BEZIER CURVES

Working with Beezers

Logo design is an art unto itself, and no professional graphic artist would entertain the idea of working on a logo design project without the aid of a vector illustration tool. Michael J Hammel shows us how Inkscape makes creating shapes a breeze, using a powerful and easy-to-use feature: Bezier curves.

L ast month, we took our first look at *Inkscape*, the latest Open Source graphics tool to sweep the Linux desktop marketplace. *Inkscape* fills a long-standing void in this arena: vector illustration. Vector design allows artists to create at one resolution and easily scale – without distortion – to any other resolution. This flexibility is extremely important in many areas of graphical art, especially in logo design.

Logos are the focal point of a corporate or organisational identity. A logo can be used on letterheads, envelopes, memo pads, coffee cups, and pens in the office; it must also serve as a location marker on conference banners or building signs and as an identifying label on company vehicles.

It would be a waste of energy (and a pain to boot) to have to design multiple logos with a raster-based tool (like *The GIMP*) for printing at different resolutions. Instead, logo artists use vector illustration to design a single logo, and they then can scale it appropriately for the intended use.

In this month's tutorial, we'll recreate the *XNotesPlus* logo paying special attention to the use of Bezier curves. If you've ever used Mac OS 9 or higher, you'll probably have come across *Stickies* – an application that lets you place Post-It™-style notes on your desktop. *XNotesPlus* is a sticky notes program that takes this idea one step further into the domain of the PIM (Personal Information Manager): with over a dozen features like email, text search, printing, audio/visual alarms, date and calendar inserts, categorisation by coloured projects, *etc*. It also includes an interface to the 3Com Palm Pilot, allowing backups and syncing of backups, uploading *XNotes* to the Pilot and downloading Pilot

Memos into *XNotes*, and a complete interface to the *Pilot Address Book*, allowing you to use addresses from the Pilot to print envelopes and email notes to your contacts. *XNotesPlus* comes with support for both *GTK* and *Motif/LessTif*. For more information about *XNotesPlus*, see **www.graphics-muse.com/xnotes/xnotes.html**

Before we dive into the meat of the tutorial, we will first need a little background on terminology.
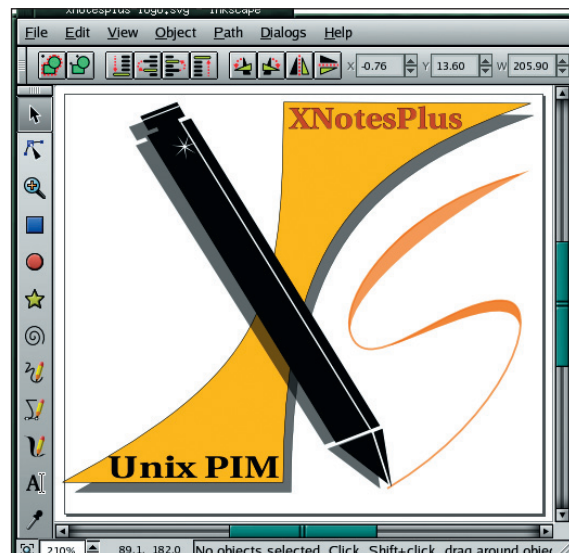
**This month's finished project: the *XNotesPlus* logo in *Inkscape*.**

PART I – GET FAMILIAR WITH NODES AND HANDLES

What is a Bezier Curve?

My wife recently started work with *Adobe Illustrator* and was having problems learning how to manipulate paths. Being self–taught, she sometimes comes to me with questions about the tools or terminology. One day, she came in frustrated and said she would never be able to figure out those stupid Beezers. *"Beezers?"* We still call them that for a laugh.

They're actually pronounced *beh–zee–AY*, after Pierre Etienne Bézier, the French mathematician and engineer who developed this method of computer drawing in the late 1960s while working for Renault, the car manufacturer. Logo design generally starts with simple text or a standard shape such as a box or circle. These objects are then converted to a path, which gives them nodes that can be moved and manipulated to change the shape of the path. A path and its nodes are collectively what make up a Bezier curve.

