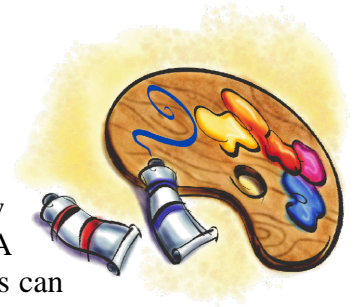




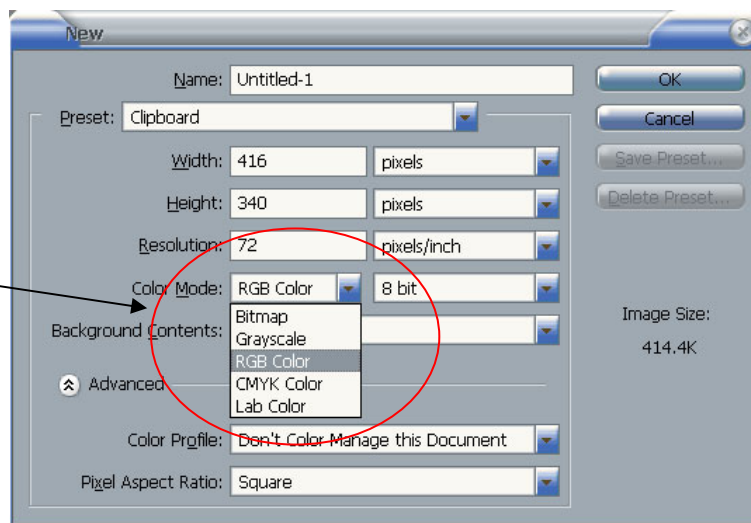
Using Adobe Photoshop

4 – Colours & Saving

Colour is important in most art forms. For example, a painter needs to know how to select and mix colours to produce the right tones in a picture. A Photographer needs to understand how different lenses, filters and film types can affect the colours in the final print. Likewise, in Photoshop the quality of your work will often depend on how well you can work with colour.



Colour modes available for new images.

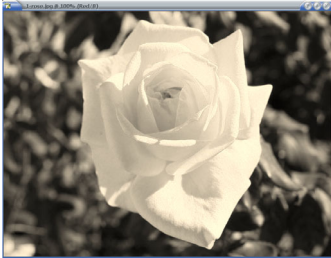


1 - Image Modes

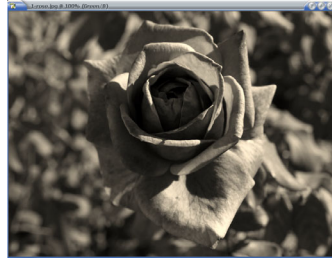
As discussed in previous sections, raster images are made of pixels. Each pixel can be a different colour, though the range of colours for each pixel depends on the image's **colour mode**. When you create a new image in Photoshop, one of the options you can choose is the colour mode of the image. You can also convert existing images to different colour modes, though image quality often suffers when converting from one mode to another. Some of the colour modes supported by Photoshop are described below.

RGB Mode

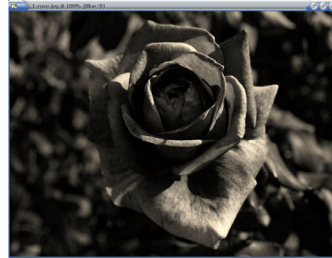
RGB (Red Green Blue) images are made up of three **channels**. One channel is for the red tones in the image, one for the green tones and one for the blue. Each of these channels combines, to create the colours in the image. This is similar to the way a TV screen uses red, green and blue dots to make a picture. E.g.



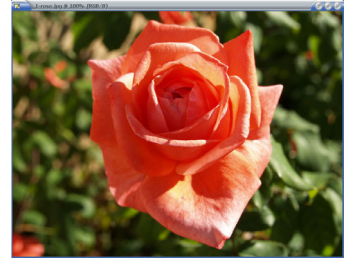
The red channel shows the red tones in the image



The green channel shows the green tones in the image









The blue channel shows the blue tones in the image



All three channels combine to create a colour image.

Some image file formats, such as JPEG can only be saved in RGB mode. RGB mode is best suited for use in images that will be displayed on a screen since your monitor's picture is made up of a combination of red, green and blue light. Each channel is represented by a number from 0 to 255. A higher value for a particular channel means that more of the colour is being used. For example if a picture has a colour value of (232, 135, 92) then that image has a lot of red, a medium amount of green and a lesser amount of blue. Below are some examples of some RGB colour values.

	255,255,255
	0,0,0
	255,0,0
	255,255,0
	255,125,255
	100,100,100

Maximum amount of all three colours creates white.

No colours creates black (since there's no light of any colour).

Maximum red with no green or blue makes red.

Maximum red and green with no blue makes yellow.

Maximum red and blue with medium green makes a light pink.

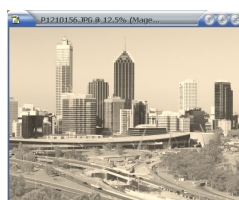
Equal amounts of all three channels makes a shade of grey. The higher the numbers, the lighter the colour (as more light is being used to create the image)

CMYK Mode

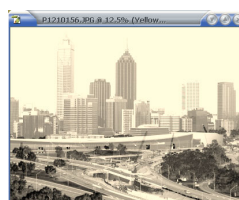
CMYK (Cyan Magenta Yellow Black) mode is the preferred mode for work that will be printed. That is because professional printers generally print with a mix of cyan, magenta, yellow and black ink. In Photoshop, a CMYK image has four channels. Each channel represents one of the colours by a percentage value. I.e. a higher value for a particular channel means that more of that colour is being used. If you imagine the image being printed, then more ink creates a darker image. Similarly, higher values in each channel leads to darker colours. In the example below, the Cyan channel shows the areas of the image where cyan ink would be used in printing the image. Darker areas show that more cyan ink would be used in those areas of the image during printing.



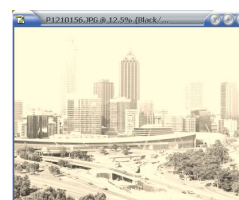
Cyan channel



Magenta channel



Yellow channel









Black channel



Combined channels

Below are some examples of CMYK colour values.

	0%,0%,0%,0%	No ink colours leaves white.
	100%,100%,100%,100%	Maximum of all ink colours creates black.
	0%,100%,100%,0%	Maximum magenta and yellow only creates red.
	0%,0%,100%,0%	Maximum yellow only makes yellow.
	24%,68%,0%,0%	Some cyan and magenta makes a light pink.
	67%,54%,41%,15%	A mix of all channels can make grey.

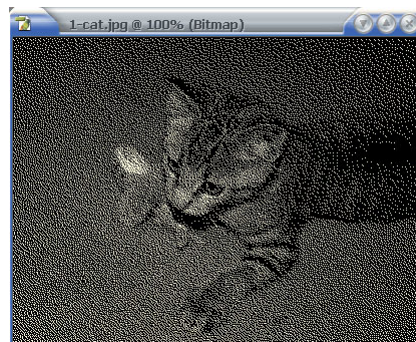
Greyscale Mode

What we often think of as a black and white image is not really black and white. Rather it is made up of many shades of grey ranging from white through to black. A greyscale image has only one channel. This channel has 255 values from 0 (black) to 255 (white). Photoshop can also be set to show greyscale value as a percentage, where 0% is white and 100% is black.



Bitmap Mode

Bitmap mode images use only white or black pixels with no shades of grey used. The same picture used as a greyscale image above is shown below in bitmap mode.



