

## Preparing images for the World Wide Web

This course aims to provide you with an understanding of the different types of graphics available. It should improve your knowledge of the different file formats (GIF, TIFF, PNG) and functional graphic types (buttons, clickable maps, animations, etc.). Worked examples guide you through the creation of the commonest web graphics. You will gain experience using graphical editing programs such as Macromedia Fireworks MX, JASC Paint Shop Pro and Animation Shop. After attending this course you should be able to develop and edit appropriate graphics for your own web pages.

Worked examples include:

- 1 Techniques for editing existing images – cropping, resizing, altering the colours, contrast, etc.
- 2 Creating text effects – shadows and masks
- 3 Creating clickable buttons for web pages
- 4 Clickable maps
- 5 Timeline animations on a web page
- 6 Creating an animated GIF from a series of screenshots

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### **Conventions:**

In this document, the following conventions are used:

- A typewriter font is used for what you see on the screen.
- A **bold typewriter font** is used to represent the actual characters you type at the keyboard.
- A *slanted typewriter font* is used for items such as filenames which you should replace with particular instances.
- A **bold font** is used to indicate named keys on the keyboard, for example, **Esc** and **Enter**, represent the keys marked Esc and Enter, respectively.
- A **bold font** is also used where a technical term or command name is used in the text.
- Where two keys are separated by a forward slash (as in **Ctrl/B**, for example), press and hold down the first key (**Ctrl**), tap the second (**B**), and then release the first key.

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## 1 Introduction

Graphics can be digital photos, scanned pictures, computer generated diagrams, animations or artwork. Graphics on web pages are always a controversial subject. You can greatly enhance your web site with the careful use of good images, or totally spoil it with poor ones. The choice of graphics should be considered an integral part of the design process. You must consider the time that the pages take to load, as there is no point putting beautiful graphics on your page if it takes so long to download that people get bored and move on. It is well worth choosing and editing your graphics carefully.

You should also design your pages from the beginning so that there are always alternative ways of navigating through your website that do not rely on pictures. This ensures that visually impaired users, those browsing your page using a device with a small screen area (e.g. a PDA) or even just over a slow link can still access it.

This guide takes you through the different types and uses of graphics on your website. The start of the guide introduces you to a range of concepts. The remainder of the guide contains a number of tasks, to provide you practice of creating and manipulating graphics. You can choose the task(s) to complete during the workshop to match your own needs and interests.

## 2 Where to get your graphics

Later parts of this course show you how to create your own graphics from scratch. You should not forget that there are a number of different sources for graphics that you can put on your web page almost straight away.

### 2.1 Digital cameras

There are a range of digital cameras available. They can be split into two types – stills cameras (akin to a Polaroid or normal 35mm camera) and digital video cameras (camcorders). Both store the picture information in a digital format. Increasingly the distinction between these two types of cameras is blurring, with digital stills cameras able to record short movies and video cameras able to save still frames.

#### 2.1.1 Using a digital stills camera

If you own, or have access to a digital stills camera, then you can take photographs and transfer them directly to your computer using the camera's software. You might want to edit the images, but they will be almost ready to put on the web. You will have had your photographs taken using a digital camera by a member of the ITS in the course *IT23: Creating web pages*.

If you are taking photos specifically for use on the web, it is worth adjusting the settings on the camera to create suitable images automatically, rather than having to edit them later using image processing software. If you can,

choose a file format such as JPEG and ensure the final image size is kept relatively small. “Megapixel” images will take a long time to load.

### 2.1.2 Using a video camera

Although typically of lower quality than images from digital stills cameras, it is often possible to generate single images from a digital video camera. If the camera has a stills function, then use this. Otherwise you have to grab individual frames of the video and save them as separate graphics files. To do this requires video-editing software such as Adobe Premiere, which is available on the video editing PCs in the Main User Area (room CM131) in the Computer Centre.

### 2.1.3 Scanners

If you have ordinary printed photographs, postcards, slides, transparencies — in fact any visual material — then you can use a scanner to make digital copies of them. Scanners come in various forms, from small hand-held devices and desktop flatbed scanners through to specialised slide scanners and large format drum scanners. There are two desktop scanners in the Main User Area (room CM131) in the Computer Centre, and scanners are also available in Library levels 2 and 3, Elvet Reading Room, Palace Green Exhibition Hall and ED244 in the School of Education. These have instructions with them, or see the ITS InfoSheets 106 (DeskScan 6250) or 122 (Scanjet 5200C). If you scan images, then ensure your use of the material will not breach any copyright regulations. Carefully read below for information on suggested image resolution (section 3.5) and file types (section 4).

## 2.2 Existing graphics from the internet

You can copy and reuse images which are already on the web. You must, however, make sure that you are not infringing someone else’s copyright. This may require you to email the author to seek their permission. In general, as long as your use of their images is not for profit and their name is acknowledged, then permission is usually granted. In the introductory course on creating web pages using Dreamweaver, you learnt to right-click on an image and select **Save Image As** (or right-click the page and select **Save Background As**) to save images from the web. There are many web sites which provide numerous free graphics, photographs and navigation buttons. Search engines such as Alta Vista also allow you to search specifically for image files.

## 2.3 Screen capture

Sometimes it may be useful to capture all or part of the image displayed on your screen (e.g. for creating manuals, or documenting a project). The simplest way to do this on a PC involves the Print Screen button, (labelled, **Prt Sc** usually located after the **F12** key). Pressing **Prt Sc** copies the whole desktop onto the clipboard (which you can then paste into a graphics program such as Paint Shop Pro and save as a JPEG or GIF). Pressing **Alt/Prt Sc** copies only the current window, which is often what you want. For more advanced screen capture (e.g. specifying whether or not you

want to include the cursor or open menus) check out the help files in Paint Shop Pro.

### **3 Understanding graphics**

An explanation of the different types of graphics and the way they store information will help inform your choice of file formats for use on the web.

#### **3.1 Vector and bitmap formats**

Graphics can generally be split into two types: vector and bitmap (bitmaps are also known as raster images). No one format is universally better, the choice depends on your application, but it is worth remembering that in general, web browsers have a much stronger support for bitmap formats.

Examples of bitmap graphics are files that end .GIF, .JPEG, .TIF, .PNG and .BMP. These images consist of dots, called pixels, arranged in a grid. Your computer screen itself consists of a large grid of pixels. Each dot is assigned a colour, and when viewed at the correct resolution, the dots go together like tiles in a mosaic to form the image. When you edit a bitmap graphic, you modify individual pixels, rather than lines and curves. These bitmap graphics are resolution dependent, because the data describing the image is fixed to a grid of a particular size. Enlarging a bitmap graphic can make the image's edges ragged, as pixels are redistributed within the grid. Displaying a bitmap graphic on an output device with a lower resolution than the image itself also degrades the image's quality.

Vector graphics describe images using lines and curves, (these are the "vectors") that also include colour and position information. Examples are files ending .EMF and .CGM. When you edit a vector graphic, you modify the properties of the lines and curves that describe its shape. You can move, resize, reshape, and change the colour of a vector graphic without changing the quality of its appearance. You can overlap objects so that they are partly hidden and alter transparency. Vector graphics are resolution independent, meaning they can be displayed on output devices of varying resolutions without losing any quality. Editing of text is better handled by vector formats.

As a general rule, images with a lot of colours, with subtle changes in tone (e.g. photographs) are best stored as bitmaps. Some diagrams (e.g. flow charts or graphs) may be better saved in a vector format. At the time of writing, vector support on the web is improving but still not universally available. For this reason many authors stick to bitmap formats on their website.

#### **3.2 Colour depth**

As image files are stored digitally, each colour on the image has to be represented by a series of numbers. For bitmap images, the less colours you use, the smaller the file can be. The number of colours used is known as the colour depth and there are several common ranges in use today. They are based on powers of two, because the data is stored in binary format. Colour depth is a trade-off between the range of subtle colour differences you want to represent in the image and the size of the file. In

most graphics packages you can alter the colour depth of a file to save space, or permit advanced editing.

### **3.2.1 Monochrome images (1 bit)**

The simplest image can be described using just two colours – black and white (e.g. a chess board). Thus on the computer, the colour of any one pixel can be represented in binary by a single number (the bit), e.g. “1” if it is black, “0” if it is white. For many graphics, particularly those including text, the result will appear very crude and jaggy. Most mobile phones use a 1 bit display.

### **3.2.2 16 colours (4 bit)**

By using four digits (e.g. “0110” or “1100”) and a bit of binary arithmetic, we can get 16 different colours ( $2^4 = 16$ ). This is the very smallest number of colours you would typically use for a colour image. The resulting files are very compact, but at the expense of a limited palette of available colours. 16 colour images will display on almost any device (even simple PDAs).

### **3.2.3 256 colours (8 bit)**

By increasing the colour depth to 256 we can represent many images in an acceptable manner. It is safe to assume that most people looking at your website will have a display capable of handling 256 colours. Thus, this is a good minimum colour depth for many web graphics. Indeed some graphics formats (such as GIFs are limited to 256 colours).

### **3.2.4 Greyscale images (8 bit)**

So far the discussion has focussed on coloured images, but some of the materials you want to use may be black and white (e.g. old photographs or x-rays). In this case it has been shown that 256 shades of grey are quite sufficient to represent the image with no discernible loss of quality to the human eye. Thus an 8 bit colour depth should be used for black and white images. As all these “colours” are actually shades of grey ranging from black to white, graphics packages contain a standard range of 256 shades of grey (a greyscale). For best results, when saving a black and white picture, save it as a greyscale image.

### **3.2.5 16 million colours (24 bit)**

For many photographic images, 256 colours will not be enough to provide a satisfactory result. Although it may seem a big jump, the next common colour depth is 16 million colours (strictly speaking 16,777,216). This gives a very wide range of colours. Most scanners and digital cameras can generate 24 bit pictures. The resulting files can be large, but are good for representing very subtle tonal ranges such as those found on human skin, or in natural landscapes. When creating web pages using 24 bit colour images be aware of the long download times – you may well need to use image compression techniques to reduce the size of the file. Remember too that not all monitors can display 16 million colours (particularly those

connected to old unix machines). In this case, the computer will try and remap the image to 256 colours, with varying results.

### 3.2.6 True colour (32 bit and beyond)

A further leap in colour depth, is to go to 32 bits, which gives you a total palette of  $2^{32}$  steps, i.e. 4,294,967,296 colours. Some users are even talking of 64 bit colour. Relatively few monitors are capable of displaying such images and fewer users can readily discriminate between 24 and 32 bit images. For graphics aimed at delivery over the web, this is a step too far. Stick to a colour depth of 16 bits or lower.

## 3.3 Colour palettes

For bitmaps that use a colour depth of 256 colours or lower, the collection of available colours is known as a palette. This is defined at the start of the file (e.g. 0 is pure white<sup>1</sup>, 1 is a very pale yellow, etc.) and then individual pixels are just described as having a colour between 0 and 255. This saves space and results in a smaller file size. It is possible to **edit palettes**, swapping one colour for another (e.g. changing everything that was red, to yellow) or indeed load a palette from another image, and effectively recolour the whole picture. As a result of the different development histories, it is not always possible to display exactly the same range of colours on different combinations of computer and browser. There are 215 common colours, which are known as the **Web-safe palette**. If you want to be as sure as possible that your pages look the same colour on different people's machines, you should create graphics using colours from the Web-safe palette.

