Digital Asset Development: Lab Session 3 – Image Formats and Artwork

Introduction

This set of exercises will focus primarily on the use of Photoshop for the creation of *artwork* rather than for image editing. "Artwork" generally refers to graphical items that are vector-based, as opposed to raster, or bitmap, images. The latter are defined as a grid of pixel values, whereas the former can be considered in terms of *objects* such as curves, points, stroke types and fill colours (among others). Vector artwork was traditionally generated via a drawing package, such as Adobe Illustrator, which has a toolset and file format specifically designed for the purpose. However, the advantages of combining vector objects with bitmap images have become clear, and Photoshop now has a wide range of vector tools incorporated into its functionality.

The main tools we will explore in the exercises will be the Pen tool, which is used to define vector shapes, and various aspects of the Brush tools. Before that though, we will look back at some of the issues relating to file formats raised in this week's lecture.

Image Formats and Quality

Open Photoshop and load up the image *flowers_original.jpg* linked on this week's section in Moodle. The photo has a fair amount of colour and detail, making it a good test of image quality. Zoom in to at least 400% magnification on an area that includes both bright red flowers and green foliage (the contrast is helpful in spotting anomalies). Now choose File > Save As, change the file name to something different but leave the format at JPG, and click the Save button. This brings up a secondary window titled JPEG Options. The main control on this dialogue is the Quality slider, which runs from 0 (low) to 12 (maximum). The slider helpfully indicates the file size corresponding to the current quality setting, and if Preview is checked you can see the impact the setting has on the save image.

Set the slider to 12, and observe that the resulting file size will be 2.3 megabytes. The image should appear unchanged from the original – we are opting to keep the maximum amount of information. Now move the slider down to 6. On your zoomed preview, you should start to observe minor flaws in the image. In particular, if you look along diagonal flower edges you may see some blockiness creeping in. If this isn't clear to you, scrub the slider up and down between 6 and 12 to see the changes happen in real time.

Now move the slider all the way along to 0 to see how the image will look at the lowest setting. You should find the photo becomes progressively more blocky as the quality decreases (see below). This is evidence of the compression process for JPEG images described in the lecture. Note that the file size for lowest quality is 234 kilobytes – 10% of that for the maximum setting – so we are discarding 90% of the information contained in the original photograph.

Fig 1: snippet of flowers image saved at minimum quality

Hit the Cancel button on the JPEG Options window to dismiss it (or if you have already resaved the image in another name, then go back to the original photo file). Go again to File > Save As, but this time choose the CompuServe GIF option and press Save. This time the popup window that appears will be that for Indexed Colour options (Fig 2), which deals with how the colour palette to define the GIF image will be created.

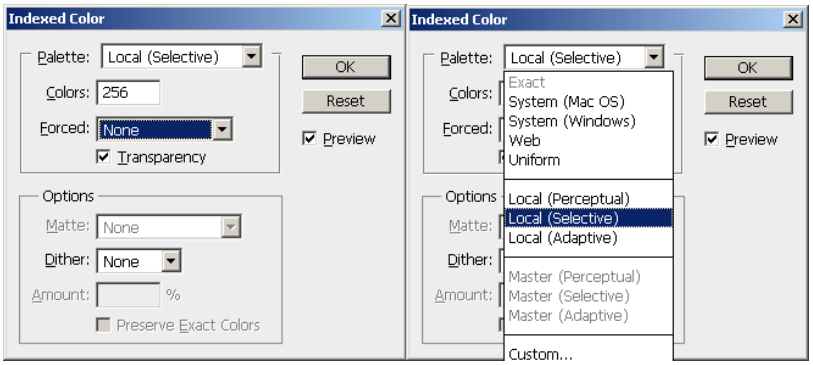

Fig 2: Indexed Colour panel, with list of palette options

The main dropdown list at the top of the window gives a number of standard palette choices. Among these are the system colour palettes for PC and Mac, and the “web-safe” palette mentioned in the Week 2 lecture. There are also different options for how a so-called local palette (i.e. one based on the properties of the photo) can be generated. Below this list are options for the number of colours in the palette – the default is 256 – and whether we can “force” certain choices, such as to make the image grayscale.