Tip In the Channels Palette, you can view each channel in an image by clicking on it. You can also select a channel by using its keyboard shortcuts which are shown next to each channel name. (colour = **[Ctrl] [~]**, Channel 1 = **[Ctrl] [1]** etc).



Exercise 1 – Converting Image Modes

- 1) Open the *1-rose.jpg* image in Photoshop.

The title bar across the top of the image will tell you that this is an **RGB** image. **JPEG** files can only be saved as **RGB** or **Greyscale** images.



Now a bit of maths for you!

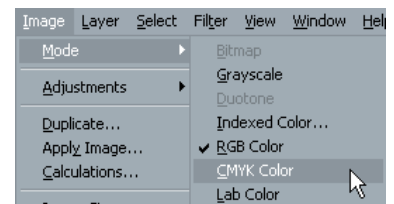
The number 8 after RGB indicates that the image has 8 bits per channel.

$8 \text{ bits} = 2^8 = 256 \text{ colours per channel}$

3 channels make a **24 bit** image since 2^{24} is approximately 16.7 million colours (or $256 \times 256 \times 256$).

- 2) From the **Image** menu select **Mode** and then select **CMYK Color**.

You may notice a slight change in the colour of the image as the colour mode is changed. This mode is more suitable for accurate reproduction of work that will be printed professionally.

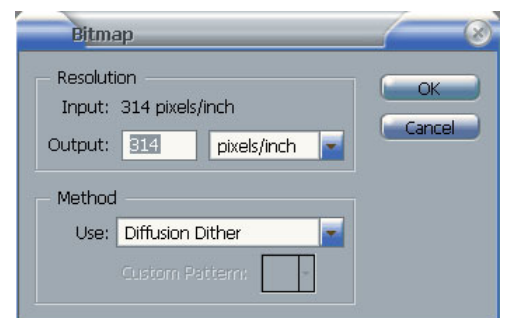


- 3) From the **Image** menu select **Mode**. You will notice that the **Bitmap** and **Duotone** modes are not available as you can't convert a colour image to either of these modes. Select **Grayscale** from the **Mode** menu.

When you convert an image to greyscale mode, the colour information is lost. Changing the image mode back to **RGB** or **CMYK** makes it possible to add colour but won't restore the old colours. The only way to restore the colour is to use the undo command or **History Palette** to reverse the mode change.



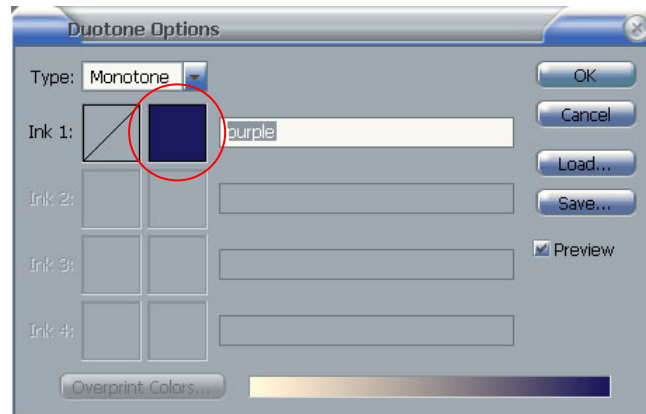
- 4) From the **Image** menu select **Mode**. You will notice that all of the image modes are now available. Select **Bitmap** from the modes. A dialog like the one to the right will appear.
- 5) Leave the **Resolution** options as they are and click **OK**. You will now have a 2 bit image. In other words, the image only has 2 colours (2^2) which are black and white. There are no grey or coloured pixels. The effect is most obvious at 100% magnification as shown below.



6) Use the undo command [**Ctrl**] [**Z**] to return the image to Greyscale mode.

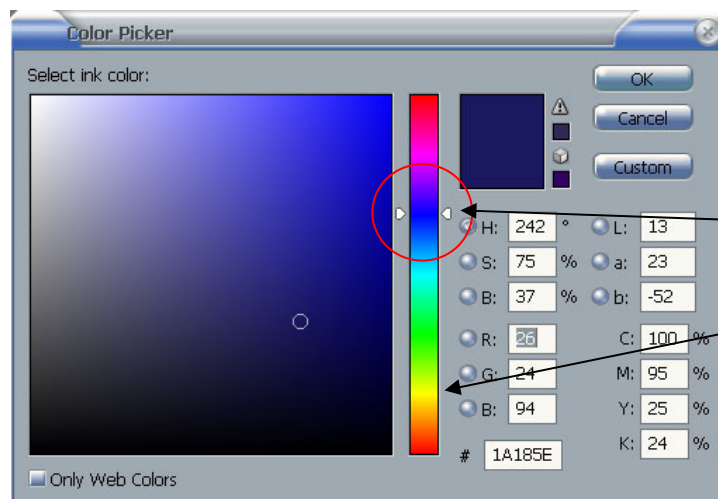
Some image modes aren't available for a new image but are available for converting an existing image.

7) From the **Image** menu select **Mode** and then select **Duotone**. A dialog box like the one below will appear.



A duotone image is like a greyscale image that is printed using a colour ink instead of a black ink. More than one ink colour can be used to create the effect of a tinted black and white image.

8) Click on the coloured box as shown above. The **Colour Picker** (explained in detail later) will appear.



9) Drag the vertical hue slider down to yellow.

10) Click **OK** to close the **Colour Picker** and click **OK** again to close the **Duotone** options. Instant sepia tone for that old fashioned look!



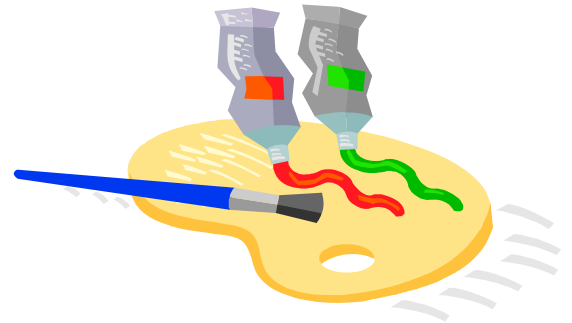
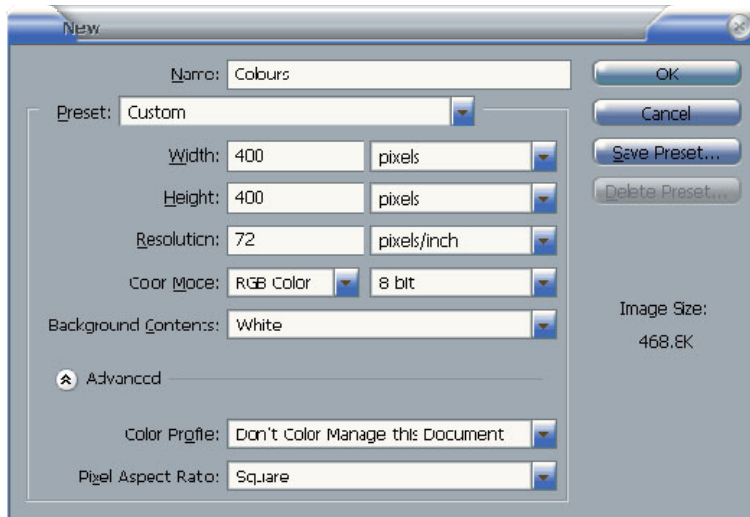
11) Close the picture without saving any changes.

