Course: 3D Design
Title: Mesh Modeling – Hand
Dropbox File: Hand.zip
Blender: Version 2.41
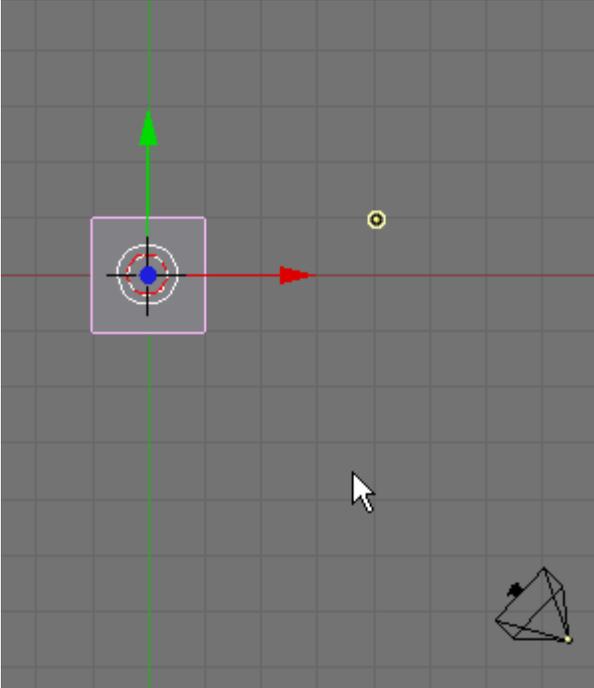Level: Beginning
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Mesh Modeling – Hand

Open a new Blender file. We will be using the default cube as a base for the hand model. (If your default Blender file does not include a cube, place your 3D cursor in the center of the top view and press / space / add / mesh / cube and TAB to object mode.) Make sure

the 3D Transform Widget is activated

Select the default cube (RMB). Press TAB to enter Edit Mode. Press the NKEY to display the Transform Properties Panel. Rename the cube object: Hand.
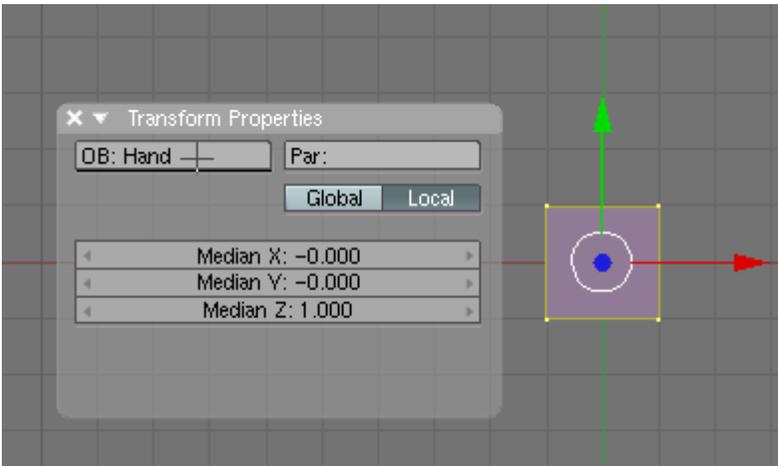

After naming the object, remove the Transform properties Panel by clicking on the "X" in the upper left of the panel.

Press the AKEY to deselect all of the vertices. Switch to Front View (NUM1). Make sure you are in wireframe draw type. You can switch by clicking on the draw type icon and changing to wireframe or press the ZKEY.
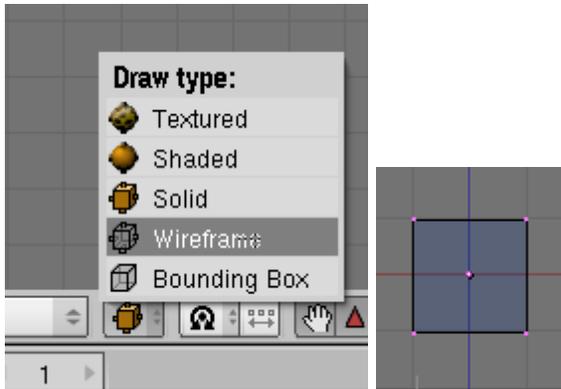
It is important to work on your mesh modeling in wireframe draw type. In wireframe mode when you select a vertex, edge or face using the RMB you will be selecting only that element and not any element directly behind it. Using the box select (BKEY) in wireframe selects all of the elements behind the selected element and subsequent box selections add to the selection.

In the Front View, press the BKEY and box select the 2 vertices on the right side of the cube.
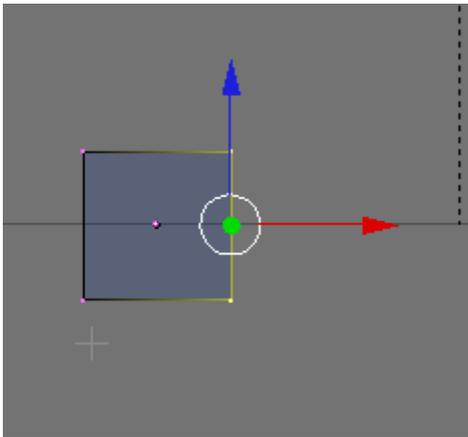
Note that because we used the box select in wireframe mode, we have actually selected 4 vertices (the 2 in front and the 2 behind).

Press the left arrow on your NUM panel once then press the up arrow on your NUM panel once. This rotates the view to show you a more perspective viewpoint.
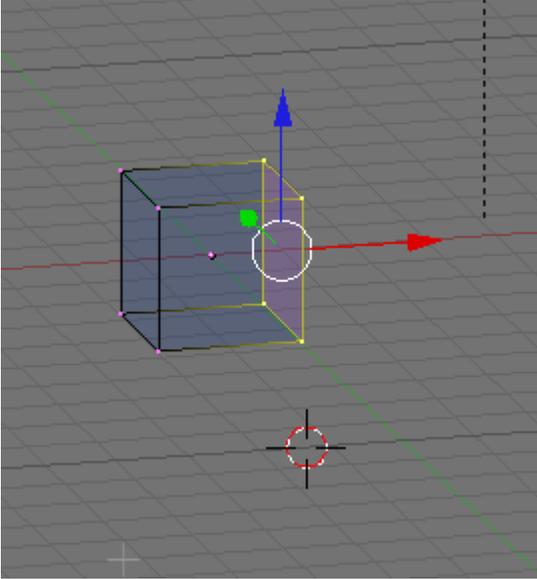
Return to Front View (NUM1). Press the EKEY (Extrude). Choose "Region" and extrude the vertices to the left 2 grid units making the cube twice as wide. LMB to set in place.
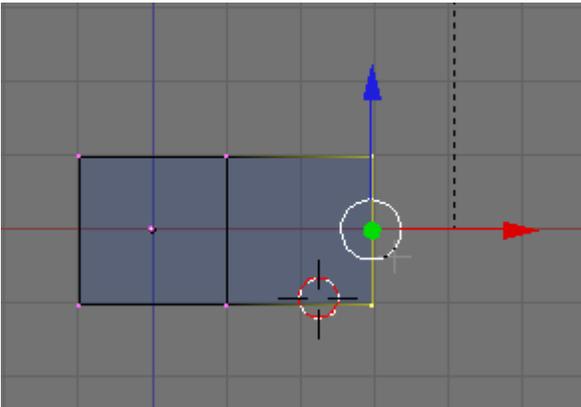

(Note: if you do not receive the option to choose "Region" then you have not selected all four vertices. This is an easy mistake to make if you use the box select while not in wireframe mode and the default "limit selection" button is active)
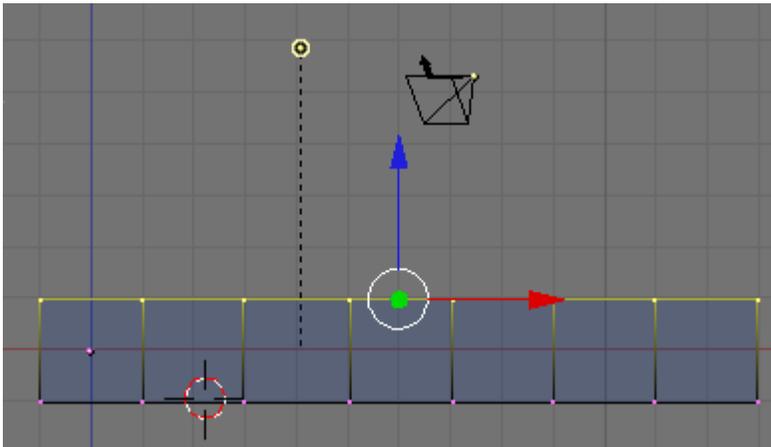
Press the EKEY again and Region extrude the vertices to the right another 2 grid units.
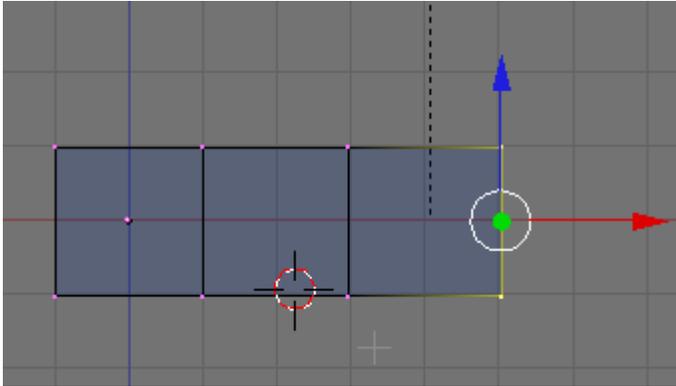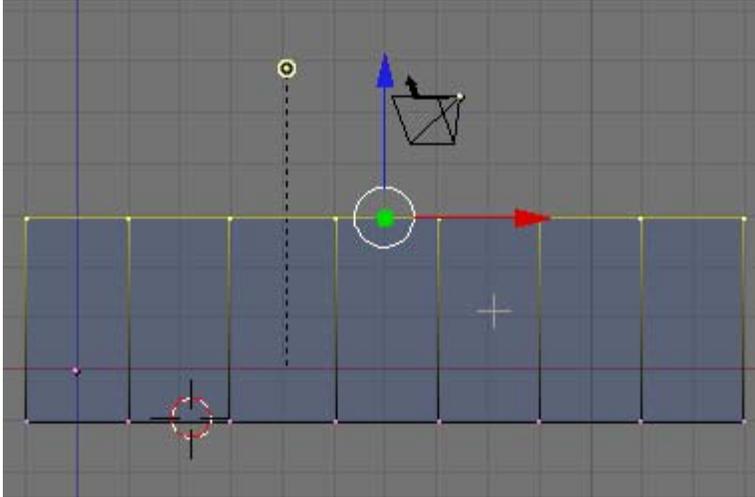
Repeat this region extrusion 4 more times to make a rectangle with 7 sections.
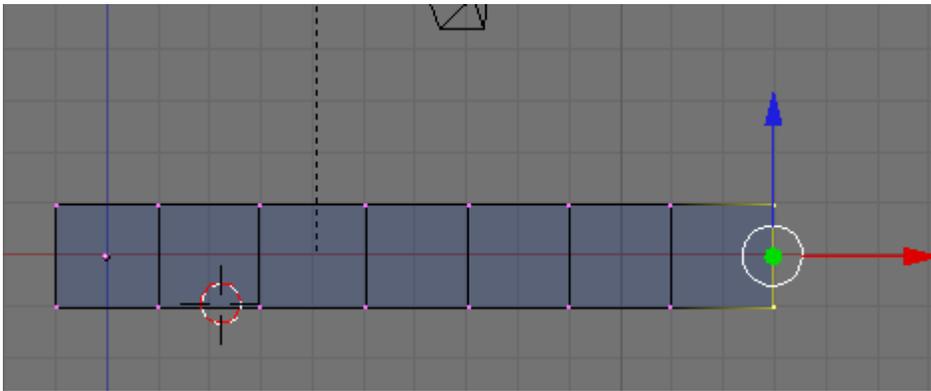
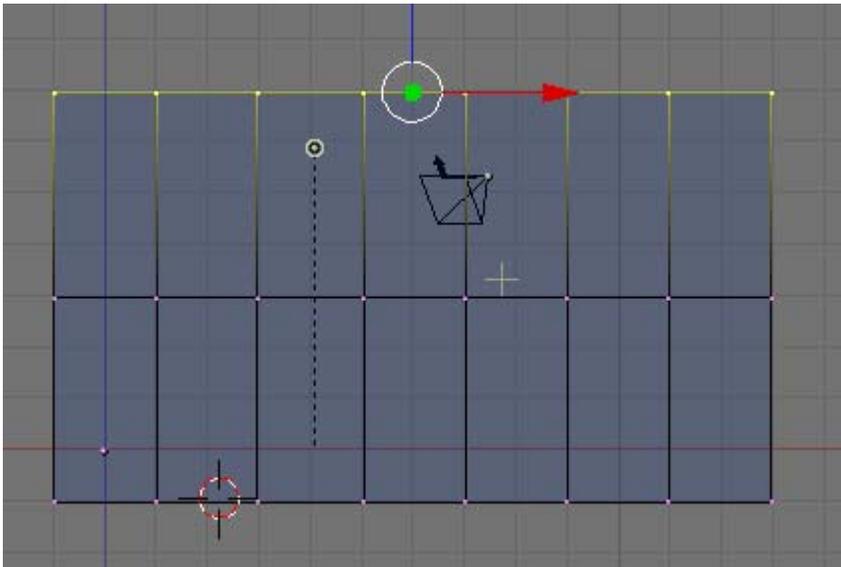Press the AKEY to deselect the vertices. Then, box select (BKEY) the top 8 vertices.