Leave all the options at their defaults and click OK, then OK again on the final options window. Once the GIF file has been created, load it into Photoshop. At a distance it will not look too bad. However, if you zoom in you will see the limitations of indexed colour on an image with a wide range of colours and tones. Because the software has so few colours to work with, the output suffers severely from colour banding (Fig 3). Not only that, but if you check the file size you should find it is actually larger than the high quality original!

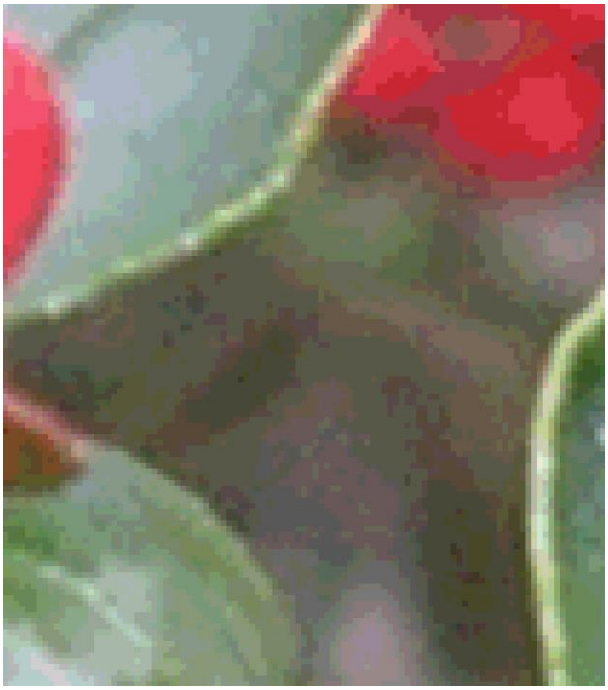

Fig 3: result of limiting the image palette to 256 indexed colours

Try experimenting with the other options available in the Indexed Colour panel in Fig 2. What does in image saved in "web safe" colours look like? How much of a difference does reducing the number of colours in the palette to 64, or to 16, actually make?

As a contrast, we can look at an image which has been created with a different purpose in mind. Download the *media-culture-and-society.jpg* file and open it in Photoshop. It is one of the icon images from the UWS Moodle homepage – there is one for each school in the institution. It is a small image, but if you zoom in you will note that the quality is also poor. You should notice flaws in the area around the writing, and around the dots in the background. Again, these are due to saving the picture as a JPEG with high compression. Do the flaws matter? At normal resolution you may feel they don't. However, you may well think the image might be better off as in GIF format.

Fig 4: excerpt from the JPEG showing high levels of compression

As an exercise, try "cleaning up" those parts of the picture where flaws are apparent. Save the resulting image out as both a high quality JPEG and a GIF, and see which looks better and how the file sizes compare.

The Pen Tool

We'll now switch to more creative aspects of Photoshop, with an overview of the Pen tool. There is a video available on Moodle which covers the basic workings of the tool. The main elements of Pen tool usage are:

- To draw a path composed of straight line segments, simply click to add an anchor point at the end of each segment.
- To draw a path made of curves, click-drag to add each new curve segment; each time you should be dragging along the desired direction of the curve at that point.
- To close a curve, place the mouse over your starting point (a small circle will appear next to the cursor) and click.
- To leave a curve open, Ctrl-click anywhere that is away from the curve.
- To switch between drawing curves and straight line segments (or vice versa) within a path, hold down the Alt key and click on the most recent anchor point; a caret symbol (^) will appear next to the cursor.
- To select and move a complete path, use the Path Selection arrow tool (below the Pen tool).
- To select anchor points and curve handles in order to edit a path, use the Direct Selection version of the same tool, denoted by an unfilled arrow.
- Tools to add and delete anchor points to a selected path can be found within the Pen tool pop out menu in the toolbox.
- The Freeform Pen tool allows paths to be drawn freehand; it is best use with the Magnetic option active, which allows the path to follow edges in an underlying image.