2 - Selecting Colours

Photoshop provides several ways for selecting colours. Some of these methods you will have already seen in previous sections. These methods include the **Colour Picker**, the **Swatches Palette**, the **Colour Palette** and the **Eyedropper Tool**. Some methods of selecting colour may be slightly different depending on which colour mode your image is in. In Photoshop, you can have two colours selected at any given time. A **foreground** colour and a **background** colour. Both are used in different ways and both will be used in the exercises which follow.

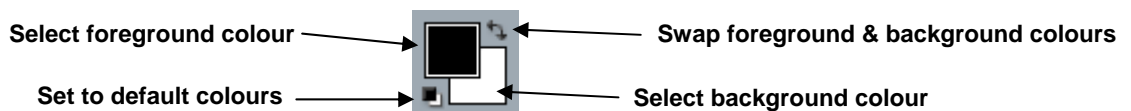
Exercise 2 – Using the Colour Picker

1) Create a new image with the options shown below

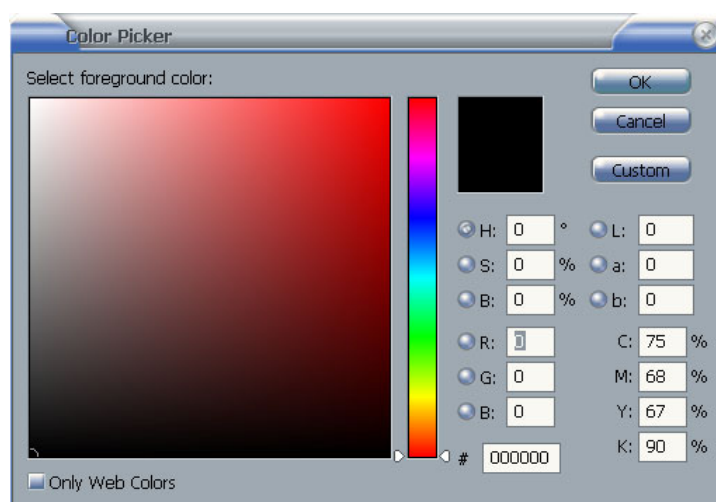


We'll practice selecting colours by making use of fills and gradients.

Look at the bottom of the tool palette and you will see the colour picker icons.

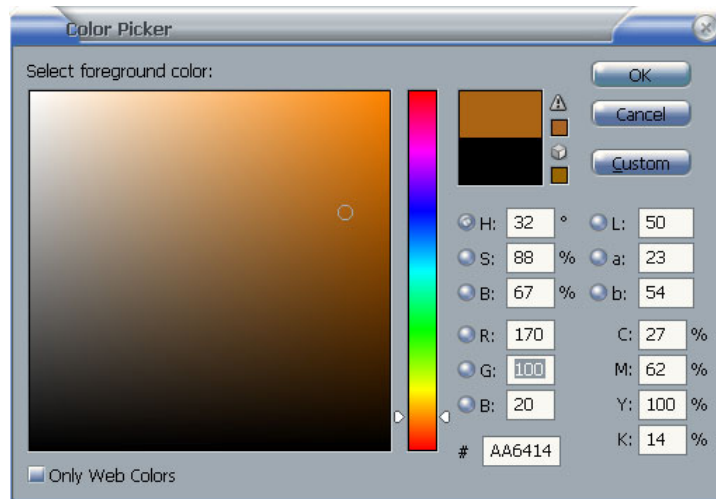


2) Click the **Foreground Colour Selector** to display the **Colour Picker**.



The colour picker may look complicated but it's a lot easier to use than it looks. The numbers on the right hand side allow you to set a colour by typing in values directly. For example if you knew that the colour you wanted had an **RGB** value of 125, 130, 20, you could enter the value directly. The other amounts allow you to set the colour using different modes such as **HSB** (hue, saturation, brightness), **LAB** colour and **CMYK** colour.

3) Try entering R-170, G-100 and B-20 as shown on the following page.



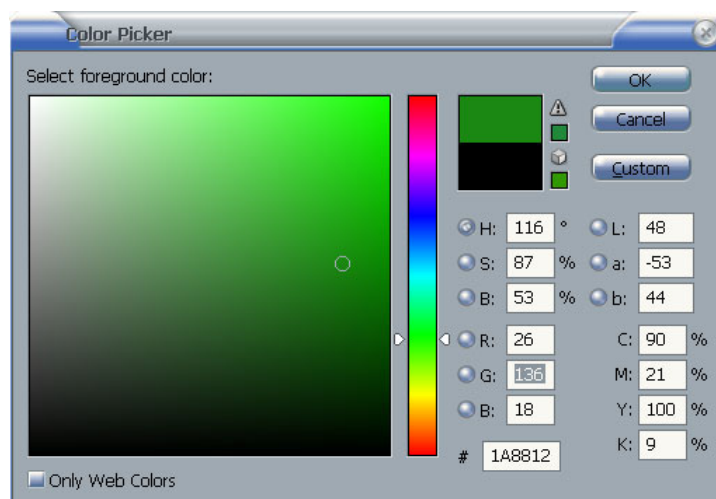
You should currently have a dark orange colour selected. Near the top of the dialog is a box which shows the colour you started with in the bottom half and the colour you have selected in the top half. The top half will change to show you any colour changes you make. You can click the bottom half at any time to return to the original colour.

In most case you will use the colour picker to select colours visually. First of all, you use the vertical hue slider to pick the colour hue you are after.

4) Drag the hue slider until you have a green colour selected as shown to the right.

The large square area allows you to adjust the shade of the selected hue. A circle indicates the shade currently selected.


- Dragging the hue closer to the bottom selects a darker shade.
 - Dragging it all the way to the bottom edge selects black.
 - Dragging it closer to the top left corner selects a lighter colour.
 - Dragging all the way to the top left corner selects white.
 - Positioning the circle anywhere along the left edge will select a shade of grey (lighter grey near the top and darker grey near the bottom).
 - Dragging to the top right corner selects brighter shades of the selected hue.
- 5) Practice dragging around the square. Notice the numbers on the right changing to show the selected colour values.
- 6) Try dragging all the way to each corner.
- 7) Try to select a dark green colour similar to the one shown below.

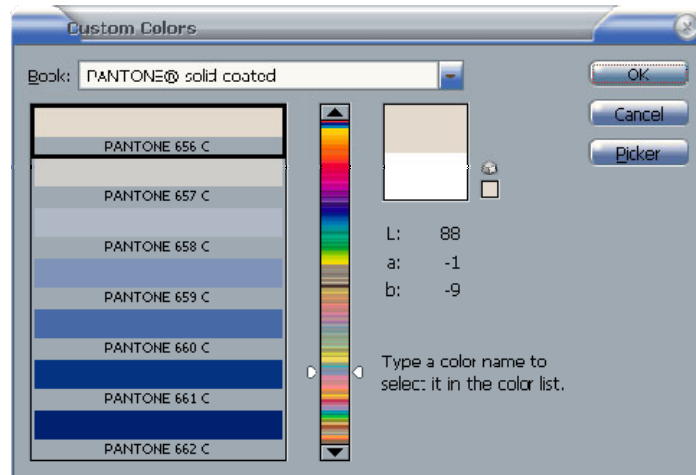


8) Click **OK** to apply the colour change.

The selected colour will now appear in the **Toolbox** as the **Foreground Colour**.



- 9) Select the **brush** tool by clicking the icon  or by pressing the **[B]** key.
- 10) Try painting with the selected colour.
- 11) Click the **Background Colour** square to open the colour picker again, this time to change the background colour.
- 12) Click the **Custom** button (below the **OK** and **Cancel** buttons). This changes the **Colour Picker** to the **Custom Colours** picker.