## 3.4 Colour models

The discussion about palettes hinted that it is not always possible to ensure that pages will look exactly the same colours on different machines. You may have noticed that when you scan a photograph, the result on screen does not always look exactly the same as the original photograph, and further if you print it out, you generate a third version that is subtly different from the other two. Printed web pages also often differ subtly from those displayed on the screen. To make matters worse there are some colours which you can print, but are very difficult to display on screen and vice-versa. To explain why, we need to look at colour models.

### 3.4.1 Additive – RGB

A computer monitor uses an additive colour model. When it is switched off, the screen appears black. Colours are achieved by firing different amounts of red, green and blue light onto the screen from guns at the back of the tube. This is called an additive model because you are starting from black (no light) and moving towards white (maximum light). To display an image on the screen, it's colours need to be described in terms of red green and

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<sup>1</sup> In this example the colours are described using words, but in the actual file these colours are described numerically, typically as different values of red, green and blue light.

blue. For a 24 bit image, each pixel is made up of 256 levels of red, 256 levels of green and 256 levels of blue.

### 3.4.2 Subtractive – CMYK

Colour printers use the reverse – a subtractive model. They start off with a white page, which reflects the maximum amount of light. They then lay down layers of ink, which reduce the amount of light reflected, so that we see only specific colours. In a subtractive model, colours are a mixture of three colours – cyan, magenta and yellow. This gives us a colour model known as CMY. In theory, to get black text, you use a full-strength mix of cyan, magenta and yellow. In practice the result often appears brown and uses a lot of ink (black is a very common colour in many documents). Thus printer manufacturers introduced a fourth cartridge of pure black ink to improve quality and lower costs. Printed images now are usually composed of varying levels of cyan, magenta, yellow and black. This is known as the CMYK model (K is used for black rather than B, to avoid confusion with the B in RGB which stands for blue). To print an image displayed on screen, the printer driver has to first convert the image from RGB into CMYK. It is this conversion which can result in slightly different colours.

### 3.4.3 Others

The RGB and CMYK models are the most common and for web graphics, you really only need to worry about RGB. It is worth knowing though that there are other colour models around. The most common take a third approach to describing colour, as a combination of three factors – hue, saturation and brightness. For obvious reasons this is known as the **HSB** model. This is much more akin to the way we would describe colours naturally. Hue places us in a general part of the spectrum (i.e. blue, green, yellow), saturation the strength of the colour (from 0% grey to 100% saturated (solid) colour and brightness an indication of lightness, where any colour with a brightness of 0% appears black, and 100% appears white. In essence this gives us a colour of the form a “strong, dark blue” (although using the HSB model we would actually say a “blue, strong, dark”). Again these values are encoded numerically, this time as percentages. The HSB model is mentioned here as it can be useful if you want to recolour something in a realistic manner, e.g. making a very yellow hillside appear more green.

### 3.4.4 Colour management

In an attempt to try and minimise differences in display and printing colours, manufacturers have come up with a set of standards which implement colour management. This is achieved by creating profiles that include data specific to a device. E.g. to achieve a true “post office red” on a Sony monitor you might need a slightly different combination of RGB values to those for a Hitachi monitor. To print this image on an HP printer might need a different combination of CMYK to an Epson printer, and so on. If you need exact colour matches, you must generate your images and web pages on a machine that supports colour management.

### 3.4.5 Colour gamuts

The range of colours that an object can display (e.g. if a monitor) or produce (e.g. if a printer) is known as the **gamut**. Many colour management issues stem from differences in gamut. In the worst case, you may not be able to get an exact match - some colours that you can display on a monitor are not possible to match on a printer, and vice versa. This is beyond the scope of this course – seek specific advice from a member of ITS.

### 3.5 Image resolution

As mentioned earlier, bitmap images have a native resolution, in the sense that this is the grid size at which they were generated and so will display best at their correct size. Ignoring metrification, resolution is typically measured in dots per inch (**dpi**) where each dot is a pixel. Thus you may also come across the abbreviation **ppi** (pixels per inch) which uses exactly the same units.

Monitor resolutions are typically about 72 dpi. Laser printers are anything from 150 to 600 dpi. This is why a graphic which looks fine on screen may appear blocky when printed. High quality printers may work at resolutions over 2440 dpi. When creating graphics for the web, you want to create them at a relatively low resolution, so that they are quick to load. If you think users may want to print the image, then you may have to save it at a higher resolution, or create a link to a separate higher resolution version.

There are a lot of myths concerning the best resolution to display images at over the web. A rule of thumb is to aim for a resolution which is at least 72 dpi (to match the screen), but you may need to go higher to produce a quality image. The answer is to experiment. When scanning files for the web, think carefully before scanning something at more than 150 dpi, unless you are trying to enlarge a very small original.

### 3.6 Transparency and alpha channels

Some image formats support the concept of transparency – where one colour in the palette is essentially see-through. Where you can vary the degree of this transparency it is more properly called the alpha channel. Transparent backgrounds can give images a more professional appearance. For example, Windows Desktop icons often use transparency so that they don't look as if they are surrounded by a square background. Not all graphics formats support transparency, those that do include the raster formats GIF and PNG and vector formats such as SVG and SWF.

### 3.7 Compression

When you describe the colour of every pixel individually, it does not take long for file sizes to become enormous. Recognizing that many of the pixels may be the same colour, or very near to that of their neighbours, or occur in distinct patterns, several compression algorithms have been developed to reduce the file size. Most graphics programs can save images, compressing them behind the scenes using some of these algorithms. Compression techniques can be separated in two, depending on whether the methods are loss-less or lossy.

### 3.7.1 Loss-less

The first algorithms developed were loss-less, in the sense that when decompressed, the file is exactly the same as the original – no information is lost. An example of a common loss-less technique is the LZW (Lempel-Ziv-Welch) algorithm, which is the same one used by programs such as PowerArchiver and WinZip. Essentially it looks for repeating patterns in the data and replaces them with codes. Image formats such as GIF and some forms of TIF employ LZW compression to reduce file size.

### 3.7.2 Lossy

Loss-less compression techniques are good for files which contain large areas of one colour. They are least effective for highly variable images, such as 24 bit colour photographs. Another approach has to be used in this case. Lossy techniques effectively simplify the image by reducing the number of colours, or applying a pattern of change to parts of the image. The idea is that many image files contain far more detail than the human eye can detect. We can therefore reduce file size by removing some of this “superfluous” detail. The method is known as lossy because saving files in this format permanently reduces their quality. *Each* time a file is saved using lossy compression, some of the original data is discarded. Lossy techniques offer the user a range of compression “strengths”, allowing you to create the smallest files that are still acceptable for your purpose. Using too high a compression strength can result in very poor images. The most well known method of lossy compression is the JPEG algorithm, which can significantly reduce file size (often creating files smaller than the equivalent GIF) and is widely used across the web. In general, lossy techniques should only be applied to the final image, editing and resaving JPEG files means that data is continually being discarded, resulting in a marked drop in quality.

## 4 Web file types

Several file types have already been introduced in the discussions above. Not all formats are readily supported by web browsers. Three raster and two vector formats suitable for web use are discussed further below.

### 4.1 GIF

GIF is an abbreviation for Graphics Interchange Format, it was the first graphic type to be supported by web browsers. It is a raster format, which support 256 colours and greyscales. GIFs allow you to set one colour to be transparent. It uses a version of the LZW algorithm to achieve loss-less compression. The use of GIFs was brought into question because the algorithm is owned by Unisys, who require companies that make products incorporating the algorithm (i.e. which create GIFs) to apply for a license. To date Unisys has not enforced this rigorously and time is running out – their patent expires in 2003. Still, the threat of this was enough to encourage many web users to look for another royalty free format. PNG might be the answer.

GIFs come in two types – version 87a and the newer version 89a. The later 89a format supports animations (see below) and the ability to interlace the file. When an interlaced file is first loaded a low resolution version appears, which is gradually updated seven times in stripes until the full resolution of the image is realised. This can be useful for users who are accessing your pages over a slow connection. Interlaced GIFs are usually slightly larger than the equivalent non-interlaced file.

#### **4.1.1 Animated GIFs**

Animated GIFs contain a series of images which display in a particular order. This gives the impression of movement. Typical examples include icons showing a spinning globe, or an envelope opening and shutting, (often used for contacts pages, or to link to email). Animated GIFs can be set to play once, or loop endlessly. Used carefully, animated GIFs can liven up web pages, but too often they are just distracting and tie up bandwidth. An example of creating animated GIFs is included in section 9.2 below.

Increasingly, where animated GIFs were once used on web pages we are now seeing Flash animations, which are generally smaller and offer greater flexibility. More details of creating animations in Flash can be found in *IT146: Creating animation and interactivity with Flash*.

## **4.2 JPEG**

JPEG stands for Joint Photographic Experts Group, the committee who set the original standard. It can be used freely without any royalties. It is a lossy raster format, frequently used for photographs on the web. JPEGs use a 24 bit colour depths (16 million colours). JPEGs can be produced at different levels of compression, a trade-off between image quality and size. Images are compressed in a series of steps, which involves splitting the image into a series of 8 by 8 pixel blocks. At high compression ratios these blocks become visible, degrading the image. JPEGs can be saved using standard or progressive encoding. Progressive encoded JPEGs are first displayed at a low resolution, then replaced by a series of images of increasing quality, similar to an interlaced GIF. Again this is useful for people viewing your pages over a slow connection. JPEGs do not support transparency.

### **4.2.1 JPEG2000**

JPEG2000 is an improved version of JPEG, launched by the Joint Photographic Experts Group in 2001. The files can be recognised by their extension(s) \*.jp2, \*.jpx and \*.j2k. The new file format increases the efficiency of file compression by about 25%. It also changes the way the file is processed - the image is compressed in a stream (a long line of pixels) rather than in 8 by 8 squares of pixels as before. This means that there should be far fewer blocky artefacts in the final image. In theory JPEG2000 should also offer progressive resolution, quality and size, which are all desirable features for delivering files over a web server. As yet, only the latest graphics packages offer native support for JPEG2000 files, (for example it is in version 8 of Paint Shop Pro), and many web browsers still require updates to display the images. Whether it will usurp the original JPEG format, or remain an interesting also-ran like PNG, only time will tell.

### 4.3 PNG

PNG stands for Portable Network Graphic and is sometimes referred to as “ping”. It was developed by an internet committee as a royalty-free alternative to GIFs. PNGs are lossless compressed bitmaps, which tend to achieve 5 to 25% higher compression values than the equivalent GIF. Like GIFs they support transparency, but take this a step further. PNG allows you to specify the degree of this transparency (the file’s opacity). PNGs can be interlaced and display faster than similar GIFs. The format supports gamma correction (allowing you to change the brightness – see below). Unlike GIF, PNG doesn’t support animations, but the format has been defined as “extensible” meaning that variants can be developed by software houses to support other features in the future. Probably the greatest improvement over GIFs though, is the fact that PNGs can support up to 48 bit. Web designers should remember that not all browsers fully support PNGs at the moment. Browsers below version 4 do not support PNG at all. PNGs cannot match the small file size achievable by saving photographs as a highly compressed JPEG.

Note that the graphics editing program Fireworks confusingly saves its own files in PNG format. These contain extra data specific to Fireworks and so don’t display well in web browsers. The solution is to export your images specifically for display as HTML.

