DGM901 COMPUTING SCIENCE: DIGITAL MEDIA
PAINT/GIMP PRACTICAL

USING PAINT, PAINT.NET AND PHOTOSHOP TO WORK WITH IMAGES.

First a little information about some programs for image manipulation:

PAINT (Start: All Programs: Accessories: Paint) is a very simple application bundled with Windows XP. It has few facilities, but is still usable for one or two things.

PAINT.NET: There is a much more sophisticated version called PAINT.net, which is free, and is available from http://www.getpaint.net/ if you want it for your own machine.

GIMP is a general-purpose image manipulation package that runs on a wide variety of computers. GIMP stands for GNU Image Manipulation Program (and Gnu stands for GNU is Not Unix: for further details see http://www.gnu.org/home.shtml). GIMP is perhaps not the easiest piece of software to learn: there are simpler tools for generating digital images. GIMP is free, and is available on the net (note: install a stable version!)

PHOTOSHOP (Start → Programs → Adobe Design Premium CS5 → Adobe Photoshop CS5) is probably the favourite image manipulation package: it's not free, and is marketed by Adobe. It is the software of choice, for this area: but it actually offers very few facilities not available in GIMP (and, in deed, Paint.net will often provide all that you actually need!)

(Note for printed version only: this is in black & white. The version on WEBCT is in colour.)

How to use this lab session:

If you have never used any image manipulation tools (or only iPhoto or Picasa), I suggest you look briefly at Paint, then take a little longer over Paint.net, then look at Photoshop.

If you are familiar with the use of simple image manipulation tools like Paint and paint.net, then jump straight to Photoshop. But if you find it hard going, go back and look at Paint.net.

If you spend your time using GIMP or Photoshop already, and are actually an electronic artist exhibiting in galleries, then use GIMP or Photoshop and write me an advanced lab sheet.
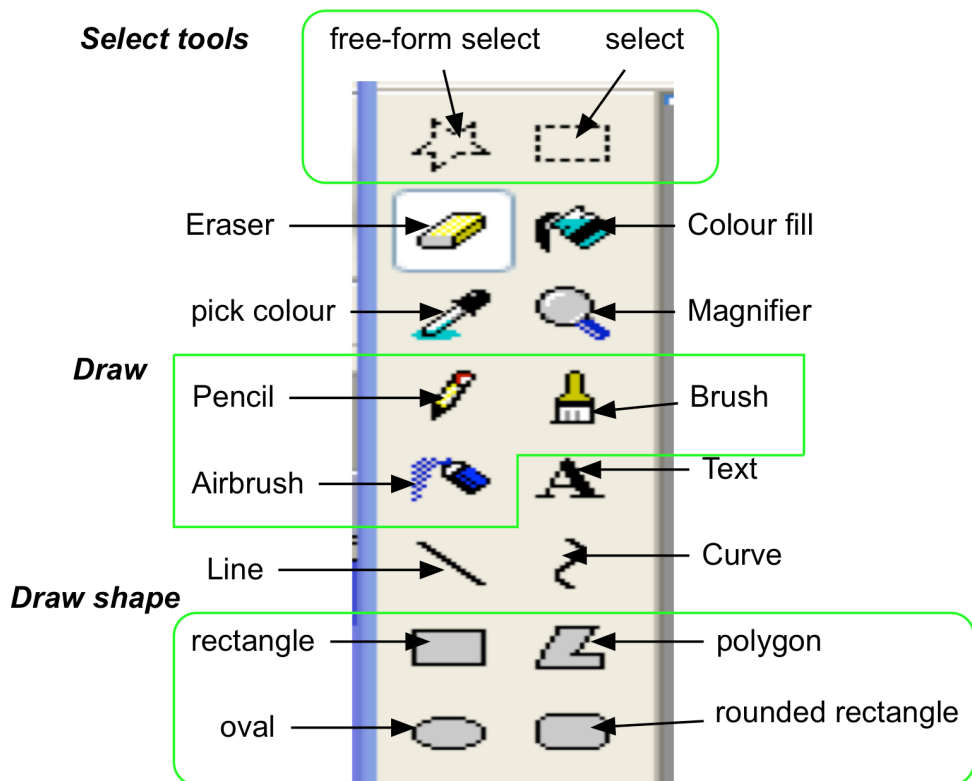
If you are somewhere between the last two, then try out Photoshop and perhaps GIMP as well.