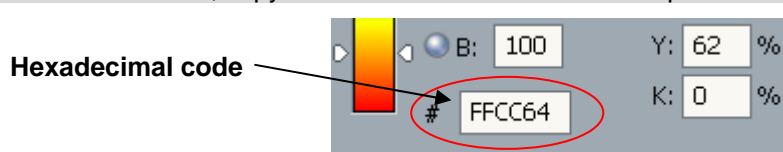


The **Book** list at the top allows you to select from several common colour 'books'. For example, many professional printers use the **Pantone** colour book (www.pantone.com) to use numbers for identifying particular colours. An organisation might have a logo that needs to be a specific colour throughout the organisation. Specifying a pantone colour ensures that whenever the organisation asks a professional printer to print the logo it will always be the same colour.

- 13) Scroll through the list to view the colours available.
- 14) Type the number 359 to select the colour *PANTONE 359* which should be a light green colour.
- 15) Click **OK** to set the background colour. Both of your selected colours will display in the toolbox.

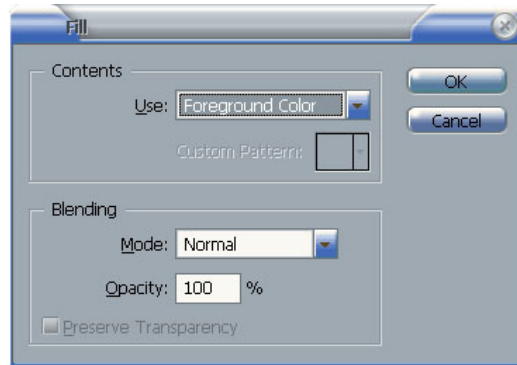


Tip At the bottom of the colour picker, the currently selected colour is represented as a hexadecimal code. These codes are frequently used to represent colours in **HTML** so website developers can select a colour, copy the hexadecimal code and then paste it in to their **HTML**.



Exercise 3 – Using Foreground and Background Colours

- 1) From the **Edit** menu select **Fill**.




- 2) Make sure the **Use** option is set to **Foreground Color** and click **OK**.

The image will now be filled with the foreground colour. You can also use the **Fill** option to fill your image with the background colour. Additionally, some shortcuts can be used.

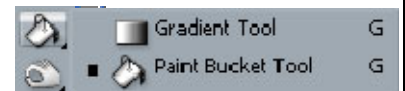
- 3) Press **[Ctrl] [Delete]** to fill the image with the background colour.

- 4) Press **[Alt] [Delete]** to fill the image with the foreground colour.

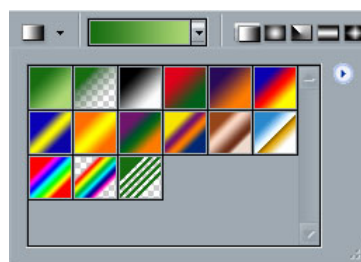
Tip You can use selections (covered in the next section) to restrict what parts of the image are filled with the selected colours.


The toolbox has a **Fill** tool  which works in a similar way to the menu option. The **Fill** tool is also grouped with a **Gradient** tool.

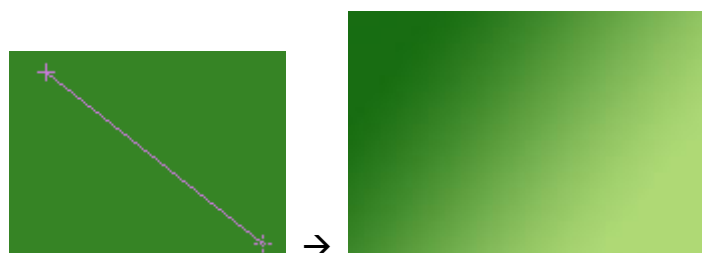
- 5) Hold your mouse button on the **Fill** tool to show the **Gradient** tool and then select the **Gradient** tool. You can also use the **[Shift] [G]** tool to select the **Gradient** tool.




- 6) The **Options Palette** along the top will show gradient options. The first of these allows you to choose from several gradient presets. Make sure the first one (foreground to background) is selected.



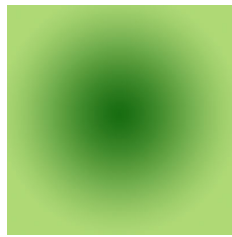
- 7) Next on the Options Palette is a selection of gradient types.  Make sure the first one is selected.
- 8) Drag across the image to create a gradient fill. The point you start dragging from will have the foreground colour. The point you finish dragging at will have the background colour. The areas in between will have an even colour blend.



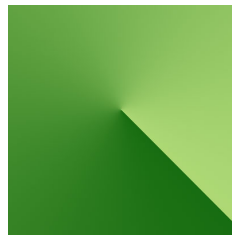
9) Try using some of the other gradient styles. 



Linear gradient



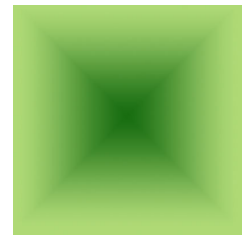
Radial Gradient



Angle Gradient



Reflected
Gradient



Diamond
Gradient

10) Click the **Switch Foreground and Background Colours** icon near the colour picker icons or press the **[X]** key to swap the foreground and background colours.



11) Click the **Default Foreground and Background Colours** icon or press the **[D]** key. This will change the foreground colour to black and the background colour to white.



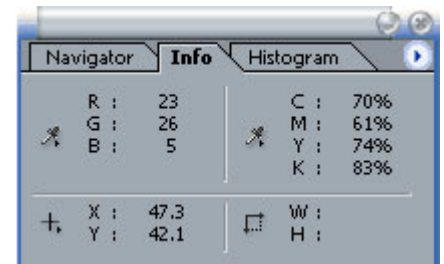
12) Save the image as *Colours.psd* and close the image.

Tip If you are painting using the brush tool or another tool, you can keep two colours ready for use. Set one as the foreground and the other as the background. Then you can simply use the **[X]** key whenever you need to switch between them.



Exercise 4 – Selecting Colours with the Eyedropper Tool

- 1) Open the *1-Rose.psd* image.
- 2) Display the **Info Palette**.
- 3) Move your mouse over the image.

The info palette will display information about the pixels your mouse moves over. For any pixel your mouse moves over it will show the coordinates of the pixel (distance from the top and left of the image), the colour of the pixel in **RGB** and **CMYK** values and the dimensions of any selected area (explained in the next section).



Notice that any lighter coloured pixels will have higher **RGB** values and lower **CMYK** values.

- 4) Select the **Eyedropper** tool from the **Tool Palette**  or press the **[I]** key. Your mouse pointer will change in to an eyedropper shape when over the image. 
- 5) Move your mouse over a dark red part of the image and click the mouse button. The foreground colour will be changed to match the colour of the pixel you clicked on.
- 6) Move your mouse over a light green part of the image and click the mouse button while holding down the **[Alt]** key. The background colour will be changed to match the colour of the pixel you clicked on.



Tip With the eyedropper tool selected you can drag slowly across the image and watch the colour icon in the tool palette until you have found a suitable colour to sample.

Exercise 5 – Using the Colour Palette

Selecting colours using the **Colour Palette** is quite similar to using the colour picker, with a few small differences.

- 1) Make sure the **Colour Palette** is showing.
- 2) Click on the foreground colour box as shown below to make sure it is selected. The selected box will have a thicker border around it and indicates whether you are changing the foreground or background colour (Double clicking on either one will open the colour picker).



There will be a horizontal slider for each channel in the image. In this case there is one each for red, green and blue.