LMB click the blue widget arrow and move these vertices up 2 grid units.

Note that we did not extrude these vertices but rather moved them making the segments twice as high as they are wide.

Now, with the vertices still selected, press the EKEY (Extrude) and region extrude them up 4 grid units making 14 segments (2 rows of 7).

Notice the difference between region extruding the vertices and moving the vertices.

Repeat the region extrusion of these vertices making 21 segments (3 rows of 7).
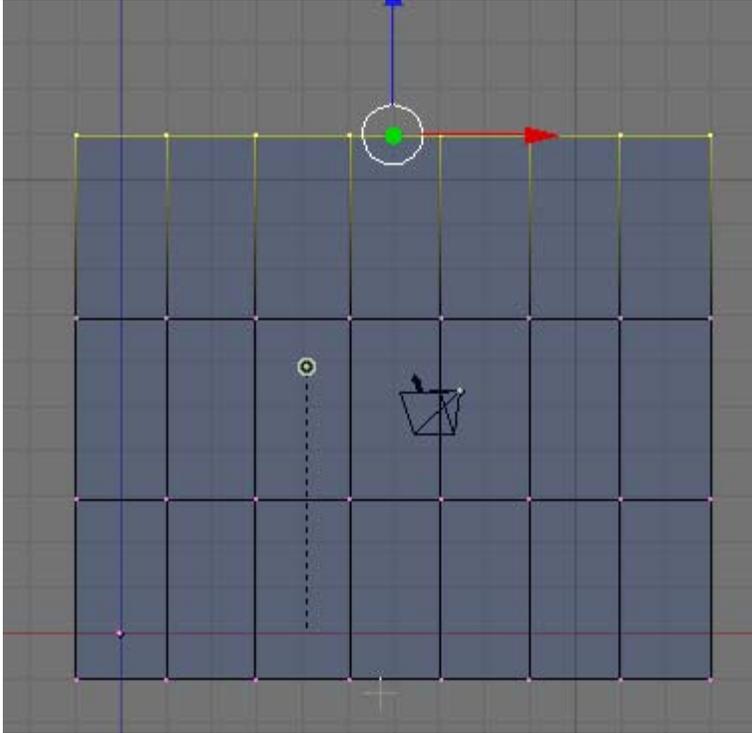
Press the AKEY to deselect the vertices.

Now that we have a basic mesh we will split the 3D viewport to view the object in multiple views. Move your cursor to the top of the 3D viewport until it changes to a double sided arrow icon. Then RMB click and choose Split Area from the menu.
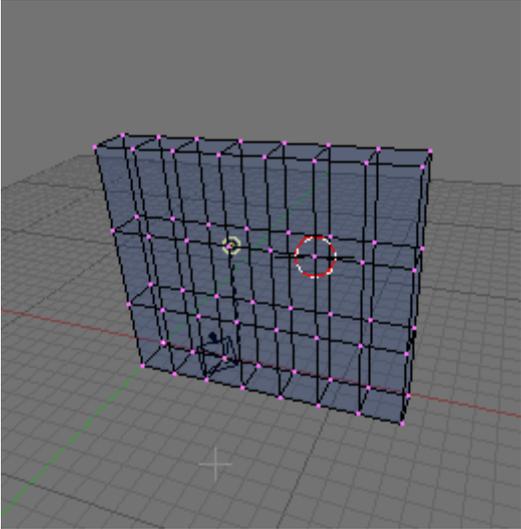

This will split the viewport with a vertical line. Move the line to the center and LMB click.
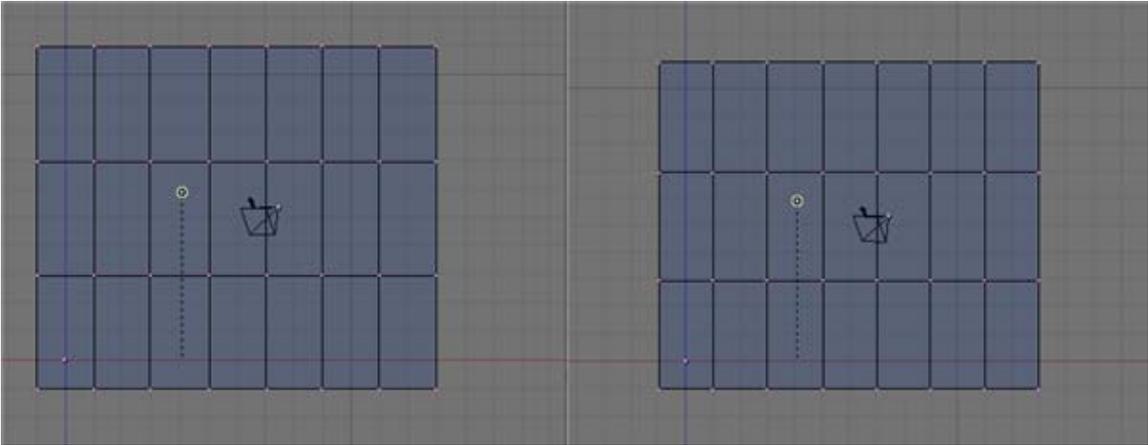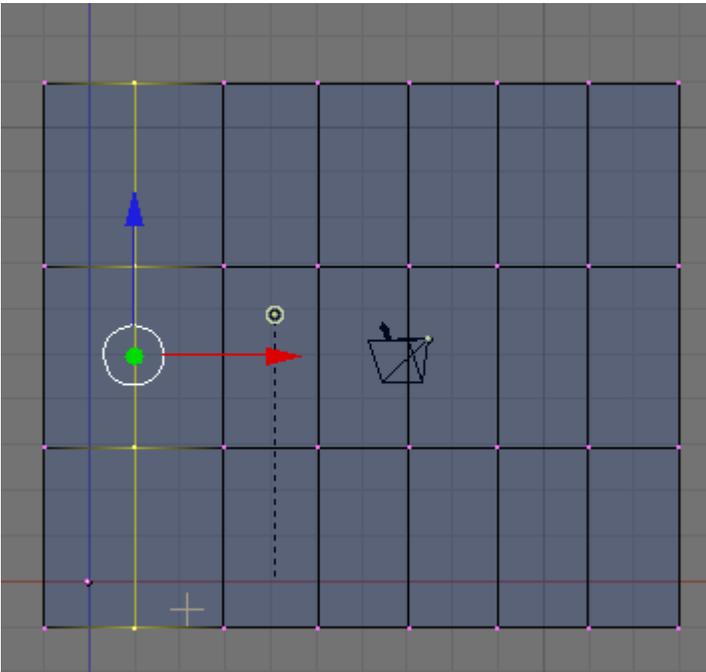
LMB click anywhere in the right viewport to activate it and switch the view to Perspective (NUM5)
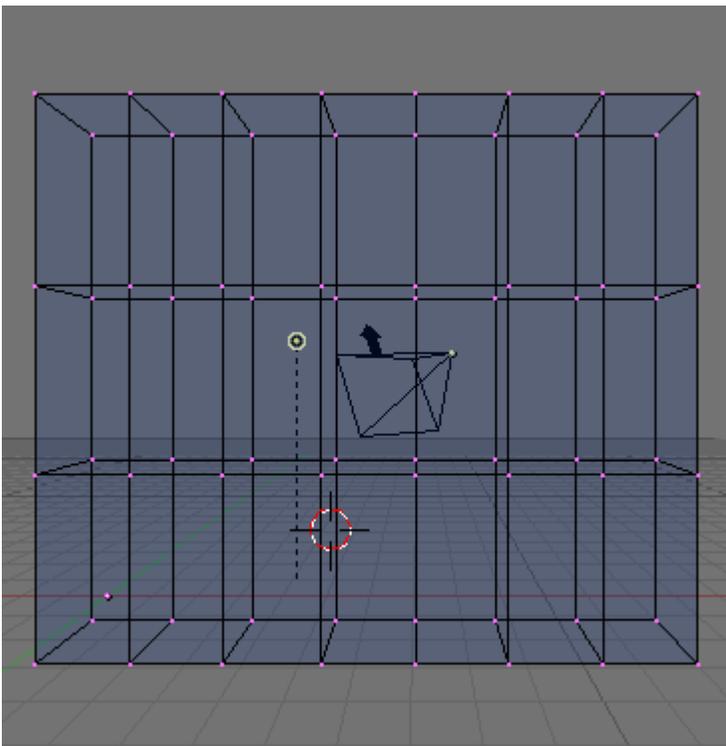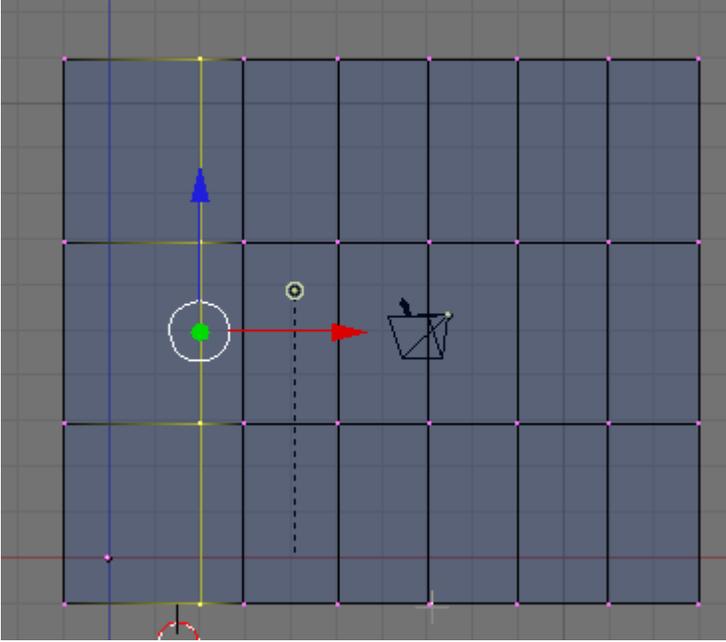