There is a separate lab sheet about GIMP (which is optional; but could be useful if you want to do image manipulation on your own machine and can't afford PhotoShop!).

PAINT

The simplest tool is Paint If you have never actually used this program, it might be an idea to try it first. (Even if you have, it's probably useful to use it again just to refresh your memory – and this will take about 5 minutes if you are used to Paint.)

The Toolbox in paint

Select tools free-form select   select

Eraser ——— ——— Colour fill

pick colour ——— ——— Magnifier

Draw

Pencil ——— ——— Brush

Airbrush ——— ——— Text

Line ——— ——— Curve

Draw shape

rectangle ——— ——— polygon

oval ——— ——— rounded rectangle

Paint allows the user to
- Select areas of the image (and these may be rectangular or free-form areas)
- To draw or erase on the image
- To draw particular shapes

And to choose a colour, and then fill that area/shape/drawn line with colour. The Text tool can be used (for example) to annotate images.

Here's some suggestions as to what you might do.

Open a photograph using File: open. (If you have no photographs in your filestore, you can get some from WEBCT. Look in the DGM901 WEBCT under either resources or materials: GIMP. Using the Web pages in there, right-click on a link, and save it somewhere in your filestore). Now add some annotation to this image. Try drawing a rectangle with PAINT. Note that when you select a rectangle (or other shape for drawing), a submenu opens below the toolbox. The top one selects drawing the edges only, the middle one selects drawing a fillable rectangle (with the outer edges), and the bottom one draws a filled shape. You can change the colour of these using the

colour from the bottom palette, or if you would like to be marginally more adventurous, using the Colors: Edit Colors panel (to get the full selection colours use the "Define Custom Colors" Button).

You can draw straight lines by selecting an appropriate pen, and dragging the mouse. Holding down shift at the same time makes the line drawn be either vertical, horizontal, or at 45 degrees.
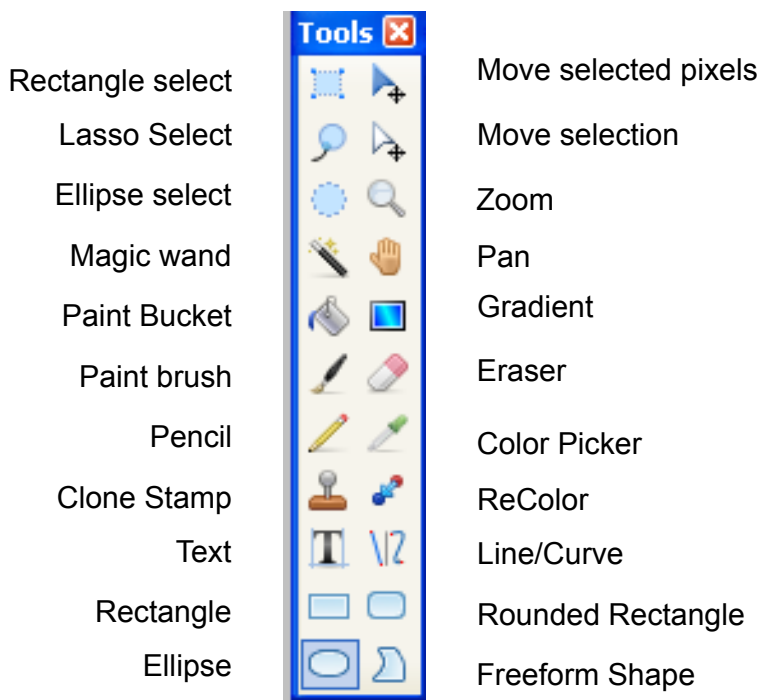
Try to create a professional looking drawing. Once you start adding a number of different entities, it starts to get difficult: in general, Paint is not really sufficiently sophisticated for many purposes (but nonetheless, it can be useful for doing something quickly, and it is very straightforward, as well as free. But it lacks important facilities, like cropping an image to a particular size.

PAINT.NET.