Inkscape shows nodes as square boxes dispersed along a curve. Two nodes make up a line segment and a line segment can be manipulated by adjusting the handles for the two nodes. Handles are shown as small circles attached to the node by a straight line.
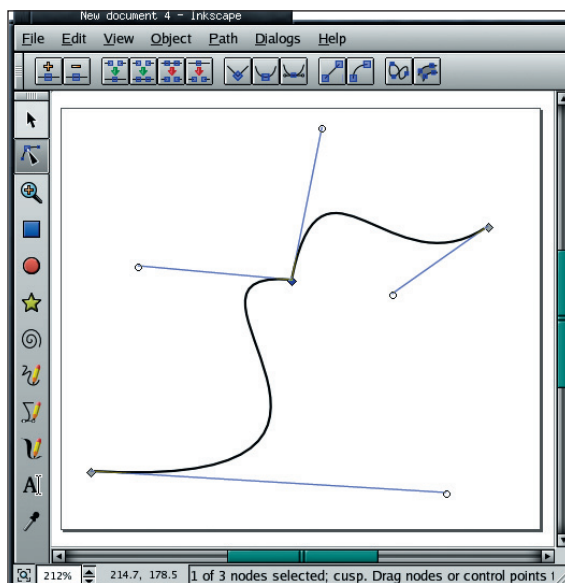
Activating and grouping
A Bezier curve with nodes and handles. Clicking on a node makes it the active node. Holding the shift key down and clicking on another temporarily groups the nodes together. With two nodes selected, you can click on the Curve Segment button to add handles between the two nodes. If the nodes are very close together, zoom in a bit to have a better chance of grabbing the handles instead of a node.

WORKING WITH HANDLES
Corner, Smooth and Symmetric

A node can have a line segment or curve extending out from either side. Each side that has a line segment or curve will have a handle. You can drag the handles around to change the shape of a curve. The behaviour of the curve with respect to the handle depends on the mode of the handle. There are three handle mode buttons in the node button bar: Corner, Smooth and Symmetric. Corner mode allows you to move a node's handles independently of each other. Dragging the two handles toward each other will produce a sharp corner in the curve at the node. This means the right-side handle does not affect the left-side curve.

Smooth also allows you to move the handles independently, but the curve at the node remains smooth. This means the right-side handle can affect the left-side curve in order to keep the curve at the node smooth. Symmetric mode forces the two handles of a node to act in unison. If you experiment with them, you will see that they keep the same distance (but in opposite directions) from the node and are always 180 degrees apart.

There are other buttons in the button bar that you will want to get familiar with later. The most important are the Line Segment and Curve Segment mode buttons. The former will *remove* handles from the selected nodes, while the latter will *add* them. When you create an object and convert it to a path, the nodes initially may not have handles. If they don't, select the nodes and click on the Curve Segment mode button to add handles. The Line Segment mode will remove handles between two nodes and cause the segment between those nodes to become straight.

Handle buttons
From left to right: Corner Mode, Smooth Mode and Symmetric Mode.

Segment mode buttons
Line Segment and Curve Segment mode buttons.

Node button bar
These buttons manage Bezier nodes and handles. If a node already has handles, then they will be displayed when you click on the node. Also, the handles for the nodes to either side of the selected node will display their handles as well. The handles allow a straight-line segment to be made into a curved path. To convert the curve back to a straight-line segment, click on the Line Segment button.

WORKING WITH NODES
Keep it Simplified, stupid!

More often than not, you'll find yourself removing nodes from objects you convert to paths. You can do this quickly with the Path>Simplify menu option, but if you have to do it manually, you can use the Delete Node button. The node buttons work with one or two selected nodes. Selecting more than two nodes will cause these buttons to simply ignore your request.

Simplify is a great tool for converting a scanned object (converted to a path with the AutoTrace Tool, which is a separate but important tool in itself) to a path with only a few nodes. You can do this with text too. Imaging converting a script font to a path – it will have a jumble of nodes for all the curved segments. Use simplify to reduce the node count and create a personalised font of your own. Try typing *"Hello World"* in any script font, convert the object to a path, click on the node tool and then run Path>Simplify several times to watch how the font changes.