- 3) Try adjusting each slider until you end up with a dark purple colour. *Hint: no green with a medium amount of both red and blue should give you the right colour.*



The **Colour Bar** along the bottom provides another way to select colours. If you move your mouse over it, the mouse pointer turns in to an eyedropper shape. This works in the same way as using the eyedropper tool on an image (So you can hold down **[Alt]** to select a background colour with it).




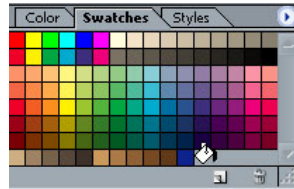
- 4) Drag along the **Colour Bar** to view different hues. Drag closer to the top of the bar for lighter colours and closer to the bottom of the bar for darker colours. Try to select a light orange colour from the colour bar.



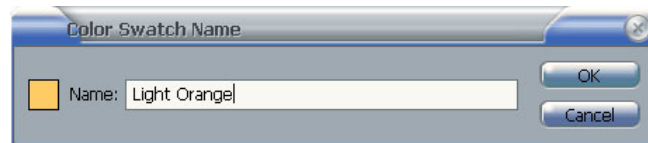
Exercise 6 – Adding to the Swatches Palette

In a previous exercise you saw that the **Swatches Palette** displays a collection of colours that you may choose from when needed. This collection of colours can be customised, meaning that you can save colours for later use. It can also be replaced with one of Photoshop's alternate swatches.

- 1) Display the **Swatches Palette**.
- 2) Make your foreground colour a light orange colour such as the one shown. 
- 3) Move your mouse over a blank area on the swatches palette. Your mouse pointer will turn in to a bucket shape.



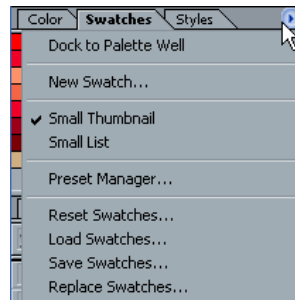
- 4) Click to create a new colour. A dialog asking you to name the colour will appear.





- 5) Enter *Light Orange* for the colour name and click **OK**. Move your mouse over the new colour and its name will appear.

Collections of colours can be saved in case you need to reinstall Photoshop or use them on a different computer. All Photoshop palettes have a menu that can be displayed by clicking the small triangle in the top right corner of the palette.

- 6) Display the palette menu as shown and select **Save Swatches**.



- 7) Select an appropriate location for your custom swatch and name it *Custom.aco*. You can save over it again if you add additional colours.

Note You can also delete a colour from a swatch by dragging it on to the bin icon  at the bottom of the palette. You can also create a new swatch/colour by clicking the  icon at the bottom of the palette, though this method doesn't ask you for a colour name so you'd need to rename it afterwards.

3 - Additional Colour Tips

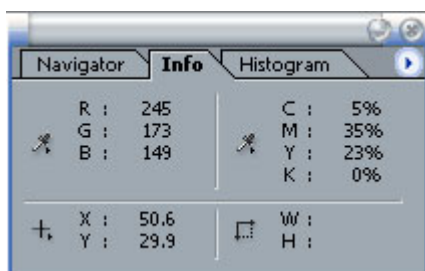
Colour Gamut

A Gamut refers to a range of colours that is available in a certain situation. Not all devices are capable of displaying the same colours. For example, your computer's monitor might be capable of displaying a bright green colour which might not be possible to duplicate with ink from a printer. Photoshop can indicate **out of gamut** colours in a couple of ways.

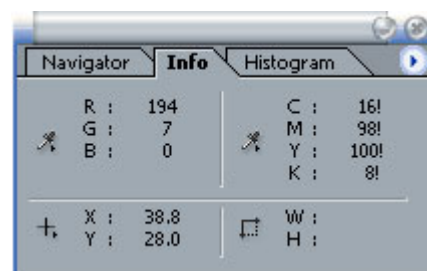
Firstly, if you are using the **Colour Palette** or the **Colour Picker**, a '!' symbol may appear next to your selected colour if it is out of gamut. This often happens when you have selected a very bright colour which would not look the same if it were printed. When the '!' appears, it will appear near a small colour square which indicates a suggested colour that is not out of gamut. Clicking this small square will set that as the selected colour.



Another way that out of Gamut colours may be indicated is in your **Info Palette**. When you move your mouse over a pixel that has an out of Gamut colour, the **CMYK** values will be followed by exclamation signs instead of percentage signs.




Normal colour



Out of Gamut colour

Web Safe Colours

Different platforms display many colours differently. For instance, a computer user viewing a web page on an **Apple Mac** with **Firefox** as the browser might see different colours to another user viewing a web page on a **Windows PC** with **Internet Explorer** as the browser. There is a standard set of 216 colours that will look the same regardless of the platform used. This set of colours is known as Web Safe colours, since many website designers make a point of choosing colours from within this range.

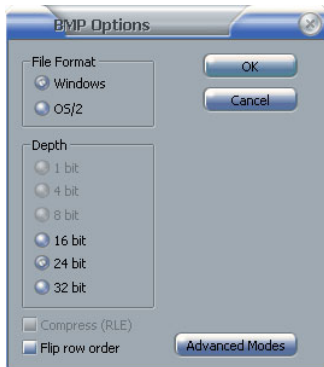
When you are selecting colours using the **Colour Palette** or the **Colour Picker**, a  symbol will appear if you have selected a colour that is not 'web safe'. You can click the small coloured square under the symbol to change to the closest available web safe colour.



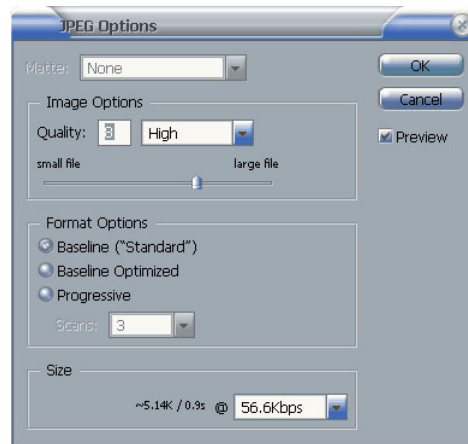
Tip Photoshop includes a web safe colours collection called *Web Safe Colors.aco* that can be loaded in the swatches palette. If you want to load the web safe colours, they are usually located where Photoshop is installed under the `\Presets\Color Swatches` folder.

4 - Saving Files

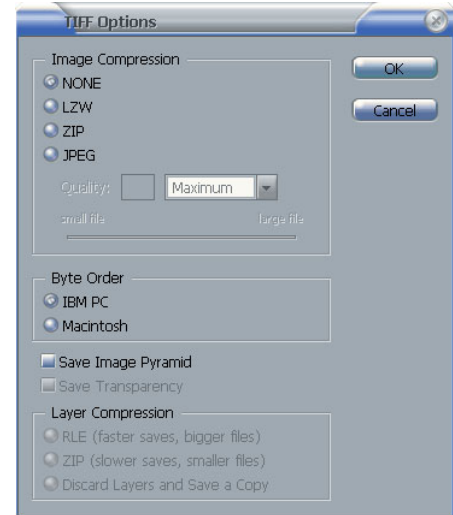
When you are ready to save a file in a format other than PSD, you need to be aware of some of the different features of different file formats.¹ For instance, you won't be able to save an image in **GIF** format unless it is in indexed colour mode. The Indexed Colour mode means that the picture is made from a selection of no more than 256 colours. With other file types, you may be prompted for additional information about the file. The following examples show some of the options that may appear when you choose to save a file in a certain format.