### 4.4 SVG

As the name suggests, the Scalable Vector Graphic format is designed to retain your images in a vector format. This allows you to keep file size down, whilst creating images that can easily be scaled up. This format is relatively new and is still being developed by the W3C web consortium. SVG graphics are stored in XML – an extended version of HTML the language currently used to create web pages. Quoting from the current (September 2001) W3C specifications: “SVG is a language for describing two-dimensional graphics in XML (XML10). SVG allows for three types of graphic objects: vector graphic shapes (e.g., paths consisting of straight lines and curves), images and text. Graphical objects can be grouped, styled, transformed and composited into previously rendered objects. The feature set includes nested transformations, clipping paths, alpha masks, filter effects and template objects. SVG drawings can be interactive and dynamic. Animations can be defined and triggered either declaratively (i.e., by embedding SVG animation elements in SVG content) or via scripting.” SVG has the capability to provide a range of text alternatives to increase the accessibility of web graphics.

At the moment only the newest versions of graphics programs support SVG format (Adobe products and Paint Shop Pro version 8). Users may need to install a (free) plug-in before being able to view the file. The competing Flash format (SWF) has gained greater popularity on the web, partly because of its smaller filesize.

### 4.5 SWF

The SWF format is a version of the Macromedia Flash Player vector-based graphics format introduced in 1997. This is the most widely-used vector format on the web. SWF files are designed for displaying vector-based

interactive and animated graphics (with sound) over the Web. Displaying a file requires the user to download a (free) plug-in, but this is widely available and already installed on NPCS machines. Because a SWF file is vector-based, its graphics are scalable and play back smoothly on any screen size and across multiple platforms. Although the accessibility of this format was originally an issue, Macromedia have made many improvements in the latest version. The format is not restricted to Macromedia products – many other vector graphics programs can save your files in SWF format. More information about creating SWF images can be found in the guide *IT146: Creating animation and interactivity with Flash*.

#### 4.6 Other common file formats

There are many other graphics file formats, both vector and raster. Common examples are TIFFs (.TIF), Windows bitmaps (.BMP), encapsulated postscript files (.eps), Computer Graphics Metafiles (.CGM) and Windows metafiles (.WMF). None of these files can be displayed directly on web pages. If you have graphics in this format you need to convert them into JPEGs, GIFs or PNGs. Ideally you should do this by exporting them in one of these formats from the package you created them in. Alternatively, you can use a graphics program (e.g. Paint Shop Pro) to convert them by opening the file and then using the **Save As** command, specifying a different format (see Section 6.4 for more details).

### 5 Inserting your images into a web page

Images are added to a web page using HTML code. There are many ways to generate this, one such is to use the program Dreamweaver MX. *IT99: Creating WWW pages using Dreamweaver* covers this in much more detail. For the moment it is enough to know that you can add images using the **Insert Image** button on the **Object Palette**.



#### 5.1 Storing images

Many web designers consider it good practice to store all your web graphics in a separate directory called **images**. If for example your web page was stored in **j:\public\_html** then your images could be kept in the folder **j:\public\_html\images**.



It is better to save files directly into this folder, rather than transferring them from other directories on your J drive. This ensures that the files are created with the correct access permissions – allowing the Durham web server to display them.

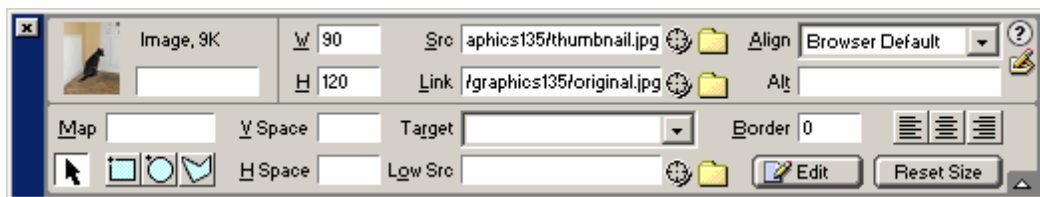
## 5.2 Alt tags

Not all browsers can display images and not all the people using your pages may be able to see them (e.g. those using a screen-reader). For this reason it is important to provide a short textual description of the picture – this is done using the **Alt** (alternative) tag (see an example in section 5.3 below). The text of the **Alt** tag will be displayed on screen before your picture loads, or if the link to it is broken. In later browsers, the text of the **Alt** tag is also displayed as a **tooltip** if you hold the mouse over an image.

Try and use informative tags – relating to the graphic's purpose. For example an Alt tag of “jump to the next page” is a lot more informative than “red arrow”.

## 5.3 Thumbnails

Rather than filling your web pages with lots of large image files, many web designers use thumbnails. These are small, low resolution copies of the original file. The images are set to be web links, which take you to the larger picture. The picture below shows you an example from Dreamweaver of a small graphic (**thumbnail.jpg**) which is a **Link** to the larger picture (**original.jpg**). Web browsers normally draw a blue box around graphics to show the user that they are links. If you don't want this, set **Border** to **0**, this sets the line thickness of the coloured box to zero pixels, effectively making it invisible.



To finish this off, add a suitable comment in the **Alt** tag field, e.g. “**Thumbnail picture of my dog. Click the image to see a larger version.**” This helps viewers navigate around your site.

## 5.4 Low resolution alternatives

If we look at the image dialog box in Dreamweaver shown above, there is a field at the bottom called **Low Src**. If you add a link to another image file in this box, it will load before the main image (specified by the source field: **Src**). In the past, web designers would put a very simple (typically 2-bit black and white) version of a complex graphic (e.g. company logo) here so that it would be seen quickly before the main picture loaded, even over a slow connection. With improved bandwidth this is becoming less of an issue, but you may want to use this feature if you are designing pages specifically for use over a dial-up connection, or if you need to make extensive use of very large graphics and want to hold your viewer's attention whilst they load.

The remainder of this guide comprises a series of tasks. You are *not* expected to complete all the tasks during the training course. Pick a couple that seem most relevant to you at the moment. You can return to the others later, in your own time.

## 6 Task 1 - Editing existing images

There are many programs available for editing image files. The most well known is probably Adobe Photoshop. Two packages are supported on NPCS machines which have a range of image-editing features. These are Paint Shop Pro and Fireworks. These are suitable for users who just want to edit photographs and for the professional graphics designer. The examples below use both packages.

- 1 Create a new directory in the root of your **J:** drive called **graphics135**. Use this to store all the materials you use in this section.
- 2 Download the two files to work with in this section – a huge picture of Durham Cathedral – **dcathedral.tif** and **drylands.jpg** a photograph of some arid land in Ethiopia. Using a web browser, go to  
<http://www.dur.ac.uk/its/info/guides/files/graphics135>
- 3 Right click on the links and save the images in the directory **j:/graphics135**. Keep the browser open.

### 6.1 Cropping files with Fireworks

The photo of the Ethiopian drylands isn't ideal in its current state – we need to focus the viewer's attention on the area of interest – in this case the goats around the central tree. The simplest way to do this is to trim off unnecessary parts of the photo – this is known as cropping.

The Animated GIF example in Section 9.2 uses Paint Shop Pro to crop files. This example uses Fireworks MX. Fireworks native format is PNG, but it allows you to save files in other formats using the export command.

- 4 Run Fireworks by choosing

**Start | Programs | Web Tools | Macromedia MX | Fireworks MX**

After Fireworks has loaded on the networked PC service you might be faced with a window entitled **Welcome**. You can follow the links in your own time, but just now, dismiss this window by clicking on the **close button** (a cross) in the top right corner.

- 5 **File | Open** and select the JPEG image file **drylands.jpg** from your new folder on the J drive.
- 6 Click the **Crop** tool button on the **Tools** panel (LHS of the screen)
- 7 Click and drag to select the part of the image you want to keep, e.g. the area around the central tree.
- 8 Double-click **inside** the area you want to keep. Everything outside the boundary is removed.



If you wanted to save this file now, you would select **File | Export wizard**, to export it as a JPEG. We don't, so close the file (without saving the changes).

## 6.2 Resizing files with Fireworks

The enormous picture of Durham Cathedral is a prime candidate for resizing.

9 **Open** the file **dcathedral.tif** in Fireworks.

Before changing the size of a file, it is important to know how big it is. Fireworks displays the size of an image (width x height) in pixels in the bottom right hand corner of the window containing your bitmap. However, Fireworks allows you to zoom in and out of a picture, so the size displayed on screen may not always reflect the actual size of the image. To see the true size of an image on-screen, ensure it is being viewed at 100% magnification.

10 To do this select **View | Magnification | 100%**

11 You will probably not be able to see the whole of this file on-screen. reduce the magnification until you can see the whole image at once. You might need to resize the window as well.

### Choosing the correct size

Many people have problems determining what size their graphics should be. The dimensions of your new image should be determined by where you are going to put it, and how much of the screen you want it to occupy. For example, if someone is looking at a web page using a monitor set at 1024 pixels wide and 768 pixels high (typical settings for the NPCS machines) then a graphic that was 500 pixels by 500 pixels would take up half the width and two-thirds of the height of the screen. If this graphic was showing a corporate logo – e.g. the University of Durham crest – it is probably far too large. If it was showing a key feature, e.g. a location map, where small features have to be legible, then this might be OK. If you are unsure, create multiple copies of the image, each one a different size, add them to a web page and try viewing them.

Remember too that web page components such as frames, and the window items of the web browser itself also eat up some screen space. Thus if you are browsing the web on a PC with a screen display size of 1024 x 768 pixels, you won't be able to see all of a file 1024 by 768 pixels at once.

12 To change its size select **Modify | Canvas | Image Size**.

13 In **Pixel Dimensions**, alter the height of the image to make it smaller, try a value around **400** or so.

14 Ensure that the **Constrain proportions** box is checked, so that changing one value (e.g. the height) causes the other (in this case the width) to change proportionally.

15 Click **OK**.

Note: to alter the dimensions by percentage rather than pixel size, select the arrow button next to the width or height drop-down lists and choose **Percent**.

At this point, the file remains written on disk in its original TIF format – not suitable for web display. If we used the Save command, Fireworks would save the document in its own version of the PNG format which is also **not** suitable for displaying on the web.

To convert your file to another format for web display we need to choose Export rather than Save. As there are a lot of options, we will use the Wizard to help us.

Select **File | Export Wizard**.

- 16 Choose **Select an export format** and click **Continue**.
- 17 As this graphic is for use on a web page select **The Web** and click **Continue**.
- 18 Fireworks generates a quick analysis of your file. Read the recommendations then click **Exit**.

A preview window opens, giving you the ability to change a wide range of options. Many of these we will ignore for the moment. The window is split into two parts, to the left a series of pages allowing you to fine tune the format, to the right two preview images. These previews show the two suggested formats for your file, as suggested by the analysis. The exact format is shown in the drop down box next to the image. Note for some settings, the preview may look significantly worse than the original.

- 19 The previews may only show you part of the image, change the magnification settings using the small box below the image, until you can see more of the file. Notice that you can zoom in and move the picture around.
- 20 As we chose to export this graphic for **The Web**, in this case the choice is between a JPEG (top preview) and a GIF (bottom preview). Making sure the **Options** tag is displayed on the left hand side, click once or twice on the preview images one at a time. Clicking on the image tells Fireworks which format you want to save the file in.
- 21 Note the differences in file size and colour depth. The JPEG manages to create a smaller file, but retain a better looking image. Areas of the sky in the GIF may show harsh **thresholding** – appearing strongly banded, jumping from one colour to the next. For this reason, click on the top (JPEG) image and then on the **Export** button.
- 22 Name the file **dcathedral2.jpg** and click **Save**.
- 23 You can now close Fireworks – **File | Exit**.