MMB Drag to rotate the view and SHIFT-MMB drag to position it so that you have a nice perspective view of the object. Zoom in or out as needed.
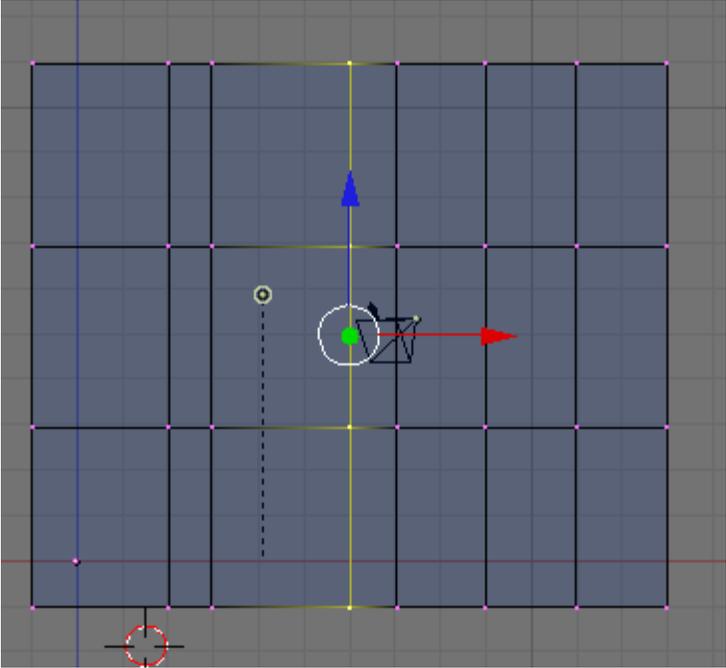
Return to the left viewport (still in front view) and zoom in a bit. Box select (BKEY) the second row of vertices from the left.
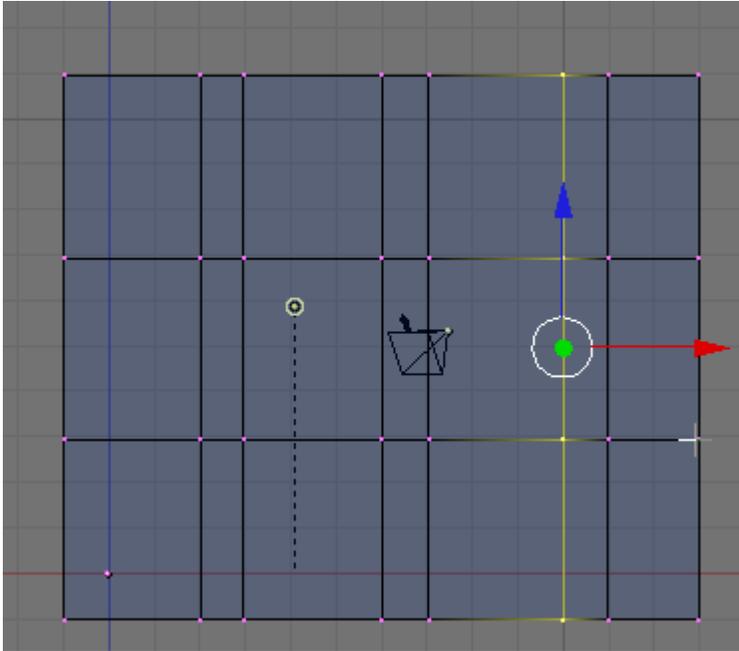

LMB click the red widget arrow and move them to the left as shown.

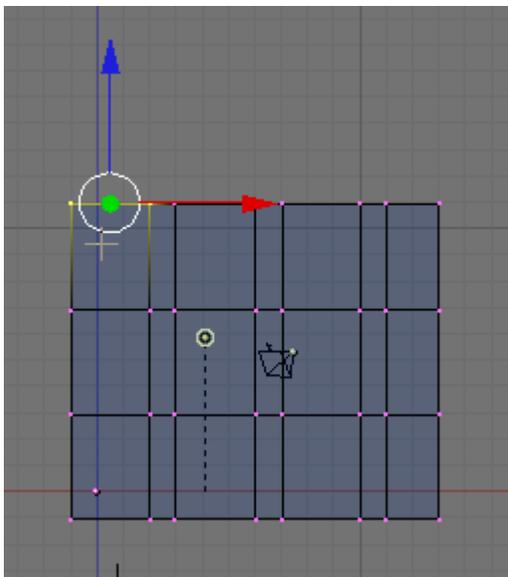Press the AKEY to deselect the vertices. Box select the fourth row of vertices and move them to the left as shown.

Press the AKEY to deselect the vertices. Box select the sixth row of vertices and move them to the left as shown.
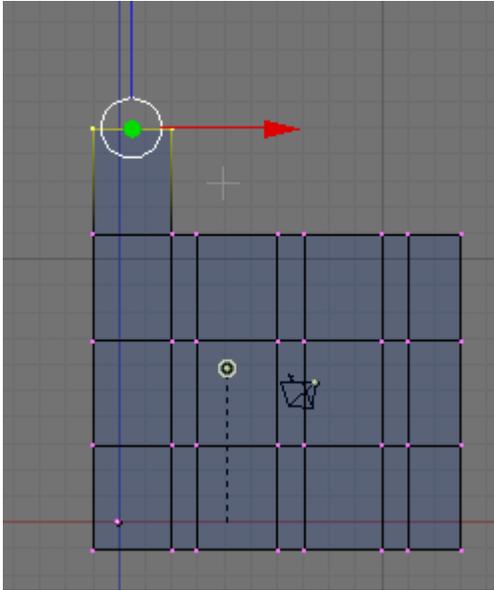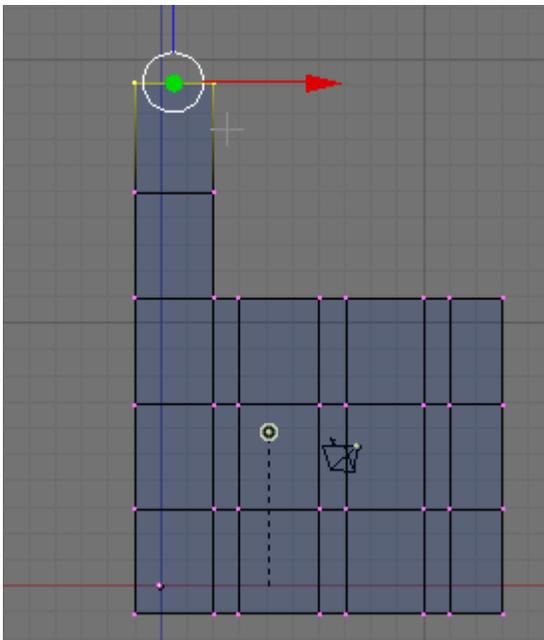
Save your file F2.

Press the AKEY to deselect the vertices. Zoom out a bit. Box select the two vertices on the top left of the object.
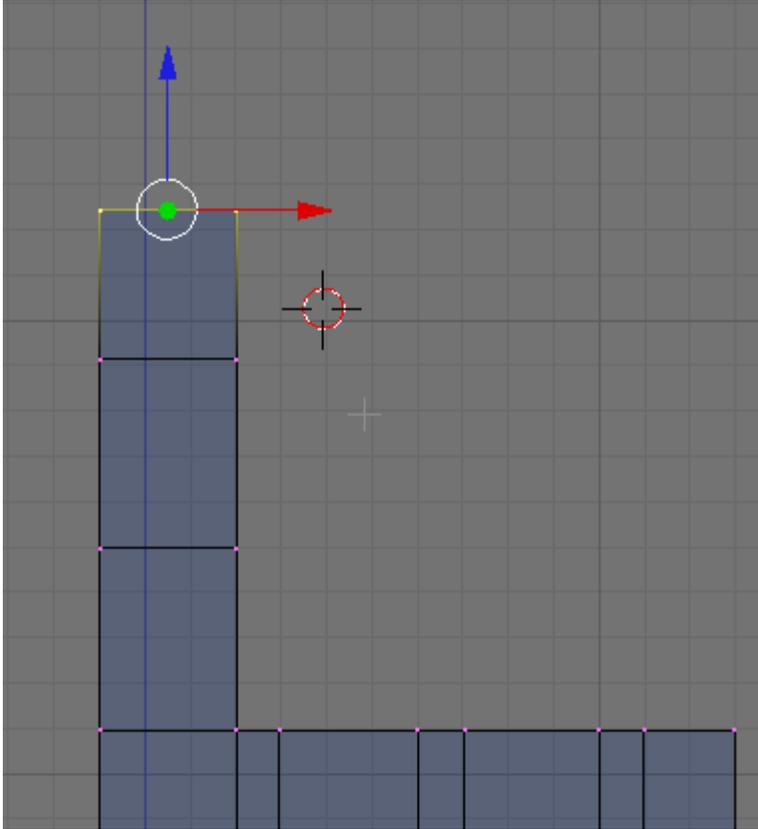

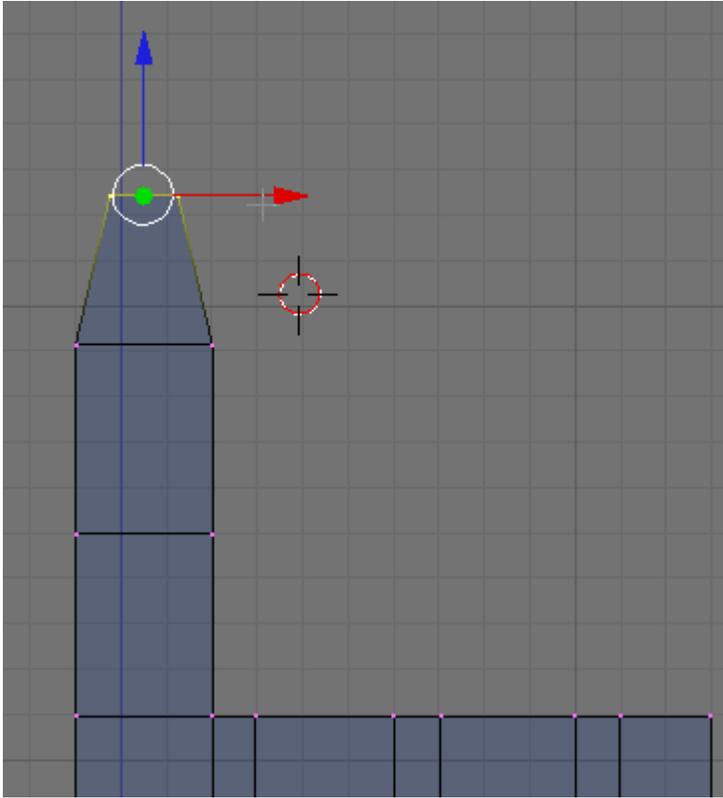Press the EKEY (Extrude) and region extrude them up 4 grid units as shown.

Press the EKEY (Extrude) and region extrude them up another 4 grid units as shown.

Zoom in to this area and re-center your view. Press the EKEY (Extrude) and region extrude them up another 3 and one-half grid units as shown.
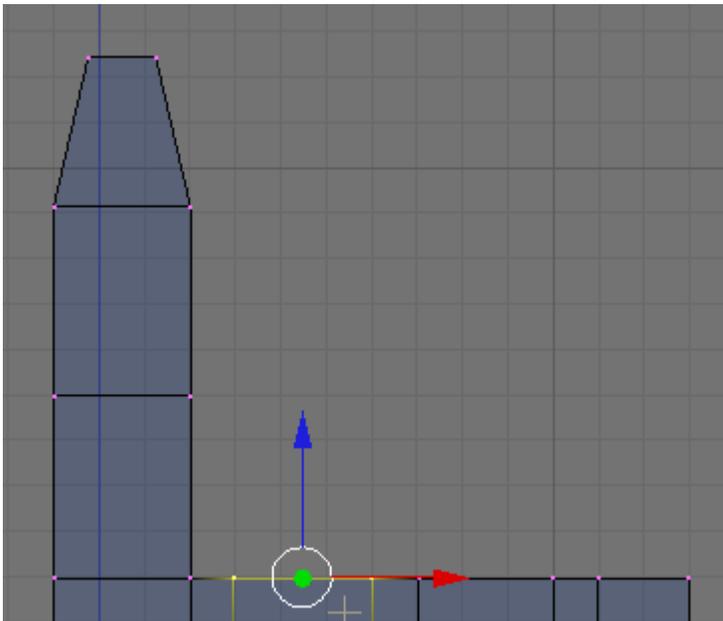
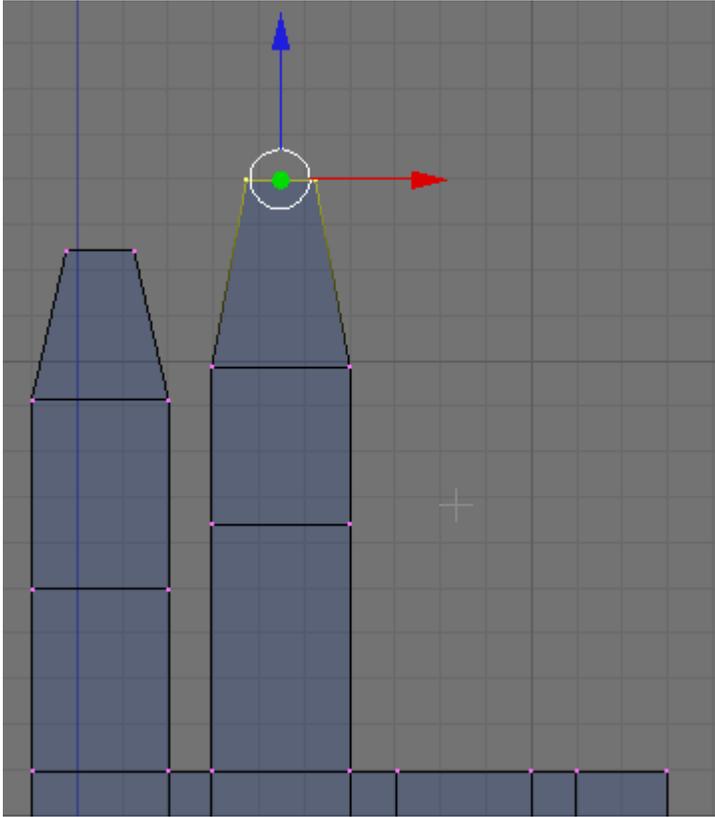Press the SKEY (Scale) and scale these vertices in a bit as shown.