Bitmap saving options



JPEG saving options



TIFF saving options

Even though you may be able to select additional options when you save a file, those options might not be used by all programs. For example JPEG images have a feature called progressive rendering. This means that if the image is loading in a web page, instead of gradually appearing from top to bottom, the whole image will appear and get clearer as it continues to load. Internet Explorer is capable of displaying **JPEG** images, but will not make use of the progressive rendering feature as other web browsers might. Likewise, if you save a **TIFF** image, you have the option to retain transparent areas and layers, though some programs such as Adobe PageMaker will only recognise **TIFF** images that don't have these extra features.

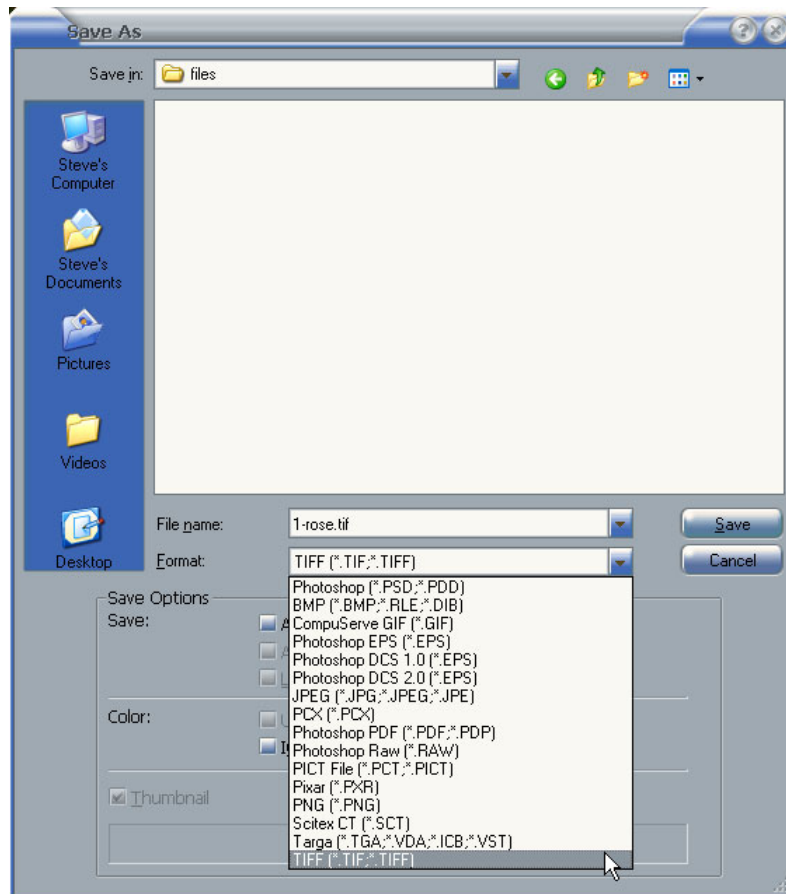
¹ For an overview of file formats see <http://www.oneil.com.au/pc/general/CommonRasterImageFormats.pdf>

Exercise 7 – Saving a TIFF Image

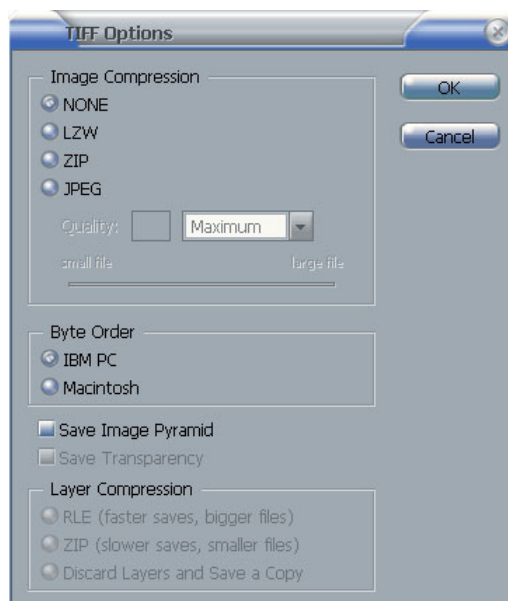
1) Make sure you have the *1-rose.jpg* open in Photoshop.

For an image that will be printed, it is best to convert it to **CMYK** mode. This will ensure that any out of gamut colours are converted to colours that will print well.

- 2) From the **Image** menu select **Mode** and then **CMYK Color**.
- 3) From the **File** menu select **Save As** or press **[Ctrl] [Shift] [S]**.
- 4) Change the list of file types to **TIFF**.



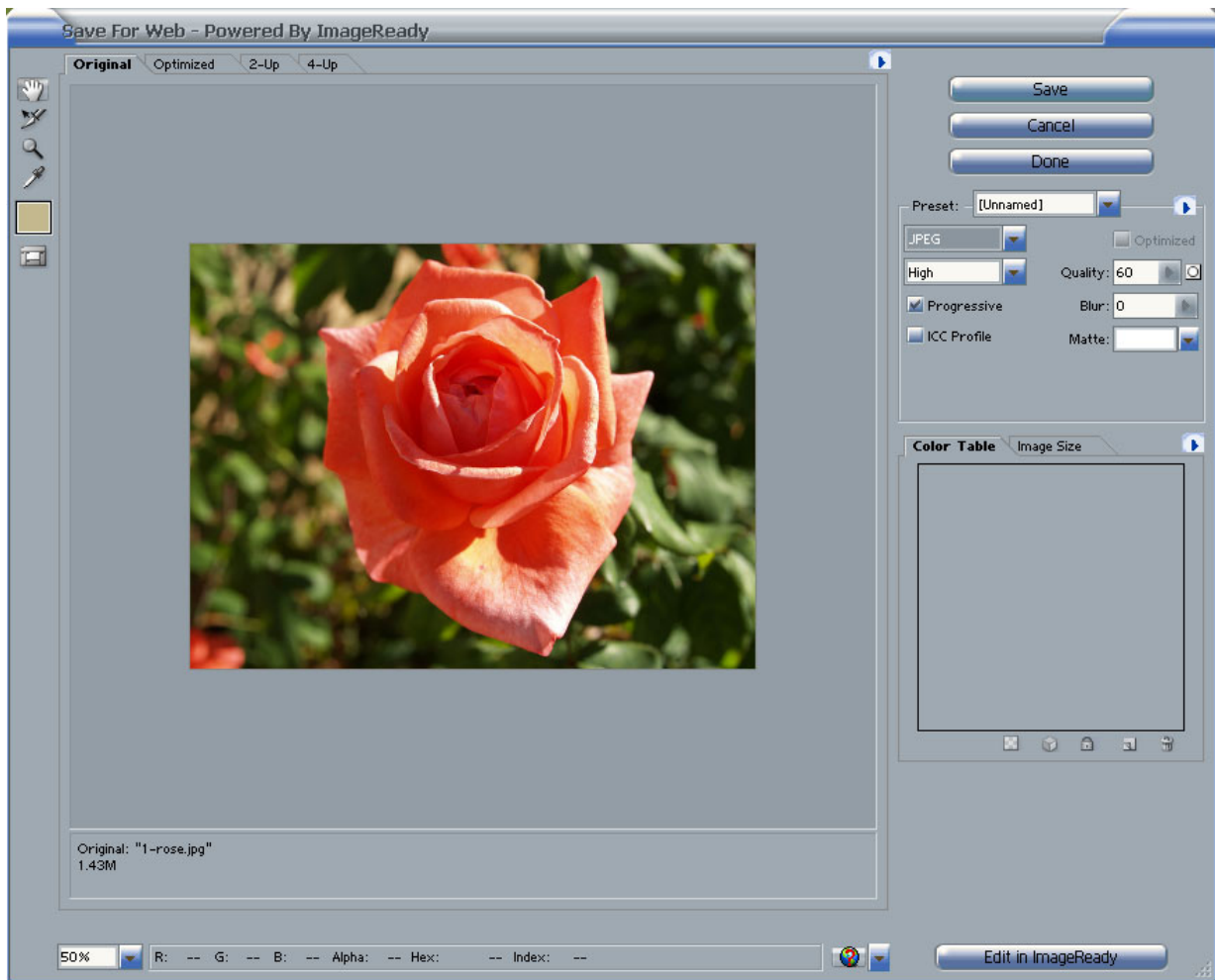
5) Click **Save**. The **TIFF** options dialog will appear. Click **OK** to complete the save.



