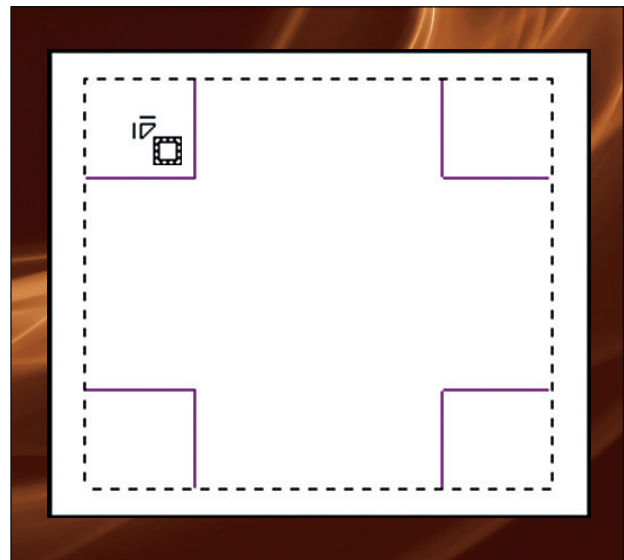


» **Gimp** Open source image-editing software you can get your teeth into

# Gimp: Know your

Everyone knows selections, right? But how well do you really know them? This month, **Michael J Hammel** gets tricky with some awkward images.



» You can drag the hotspots to edit the selection while the bounding box is displayed.



## Our expert

**Michael J Hammel** is a contributor to the *Gimp* project and the author of three books on the subject, including his latest, *The Artist's Guide to Gimp Effects*.

If masks are the heart of image compositing, selections are the blood that gives them life. Compositing, for those who don't know, is simply the process of merging two images. Without masks, compositing would be nothing more than a child's photo collage, created just as you might cut photos from magazines or a newspaper. But masks let you do more than lay one image on top of another. Masks, and their companion, Layers, let you blend the edges of each image with the one below into a seamless collection that is more than the sum of its parts.

There are many ways to create masks, and nearly all of them start with a good selection. The trick to making selections into useful masks is a fine art of combining selections. By working with multiple selections we can outline nearly any shape we require, from boxes to fur.

In this tutorial I'll start with a review of selection basics and then move on to finer-grain techniques for more difficult productions. I'll also cover methods of improving the selection so that a mask or layer can more seamlessly blend into another layer. The basic selection tools were given an overhaul in *Gimp 2.4* and now offer more user-friendly interfaces. Both the Rectangle and Ellipse selection tools outline a selection with a bounding box that includes hotspots for interactive editing of the selection. Move the mouse around the bounding box – left, right, top, bottom and the corners – to view the hotspots. At the same time, note the changes to the cursor that display which direction you can drag to modify the selection.

The selection is active while the bounding box is in place. You can, for example, drag and drop the colour boxes from the Toolbox into the selection to fill it even while the selection bounding box is displayed. However, you may also want to complete the selection edits by clicking inside the selection's dotted outline or hitting the Enter key. Completing the selection prevents further editing of the selection by removing the bounding box. Editing of the rectangular and elliptical selections is limited to height and width when using the bounding box hot spots.

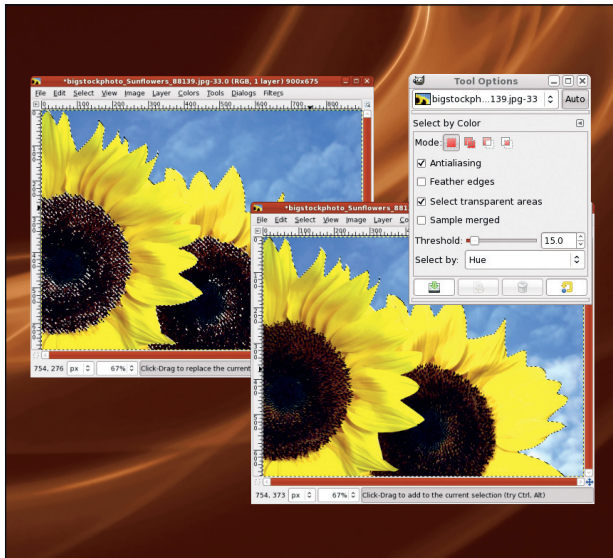
## Boxes on the corner

Fortunately, more editing is possible with the latest version of *Gimp*. Added to the 2.4 release is the ability to transform your selection after it is completed. The transform tools in the Toolbox (Rotate, Scale, Shear, Perspective and Flip) all support transforms on either the current layer, the active selection boundary or paths. This means you can create a selection with the Free Select (lasso) tool and add perspective to the selection using the Perspective tool. But be careful here. The transform tools must be configured to operate on the selection by clicking the selection button in the Tool Options dialog.