Press the AKEY to deselect the vertices. This forms the basic structure for the index finger of the right hand.

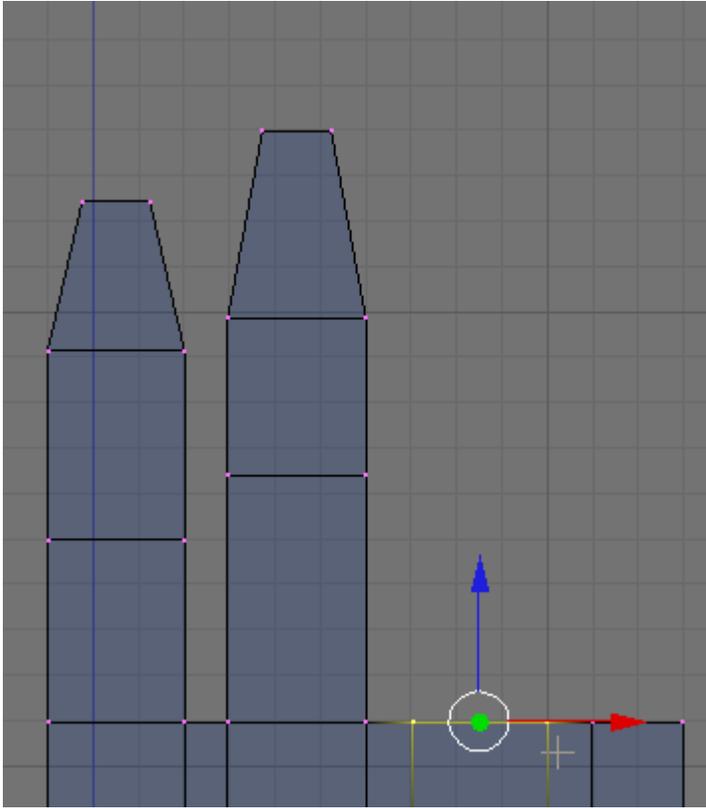Box select the third and fourth top vertices of the basic hand.

Region extrude these vertices 3 times (scaling down their final position) to form the middle finger of the right hand as shown.
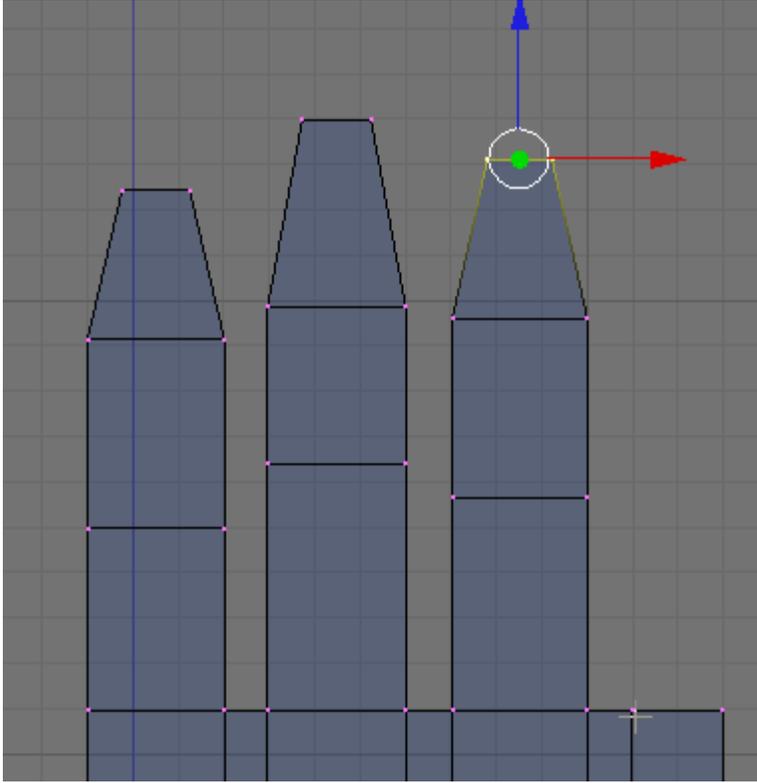

Note: the middle finger is a bit longer than the index finger and the segments are of a different length.

Press the AKEY to deselect the vertices. Box select the fifth and sixth top vertices of the basic hand.
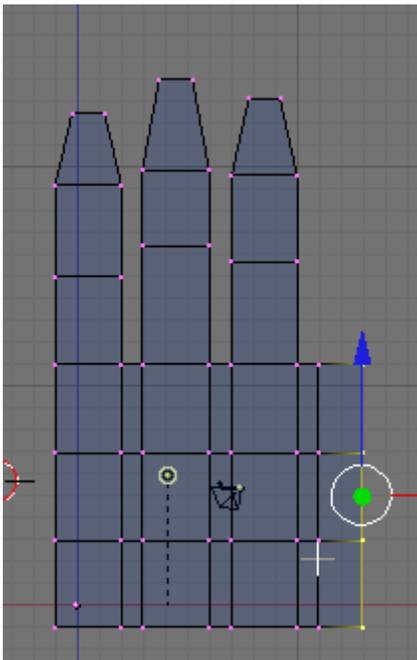
Region extrude these vertices 3 times (scaling down their final position) to form the ring finger of the right hand as shown.
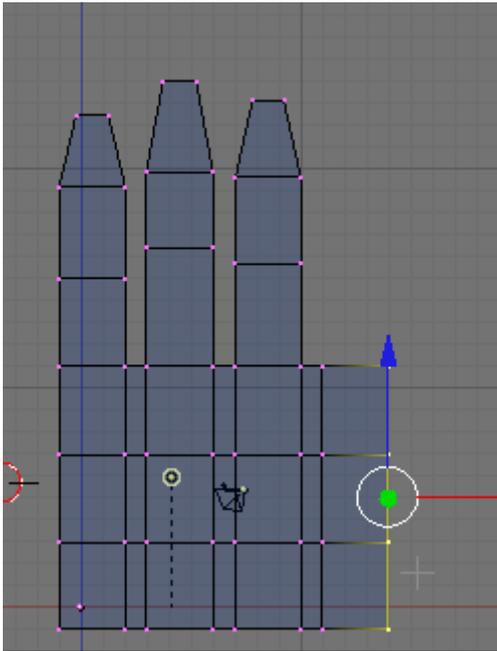
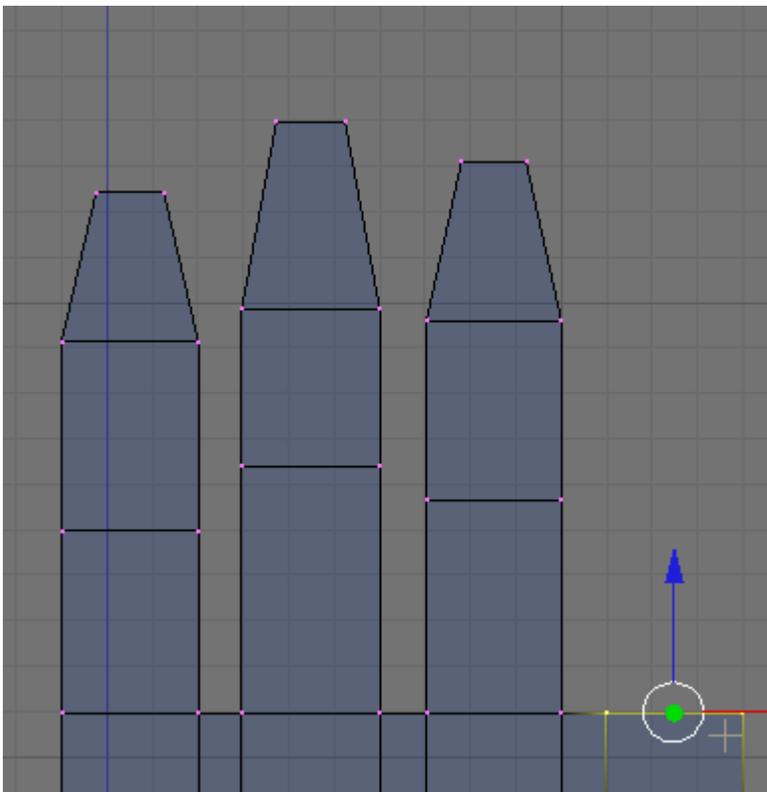Notice the size of the segments in relation to the other fingers.

Zoom out a bit and box select the row of vertices on the right side of the hand.

LMB click the red transform widget and move them 1 grid unit to the right so the segment is as wide as the other finger segments.

Press the AKEY to deselect the vertices. Zoom back in a bit. Box select the seventh and eighth top vertices of the basic hand.

Region extrude these vertices 3 times (scaling down their final position) to form the pinky finger of the right hand as shown.
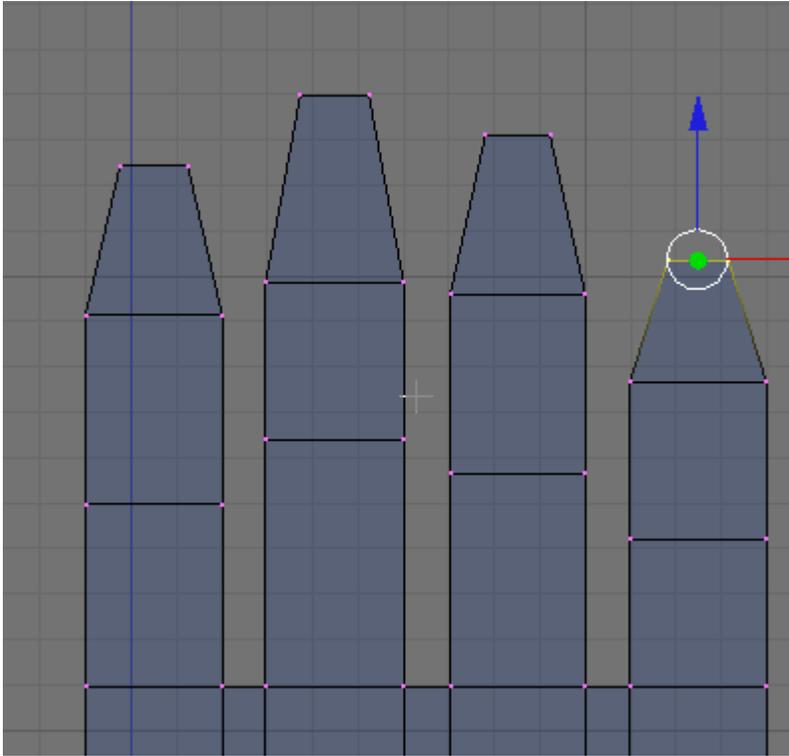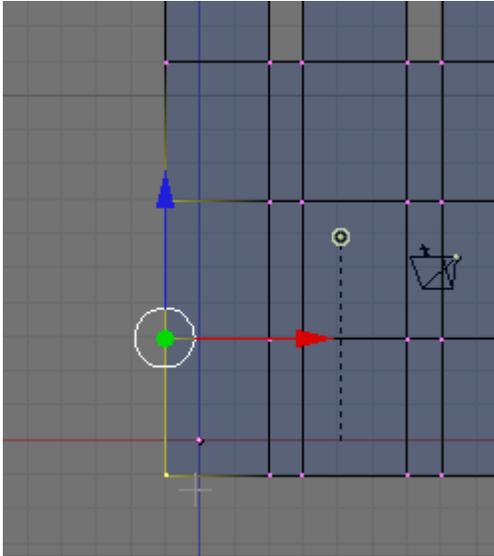

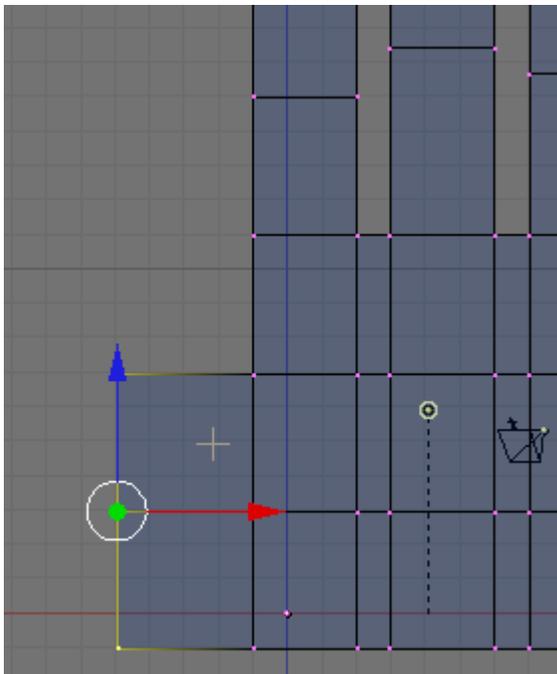Notice the size of the segments in relation to the other fingers.