[If you didn't understand all of that straight off, then you should view the video on Moodle!]

Load up *flowers_original.jpg* in Photoshop, and select an interestingly-shaped flower, bud, leaf or twig. Organic shapes such as flowers are great for practicing with the Pen tool, as they generally have a combination of curves and corner points. Make sure the Pen tool is in Paths mode via the menu at the left of the options bar (the other choices are Shapes and Pixels). Zoom in, and use the tool to draw around your chosen item (see example below). Don't just rely on using curves – use the Alt key to turn anchor points into corners when necessary. You don't have to get it perfect, as the path will still be editable later.

Fig 5: example path

Once your path is complete, use the Direct Selection tool to edit and improve it. You can add, delete and convert points using the various sub tools, in addition to dragging points and handles. If you zoom far into the picture (say, 1600%) you'll see that your control over the path isn't limited by the pixel resolution. This is a major advantage of vector-based tools.

Looking in your Paths panel, you should see a thumbnail icon named Work Path. With this active, click the Make Selection icon, which is the third from left along the base of the panel. This converts the path into a selection – the object you drew around should now have a selection border. Copy the selection, go to the Layers panel, add a new layer, and paste the selection back in. Make the background image invisible to see the result.

You may wonder why this is better than making a selection any other way. Besides the control over curves you get, your selection can also be remade by returning to your path and editing it. All paths in a document are accessible (and editable) via the Paths panel unless you delete them, unlike selections which have to be explicitly saved. Thus, if you decide to alter your selection shape later you can do so with ease.

There are many other uses for paths, some of which we will see in future weeks. The next exercise shows their use in generating artwork.

Making a Portrait

For the rest of the lab, we'll be creating a portrait from an existing digital image. To find a subject, just go online and select a headshot portrait image, ideally in three-quarter view rather than in profile or head on, as in the example below. The hat is optional, but a subject with long, flowing hair is good as it will work well with the Pen tool's curves.

Fig 6: example starting photo for portrait exercise

Load your chosen image into Photoshop, then add a new layer above it. This will be transparent by default. Set the background colour to white in the Toolbox and, with the new

layer active, use the Ctrl-Delete shortcut to fill it with that colour. Rename the layer as “white”. Obviously we can no longer see the background image, so set the white layer’s opacity to 50%.

In the new layer, use the Pen to draw an outline of the subject’s hair. Edit the path using the Direct Selection tool if you aren’t satisfied with your first attempt. Once it is OK we will apply a stroke style to the path so it will be visible in our portrait. Add a new layer to the document and call it “outlines”. In the Paths panel, convert the path to a selection. Then go to Edit > Stroke, and from the dialogue box choose a stroke width of 3 pixels in black, and set the Location to Centre (this centres the stroke along the path). Click OK, and use Ctrl-D to deselect.

If there are gaps in the hair that you want to include in your portrait, as in the left side and lower right corner of the example, then use the Pen to create paths for each. Convert these into stroked outlines in the same way as before. Repeat the process for the other non-facial outlines in the picture, as in the shot below. Note that if paths overlap, as with the brim of the hat, you can delete the contents of the selection before applying the stroke.

Fig 7: basic portrait outlines

Zoom in and focus on the subject’s eyes. Use the Elliptical Marquee tool to select each iris in turn, applying a stroke as before. Switch back to the Pen tool for the eyes. These are best done just with two anchor points (see below), while care should be taken in correctly defining the curves. You may want to hide the outlines layer to avoid clutter.