### 6.3 Improving the display of raster images with Paint Shop Pro

Often digital images may require a little editing – pictures may appear too dark, or lack contrast. The examples below introduce image editing techniques.

- 1 Most of the exercises in this section will use a digital photograph of a mountain hut in Ethiopia – **durohut.jpg**. This picture is over-exposed and needs some image manipulation. Download this from the ITS website:

<http://www.dur.ac.uk/its/info/guides/files/graphics135>

Save a copy in the directory **graphics135** on your **J: drive**.

- 2 Now start the program Paint Shop Pro:

**Start | Programs | Graphics | Paint Shop Pro 8 | Paint Shop Pro 8**

- 3 Open your file:

**File | Open**

Move to the **J drive**, pick the directory **graphics135** and select the file you just saved above. The file should appear on screen.

The next step is to create a **duplicate** of the original file – always a good idea before carrying out any editing work. All the editing work below will be carried out on the duplicate image, rather than the original.

- 4 To create a duplicate, with your image file highlighted (which it will be if it is the only file open):

**Windows | Duplicate**

An identical copy of your file is created. As we haven't specified a name for the copy, it will be currently called something like **image1**

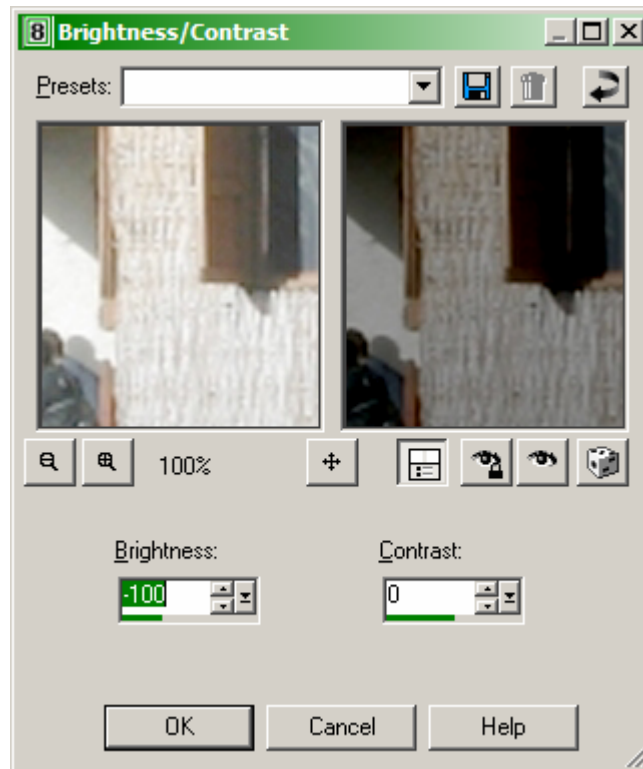
#### 6.3.1 Brightness and contrast

A simple method of improving an image is to adjust the brightness and/or contrast (these controls are found on most TVs and monitors).

- 5 In Paint Shop Pro they can be found as follows:

**Adjust | Brightness and Contrast | Brightness/Contrast**

A dialog box opens, showing an extract from your image on the left, and how it would appear as you change the brightness and contrast settings.



- 6 Try changing the values of the Brightness and Contrast settings to see their effect. If you find that the small extracts aren't enough to help you choose, click on one of the eye buttons (between the right hand window) to see the changes applied to your image file in real time. With a large file (or a busy network) it can take some time for the changes to take effect.
- 7 When you are happy with the changes, choose **OK**, if you cannot get a satisfactory result, choose **Cancel**.

### 6.3.2 Gamma correction

An alternative way to compensate for over or under exposure is to alter the colours in the image file using a re-mapping function. This is known as gamma correction.

- 8 Create a new **duplicate** of the original file **durohut.jpg**.
- 9 Start the Gamma correction process:

#### **Adjust | Brightness and Contrast | Gamma Correction**

Another dialog box opens, similar to the one for brightness and contrast.

This one has a set of three sliders, which can be changed together, or separately. Leave them changing together, and experiment with gamma correction values until you find one which improves the image.

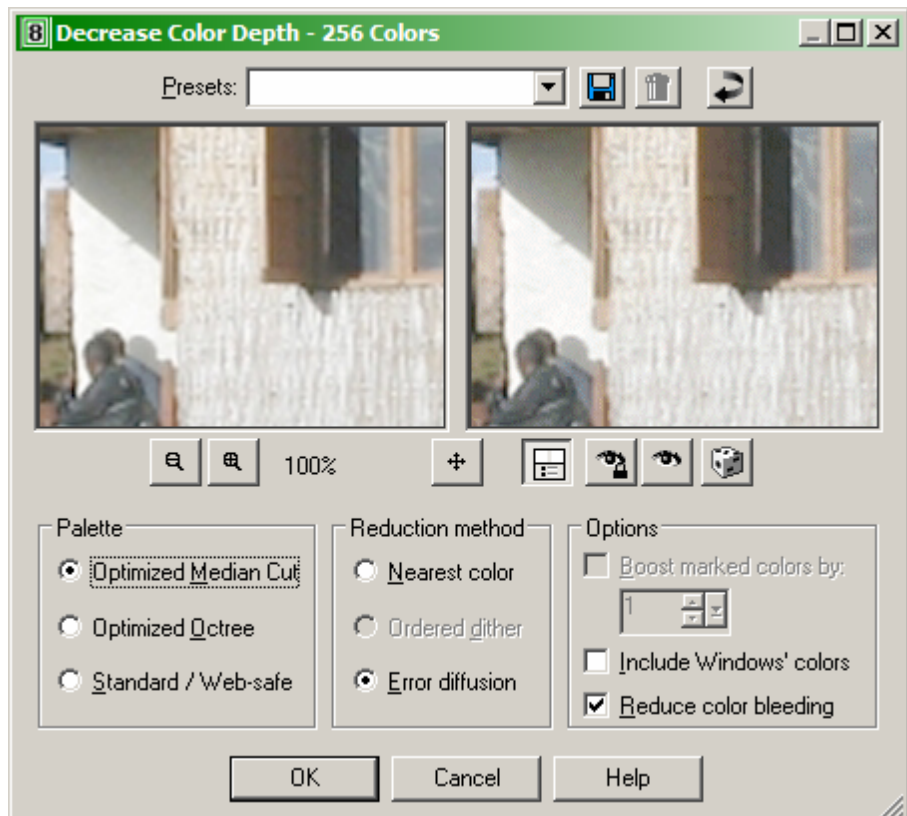
### 6.3.3 Colour depth (number of colours)

One way of significantly reducing file size can be to reduce the numbers of colours used. In this example we are going to drop the colour depth of the files from 16 million colours to just 256.

- 10 Create a new **duplicate** of the original file **durohut.jpg**.
- 11 Start the colour depth modification process:

#### Image | Decrease Colour Depth | 256 colours (8 bit)

A dialog box appears, asking you which method you want to use to reduce the colours depth:



- 12 In this case, choose **Optimized Median Cut**, but you might want to repeat this process using the other options and compare the results. Note that one of the options is to restrict the colours used in your file to the Web-safe palette (see section 3.3 for more details on this).
- 13 Press OK to apply this change. Compare the result with the original 16 million colour file – is the end result acceptable?

Note, to see the effect of reducing the colour depth on file size, you would need to save the file, preferably in a format that supports 256 colour palettes (e.g. GIF or PNG).

### 6.3.4 Making the background transparent

For this example, we will use a different file – **crest.gif** - a picture showing the University of Durham crest. This is because transparency effects don't work well on photographic images, they are best suited to diagrams and other vector-type artwork

- 14 Download the file **crest.gif** from the ITS website:

<http://www.dur.ac.uk/its/info/guides/files/graphics135>

Save a copy in the directory **graphics135** on your **J: drive**.

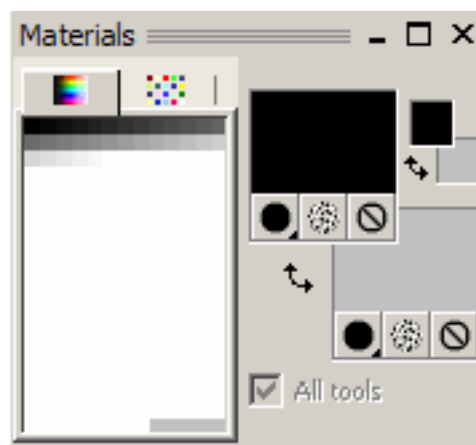
- 15 Open it in Paint Shop Pro.



- 16 Select the **Dropper** tool, and right click on the grey background of the image.

By clicking with the right mouse button, we have altered the default "background colour" in Paint Shop Pro to the grey of our image.

This change to the background colour is reflected in the colour of the right hand of the two coloured boxes in the **Materials** window



In the example shown here, the foreground colour is set to black, the background to grey. The palette shows the ranges of colours used (or available for use) in the current image. In your example the background colour should now be grey.

- 17 Now we need to select which colour we wish to become transparent:

**Image | Palette | Set Palette Transparency...**

- 18 In the box that opens, click on the option **Set the transparency value to the current background colour** (this is why we right-clicked on it above).

- 19 To see the effect, click on the **Proof** button

- 20 To apply these changes, press **OK**.

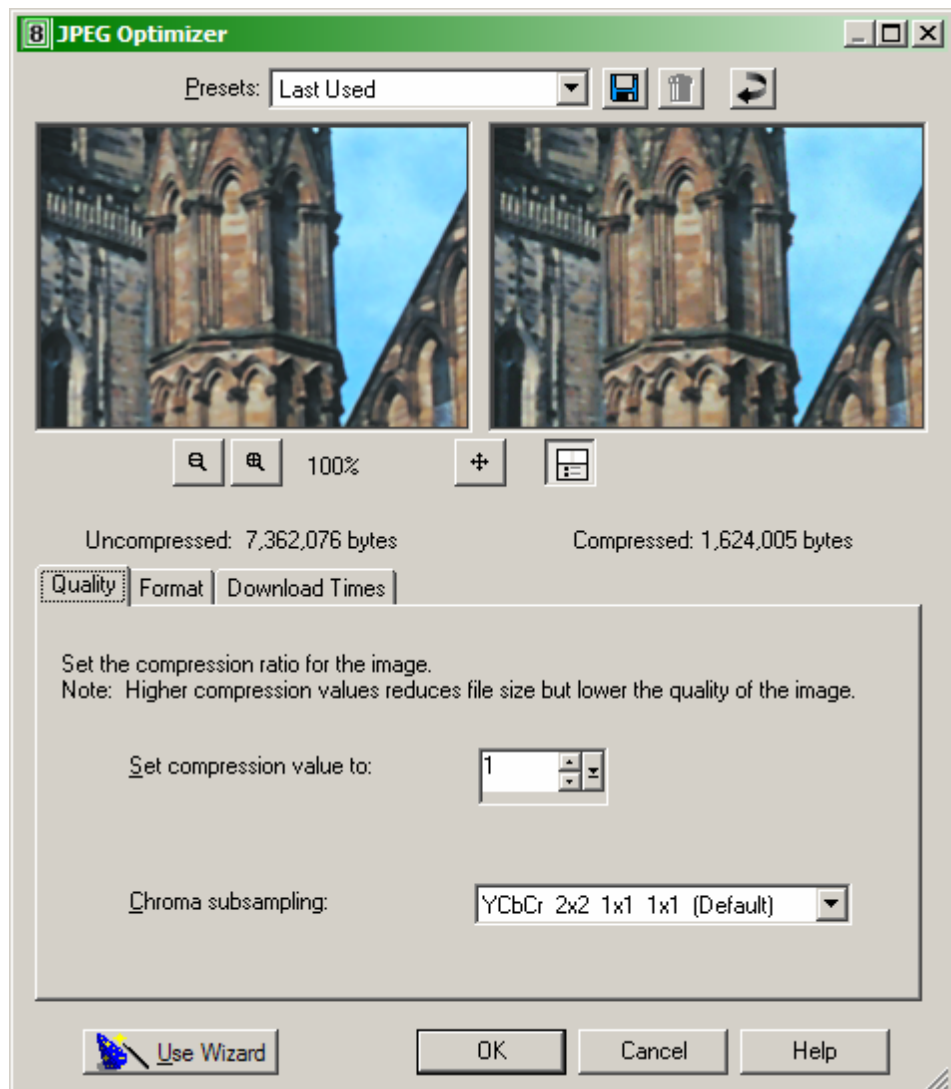
- 21 **Save** this file.