Press the AKEY to deselect the vertices.
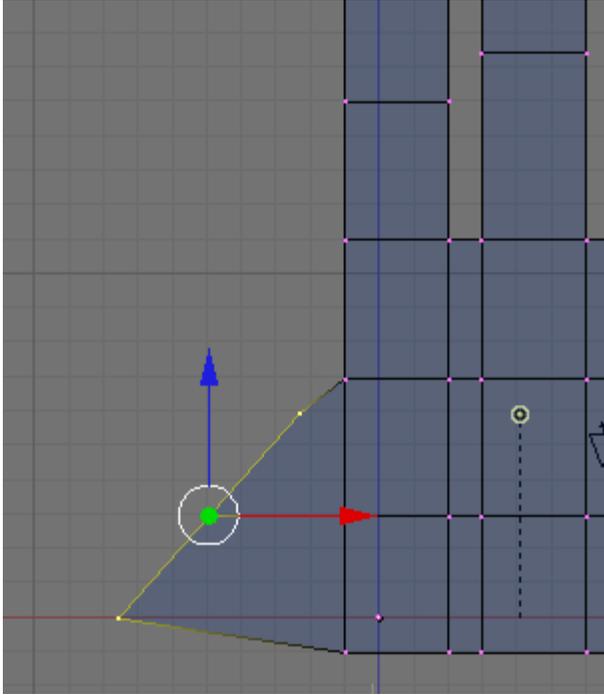
Save your file CTRL-W.

Zoom in a bit to the lower left portion of the hand. Box select the bottom 3 vertices on the left.
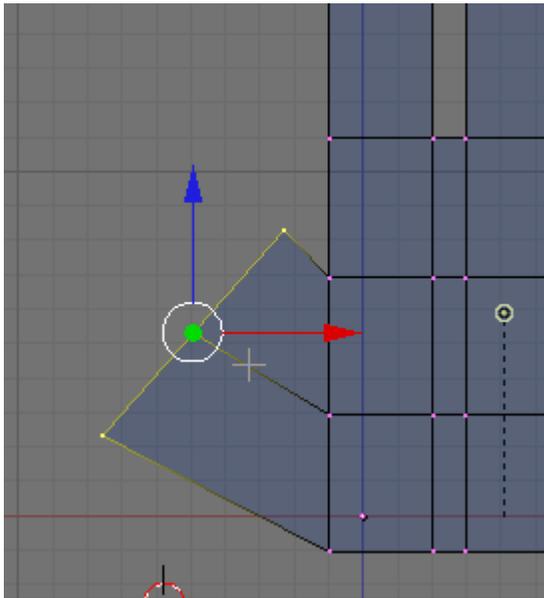
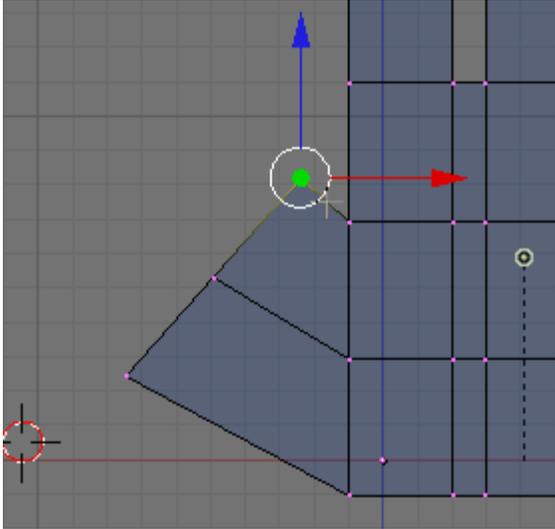Press the EKEY (Extrude) and region extrude these vertices to the left 4 grid units as shown.

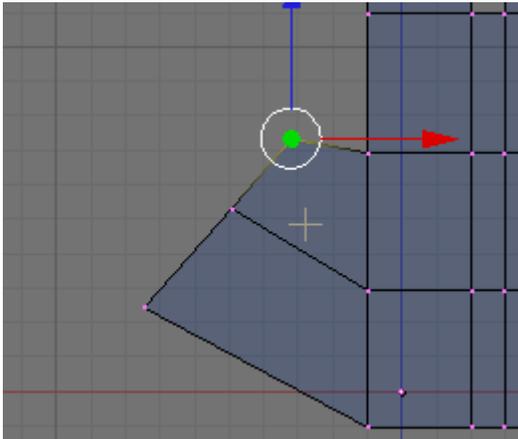Press RKEY (Rotate) and rotate the vertices as shown below.

LMB the blue transform widget arrow and move the vertices up a bit as shown.
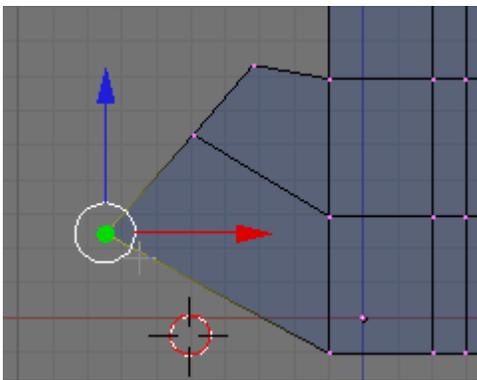

Press the AKEY to deselect the vertices. Box select the top right vertices on the thumb as shown.
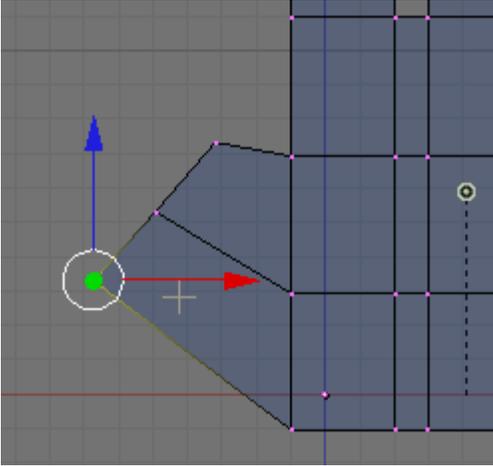
Press the GKEY (Grab) and move the vertices down and to the left a bit ass shown.
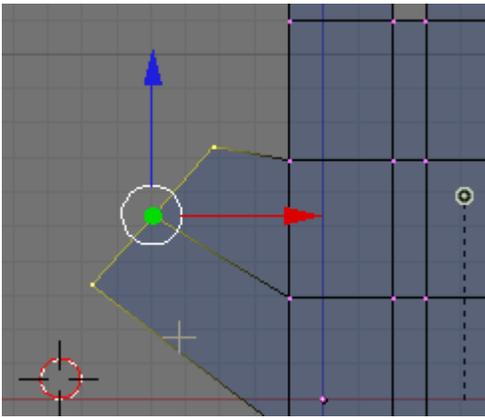

Press the AKEY to deselect the vertices. Box select the bottom left vertices on the thumb as shown.
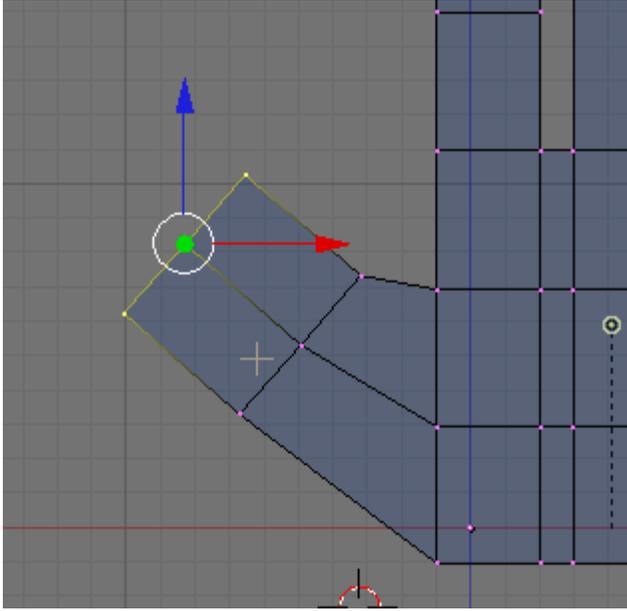

Press the GKEY (Grab) and move the vertices up and to the right a bit ass shown.
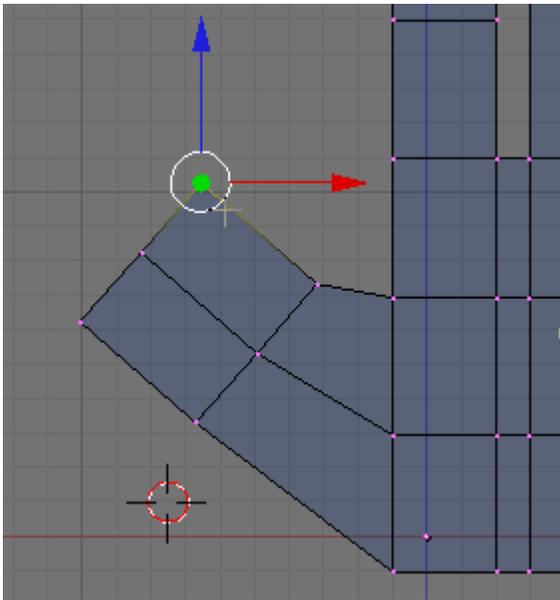
Press the AKEY to deselect the vertices. Box select the 3 top vertices of the thumb.
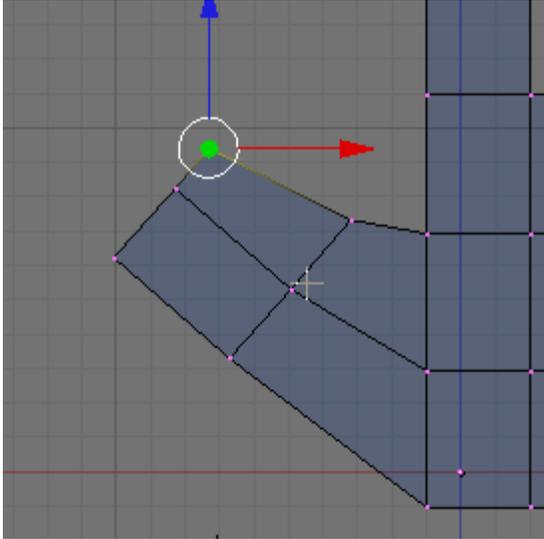

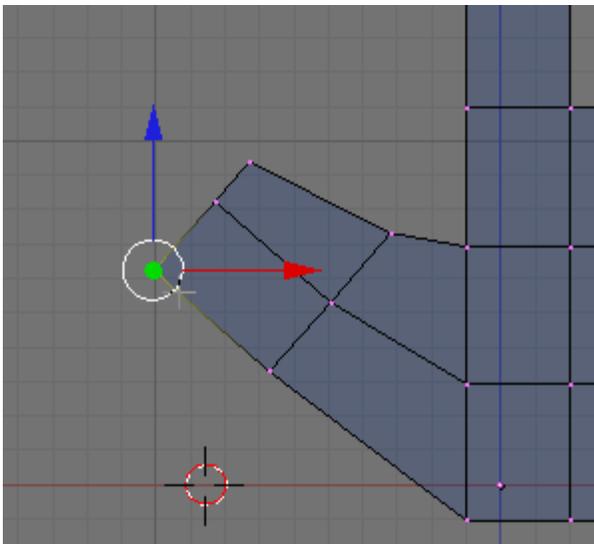Press the EKEY (Extrude) and region extrude the vertices as shown.