Managing nodes
From left to right: Add, Delete, Merge two nodes, Join two nodes with a line segment, Split the segment between two nodes, Convert a single node to two separate nodes.

‹‹ PART II – RECREATING THE LOGO

Deform a square

We start with a simple square. Select 'Path>Object to Path' to convert the object to a path. Click on the node tool, and you'll see nodes at each of the four corners of the square. The square is tall and thin. Click on the left-side ruler and drag out a vertical guideline to the middle of the page. Select the two nodes at the top of the square and drag them to the right, effectively shearing the rectangle. Drag until the top-left node snaps itself to the guide. Now, select just the bottom two nodes and shear to the left. Drag until the bottom-right node snaps to the guide. Remove the guide by dragging it back into the left-side ruler.

Sheared box with guide
The box has been sheared when the nodes snapped to the guide.
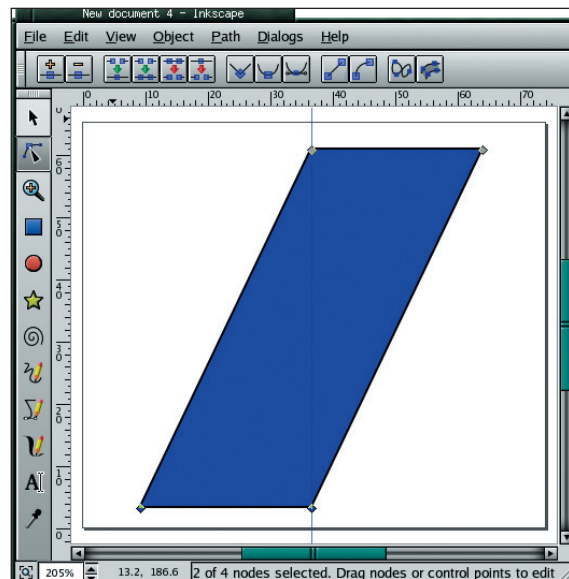
Select the two left-side nodes. Click on the Curve Segment mode button. Adjust the handles as shown. This creates the left-side curve. The amount of adjustment is not easy to measure with the current version of *Inkscape*, so you'll just have to eyeball it for now. Repeat this process for the right-side nodes. Finally, select 'Dialogs >Fill and Stroke' and choose **yellow** for the fill colour of the box. Set the stroke width to **1 pixel**.

Sheared box with curve-adjusted handles
The handles have been adjusted to create the curves on either side of the box.
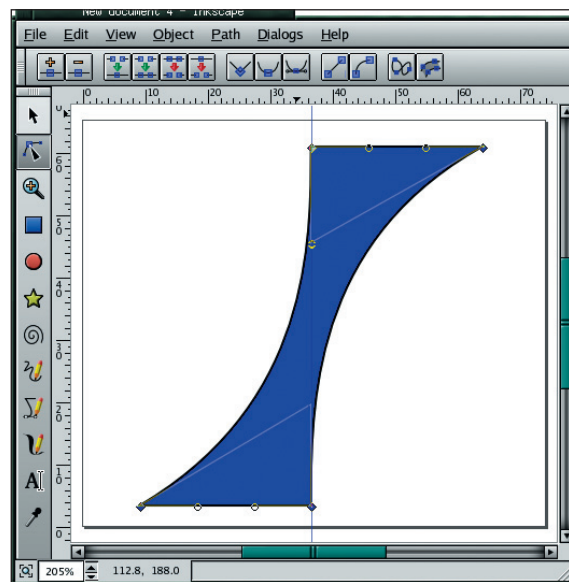
Drawing a pen

Creating the pen requires no handle changes, but does require adding new nodes and repositioning them. Start with a long thin horizontal box – this will be the pen's shaft. Make it moderately large – remember that you can easily resize objects in *Inkscape* without distorting them. Add two vertical guides toward the left side of the box and four horizontal guides evenly spaced with two of the horizontal guides on the outside edges of the box. Convert the box to a path and click on the node tool.