## 6.4 Converting file types with Paint Shop Pro

You have already seen options for converting files from one type to another in section 6.2 using the Export Wizard in Fireworks. We will now explore

the options in Paint Shop Pro, saving the huge Durham Cathedral TIFF file as a JPEG.

- 22 Open the file **dcathedral.tif**
- 23 Choose **File | Save As**
- 24 Type a filename (without the extension) e.g. **dcathedral4** in the box marked **File name:**
- 25 Immediately below this are the **Save as Type:** options. Click on the arrow and from the list, choose the format you want, e.g. JPEG.
- 26 You could simply press OK now, but for more control, press the **Options** button. This displays options relating to the specific file type you have chosen. To get help in selecting the right values, click the **Run Optimizer** button. This box should appear:



- 27 Adjust the **compression value** on the **Quality** page and see the effect on both the file size and image quality. (Values closer to 100 give a high quality image but large file size – experiment!) For an

idea of how quickly this file might download, click on the **Download Times** tab. When you find an acceptable value, click on the **OK** button to save the file in it's new format.

- 28 Open both files in Paint Shop Pro and compare their quality.

## 6.5 Task 2 - Working with text

In Fireworks MX, all text creation and most modifications take place in the Text Editor. After you create the text, a text object appears in your document. You can use the Text tool in two ways:

- Click on the canvas with the Text tool to set a starting point for your text
- Drag out a rectangle text region with the Text tool

To create the basic text graphic:

- 1 Open Fireworks MX and select **File | New** and set the **Canvas Size** to **400** by **400** pixels.
- 2 Choose **transparent** as a **Canvas Color** and click **OK**.
- 3 Click the **Text Tool** in the Tools Palette (it looks like the letter “A”).
- 4 Select **Arial Black**, font size **31** and a colour then type **University of Durham**.



## 6.6 Transforming text

You can add strokes, textured gradient fills to text as well as scale, skew or distort to warp the text. By default, Fireworks MX fills objects with solid colours but you can choose from preset patterns that diffuse the colour in a variety of ways. You need to experiment with the different effects to explore the possibilities. We will create a simple drop-shadow effect like the image below:

**University of Durham**

- 5 Select the **Palette tool** (the black arrow), leaving the text still highlighted. Look at the bottom of the screen in the **Properties** box. Click on the cross button to **Add an Effect**.
- 6 Choose **Shadow and Glow** from the menu and select **Drop shadow**.
- 7 A drop shadow is instantly added. To make changes, e.g. alter the colour, you can adjust the settings displayed in the panel now visible next to the **Add Effect button**.



## 6.7 Saving text as an image

You will save your file first as a png in case you want to work on it further in Fireworks MX and then also as a gif file for your web page. You will also trim the canvas to ensure that your file is as small as possible.

- 8 Select **File | Save** and give it the name **university.png**. Save this version (the raw Fireworks file) on your **j** drive.
- 9 Select **Modify | Canvas | Trim Canvas**.

- 10 Select **File | Export** and save as **university.gif**. This version could be used on the web (with a suitable Alt tag). Note that it has a transparent background.
- 11 **Save** your Fireworks file as **university.png** on your J drive then **Close** it.

## 6.8 Masking images with text

A mask group is two or more objects grouped together where the bottom object is visible only through the top object. The example you will create is shown below - here the text is the mask, obscuring the picture behind it.



- 12 Before you start this exercise, save the file **cathedral.jpg** from the website to your J drive, as before.
- 13 In Fireworks MX select **File | New** and set the **Canvas Size** to **500** by **250** pixels.
- 14 Choose **white** as a **Canvas Color** and click **OK**.
- 15 Click the **Text Tool** in the Tools Palette .
- 16 Type **UNIVERSITY** (Return) **OF DURHAM** in capital letters and highlight the text. In the **Properties Inspector**, select Arial Black, font size 70, bold, centred text and a colour of your choice.
- 17 If necessary, use the **Arrow Tool** to reposition your text in the centre of the window.
- 18 We are going to use this text as the mask, by cutting it (and so storing it in the Windows clipboard): Select **Edit | Cut**
- 19 Select **File | Open** and choose **cathedral.jpg**. When it appears on screen drag the picture of the cathedral onto the blank canvas of your first picture.
- 20 Click on **Modify | Mask | Paste as Mask**.

The image of the cathedral is now only visible through the text.

- 21 Select **Modify | Canvas | Trim Canvas**.
- 22 Select **File | Export** and save as **universitytext.gif**.
- 23 **Save** the Fireworks file if you want to, then **Close** it and the image file - cathedral.jpg.

## 7 Task 3 - Creating buttons in Fireworks MX

Buttons are a set of one or more images, which are quickly swapped to give the impression of movement (e.g. to make it look depressed when you click on it). The swapping of images is carried out using a **rollover** command. The button is linked to an action, e.g. opening a new web page or running an email program.

The Fireworks Button Editor leads you through the button creation process and results in a button Symbol that includes a 2, 3 or 4 state rollover. First you will draw a vector shape and then convert it into a button **symbol**. A symbol is an object that is stored in the Symbol Library and is useful if you want to reuse an object. Copies of a symbol are called **instances**. If you edit the underlying Symbol then these changes will automatically be made to every Instance – saving time and ensuring consistency.



You will then use the Button Editor to create additional button states for the rollover effects. In Fireworks, you can determine the object that will appear during a rollover for as many as four different button states. To make it clear which state is which, you will create a button rollover that swaps shapes when the pointer rolls over the button.

### 7.1 Create the basic vector shapes

- 1 In Fireworks MX select **File | New** and set the **Canvas Size** to **400** by **400** pixels and set the image **resolution** to **72** dpi.

- 2 Choose **White** as a **Canvas Color** and click **OK**.



- 3 Click the **Rectangle** button from the Tool Palette.

- 4 Drag on the canvas to draw the shape of a button, similar in size to the one shown above.



- 5 To change the fill colour for your shape click the **fill color** box in the Tools panel, click the down arrow next to the **color box** to open the **color box** pop-up window and choose a colour from the swatches.

Your shape will change to this colour.

- 6 To move your rectangle, click on it and drag.



- 7 To resize the rectangle proportionally, click and drag the rectangle at any corner. To lengthen or heighten the rectangle, click the **Scale tool** then click and drag the box along the edge of a side.

## 7.2 Using Effects to make your shape look like a button

Fireworks contains a lot of graphic **Effects**, procedures which allow you to alter text and graphics to quickly achieve professional results. This example uses one of the effects that comes with the standard Fireworks MX installation.



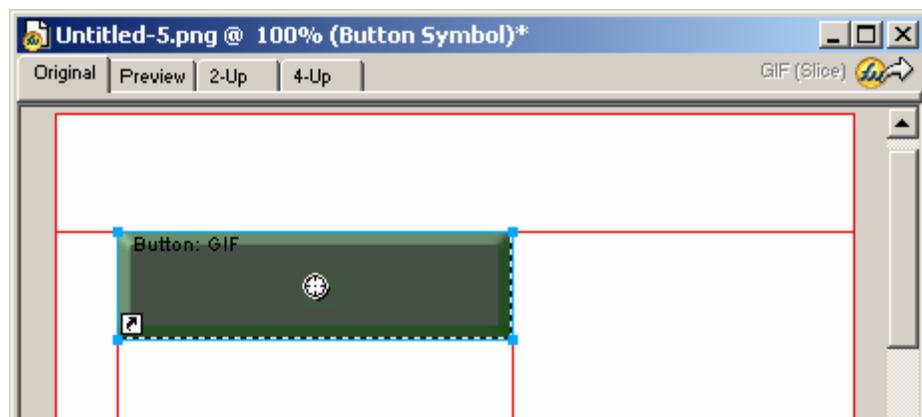
- 8 With your rectangle highlighted, click on the **Add Effect** button in the **Properties** panel at the bottom of the screen.
- 9 A pop-up menu appears – choose **Bevel and Emboss|Inner Bevel**. This makes the edges of your rectangle look rounded. Note that the changes are applied immediately.
- 10 Another dialog appears next to the button, allowing you fine control over the effect. Change the edge shape from **Flat** to **Smooth**, to **Sloped**. Choose the effect that you like best.  
  
Note : After you've added a Live Effect, if you wish to modify it later, click the Info button on the Effect panel.
- 11 You may want to change the width of the bevelled edge – probably set at the default value - **10** pixels. Try dropping it to **6** or **7** pixels.

## 7.3 Creating the button

The next step is to turn your vector shape, the rectangle into a button by adding it to the library as a button symbol.

- 12 Select the rectangle, right click and select **Convert to Symbol**.
- 13 In the Symbol Properties dialog box, name the symbol **links**.
- 14 Select **Button** as the type, and click **OK**.

Note how the vector shape has changed. The button has an overlay, indicating it's a slice, which won't appear in the exported file. A slice is part of an image file and each slice can be edited individually. The small arrow in the lower left corner of the button indicates the object is an instance of the Navigation symbol that appears in the Library.



- 15 To see the button symbol in the Library, choose **Window |Library**.

## 7.4 Adding text to your button (or any other image)

You add text to the button by first opening the button in the Button Editor and then opening the Text Editor.



- 16 Select the Pointer tool, then double-click on your new button in the middle of the Fireworks MX window. In Fireworks parlance, you are now editing an instance of the symbol called **links**. Changes you make to a single instance don't affect anything else, but changes you make to the master symbol affect all instances.

The Button Editor appears. The tabs along the top of the screen show how the button will look in each different state – normal (Up), depressed (Down), etc. The web browser swaps images to create the desired effect.