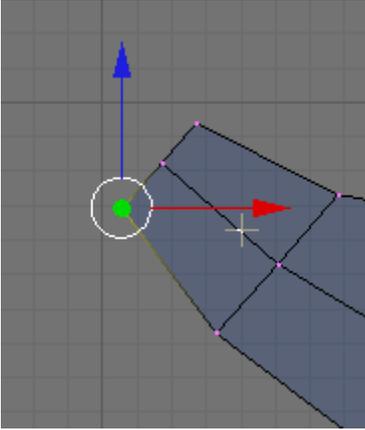Press the AKEY to deselect the vertices. Box select the top right thumb vertices.

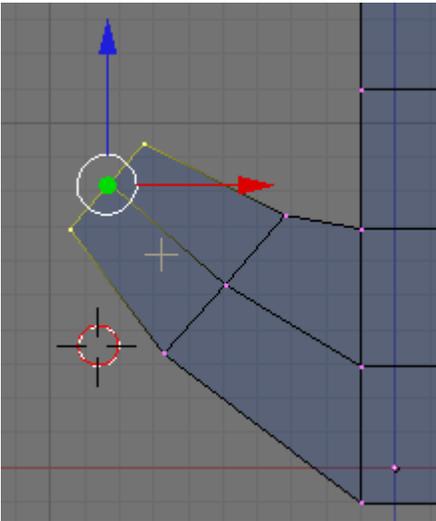Press the GKEY (Grab) and move them down and to the left a bit as shown.

Press the AKEY to deselect the vertices. Box select the bottom left vertices on the thumb as shown.
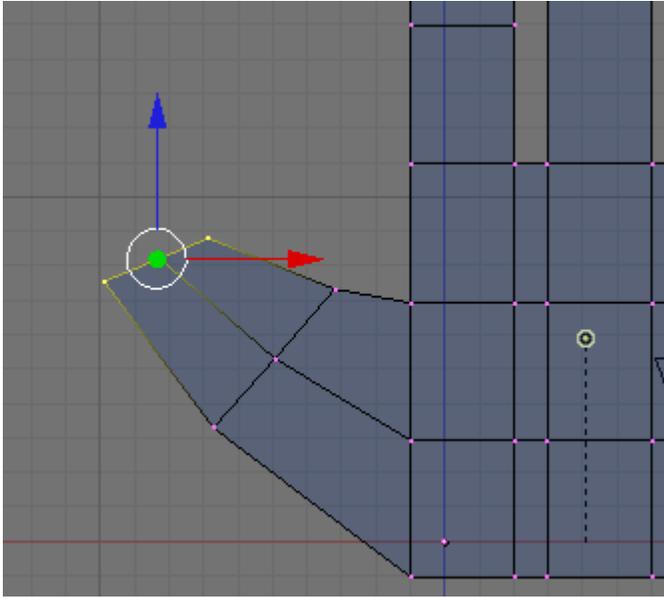

Press the GKEY (Grab) and move them up and to the right a bit as shown.
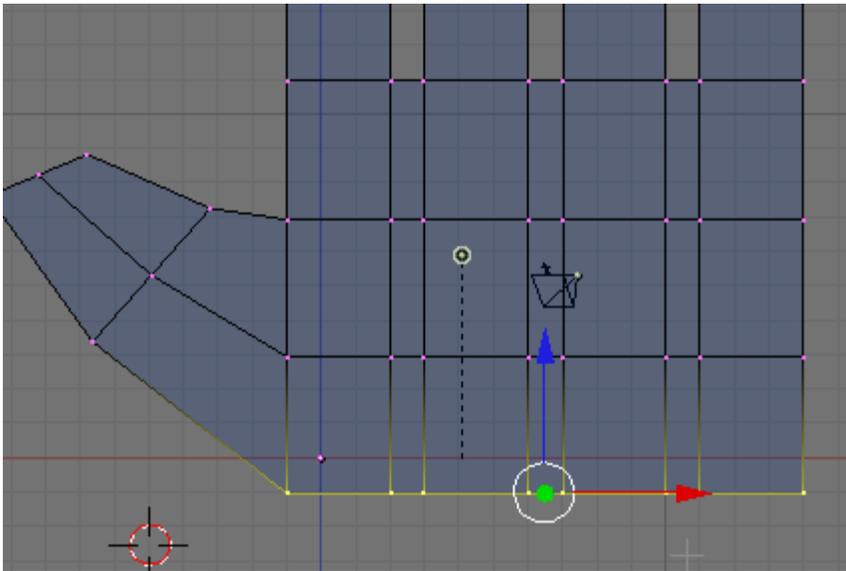
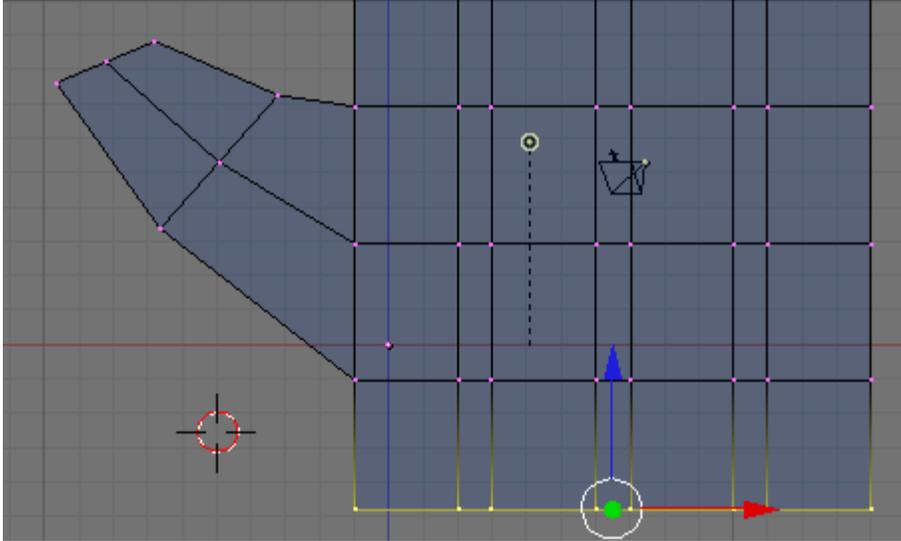Press the AKEY to deselect the vertices. Box select the 3 top vertices on the thumb as shown.

Press the RKEY (Rotate) and rotate the vertices a bit as shown.
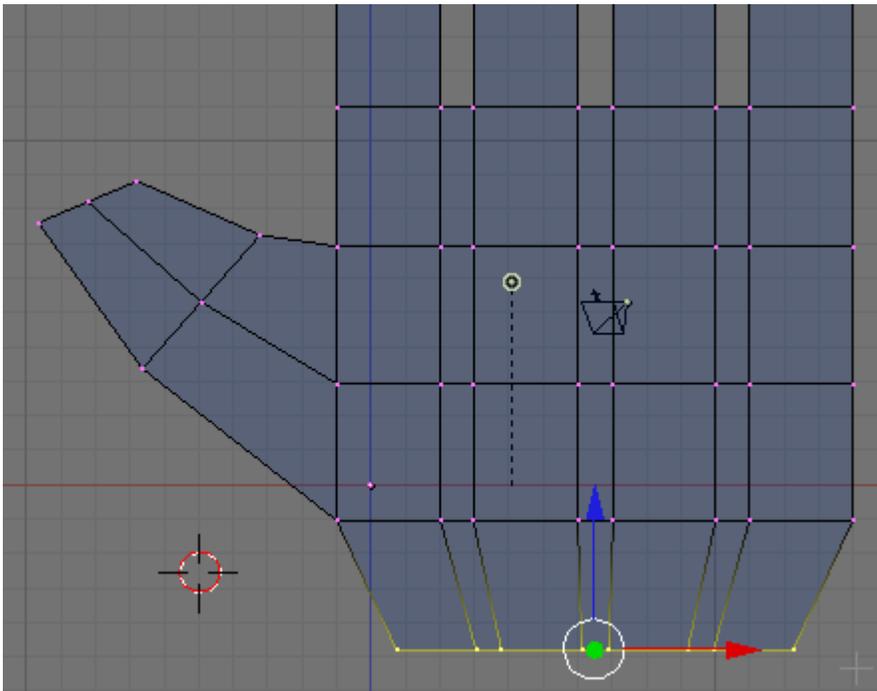
Press the AKEY to deselect the vertices. We will now add a little bit of a wrist to the hand. Box select the bottom row of vertices on the hand.
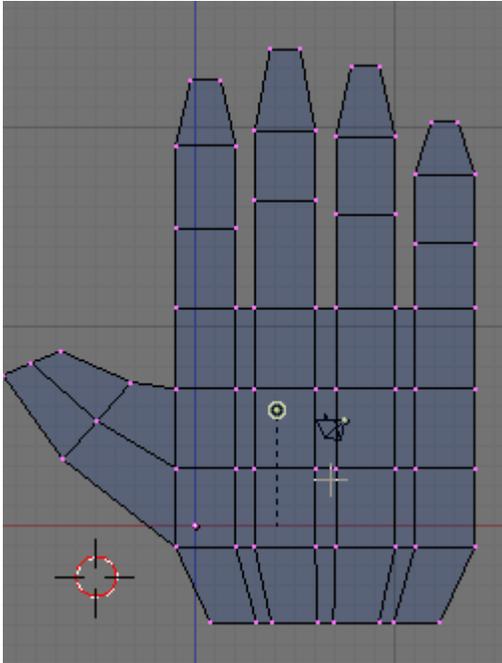

Press the EKEY (Extrude) and region extrude the vertices down as shown.

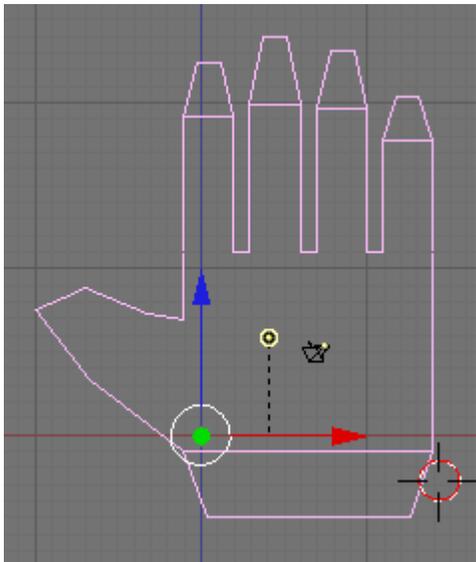Press the SKEY (Scale) and scale the vertices in a bit as shown.

Press the AKEY to deselect the vertices. We now have the basic hand structure.
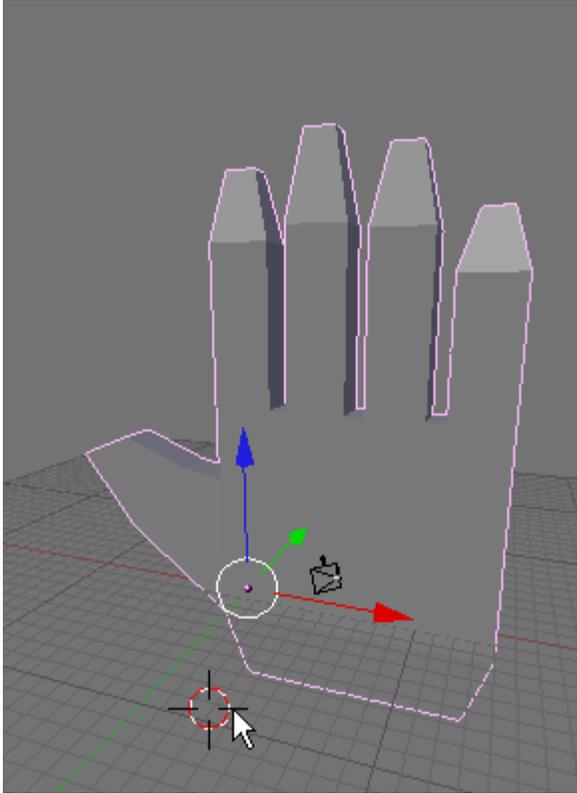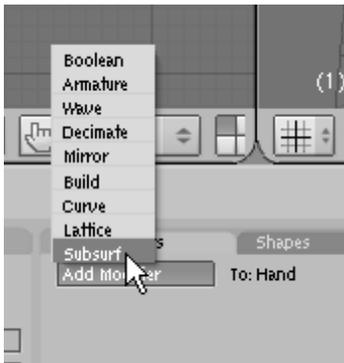
Save your file CTRL-W.
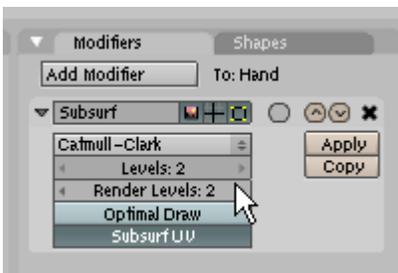
Next, TAB to Object Mode.