The transform buttons, which appear in the Tool Options dialog for all the transform tools, apply the transform against the image (first button), the current selection (second button) or the currently active path (third button). Be sure to set this option before applying a transform.

» **Last month** We made words and pictures go together like a horse and carriage.

# selections



› **Combining a colour-based selection with a free hand selection doesn't require any precision work to create.**

In this example above (the sunflowers) I want to select the flowers alone. Normally I might use Select By Colour to select the sky and then invert the selection. But the sky is filled with faint clouds that blend with the flowers in the bottom-right of the image. Fortunately, I can start with the flowers instead.

With the Select By Colour tool chosen from the Toolbox, I set the 'Select By' menu entry to 'Hue' and click on just about any yellow part of the flowers (no dragging required – just a click). This selects the outline of the flowers but leaves some of the seeds unselected. Since the outline of the flower provides a bounding area for selection, all that's required to add a Free Select to it.

Leaving the current selection intact, I choose the Free Select tool from the Toolbox. I make sure the Add Mode is active in the Tool Options dialog (second from left in the Mode row) and I then draw a freehand selection around the seeds of the flower, dragging the mouse outside of the canvas where necessary.

## Subject isolation

The whole point of a selection is to pull an object from an image. How you do this depends a great deal on the original image. Cluttered backgrounds make the process more difficult, but not impossible. The trick with this type of image is to use more sophisticated tools and methods. The Fuzzy Select tool, sometimes referred to as the magic wand, works much like the Select By Colour tool, but is even better with images with solid or nearly solid coloured backdrops. In fact, as easy as it was to select the flowers with Select By Colour, Fuzzy Select can select the flowers with one single drag.

Choose the Fuzzy Select tool from the Toolbox, then click and drag slowly through the sky in the image (the sky, not the flowers!). As you drag, the selection grows until it selects the entire

sky. Now invert the selection (Select > Invert) to select the flowers. Because of the differences in hue the selection is extremely accurate with this particular image.

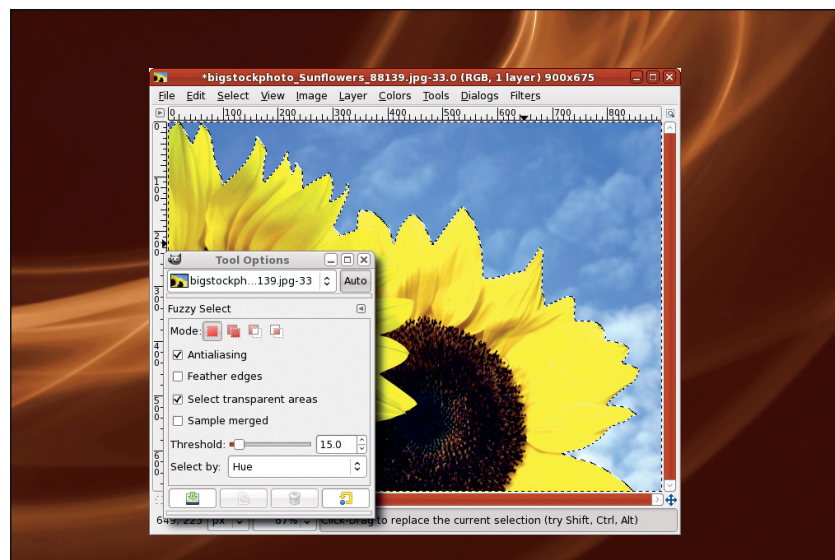
Sometimes the edge between the subject and the background is obvious. In cases like this the Scissors tool can be used to outline the subject with a series of anchors just as you would create a path. This process takes a little more work but can outline an object in great detail and, more importantly, allows you to moving the anchors and edit the outline before converting the path into a selection.