Add two nodes between the top nodes of the box. Drag the two new top nodes to where the vertical guides meet the top horizontal guide. Select the two nodes and add another node between them. Drag this new node down to where the left vertical guide meets the second horizontal guide. Select the new node and its right-side neighbour node. Add a node between these two and drag it to where the right vertical guide meets the second horizontal guide. You now have one side of the stem complete. Repeat this process for the bottom-side of the box to create the other side of the stem.

To the right of the pen shaft, draw another box the same height, but not as long. You can use the horizontal guides for this. Convert the box to a path. Delete the top right node. Move the bottom-right node up so that it is visually centred between the top and bottom horizontal guides. This is the pointed part of the pen.

Using the Bezier tool, draw a straight line from the stem to the right side of the pen shaft. From the 'Dialogs>Fill and Stroke' window, set the width of the stroke to **2 pixels** and the stroke colour to **white**. Draw a similar line from the left side of the pen point to the right tip. These two lines act as reflected light from the edge of the pen.
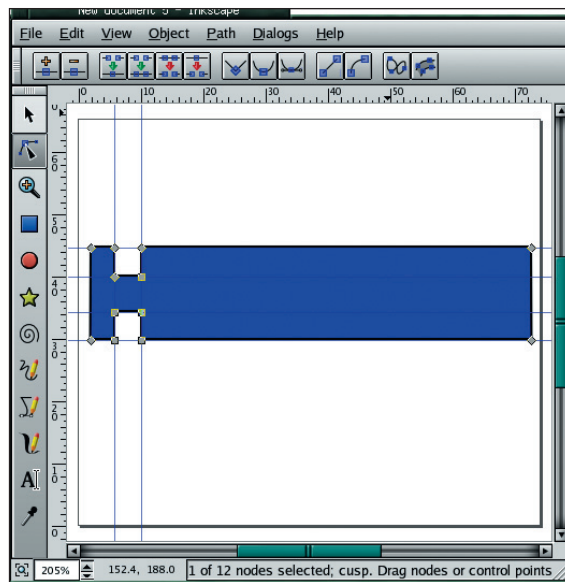
Pencil with stem nodes and guides
The stem on the pen has four nodes on each side.

Select the Star tool. Click on the pen shaft where the star will go, and drag to create a polygon shape. Hold down the right mouse button on this shape to view an object menu, and choose the Star Properties menu option. Make sure the Flatsides option is set to **False**. Set the number of sides to eight. The object
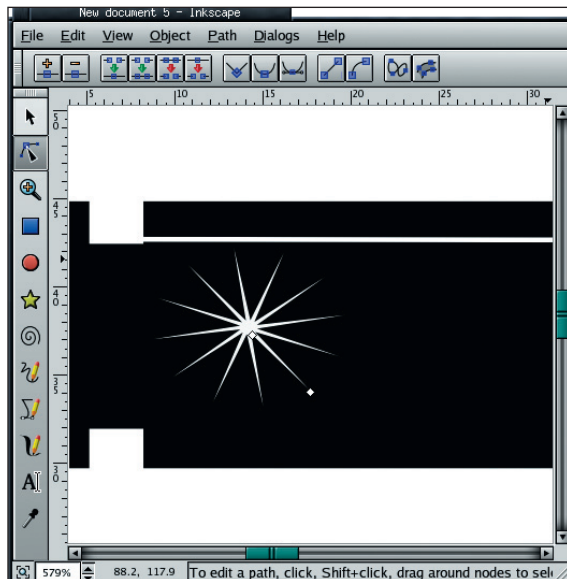
Reflective star
A reflection is made from a star shape with multiple points and a small internal radius.