Click in the right Perspective viewport and then press the ZKEY to enter shaded move for that viewport.

Press F9 (Editing) if not already selected. In the Modifiers Panel click on the add modifier button and use the dropdown box to select the SubSurf modifier.
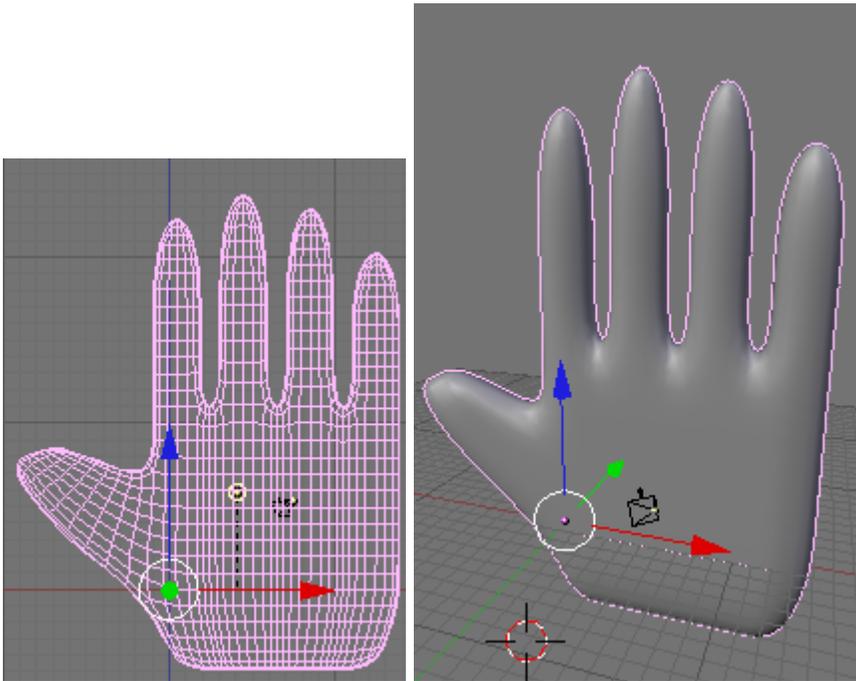

Set the Level setting to 2 and the Render Level setting to 2.

In the Links and Materials Panel press the Set Smooth button (activating it).
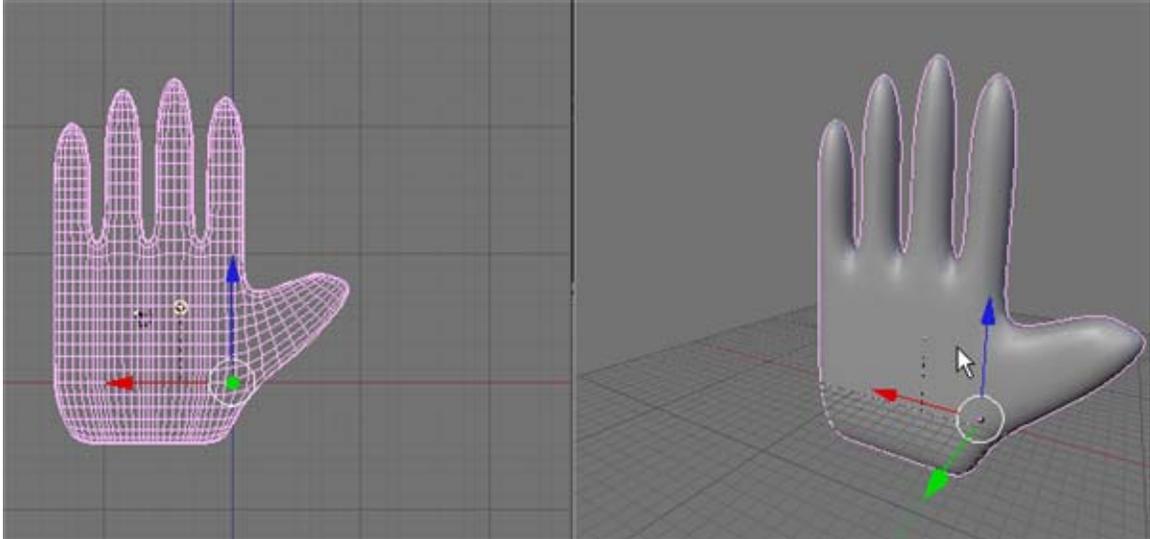

The hand is nicely formed.

Save your file F2.

We will now add a little modeling to the palm. Switch the left viewport to the Rear View (CTRL-NUM1). Rotate your right perspective view so you see the palm of the right had (it is backwards now).

Return to the left viewport rear view by clicking anywhere in the viewport. TAB to Edit Mode. Press the BKEY TWICE. This activates the circle select. A circle now appears connected to the cursor. You can increase or decrease the circle by rotating the MMB track wheel. Set the size of the circle as shown below.
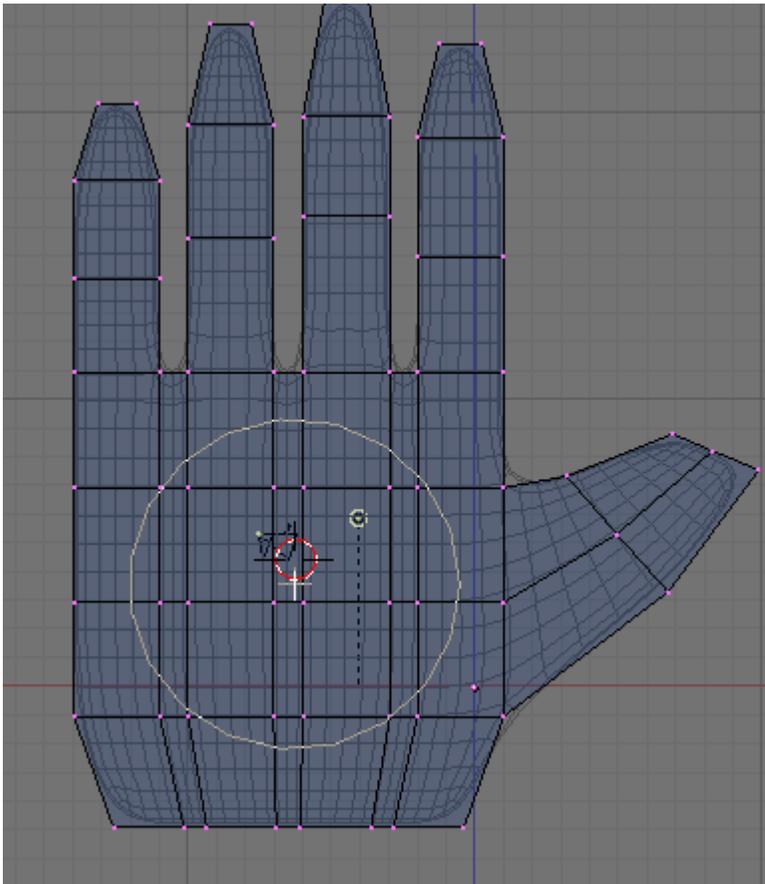
Move the circle select to the center of the palm and LMB click. This will select the vertices in the circle (and the ones behind them).
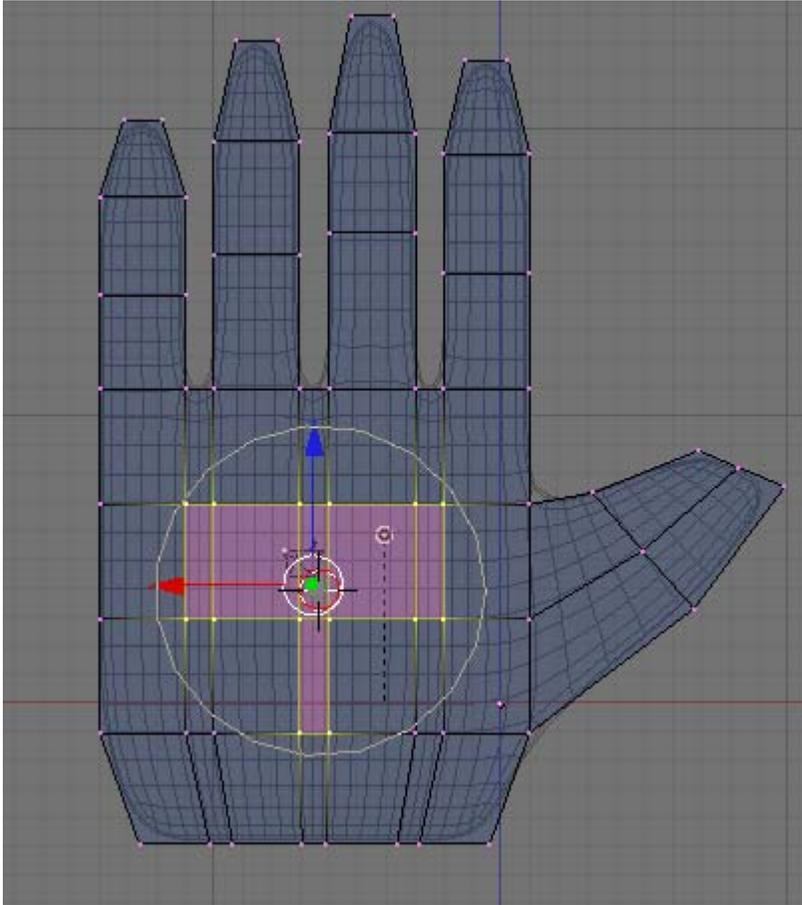
RMB click to leave circle select mode. Switch to side view NUM3.
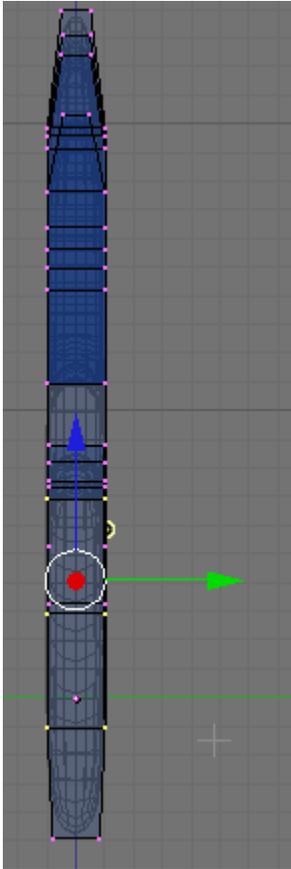
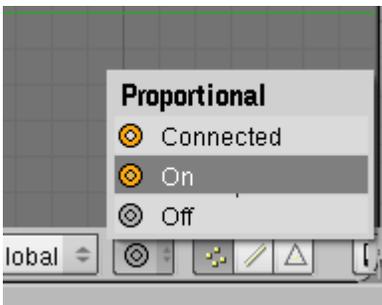We will now use Blender's Proportional Edit Falloff function. Open the side viewport by dragging its left border to the right to expose more of the buttons on the menu bar. Press the Proportional Edit Falloff button and choose ON.