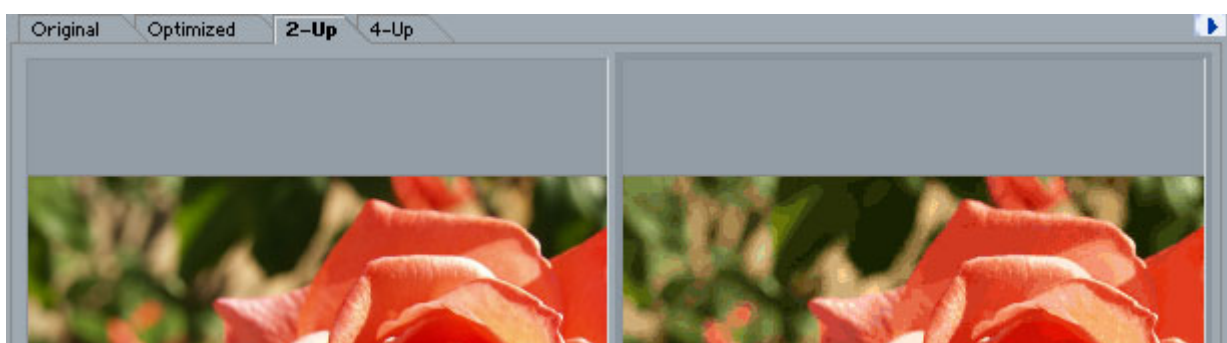
Exercise 8 – Save for Web Options

For websites the common file formats are **GIF**, **JPEG** and **PNG**. These can be saved like other files, but to take advantage of the features in each of these image formats you can use the **Save for Web** feature.

- 1) Open the *1-rose.jpg* open in Photoshop.
- 2) From the **File** menu select **Save for Web** or press **[Ctrl] [Alt] [Shift] [S]** (A long shortcut but well worth remembering if you do a lot of work on websites). A dialog like the one below will appear.



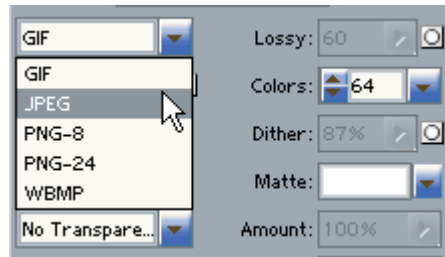
- 3) The main area is taken up with a preview of your image. Click the **2-up** tab along the top. This will split the preview screen in two halves. The first will show your image normally. The second will show how your image will look with the selected save options. You can zoom on the preview and move around the preview just as you would normally in Photoshop.



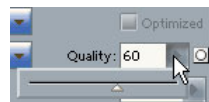
Under the second preview, you will see some information about the image. This will show the currently selected file type along with other information such as an estimate of the final file size and the estimated download time one a specified internet connection speed.



- 4) From the options on the right, set the file size to **JPEG**. The rest of the options will change to suit the **JPEG** format.



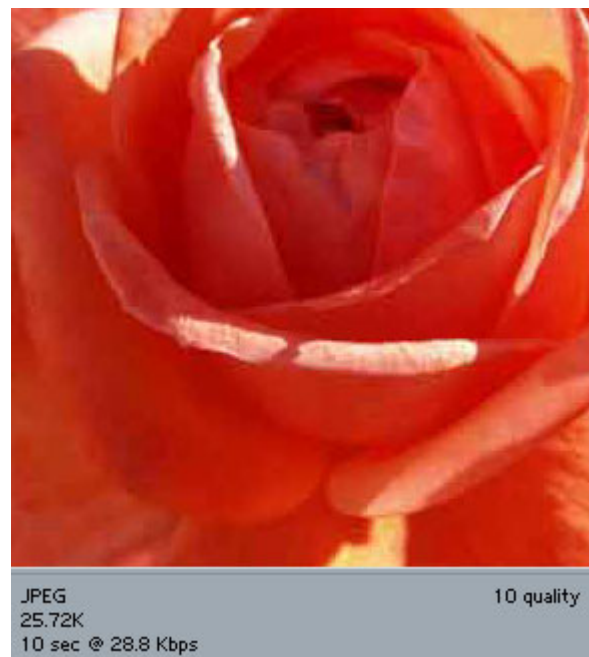
- 5) Try changing the quality settings. If you set it to high amounts, the two preview images won't look much different but the estimated file size will be relatively high. Change to a lower quality setting and the estimated file size will be small, but you will notice a difference in the quality of the preview image.



E.g.



Good quality but large file size



Small file size but poor quality

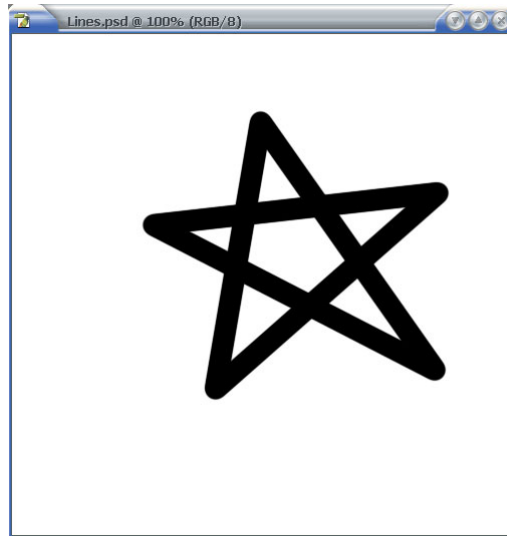
- 6) Set the quality to the lowest amount you can without too much loss of image quality (around 40% should be ok).
- 7) Click **Save** to complete the options.
- 8) Select an appropriate file location. Enter *rose web* as the file name and then click **Save**.



Note Photoshop will replace the space in the filename with a dash since it is best to avoid spaces in filenames. Many web developers use a dash – or an underscore _ instead of spaces.