The swoosh with triangle nodes
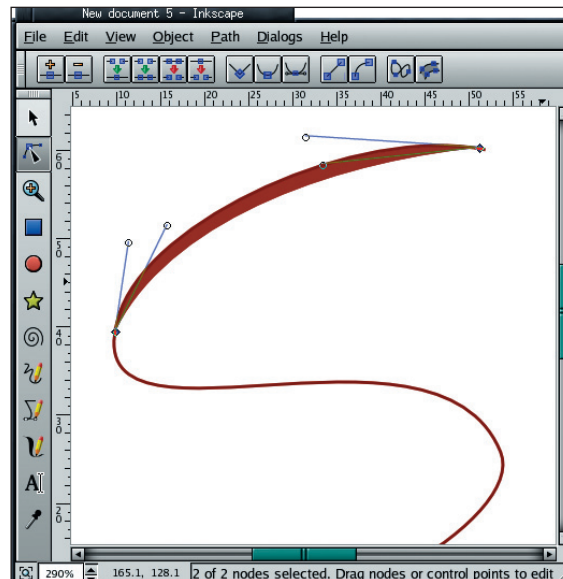**The swoosh has a modified triangle to give it width.**

should have two nodes: one for the inner radius, and one for the outer radius (switch to the node tool to see them). Drag the inner radius toward the object centre to create longer, thinner spikes. Change the stroke width to **0** and set the fill colour to **white**.

Finally, select all objects in the pen – including the white reflections and star – and group them as a single object. Resize so the pen is proportionate to the yellow shape. Rotate the object –60 degrees (the amount is shown at the bottom of the window). If you find the size of the pen is not right after the Rotate, undo the rotation and resize again. Note: *always* do the resizing from the horizontal position, not from an angled rotation.

Position the pen group so the pen acts as a 'top-left to bottom-right' stroke of the letter X, with the modified square shape acting as the other stroke.

The swoosh
Draw a reverse-Z shape with the Bezier pen tool. Switch to the node tool. Add handles as needed, and adjust them to make it a smoother S shape. Draw a triangle on the top part of the S, again with the Bezier pen tool. Zoom in to view the nodes' intersection with the S shape. Reposition the nodes to fit on the curve. Adjust the handles for the triangles nodes so that two sides follow the S. Delete the last node of the triangle – we just used it to keep part

of the path out of the S shape. Adjust the remaining handles so that the segment follows the S closely, but doesn't intersect it. Set the fill for the triangle to match the S shape. Repeat this process for the bottom part of S curve. This creates fat sections on the S curves. Group all these components into a single object.

Text and shadows
The major pieces are complete. All that is left is to add some text and shadows. For the text, set the stroke width to **1** and fill with appropriate colours. Position the text as seen in the original logo.

For the shadows, duplicate the original box we reshaped and filled with yellow. Fill this duplicate with black and offset a small amount to the right and down from the original shape. Then lower the duplicate to the bottom (Object>Lower to Bottom). Repeat this process with the pen shape. After you lower the pen shadow to the bottom, raise it twice with Object >Raise. This puts the pen shadow above the yellow shape, just as in the original logo design.

Your final result may not look exactly like the original logo, but fear not: this is a practice session. The work of learning a new tool predominantly focuses on imitation of existing work. The more you practise to imitate, the better you learn the tool. And that will eventually lead to logo designs of your own... **LXF**

NEXT MONTH

If there's any aspect of artwork production under Linux – whether it's using *The GIMP* or other art apps – that you would like to see featured as a tutorial in future issues, or if you have any ideas about particular tasks you would like to see as a step-through, please drop us a line at **linuxformat@ futurenet.co.uk** with 'Art tutorial suggestions' as the subject line, and we'll pick the best for publication!

INKSCAPE
www.inkscape.org/

Inkscape's main motivation is to provide the Open Source community with a fully XML, SVG, and CSS2 compliant SVG drawing tool. Additional planned work includes conversion of the codebase from C/*GTK* to C++/*gtkmm*; emphasising the use of a lightweight core, with powerful features added through an extension mechanism, and establishment of a friendly, open, community-oriented development process.

The current release of *Inkscape*, version **0.38**, does not support layers. However, layer features are being added quickly and extensive layer support is expected in the **0.39** release.

Inkscape is available for both Windows and Linux users: download your copy from **www.inkscape.org/download.php**