Paint.net is a much more powerful piece of software than Paint. In particular, it has layers, allowing an image to be built up layer by layer. There is a really excellent interactive tutorial on the web about Paint.net, originally at http://eulogy-dignity.deviantart.com/art/Paint-NET-Interactive-Guide-71790584, and I have made it available locally at
http://www.cs.stir.ac.uk/~lss/DGM901/Paint.Net/BeginnerGuide2.0.html

There is also the more usual type of tutorial on it at
http://www.eecs.wsu.edu/paint.net/doc/2.6/Help/en/index.html

For reference, here is the toolbox in Paint.net

	Tools	
Rectangle select		Move selected pixels
Lasso Select		Move selection
Ellipse select		Zoom
Magic wand		Pan
Paint Bucket		Gradient
Paint brush		Eraser
Pencil		Color Picker
Clone Stamp		ReColor
Text		Line/Curve
Rectangle		Rounded Rectangle
Ellipse		Freeform Shape

PHOTOSHOP
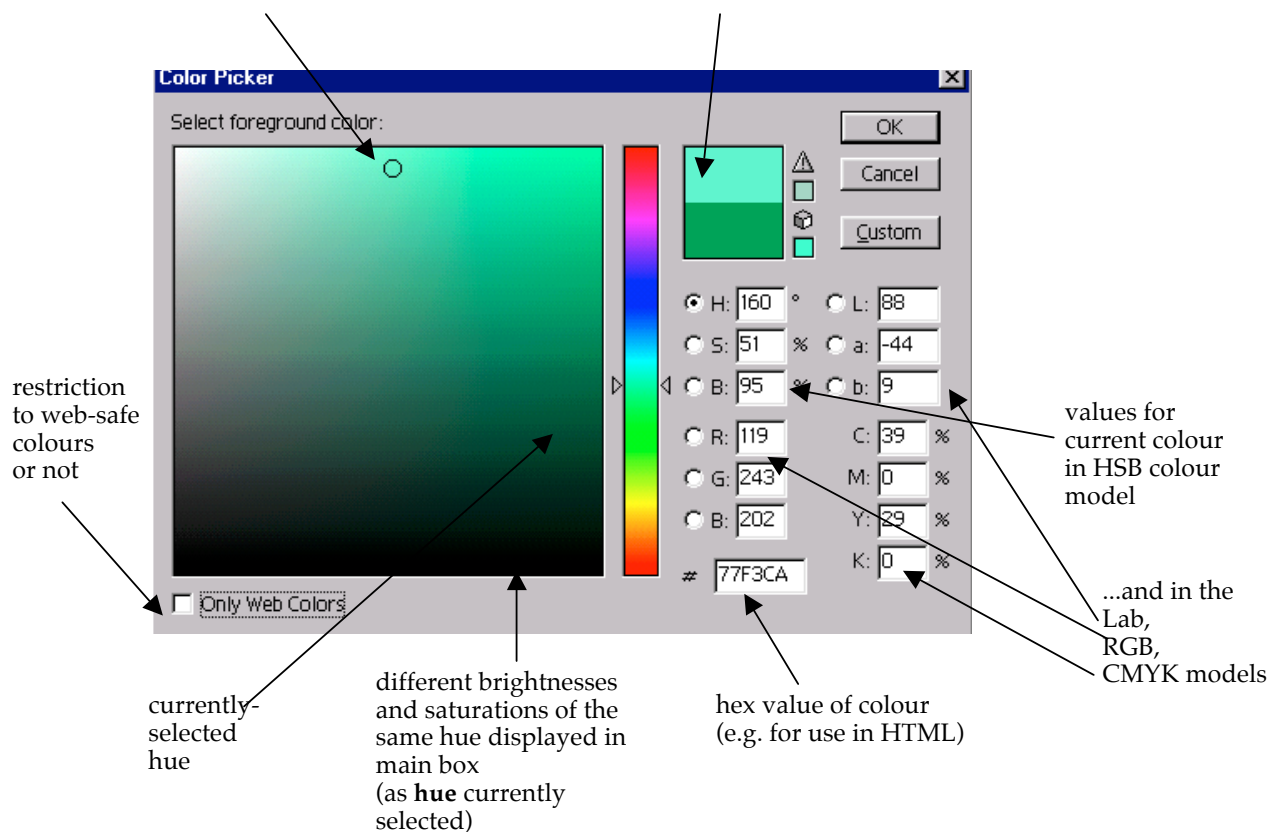
This part of the lab sheet aims
- To give you some practical experience of some of the main features of Adobe's *Photoshop*, which is the leading software package for pixelmap image creation and manipulation.
- To take a look at a few useful graphics creation techniques, suitable for multimedia graphics.
- To help your understanding of colour and colour models.
- To practically illustrate some of the graphics material covered in lectures so far and that you will encounter in future graphics lectures, particularly different graphics file formats.