- 17 In the Tools panel, select the **Text** tool and click the left side of the button in the Button Editor.
- 18 In the Text Editor, choose **Arial** as the font, **20-point** as the font size, and **Center Alignment**. (Make sure bold and italics, are **not** selected)
- 19 You can select a colour using the font colour box. Note that you make the changes before you start to add text.
- 20 Make sure that **Smooth Anti-Alias** is selected in the Anti-aliasing level field and **Auto Kern** is selected.

Anti-Aliasing smooths the edges of bitmap text. Kerning adjusts the spacing between certain letter combinations (e.g. "A" and "V" to improve the way the letters look next to each other.

- 21 In the text entry field, type some text, e.g. the name of your **Department** and click **OK**.

## 7.5 Align the text

To align the text within the button, you use menu commands.

- 22 The text box should still be selected so hold down the **Shift** key to add the button to the set of items selected.

(If the text box is not selected then select it by clicking on the Pointer and then clicking on the text box)

- 23 Select **Modify | Align | Center Vertical**.
- 24 Select **Modify |Align | Center Horizontal**.

This should centre the text in the button. The use of the align command can help produce professional looking layout.

- 25 You can make further changes to the size, colour or font of the text, using the controls in the Properties box. Experiment until you are happy with the result.

## 7.6 Creating a rollover

You have designed the way the button appears during its Up state, when the user's pointer has not touched the button. Now you'll use the Button Editor to design the button's *Over* state — the way the button appears when the pointer is over it. You will use the **Copy Up Graphic** feature to save you from having to create another similar button.

- 26 Click the **Over** tab in the Button Editor, and then click **Copy Up Graphic** on the lower right side of the window.
- 27 With the Pointer tool, click the text on the button. In the Fill panel of the toolbox, use the color box to select a different colour.
- 28 Repeat this process to apply a different background to the button whilst it is pressed *Down*.
- 29 Close the Button Editor by pressing the **Done** button.

## 7.7 Preview your button



- 30 In the Tools panel, click the **Hide Slices** icon at the bottom of the panel under View to hide the green overlay.
- 31 Click the **Preview** tab at the top of the window and move your pointer over the button and press it once to view the rollover effects.

## 7.8 Creating more buttons

You will now take advantage of having created your button as a symbol, by rapidly adding two more rollover buttons.



You will drag two instances of your button symbol from the Library to the canvas and then modify the text without affecting the original symbol.

- 32 To exit **Preview**, click the **Original** tab.
- 33 If the Library panel is not open, choose **Window | Library**. In the Library panel, select your button and drag it onto the canvas, placing it below the first button you have just made.

- 34 Drag another instance of the same button and place it next to the second button. If a series of new red guides appear, just move the button until it aligns with the others.
- 35 Click once to select the second button instance. In the Properties box at the foot of the screen, alter the text in the **Button Text** field. For example replace it with the word **Research** and then press **Enter**.
- 36 Repeat the last 2 steps with the final button, this time changing the text to **Home**.
- 37 Use the **Preview** tab to view your rollover buttons. When you finish, return to the **Original** tab.

## 7.9 Aligning and trimming

Your buttons are probably not positioned exactly as you would like them. Fireworks provides features to automatically align the buttons and trim the canvas. This helps ensure that the file is as small as possible.

- 38 To align your buttons, click on the **Original** tab and select them all and then choose **Modify | Align | Center Vertical**, and then **Modify | Align | Distribute Heights**
- 39 To trim your buttons, select them all and then choose **Modify | Canvas | Trim Canvas**.

## 7.10 Assigning URLs

Buttons generally provide a method of navigation. To specify the links for each of your buttons, you use the Link Wizard.

- 40 On the canvas, select the top button
- 41 In the **Link** field of the **Properties** box, type your department's URL in the top pop-up menu, e.g. **http://www.durham.ac.uk/its** and next to **<alt>** type something appropriate, e.g. **Jump to the IT Service homepage**, then click **OK**.
- 42 Repeat this process, assigning appropriate links and Alt tags to the other two buttons.

You can test the links later after you have exported the buttons.

## 7.11 Saving your buttons

- 43 Click **File | Save** to open the Save As dialog box and save your button in Fireworks PNG format in **j:\graphics135**
- 44 Type the filename **links** for the buttons and click **Save**.

Note that this saves the file in a version of PNG modified by Macromedia. This format does not display well on the web – for this we need to export the files.

## 7.12 Exporting

You are going to export the file so that you can use the graphics and links in Dreamweaver MX.

45 Select **File | Export** and use the filename **links.htm**.

46 Change the directory to **j:\public\_html**

We are saving this to the <b>public_html</b> directory of your <b>J drive</b> , so that we can view the effect over the web.
--

47 Leave **Save as type:** set to **HTML and Images**.

48 Next to **Slices** make sure **Export Slices** is selected.

49 Tick **Put Images in Subfolder**.

50 Remove any tick from **Include Areas without Slices**

Fireworks MX will create an **images** subfolder within your **public\_html** directory (if it doesn't already exist) that will contain all your images.

51 Click **Options** and make sure that **Dreamweaver** appears in the **HTML Style** pop-up menu and then click **OK**.

52 In the Export dialog box, click **Save**.

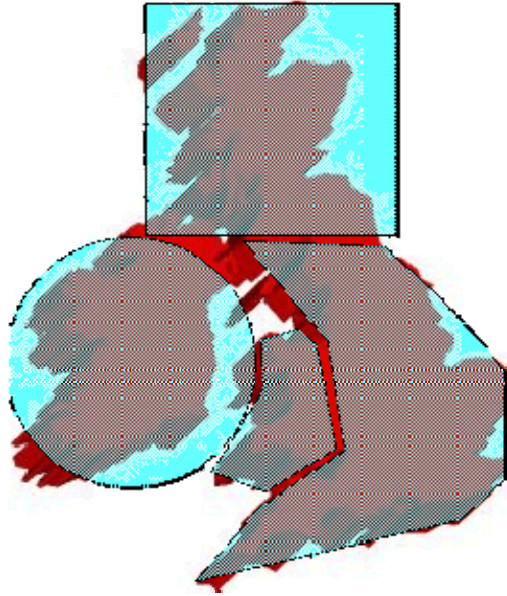
53 Open the file **links.htm** in your web browser to test the links.

The buttons will appear in the page with their links and button states.

If you want to edit the item later, you can do this in Fireworks MX or Dreamweaver MX. A search of the online help for these programs (look under **Creating Buttons and Pop-Up Menus**) will reveal more details plus further instructions for creating **dynamic cascading menus**.

## 8 Task 4 - Creating image maps

An image map is an image which has been divided into regions or 'hotspots'; when the 'hotspot' is clicked you are taken to a new web page. You can create image maps in both Fireworks MX and Dreamweaver MX. This example uses a map of the British Isles and creates a link to the four national Tourist Boards.



- 1 Copy the image **uk.jpg** using the text link on the page  
<http://www.dur.ac.uk/its/info/guides/files/graphics135>  
to **j:\public\_html** or **j:\public\_html\images** - this file will be viewed over the web.
- 2 Run **Dreamweaver MX** by choosing  
**Start | Programs | Web Tools | Macromedia MX | Dreamweaver MX**  

If you have not used Dreamweaver MX before you may need assistance when setting up your site. If so, please seek help from one of the staff teaching this course.
- 3 Click the **Insert Image** button from the **Object Palette** and select **uk.jpg**.
- 4 Click the expander arrow in the bottom right hand corner of the **Property Inspector** to see the **Map** button.
- 5 In the **Map Name** field type  
**UK**

- 6 Click on the square tool and click at the top left hand side of Scotland, and drag across **Scotland**. In the **Link** field type

**<http://www.visitscotland.com/>**

and in the **Alt** field type

**Scotland**

- 7 Select the circle tool and click in the centre of Ireland, and drag the circumference out until it covers Ireland. In the **Link** field type

**<http://www.ireland.travel.ie/home/>**

and in the **Alt** field type

**Ireland**

- 8 Repeat for England and Wales (you might want to try the Polygon tool):

**<http://www.travelengland.org.uk/>**

**<http://www.visitwales.com/>**

To define an irregular shape select the polygon tool and click once for each corner point and twice to close the shape.



- 9 Click **OK** and test your image map in a Browser by clicking on the **Web Preview** button.
- 10 Save your file in the folder **j:\public\_html** as **touristmap.htm**

## 9 Animations

Two animation examples are considered. The first manipulates graphics added to layers in a web page to give the illusion of movement. This task uses Dreamweaver. The second task creates an Animated GIF which you can add to a web page just like a normal image. The animation is built using a collection of screen grabs from an Excel file. It uses two programs – Paint Shop Pro to create and trim the screen grabs and Animation Shop to assemble the final animated GIF.

### 9.1 Task 5 - Using Dreamweaver MX to create a timeline animation

You can create animations in Dreamweaver by positioning layers on your web page at different points in a timeline. The moving layers create the effect of an animation when viewed in a web browser. Layers are supported by **version 4.0** or above of both **Microsoft Internet Explorer** and **Netscape Navigator**.

First you will create the layers with the graphics in and then use the timeline to control the movement.

#### 9.1.1 Creating layers

Layers are used to position elements at exact locations in the browser window. They can contain text, images, plugins, and even other layers — anything you can put in the body of an HTML document you can also put in a layer. Layers are especially useful for making parts of your page overlap. You can show and hide layers with ‘behaviors’ and you can make layers move or change over time with the Timeline.

We will use two images of a duck – in different formats: **duck.png** and **duck.gif**. These images have transparent backgrounds. Copy the files from:

<http://www.dur.ac.uk/its/info/guides/files/graphics135>

to:

**j:/public\_html/images**

- 1 If it is not already open, start **Dreamweaver MX**

**Start | Programs | Web Tools | Macromedia MX | Dreamweaver MX**

If you have not used Dreamweaver MX before you may need assistance when setting up your site. If so, please seek help from one of the staff teaching this course.
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- 2 Open a new page (**File | New**), making sure it is in Design View.
- 3 Click the **Draw Layer** button on the Object palette. (If you can't see this click on **Window | Objects**). Draw a rectangle on the screen (it's exact size doesn't matter just now).



- 4 With the layer still selected, insert an image into the layer - Click the **Insert Image** button from the **Object Palette**, and select **duck.gif** as the **Src** field.

- 5 To change the size and shape of the layer, first click anywhere on the thin black rectangle marking its edge. Black rectangular markers appear, drag these to alter its size. Try and make the layer a reasonably close fit to the image.



- 6 To move the layer click the layer's selection handle in the top left and drag it. (If the handle is not visible, click anywhere inside the layer to make it visible.) Check that the duck image moves with the layer.

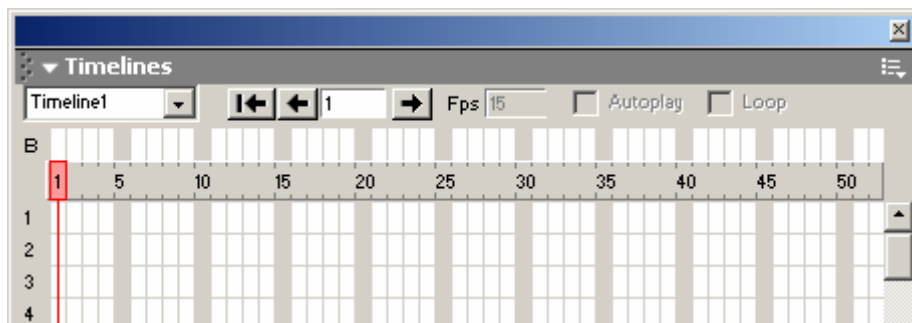
- 7 **Save** the page as **ducks.htm** in the directory **j:\public\_html**.