## Clever scissors

The Scissors tool works by searching for an edge near where you click. The anchor is placed on that edge and a curve drawn between the new anchor and the previous anchor. Once you've outlined the subject you click inside the path you've created to convert it to a selection. Alternatively, you can use paths to create a similar selection. The advantage to a path is that it lives in its own dialog (like the Layers dialog) so you can edit the path later to modify your selection.

Although it's displayed there, a path doesn't exist in the canvas – the path lives only in the Paths dialog. In order to have it show up in the canvas you need to either stroke it (to draw in the current layer of the image) or convert it to a selection. Both options are available as buttons in the Tool Options dialog for the Paths tool.

The newest addition to *Gimp's* selection collection is the Foreground Select tool. This tool has built-in intelligence, like the Scissors, but is easier to use. When chosen from the Toolbox, the Foreground Select tool turns the cursor into a lasso. Use this to draw a rough outline around the subject. In the example above-right I drew a line around the building, dragging outside the



› **Setting the Select By menu to Hue for Fuzzy Select enables the tool to detect the differences in hues of the sky and flowers.**

› **If you missed last issue** Call 0870 837 4773 or +44 1858 438795.

# Tutorial Gimp

» canvas on the left and re-entering on the right. The outline is roughly oval and includes some of the background.

Once the lasso selection is completed, Foreground Select tints the non-selected background blue. After the lasso operation is complete the cursor turns into a paintbrush with a circular tip. You can increase the size of the tip in the Tool Options (a necessary step if you're working on a very large image, since the default size of the brush is best suited to web-sized images as opposed to print-sized images). Now click over the foreground subject and drag the mouse to draw a line through the foreground object. The line should cover a set of pixels that make a good representation of the colours in the foreground object. Once you release the mouse button, the Foreground Select tool begins to compute the outline of the foreground object. To complete the selection, hit the Enter key and you'll see the line of marching ants around the selection.

The usefulness of Foreground Select is in the ease with which the user can make the selection – a rough outline and a brush stroke are about all you need. The drawback with Foreground Select is that the responsiveness of the brush during the stroke is slow when the brush tip is large. Despite this, Foreground Select can create extremely accurate selections with little user effort.

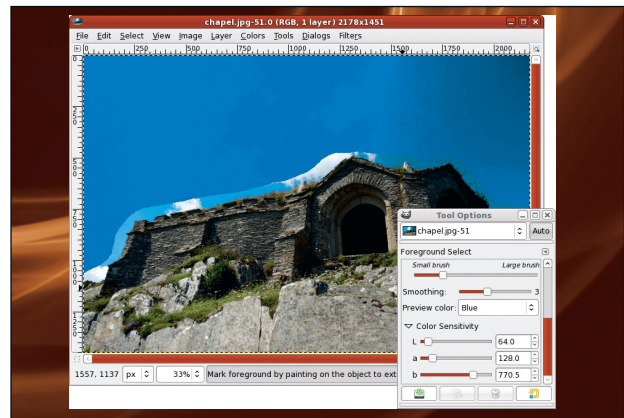
## Alternative methods

Complex selections nearly always involve hair, fur or any other sort of very thin lines. Even the most advanced selection tools by themselves cannot make these selections. What you need is to combine tools or use specialised masking techniques that don't involve the selection tools at all.

Let's try Foreground Select on a more complex image – a set of tennis balls sitting on the strings of a tennis racket (below right). The image is more complex because the tennis balls are not touching – their pixels cannot be selected contiguously as was done in the previous example. Worse, the edge of the racket is also yellow. Fortunately, we can use multiple tools to isolate the tennis balls. First, I outline the tennis balls using the Foreground Select lasso operation, doing my best to include as little of the racket as possible. Then I draw my foreground selection line through all three tennis balls. This does a good job of selecting the tennis balls only, but it also picks up some of the racket strings while leaving out some of the text stamped on the nearest ball.

Now I turn off the Contiguous button in the Tool Options. Then I draw a few more foreground selection lines in various parts of the balls, like the dark text. This refines the Foreground Selection a bit but there is plenty of work left to do.