Firstly we'll need to have some colours set, before taking a look at some of Photoshop's main features. Set the foreground and background colours:

⇒ **Click on the foreground colour in the toolbox. A colour picker box should appear.**

Click to select desired colour

New and current colour

restriction to web-safe colours or not

values for current colour in HSB colour model

...and in the Lab, RGB, CMYK models

currently-selected hue

different brightnesses and saturations of the same hue displayed in main box
(as **hue** currently selected)

hex value of colour
(e.g. for use in HTML)

This is an excellent opportunity to make sure you understand how the various colour models work, so play around with the colour picker until you've got the idea of them. In particular, follow these suggestions:

⇒ **Click on the check box for web-safe colours (if it wasn't already selected). Note the difference in the range of colours available.**

You probably have lots of colours of the same hue visible at the moment. One of the colour models supported by this colour picker is the HSB model (one of the variants of HSV you saw in lectures).

pick a colour you like for the foreground!

⇒ **Now also select a colour for the background. Pick a colour that strongly contrasts with your chosen foreground colour.**

So far we have not had an image to apply our colours to. Before we do that, on the right is a list of what each icon in the toolbar does. Note that most of these icons can change to further icons that can be displayed by right-clicking on them (see next page

Let's create an image:

⇒ **Open up a new image (File → New), of whatever size you like (400 by 400 pixels is a useful size – you may need to change the dimensions to pixels), select** *Background colour* **for Background Contents and ensure the image is in RGB Color mode with a resolution of 72 pixels per inch.**

	Move tool
	Marquee tools
	Lasso tools
	Quick selection/magic wand tool tool
	Crop tool (Slice tool)
	Eyedropper/ruler/note tool
	Spot healing brush/patch, red-eye tool
	Brush/pencil/color replacement tools
	Clone pattern/patternstamp tool
	History/art history brush tool
	Eraser/Magic eraser tool
	Gradient/paintbucket tool
	Blur/sharpen/smudge tools
	Dodge/Burn/Sponge tools
	Pen/anchor point tools
	Horizontal/vertical type tool
	Path selection/Direct selection tool
	Rectangle/ellipse etc tool
	3D object rotate/pan/roll tool
	3D camera tools
	Hand/rotate view tools
	Zoom tool
	Foreground/background colour tool
	Edit in quick mask mode.

Shapes: select then edit

There are various ways of selecting areas in Photoshop. You can use one of the tools to define an area, or to select something already created. The marquee tool (top left of the toolbox) is one of these, that can select simple rectangles and ovals.

⇒ **Use the marquee tool (top left of the toolbox) to select a nice big rectangle or oval in your image.**
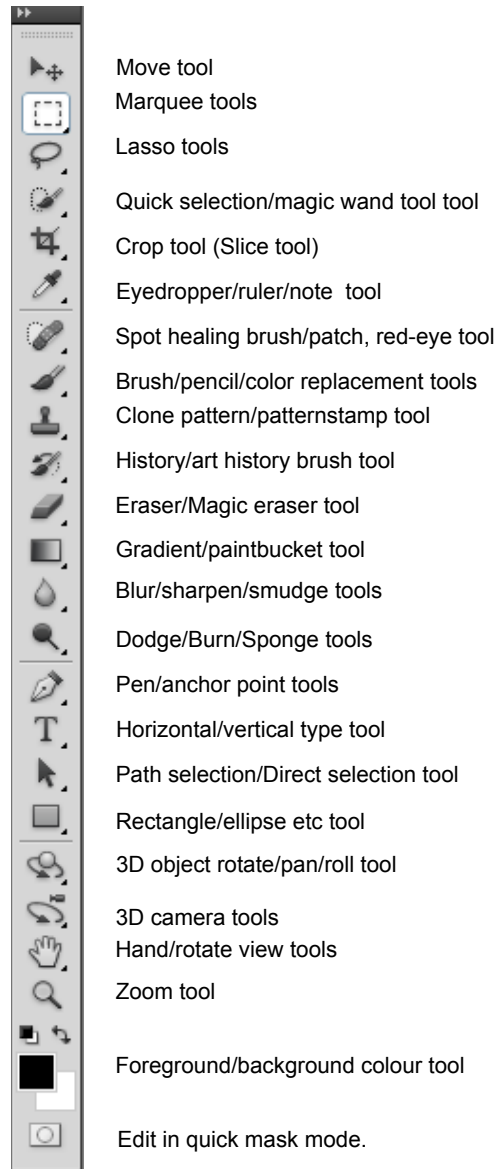
You should see a moving marquee outlining your shape. Now let's do something with that shape, say by using the gradient tools (halfway down the toolbox).

