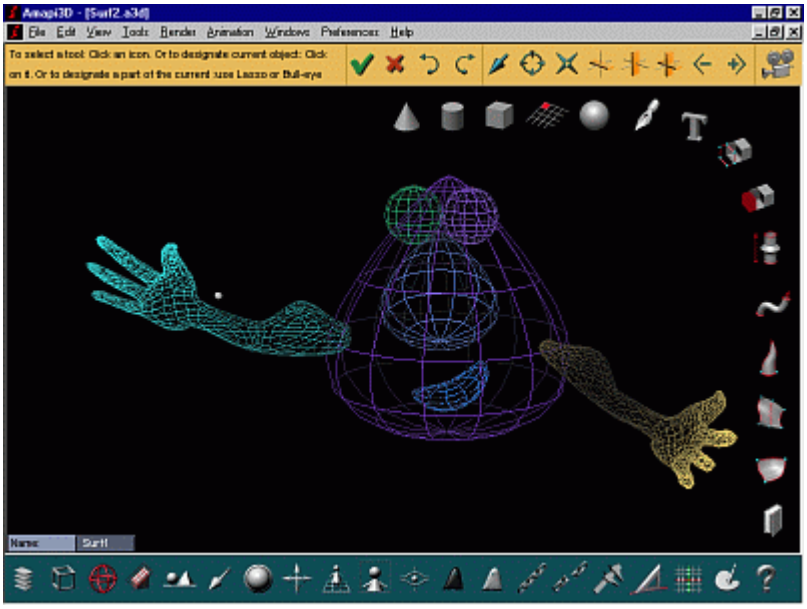
Also, after this and other editing commands, such as adding bevels, it is possible that the model contain adjacent, coplanar facets which can be regrouped and converted to a single complex polygon if desired.

Here are two shots showing my final arm - a little bit of bicepts muscle in the upper arm :-)

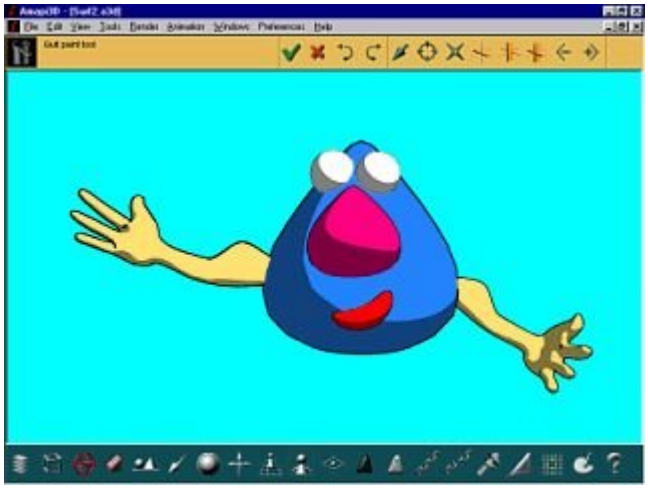
Including a bunch of Alt-PrintScreens to capture the



above images into my favorite image viewer (Irfanview), and a run to the refrigerator for more icecream, this so far took about 1 hour.



Quick, let's add a body, er... head, nose, eyes... duplicate the arm to the other size, use the global deformator, to bend, twist, etc...



Amapi has a **cartoon rendering** engine (Styles) - let's assign styles to each part (clean cartoon style, and 2 shades)...

Tadaah!

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