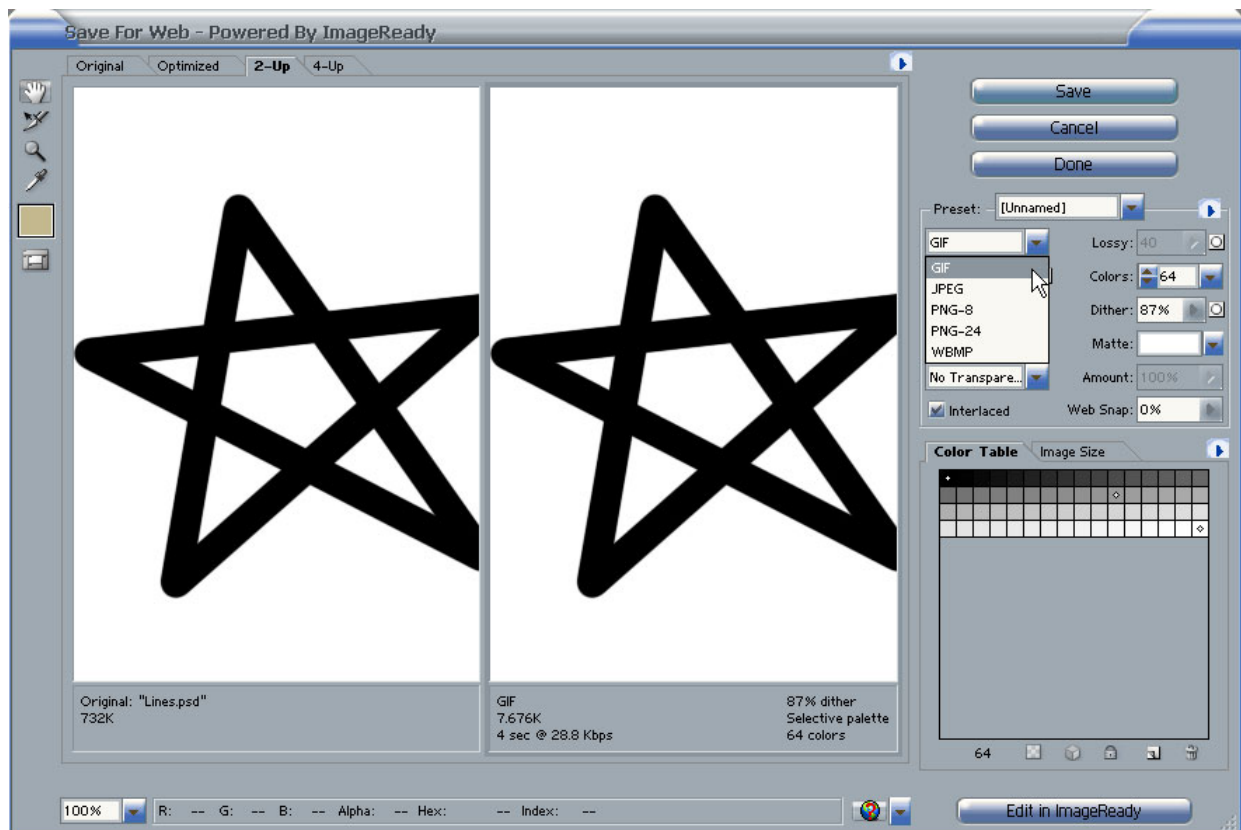
9) Close the rose image.

10) Open your *Lines.psd* image. If you didn't save it earlier then create an image to look like the one below.



Since this image has very few colours and has large areas of solid colour it is ideal for the GIF file format.

- 1) From the **File** menu select **Save for Web** or press [Ctrl] [Alt] [Shift] [S].
- 2) Set the file type to **GIF**.



The colour table shows the number of colours currently used in the image. It includes a lot of different shades of grey that are used to make the edges of the lines appear smoother. In many cases, the image can still look good with a lot less colours, which results in a smaller file which will download quicker in a web site.

- 3) Change the number of colours to the lowest amount you can without too much loss in image quality. You could probably change it to as little as 8 colours without any noticeable loss in quality (some images look fine with even less).

One feature of **GIF** images is that certain parts of the image can be transparent.

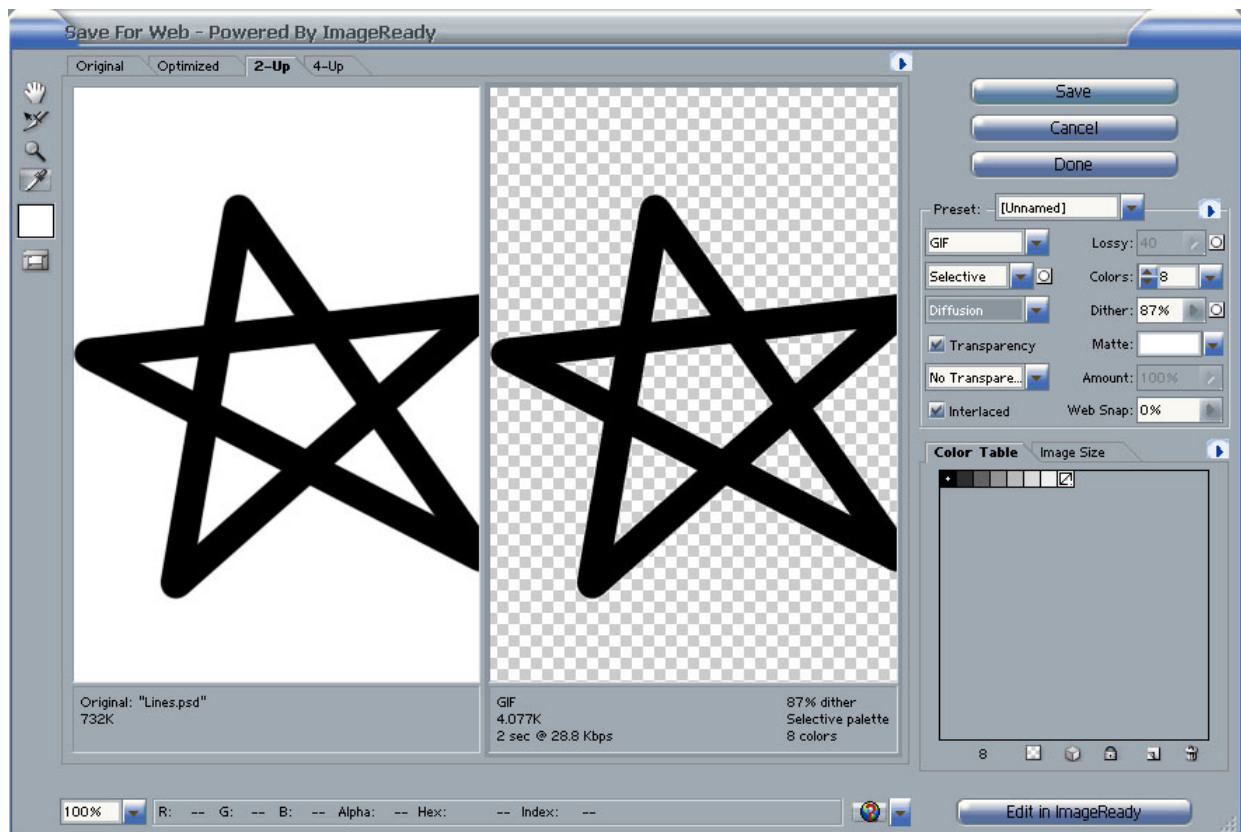
- 4) Click the **eyedropper** icon on the left of the window.



- 5) Click on a white part of the image. If you look in the **Colour Table** you will see a small border around the white coloured square (you could have also clicked it here to select it).







- 6) Click the first of the icons along the bottom of the **Colour Table** to set the selected colour as transparent. You can set more than one colour to be transparent but that won't be necessary in this case.
- 7) Click **Save** to complete the **GIF** options.



- 8) Select an appropriate file location.
- 9) Enter *Star* as the file name and click **Save**.



5 - Shortcuts Learned

Shortcut	Icon	Purpose
[Ctrl] [Delete]		Fill the selected area (or entire image) with the background colour
[Alt] [Delete]		Fill the selected area (or entire image) with the foreground colour
[G]		Select the fill / gradient tool
[X]		Swap the foreground and background colours
[D]		Default colours
[I]		Eyedropper tool
[Ctrl] [Alt] [Shift] [S]		Save for web