⇒ **Double click on the gradient tool, to bring up the gradient settings toolbar (below the menu toolbar). Make sure the mode is** *normal,* **the opacity is 100.**

⇒ **Select your choice of gradient tool from the selection of icons on the toolbar (see right).Then click and drag in your selected shape to perform the gradient fill.**
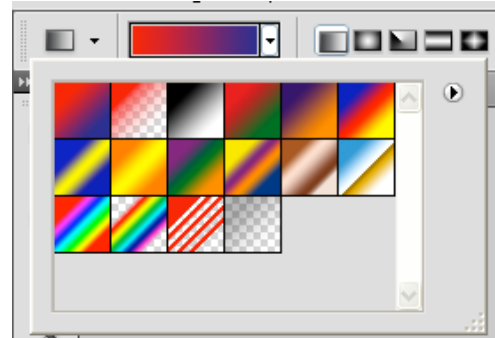
Don't like it? Try several more times, with different gradient fills if you like, until you get one you like. You can also try changing the settings, such as mode and opacity.

It's also worth mentioning there are other ways to select. For example, when you have selected one shape, you can also select everything *but* that shape. To create a really bizarre image:

⇒ Choose new contrasting foreground/background colours. Go up to the menus, Select → Inverse. Now do another gradient fill on everything but your original shape.

Layers

Photoshop lets you organize your work on *layers*. With the use of transparency, it makes it easy to combine images in different ways to form composite images. You can see the layers palette at the bottom right of your screen. If you don't have it, click on **Window → Layers**.
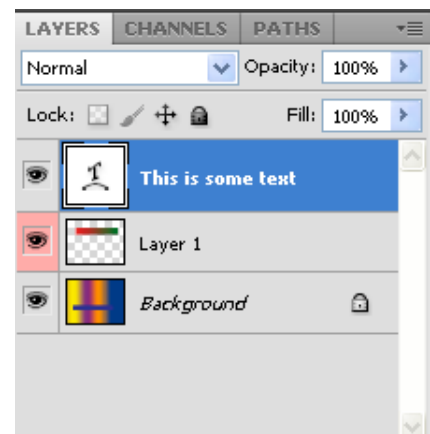
What you've done so far should be in a background layer and you should be able to see a block in the layers palette, representing your background, with a tiny thumbnail of your image so far on it. Let's create another layer. We'll add some text to the picture.

Text

⇒ **Select the Text tool from the toolbox.**

You should get a different cursor, and then clicking on the image allows you to select the position of entry for the text. Now you should get a toolbar with various options to play around with the text.
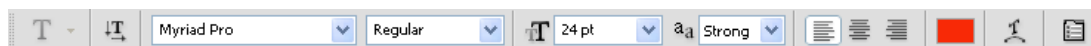
⇒ **Type in some text, and try out the various options for text (see below for hints).**

Select (highlight) the text you type, then font choices will show up immediately as you choose them. Try a contrasting colour for your text. Try different fonts at different sizes.

Also, try out some text options. For this, a good font to choose is Times. You'll also want to enlarge the image quite a lot so that you can see what effect the aliasing has on the image. To enlarge the image, press CTRL and + together. Repeat several times (and use the scrollbars) to get a good size magnification. (CTRL and – will zoom out again). How do smooth/strong/crisp/sharp and none compare?