» The curve between anchors is jagged when you use the scissors tool, so it's better to use a path with this selection



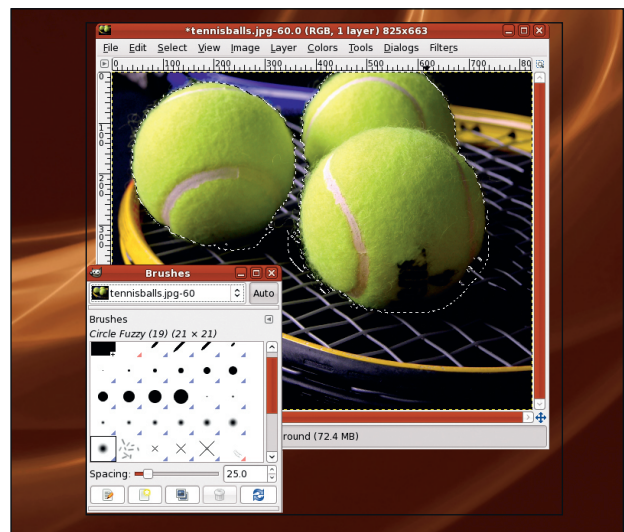
» The lasso selection just provides an initial selection that the remaining steps of Foreground Select will improve upon.

Next I switch to Select Background and draw along the edges of the balls over the racket strings. I zoom in on this area first to get a better look at the area. Zooming in will not alter the size of the brush tip so a small brush tip works well for detailed work like this. I zoom out and hit Enter to convert this into a selection. Here I can see how poor the selection really is. The only choice I have is to clean it up with the Quick Mask.

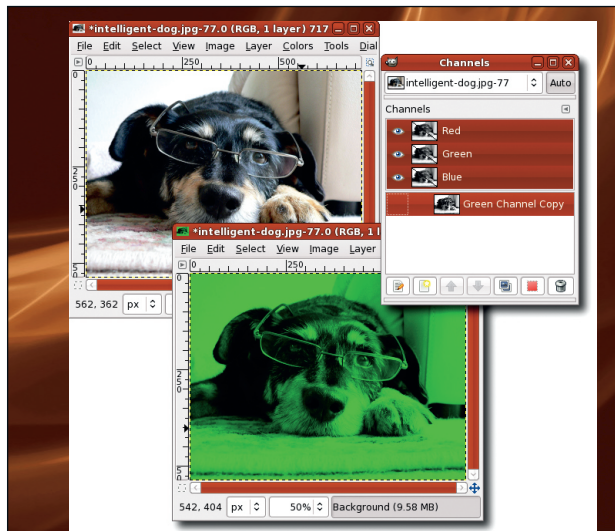
The Quick Mask works very much like Foreground Select. When you enable it (the Quick Mask button is the square button in the lower-left of the image window) everything outside of the selection is tinted red. Red is the default colour – right click on the Quick Mask button to change to a different colour, though the Red tint shows up well while working with the yellow tennis balls.

Next you select a paint tool from the Toolbox. The Paintbrush is ideal for this along with using a soft-edged brush such as one of the Circle Fuzzy brushes that are part of the default *Gimp* installation. Soft-edged brushes in the Quick Mask work like feathering of a selection, though if you choose to use a hard edged brush you can always feather the resulting selection later (using Select > Feather).

Now we simply paint over the balls with white to add them to the selection. When using Quick Mask, white paint will cause the mask to be removed (you don't actually see the white paint) while black paint will add to the mask (you see the mask tint added to where you paint). I paint out the basic ball outlines with white paint and then switch to black paint to remove areas I don't want



» Quick Mask lets you paint the areas to be selected (or not selected). Soft edged brushes will make the selection feathered.



› The green channel was selected for this image, though in this case the red channel might work just as well.

included in the selection. With Quick Mask it's possible to zoom in on the image, use a very small brush, and manually select the fine fur or hair in an image. This is a very labour-intensive process, however, and except for high-end image productions you probably won't need to do it – it's just nice to know you can. Once I've finished painting in the Quick Mask I click on the Quick Mask button again to switch back to a real selection.

## Corner cases

Finally, we have to consider those images that simply don't cooperate with the basic selection tools. In these cases, the image needs to be manipulated manually. Take, for example, the scholarly-looking canine above. A few passes with Foreground Select shows that this tool simply won't work without heavy editing. Because of the computational time required with each new drag to add to the foreground object the process becomes overly time consuming with extensive tweaking.