### 9.1.2 To create a simple timeline animation



- 8 Select **Window | Timelines** on the Menu bar.

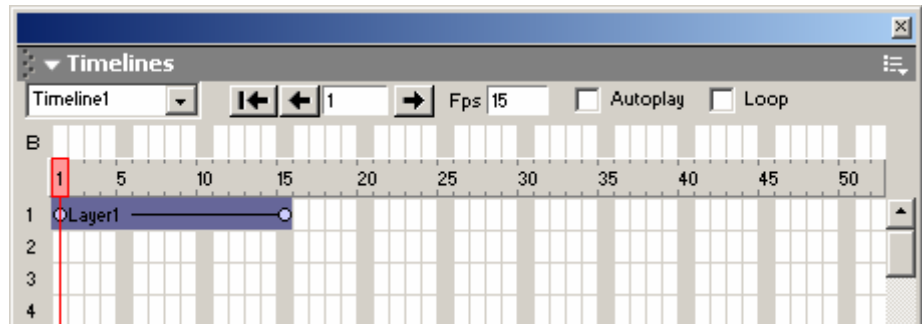
The following window appears:



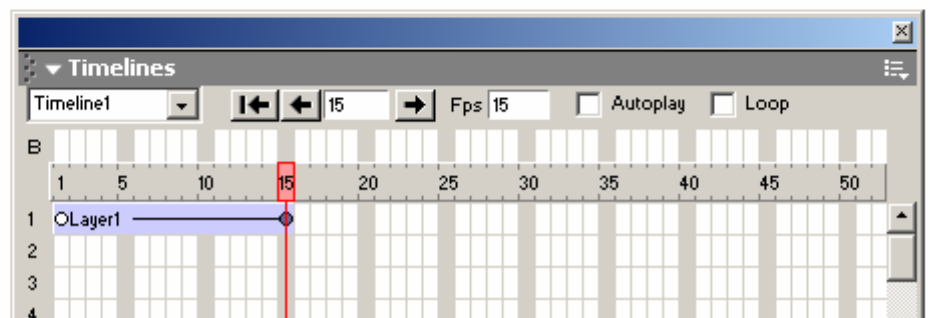
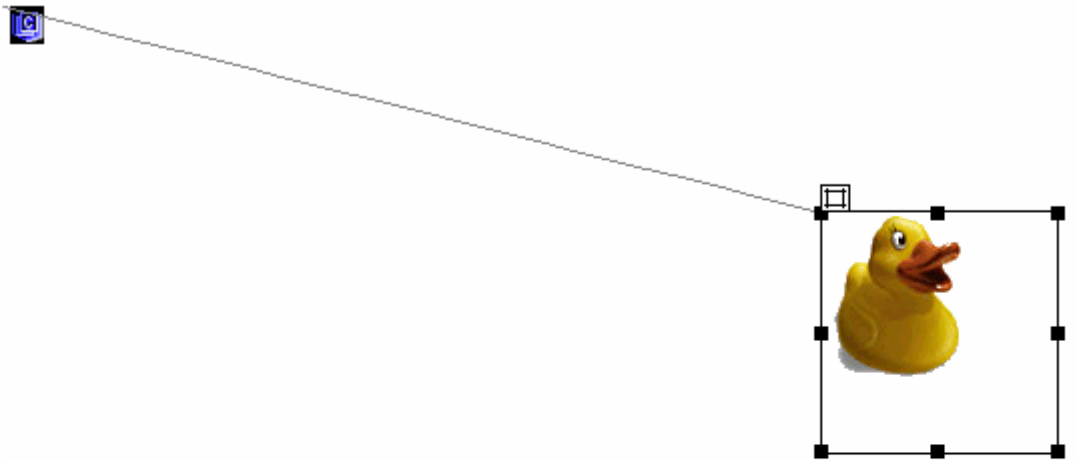
This should be familiar to users of Flash MX. The animation in the web page is split into a series of steps – called **frames**. These are represented by the columns of boxes. The rows represent different layers. Dreamweaver MX can only display the position of items one frame at a time. The red square and vertical line (the **playhead**) shows which frame we are currently viewing – frame **1**. To move back and forth we can use the rewind and play buttons.

- 9 Click the layer marker to select the layer containing the image **duck.gif**. Make sure you have selected the layer, not just the image. Handles should appear around the layer when it is selected.
- 10 Select **Modify | Timeline** then **Add Object to Timeline**.

An information dialog may appear warning you which elements it can and cannot animate. Read it, then press **OK**. A bar appears in the timeline representing our layer:



- 11 Click the circular **keyframe** marker at the end of the bar (frame 15 in the diagram above). Keyframes are used to mark start and endpoints of animation. At the moment the duck graphic is in the same place in both keyframes, so it does not move. By clicking on the final keyframe, we can alter the position of the graphic in the last frame. Dreamweaver will create the animation for the other frames automatically.
- 12 Move the layer on the page to where you want it to be at the end of the animation. You can move it by dragging the mouse, or with the arrow keys.





- 13 Click and hold down the **Play** button to preview the animation.
- 14 Tick the Autoplay box so that the animation starts when the page is loaded.

### 9.1.3 To animate an image along a twisting route



- 15 Ensure that the playhead is sitting at frame 1. If not, press the rewind key or type **1** into the frame number box.
- 16 Use the **Draw Layer** button on the Object palette to create a second layer down and to the right hand side of the page. Make sure it doesn't overlap the first.



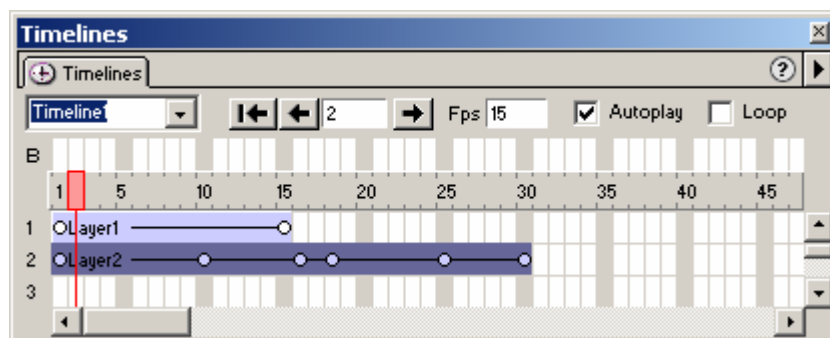
- 17 Insert the second image into the layer - Click the **Insert Image** button from the **Object Palette**. This time, choose the PNG image - select **duck.png** as the **Src** field.

- 18 Resize the layer if you want.

Rather than add the object to the timeline, then animate it as before, this time we are going to set the animation and it to the timeline all at once.

- 19 Right click on the second duck and choose the option **Record Path**.
- 20 Briefly drag the layer containing the second duck around the page to create the path and release the mouse button where it should stop. The animation's position is marked as a trail of grey dots.

A second line is added to the timeframe. It may be a different length, depending how long you spent dragging the graphic. You might want to try altering this afterwards.



- 21 To see the animation, click the **Rewind** button, then click and hold down the **Play** button.
- 22 **Save** the page again and test the timeline in a web browser.

### 9.1.4 Experimentation

You can create much more complicated animations than the example here. Try editing points in the timeframe to change the animation – e.g. synchronise when the two images stop. You could also play with the loop

option. More help is available – look up timelines in the index of the Dreamweaver MX help pages.

Try opening the web page in a few different browsers. Does it always look the same? Do all browsers support the transparent background in the original PNG (duck faces left) and GIF (duck facing right) images?

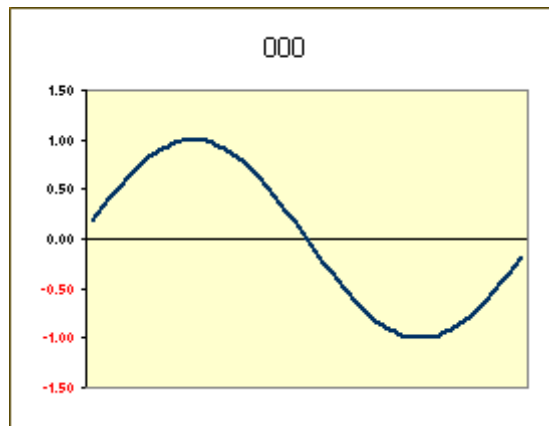
#### **9.1.5 Reflection**

From a pedagogical perspective do you think the animation helps to make a point, would it serve to maintain or re-engage a viewer's interest, or just distract them?

## 9.2 Task 6 - Using Paint Shop Pro and Animation Shop to work with screen grabs

Sometimes you might want to animate a series of images generated from model runs, maps or graphs from different years to show changing trends. This requires you to first capture your images, then create the animation.

This example shows you how to generate an animated GIF from an Excel chart. The first frame of the animation looks like this:



The animation shows a moving sine wave, similar to the display you might get on an oscilloscope. The graph is first generated in Excel, then the screen image copied to the clipboard (a screen grab) and pasted into Paint Shop Pro. Paint Shop Pro is used to trim away unnecessary parts of the Excel window from the screen shot and convert the image into GIF format. A series of images are created in this manner, by incrementally changing the data in the Excel worksheet. The ability of Paint Shop Pro to save a selection area to disk, allows you to capture exactly the same part of the Excel window (i.e. just the graph) each time. The images are finally combined in Animation Shop to create the animated GIF.

### 9.2.1 The Excel worksheet

If you have not already done so, create a new directory (folder) in the root of your **J:** drive called **graphics135**. Use this to store all the materials you use in this section.

- 1 The graph is created in an Excel worksheet (**sinewave.xls**), which you can download from:  
<http://www.dur.ac.uk/its/info/guides/files/graphics135>
- 2 Do **not** open this file in your browser – save this file in your directory **j:\graphics135**.
- 3 Then, run **Excel** and open this file from your **J drive**.

The worksheet contains a **SpinButton** - a pair of arrows which change the value of a variable in discrete steps. On this worksheet the SpinButton allows you to change the start point of the graph, by altering the data in the underlying table. Experiment with it now.



*It is not important for this course that you understand exactly what the graph shows, or indeed how the Excel sheet works – it is just an easy method for generating a series of slightly different images.*

### 9.2.2 Generating a screen grab

- Using the SpinButton, set the initial value of the Excel graph back to **000**. This alters the graph so that the first (left hand most) value is equivalent to  $\sin(000^\circ)$ . This will be the start point of the animation
- Making sure that the entire graph is displayed on screen, and that your mouse isn't hovering over the graph (which would mean part of it is masked by a ToolTip). Press **Alt/Prt Sc** to copy the whole of the screen to the Clipboard.

### 9.2.3 Trimming the file in Paint Shop Pro



- Open the program Paint Shop Pro
- Notice that the **Paste** button is coloured, indicating that there is something stored in the Windows clipboard. Press this button (or go to the **Edit** menu and choose **Paste**) to display the screen grab you have just made.
- Use the magnifying glass icon - the **Zoom tool** – to zoom into the graph. Position the magnifying glass over the centre of the graph and click the left mouse button. Repeat as necessary until the graph fills about a quarter of your screen. Right clicking the mouse with this tool selected zooms you back out.