⇒ Now try out some different text. Type in "YAWN!" and highlight it. Try clicking on the icon at the far right of the text toolbar: you should see the panel on the right.

Change the value in the AV panel to -100: you should be able to see the distance between letters shrink. Try out the other options in this panel as well.

Saving Your Images

Photoshop uses its own native file format called **PSD** for its image files. These files are usually **very large**, but they retain *all* the information you need to continue editing your image at a later time, such as any separate layers that you are using. It is recommended that you only store your images in PSD format if you will need to edit them again. (On the other hand, if you do need to edit them again, then you must store them in this format). Otherwise save them in a format suitable for the particular image and its intended use, such as GIF or JPG.

⇒ To save your image in a suitable format, select File: Save as Copy… and select the file format that you want, such as GIF. Navigate to somewhere suitable in your file space, enter a file name and click Save. Depending on the format you have selected you may get a number of dialog boxes appearing (such as "Flatten layers?"). Clicking Yes and accepting any default values is usually suitable here.

Having tried out a very few effects in Photoshop, let's try out some more sophisticated features that can produce graphics that you might just find useful…

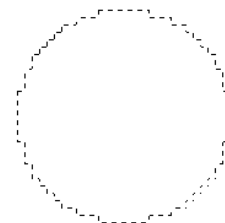# Graphics Example 1: Little Ball Icons

This example looks at how to create little ball icons that you could use to, say, highlight entries in lists of things on a web page.

Here's an example, enlarged so that you can see it:

⇒ Open a new image, about 40 x 40 would be a good size, with a white background. (Make sure that the RGB colour model is being used when you initialise it.)

⇒ Now magnify it to a nice, enormous size (it makes doing the drawing bits a lot easier; use Ctrl-+; note that Photoshop seems to crash at certain sizes when drawing the ball!)

⇒ With the Elliptical marquee tool, select a circle-sized area on your image (hold down the shift key while dragging from top left to bottom right to get a perfect, large circle):

⇒ Now select as a foreground colour whatever colour you want the ball icon to be, say a nice medium blue.

⇒ Select the paint bucket tool (you may need to right-click on the gradient tool to select the paint bucket). Then click in the circle to fill it.

⇒ Now go to the menu and select Filter → Render → Lighting Effects.

⇒ Of the various styles available, select "Flashlight" and narrow the focus of the light by dragging in the preview box. Drag the centre of the light towards the upper left hand corner. Set the intensity to about 35, and the gloss to about 45. Click on Ok. You should now have something like:
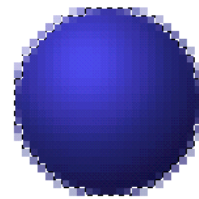
⇒ Now choose Select → Inverse from the menus.
You should now see everything *but* the ball selected. This enables you to draw on everywhere but the ball itself.

⇒ Select the brush tool (right-click alternative to pencil tool). Adjust the brush type to airbrush, and the brush size to 9 pixels (first two options in the Brush toolbar that appears below the main menu). Select the foreground colour grey.

⇒ Now airbrush in a shadow behind the ball by clicking-and-dragging. You should now have something like:
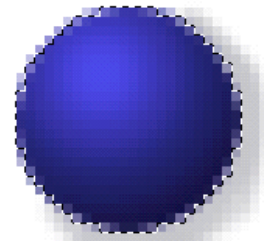
Finally, add a little highlight to the ball:

⇒ Do Select → Inverse to select the ball again, then still using the airbrush, but using a white colour, and with a pretty small brush (eg 4px), brush in a little highlight to the lightest spot on the upper left of the ball.

Hopefully you now have a ball like:

View it at the correct magnification. You can change the size of the ball to get an icon as small as you want. Save it in a file for now, in GIF format, as you did with your text image.
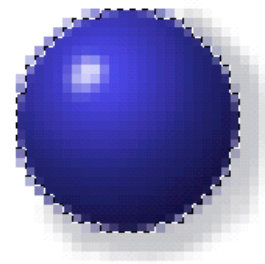
But what if you want several balls of different colours?

⇒ Go to Image → Adjustments → Hue/Saturation and use the sliders there to adjust the colour!