An easier solution is to find a channel that provides the greatest contrast and use it as the starting point for creating a mask. Open the channels dialog and turn off all the channels by clicking on their visibility icon, then turn them back on to find the one that has the greatest contrast. For this image, that would be the green channel. Right-click on that channel and select Duplicate Channel. A duplicate of this channel is added to the bottom of the list. Click on the visibility icon (the eyeball to the left of the thumbnail) to turn the duplicate channel visibility on.

We're going to use this duplicate channel to create a layer mask to isolate our friendly mutt. In the layers dialog, turn off the visibility of the background (and only) layer. Now you can see the channel itself, which looks a lot like a desaturated version of the dog layer. Make sure the channel is active by clicking on it in the Channels dialog then open the Levels dialog. Adjust the sliders until you've gotten the best outline of the dog – don't worry about the inside of the dog, as we'll add that later.

We don't want the extra cruft around the edges, so we can paint those white directly in the channel. But we don't have an exact outline of the dog yet, so we can't fill the inside with black yet. The way to handle this is to copy the channel (Select > All, Edit > Copy), return to the Layers dialog and click on the background layer to make it active, then paste into the image window (Edit > Paste). Anchor this selection in the Layers dialog (Layer > New).

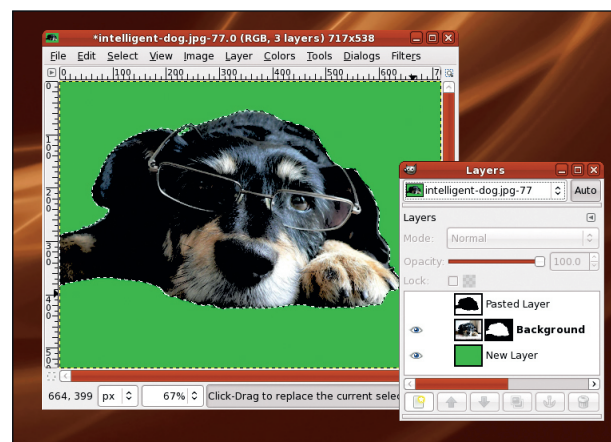
Now we can edit this new layer by reducing its opacity (move the Opacity slider to 25.0 in the Layers dialog) and carefully draw a black line along the edges of the dog where no black in the new layer currently exists. I zoomed in here to see the edge more cleanly and use a very small brush with a hard edge and the Pencil tool. Once the outline is closed, we can select most of the white area with the Fuzzy Select tool, grow the selection a few pixels and fill it with black. Then we clean up the rest of the image manually with the paintbrush.

With the outline of the dog filled with black in the new layer we can copy it into a layer mask of the original layer. Click on the dog layer to make it active and then add a layer mask to it (Layer > Mask > Add Layer Mask). Click on the new layer with the black outline of the dog in the Layers dialog to make it the active layer. Copy it (Edit > Copy), then click on the dog layer's mask – make sure to click on the mask itself in the Layers dialog! Paste the copy into the mask (Layer > Paste) and anchor it (Layer > Anchor). Black represents transparent in a mask, so invert the colours (Colours > Invert) in the mask. A light blur should be applied to the mask at this point as well (Filters > Blur > Gaussian Blur, about five pixels). Now you should have a good outline of the dog. I've added a green background just so I can see the results. To create a selection from this, just convert the mask to a selection (Layer > Mask > Mask to Selection).

## It's all about choice

Which tools and techniques you use depends a lot of the source image. High-contrast images work well with the basic tools. Large differences in hue between the background and foreground object work well with Fuzzy Select, Select By Colour and Foreground Select. Objects that blend into the background, have lots of fine lines along the edges and/or sit in front of busy, multicoloured backgrounds require much more work using multiple tools, adjustments to the Levels and Brightness/Contrast tweaks to create a suitable mask.

In the end, what works best is a lot of trial and error. If there were a magic bullet for all selections, *Gimp* would have it. Fortunately, we have a plethora of tools in the *Gimp* toolchest to make our selection experiments quick and painless. **LXF**



› It takes more effort to get this selection, but the results are worth it.

## Brush tips

The stock brushes in *Gimp* are fairly static in size. You can duplicate them to edit the size and shapes, but I find it easiest to create a new brush that I edit manually

repeatedly for whatever process I'm working on. See the New Brush button in the Brushes dialog button bar to create a new brush.

›› **Next month** We'll see how to get your work out of Gimp and on to paper.