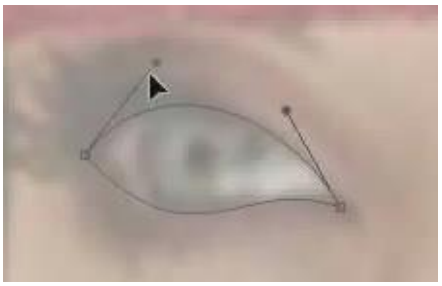

Fig 8: outlining the eyes

You will find in almost all pictures that the iris outlines extend beyond the eye shape. To fix this, while the eyes are selected, invert the selection (Shift-Ctrl-I) to make the rest of the image active. Then switch to the Eraser tool and rub out the stray pieces of outline (see below). Invert the selection again and apply the stroke as before.

Fig 9: erasing the iris extremities

Carry on drawing paths for the different facial features. For features such as the nose and eyebrows which are not closed curves, you will find a problem – converting the path to a selection will add an unwanted straight line between the two ends of the path. To avoid this, don't convert to a selection, but instead select the Brush tool. Set the brush width to 3, hardness to 100%, and ensure the foreground colour is black. Then hit Enter, which applies the current brush stroke to the selected path.

With the main facial features outlined, your portrait should look be something like the example below. The next stage is to create some fill colours.

Fig 10: portrait with completed outlines

Add a new transparent layer, name it "fill", and position it below the outlines layer in the Layers panel. Select the Eyedropper tool and turn off the visibility of all layers above the main photo. Use the dropper to select a representative skin tone as the foreground colour. Turn on all the layers again, and with the outlines layer active, use the Magic Wand to select all the areas that appear as skin in the original picture. Switch back to the fill layer, and use Alt-delete to fill the selected area with the foreground colour. Repeat this process to fill in the other main areas of colour, either by sampling with the Eyedropper or by choosing colours you feel are most suitable.

Some areas of the image that are not fully outlined, such as the teeth in Fig 10, can be painted in with the Brush tool on a narrow setting. As long as you keep the fill colours and outline strokes on their respective layers you can't go too far wrong. To paint the eyes, use a narrow, hard black brush to add the pupils, and a softer white brush for a reflective highlight (see Fig 11). Similarly, you can use the brush tool to add extra shadowing around the eyes, as well as eyelashes.

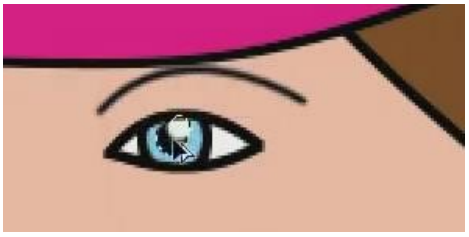

Fig 11: painting the eyes

To give more realistic hair, we need to alter the flat colour we have at the moment. Use the Magic Wand to select the hair on the fill layer, and click on Lock Transparency in the Layers panel. We will use the Dodge and Burn tools to add streaks to the hair. These tools respectively lighten and darken the areas they are applied to. Like the Brush tool, they have associated width and hardness settings, as well as working within a specified tonal range (shadows, midtones or highlights).

Select the Burn tool – it lies just above the Pen, choose a width around 40 and set Range to Midtones. Paint streaks along the flow of the hair to simulate the kind of variation we might expect to see. Adjust the tool width to achieve greater variation. Hold down the Alt key to switch to the Dodge tool, and with the Range set to Highlights apply further streaks. Continue varying and alternating these across all the hair. Now change to the Smudge tool (above Dodge/Burn in the Toolbox), and select a width around 20. Use this to smear the streaks into a more varied form still. Once you have done with the hair, you can use the Dodge and Burn tools to apply shadows and highlights to the general skin tones and other elements of your portrait. The picture below shows how these techniques will add greatly to the sense of depth and form in your image.

Fig 12: portrait with shadowing and highlights added using the Dodge and Burn tools