#### Note:

In the latest version of Paint Shop Pro the Magnifying Glass Tool button is often not displayed by default, instead you see the Pan Tool – a simple arrow. Click the black down arrow next to the Pan Tool icon to select the magnifying glass icon. There is another tool – the Dodge Brush – that looks a bit like a magnifying glass – it has a very different function!



- Change to the rectangular **Selection tool**. This allows you to draw a rectangle over your existing image, which we will use to mark out the portion we want to keep.

Starting in one corner of the Excel graph, click and hold the left mouse button, dragging the cursor over the screen creates a rectangle. When you reach the other corner, let go the mouse button. Selecting just the portion you want can take some experimentation and patience!

Normally at this stage you would now trim the image using the command Crop to Selection. As we want to repeat this operation on several more images (different Excel graphs) it makes sense to save the position of the rectangle you have just created, rather than trying to recreate it each time.

This also has the added bonus of ensuring that all your images are the same size, and that the graph is positioned in exactly the same place each time.

- 10 To save the rectangular selection, go to the **Selections** menu and choose the option **Load/Save Selection** and then **Save Selection to Disk...** - give the selection a suitable name such as **graph** - it will be saved in Paint Shop Pro's default selection folder.
- 11 Now trim your image by going to the **Image** menu and selecting **Crop to Selection**. If you get a strange coloured border around your image, you need to set the background colour to white and ensure that the feathering value in the options toolbox is set to zero.



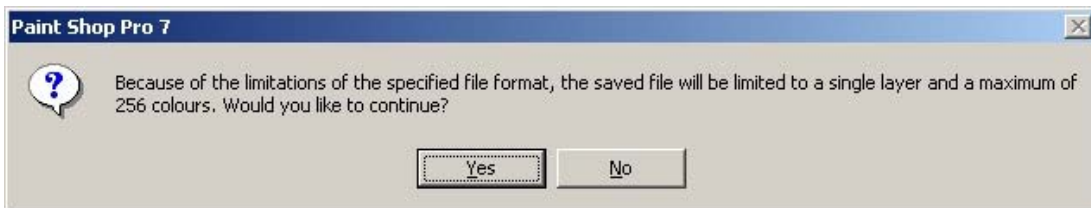
- 12 All that is left is to save your image. Go to the **File** menu and choose **Save**, or just press the Save icon.

As this is the first time we are saving this image, Paint Shop Pro offers us a choice of formats, including its own .PSP format. This graphic is to be part of our animated GIF, so we must choose .GIF. Paint Shop Pro uses the full name for this: **CompuServe Graphics Interchange (.GIF)** format.

Specify a suitable filename, such as

**graph000.gif**

When you press **Save** you will be greeted by a warning message



The screen grab uses as many colours as the current display settings of your monitor. As we discussed earlier, GIFs only support 256 colours, so the colour depth has to be reduced. Click on **Yes** and Paint Shop Pro will do this for you automatically.

*Note that it is also possible to do this yourself from the Colours menu, which affords you greater control over the reduction process.*

You have now saved your first frame of the animation. We will repeat this process one more time, to demonstrate the use of stored selections.

- 13 Return to the Excel worksheet (e.g. by pressing **Alt/Tab**).
- 14 Use the SpinButton to set the starting value of the graph to **010°**. Be careful not to move around the page – don't use the scroll bars.
- 15 Screen grab this image using **Alt/Prt Sc**.

- 16 Return to Paint Shop Pro (by pressing **Alt/Tab**) and **Paste** this new image into the working area.

Whereas before we had to use the Selection tool to delimit the graph, this time we can load the previous version:

- 17 Go to the **Selections** menu and choose **Load/Save Selection** and the **Load Selection from Disk...**

In the dialog box that opens, use the drop-down selector in the top left corner of the window to choose your previous selection **graph**. Click on **Load**. A dotted rectangle should now appear around your graph, just as before.

- 18 Trim your image by going to the **Image** menu and selecting **Crop to Selection**.

- 19 Save your image in GIF format, this time calling it **graph010.gif**.

You now have two frames for your animation. To generate the rest, you would just repeat this process a further 34 times. Happily you don't need to do this. A full set of images is available on our intranet at:

<http://www.dur.ac.uk/its/info/guides/files/graphics135>

- 20 Create a new subdirectory called **frames** in **j:\graphics135** i.e. **J:\graphics135\frames**
- 21 Save the self-extracting zip file **graphics.exe** into your new frames directory
- 22 Using **Windows Explorer**, double-click on the file, to automatically extract the 36 files. Once complete, you can delete the file **graphics.exe**.
- 23 You can now safely close Excel. Note that you do not need to save any changes if asked. You can also delete your versions of the files **graph000.gif** and **graph010.gif** which were saved earlier in the directory **j:\graphics135**.

#### 9.2.4 Constructing the animated GIF using Animation shop

Animation Shop is the program which we are going to use to assemble the individual files into an animated GIF. It can be started from within Paint Shop Pro:

From the **File** menu choose **Jasc Software Products** and then select the item **Launch Animation Shop**.

Or, directly from the Start menu:

**Start|Programs|Graphics|Paint Shop Pro 8|Animation Shop 3.04**

- 1 This time, use the second method.

Animation Shop allows you great control over the assembly process. For ease in this example, we are going to simplify the process using a Wizard. Often, as in this case, the final product is perfectly acceptable.



- 2 Start the Wizard by clicking on the **Animation Wizard** icon, or going to the **File** menu and choosing **Animation Wizard**.

The Wizard now asks you a series of questions, using your answers to inform its design of the final animated GIF.

- 3 **Step 1** asks you whether you want to specify a size for the animation, or base it on the first image. As all our images are the same size it makes sense to base it on the first image. So ensure the radio button is clicked beside **Same size as the first image frame** then click **Next>**.
- 4 **Step 2** sets the colour of the background for the animation. The choice is between transparent and opaque. In this case we will choose **Opaque** so that the animation looks the same on any web page. This helps ensure it is legible.
- 5 **Step 3** asks questions to determine how Animation Shop should handle images of different sizes. As all our images are the same, we can ignore this question and proceed to the next stage.
- 6 **Step 4** sets features of the display. Animated GIFs can be set to **loop** – play indefinitely, or just play a set number of times then stop. You can also control the time (in 1/100ths of a second) each frame is displayed onscreen.

Choose **Yes** to the first question to create a looping animation, and select a frame rate of **10**.

- 7 **Step 5** displays a dialog which allows you to pick the files to be included in the animation. Pressing the **Add Image...** button opens up a standard file dialog.

Navigate to the directory **J:\graphics\frames** and select all the files from **image000** to **image350** by left clicking once on the file **image000** and then scrolling along until you can see the last frame - **image350**. Pressing and hold down the **Shift** key and then clicking on **image350**. This shift and click method allows you to select multiple files at once.

The filenames appear in the window on the right hand side. The order of the filenames is important, as they will be added one at a time as frames in the animation, starting at the top of the list. Some of the files may need to be re-ordered. To do this click once to select the filename and then use the **Move Up** and **Move Down** buttons. Note that this is a rolling list - items which are moved off the top of the list appear at the very bottom, and vice-versa.

Once you are happy with the list, press the **Next >** button which will take you to a screen with a **Finish** button. Pressing this closes the Wizard and takes you back to the main work area.

Your animation is now displayed as a series of frames. You could edit it further here, e.g. to rearrange the order of the frames, but we don't need to.

- 8 To preview your animation, go to the **View** menu and choose **Animation**. You should see a moving Sine wave. Note that the animation seems to carry on forever, this is because we selected the looping option in Step 4 above.

The final step is to save it.

- 9 Go to the **File** menu and choose **Save**.
- 10 First give the animation a name, e.g. **sinewave.gif**. Put it in any directory you want.
- 11 You have a last set of options, to set the resolution (and thus file size and loading speed) of the animation. File size is a trade off between loading speed and image quality. For the moment choose the highest quality and press **Next >**.
- 12 A preview window opens, showing on the left the original (full quality) animation and, to the right, the version to be saved using the settings you select. This display works best for small animations, for a relatively large image such as this one the differences in the two preview window aren't particularly clear.
- 13 Clicking **Next >** again provides you with a table of file sizes and estimated download times. If you don't like the results, you can use the **< Back** button to alter the settings. For just now, choose **Finish**. You have completed your first animation.

### 9.2.5 Viewing your animated GIF

If you look at an animated GIF in a directory view, or load it into most graphics programs, you will only see the first frame. To see it move, the easiest thing is to open it in a web browser. Run **Netscape**, **Internet Explorer** or **Mozilla** and open your file **sinewave.gif**. Now you can see it move. If you want to insert it into a web page using programs such as **Dreamweaver MX**, just insert it as you would a normal GIF or JPEG. You will only see the first frame displayed in Dreamweaver MX, but as before, the web browser will automatically recognise that your web page contains animations.

### 9.2.6 Experimentation

You may like to experiment with these files – consider building your animation using only every second file, e.g. **image000**, **image020**, **image040**, etc. How does this affect the file size and the smoothness of playback? You could also try reversing the order of the images, decreasing the size of the

animation, or dropping the quality settings as you save the file in Animation Shop.

You could also try creating this Animated GIF using other software, e.g. Fireworks, to compare ease of use.

### 9.2.7 Reflection

Look at the final animated GIF. Do you think this animation improves learning, or does it only distract the viewer – is it mere Window-dressing? Does the moving image convey a greater understanding than a series of four or five still frames? Do you think there is sufficient information within the image? Does it need more explanation next to it? Would it be better if the student could interact with it more, e.g. be able to halt frames, or move back and forwards? (If so, then you need to think about creating a Flash animation, or saving the animated GIF as an AVI video file). Or perhaps the original Excel spreadsheet is sufficient? These are the sort of questions you should be asking yourself when creating web graphics for your own teaching.

## 10 Further information

The Technical Advisory Service for Images (TASI) has a wealth of detail about digital images, colour models, etc.

<http://www.tasi.ac.uk/advice/creating/image.html>

An interactive Flash animation which demonstrates different colour models can be found at:

<http://www.designpedagogy.com/samples.html>

Macromedia support a series of websites for users of their products. Two worth visiting are :

The Fireworks Online Forum

[http://www.macromedia.com/support/fireworks/ts/documents/fwnews\\_group.htm](http://www.macromedia.com/support/fireworks/ts/documents/fwnews_group.htm)

and the Macromedia Exchange:

<http://www.macromedia.com/exchange/>

The Jasc Software Learning Center contains a link to lots of pages detailing mostly bitmap graphics. These go far beyond mere tutorials advertising their own products. It would be worth a visit to their Web Design Center.

<http://www.jasc.com/learncenter.asp?>

Research-based web design and usability guidelines (often with links to the underlying research) can be found from the US National Cancer Institute website

<http://www.usability.gov/guidelines/>

More accessibility materials can be obtained from the JISC-funded TechDis service:

<http://www.techdis.ac.uk/>

You can see simulations of how your site might appear to a colour-blind user at:

<http://www.vischeck.com/>

Examples of animated GIFs, ably demonstrating how using too many can destroy your site can be found at:

<http://www.geotech.com/webangif.htm>

More details about SVG format can be found from the definitive W3C site:

<http://www.w3.org/TR/SVG/>

Up to date reviews of graphics packages and web design tips can be found at the Designer Info website:

<http://www.designer-info.com/web.htm>