Free Form Fun!

Now that you have a few Photoshop skills under your belt, let's have some fun. The instructions given here will assume that you have completed the practical session so far. You may need to refer back to the instructions above to remind yourself of how to do various things.

What we will do is play with an existing photo (perhaps one acquired earlier with a digital camera or scanner.) You can use your own, find one on the web, or there are suitable photos accessible via a web browser at:

http://www.cs.stir.ac.uk/~lss/DGM901/Photos/photos.html

In Photoshop, close any image windows you have finished with and then:

⇒ Create a new image of a suitable size (say 400 by 400 pixels), in RGB Color mode and using Background Color.

Select foreground and background colours and fill the image, using a gradient tool of your choice.

Copy one of the photos (from the folder or webspace listed above) that you like to your own file space and open it in Photoshop via File:Open.

A new image window will appear in Photoshop showing the photo. We will first resize the photo, and then incorporate it into your background image, as follows.

You may need to resize the photo by selecting Image→Image size… so that it will fit onto your background.

Select the Move tool from the Toolbox, then click-and-drag the photo from its window onto your "background" window (you might need to select a suitable window arrangement from Window→Arrange so you can see both images at once).

This has put a copy of the photo on a new layer in your image. Having it on a separate layer means you can easily manipulate the photo independently of the background. Move the photo around until it is positioned where you would like it.

Add a title above the photo using the Text tool. Add any effects to the title that you would like using Layer→Layer Style e.g. Drop Shadow.

Now we'll have some fun with the photo. First we will adjust the brightness, contrast and colour balance of the photo. Then we'll try out the various filters that Photoshop provides. And try different blends of the photo with the background. Make use of the online help to find out about the filters and blends that are available.

Select the layer containing the photo in the Layers tab.

To adjust brightness and contrast, select Image→ Adjustments→ Brightness/Contrast…
Make sure Preview is selected, then move the triangular markers to adjust the
brightness and contrast. Click OK when you are satisfied.

Now adjust the colour balance by selecting Image→Adjustments→Color Balance… and
adjusting the different colour channels in the same way as brightness/contrast.

Now try out some of the different blends and filters**.** Blends specify how the pixels of the
current layer are combined with those of layers beneath it. Your photo layer should be
in **Normal** mode (as shown in the **Layers** window).

Click the dropdown arrow next to "Normal" on the Layers window and try some of the
different blending options. Return to "Normal" mode before carrying on.

Filters apply various mathematical transformations to the pixels in a layer. This can take
quite a long time, so do not be surprised if you have to wait to see the results. But let's
try some anyway.

Select any of the options from Filter and see what happens. Usually you will get a
preview window before it is applied to the image itself (use Edit->Undo immediately if
you need to reverse the filter once applied).

Try Filter→Distort→Wave. It's particularly wild!

Photoshopping

Another capability that Photoshop has is for adjusting images subtly: sometimes known as
photoshopping!

Look at the image of Lencois in http://www.cs.stir.ac.uk/~lss/DGM901/Photos/photos.html

Near the top, there is part of the helicopter from which the image was (I believe) taken. It would
be a better image if this are was simply sky …
You could simply crop the image. But you can also subtly
change the image. Look at the Clone Stamp tool. This
allows you to copy little pieces of an image smoothly to
somewhere else in the image: in this case we can replace the
dark parts of the image with pieces of sky copied from
elsewhere.

Select clone stamp. Now control-click somewhere in the
photo. You will see a selection of areas that might be
cloned, and be given the option of size and hardness. Then
if you alt-click somewhere in the image, this area will be
copied. And then you can paste it to over-write and area of
the image. Try it: you may never believe another
photograph again!
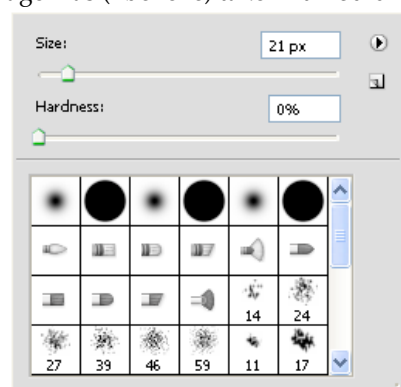
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