A Falloff button will appear on the menu bar next to the Proportional Edit button. Click the Falloff button and choose Sphere Falloff.
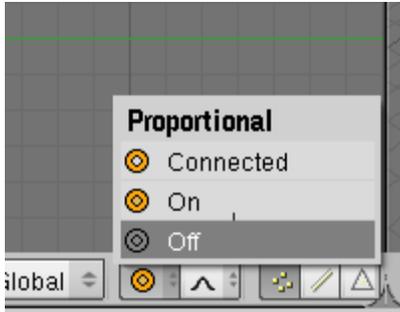
LMB the green Transform widget arrow in the side viewport and move it slightly to the left as shown.
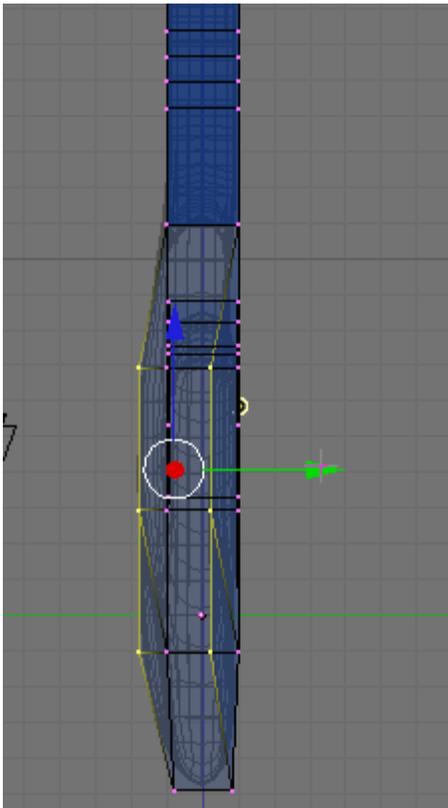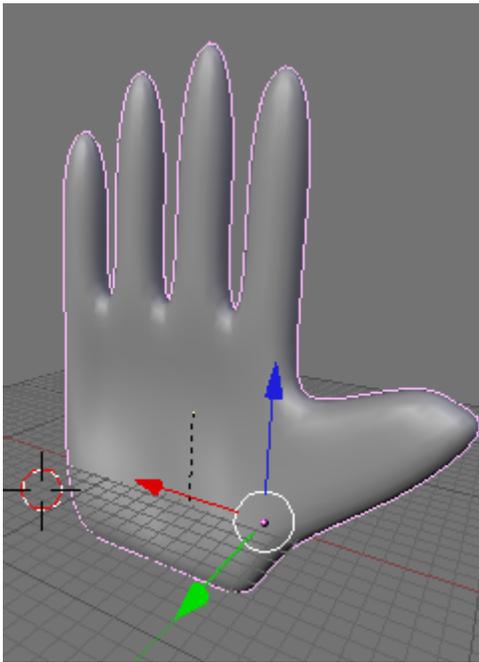

Note that the proportional Edit with Sphere falloff creates a spherical indent into the palm and raises the back of the hand accordingly. This is because the vertices are affected to different degrees (based on a sphere) to movement.

Turn off Proportional Editing.

Press the AKEY to deselect the vertices. TAB to Object Mode. We now have a more detailed palm.

Save your file F2.

Switch the left viewport to top view (NUM7). Switch the right viewport to camera (NUM0). Note that the camera needs to be adjusted. We will use Blender's constraint feature to make the camera look at an "empty" object.

In the top viewport place your 3D cursor to the side of the hand object. Press Space / Add / Empty.
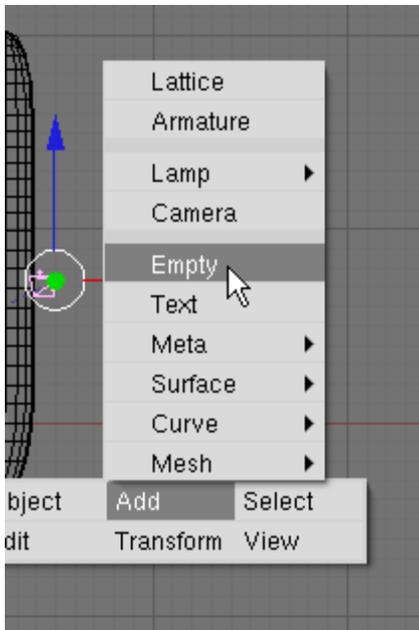
An empty object is a non-rendered "point". It is displayed on the 3D viewport as a 3D Axis.

It has many uses. In this case we will force the camera to look at this empty object and then place the empty object where we want the camera to focus. With the empty object selected, press the NKEY (Transform Properties Panel). Name the empty CameraFocus.
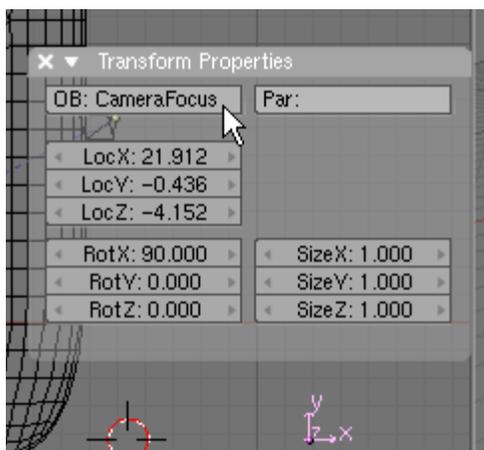
In the top viewport select the camera. Before the camera can be constrained to look at the CameraFocus empty object we must first remove and rotation applied to the camera as part of the default set-up. Press ALT-R and choose to clear the rotation.
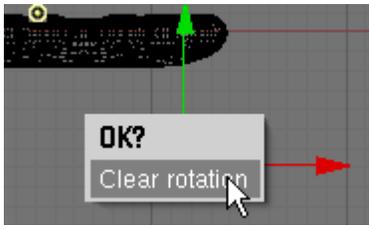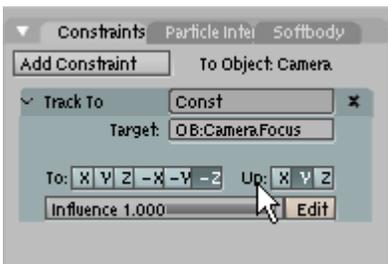

Press F7 (Object). In the Constraint Panel press the Add Constraint button. Choose Track To as the type.
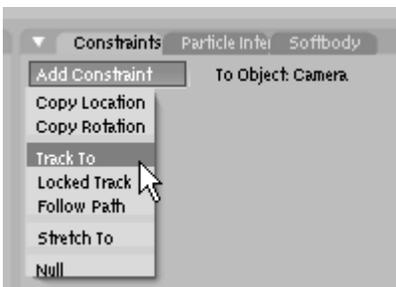
In the Target Object box type CameraFocus (This is the name we originally gave to the empty object. It must be spelled exactly as named in the Transform Properties Panel.
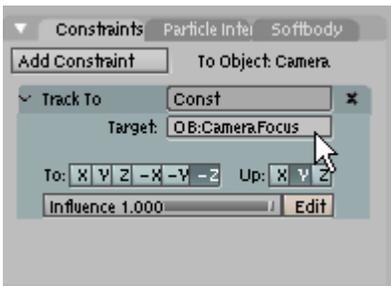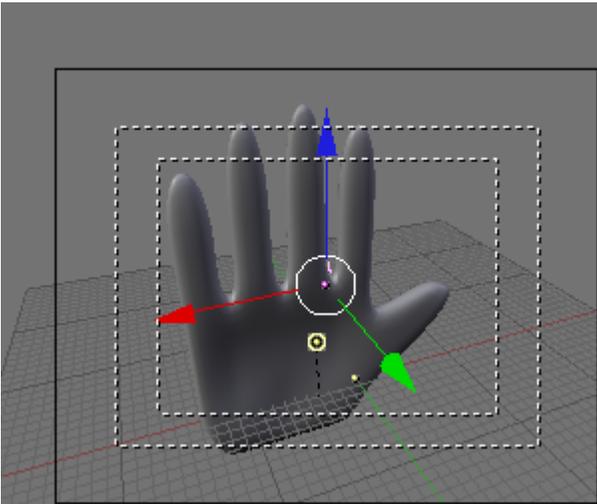

Set the To: button to –Z and the Up: button to Y.

The camera will now always point to the center of the CameraFocus empty object. In the top viewport grab the empty object and place it on top of the hand object.

Switch to side view (NUM3) Grab the empty object and move it to the middle of the hand.
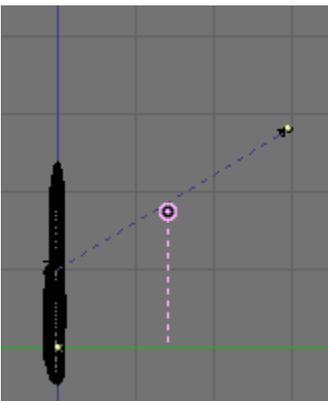

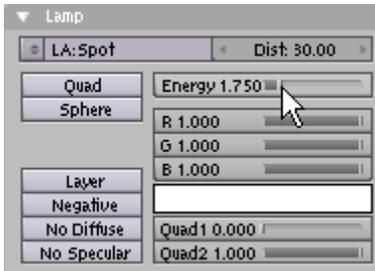Grab the camera and position it so that the camera view look like below.
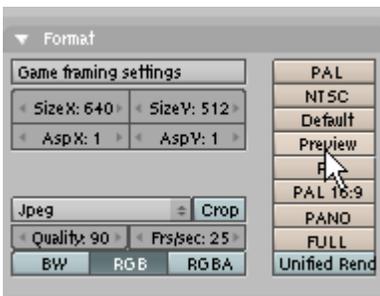

Save your file F2.

In the side view, grab the lamp and move it between the camera and the hand.
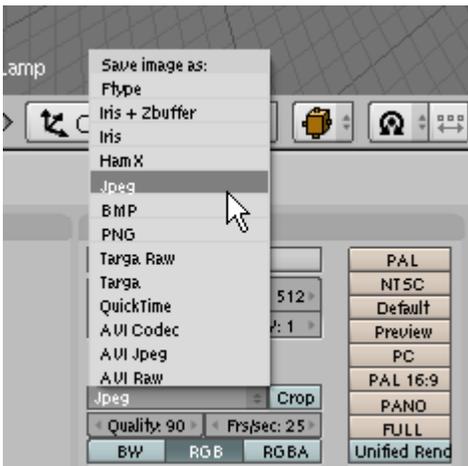
With the lamp selected press F5 (Shading). In the Lamp Panel change the Energy setting to 1.75

Press F10 (Scene). In the Format Panel press the Preview Button. This sets the rendered image size to 640 x 512 at 50% (320 x 256).

In the Format Panel make sure the File output type is set to JPEG.

Press the Render Button or F12. Blender will render the camera view. You can save a copy of it by pressing F3 (Be sure to add the .jpg extension to the file name.)
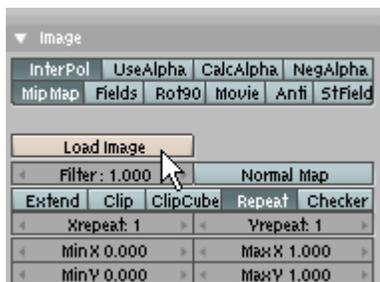
We will now add a texture to the hand. Select the hand object and press F5 (Shading). (If you see Add New material button press it.)
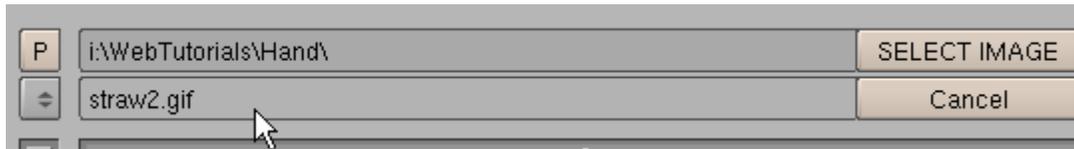
Now press F6 (Texture Buttons). (If you see Add New Texture button press it.) In the Texture Panel choose Image for Texture type.
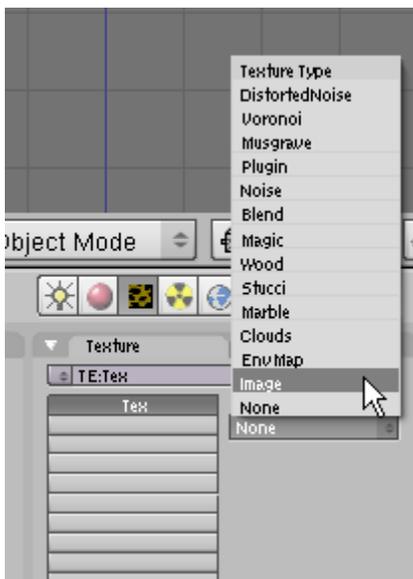
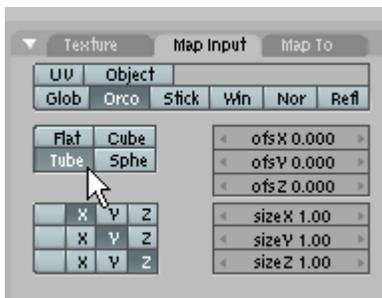In the Image Panel choose Load Image.

Select the straw2.gif image. This image is in the Hand.zip file.

After you select the image press the Select Image button. Click on the Material Buttons

sub-context button. . Select the MAP INPUT tab on the far right. In the Map Input Panel set the mapping to Tube.

Render F12.

You can save a copy of it by pressing F3 (Be sure to add the .jpg extension to the file name.)

There is a completed copy of this tutorial in the Hand.zip file called HandComplete.blend.