IMAGING FOR WEB & PRINT

A Beginner's Workshop

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overview

- Graphic Formats (Raster and Vector)
- Bits, Pixels and Resolutions
- Image Formats (bmp, jpg, gif, tiff, png)
- Colour Facts
- Acquiring Images
- Basic Photo Manipulation :
  - *Practical Workshop Session*

Graphic Formats

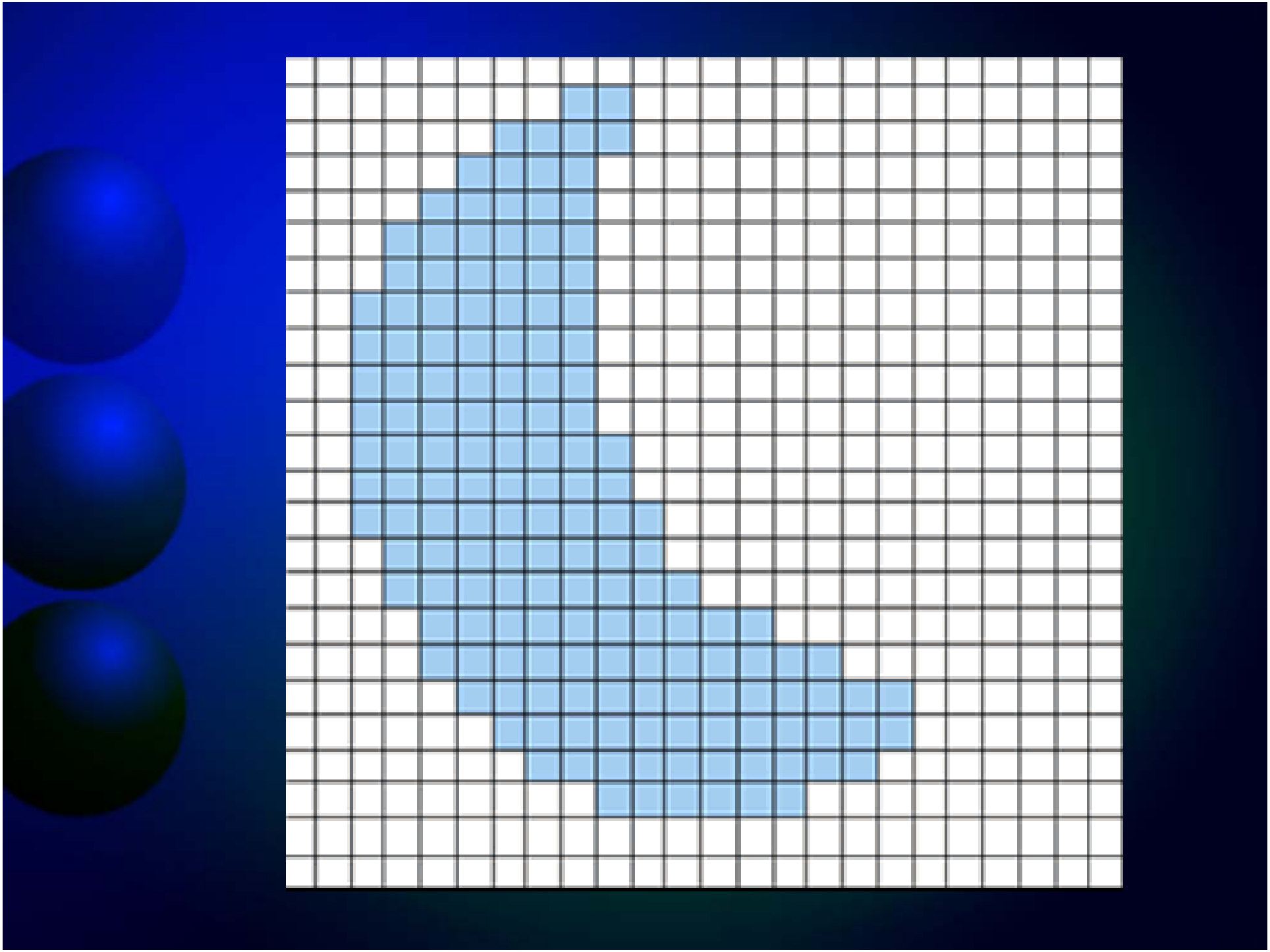
- Raster Images
  (pixel-based)
- Vector Images
  (object-based)

Raster Images

- A raster image is defined by pixels.
- A pixel is the smallest display element that makes up the images seen on a computer monitor or television.
- In raster images, the more pixels an image contains, the higher its resolution.
- Programs such as Photoshop, PaintShop, and PhotoPaint all work with pixels (raster images).
- Raster images are the best choice for creating subtle gradations of shades and colour, such as in a photograph.

Raster Images (continued)

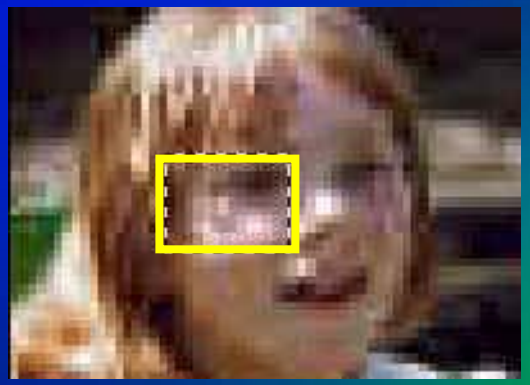
- A raster image is **resolution-dependant** because it contains a fixed number of pixels that are used to create the image.
- Since there is a fixed and limited number of pixels, a raster image will lose quality if enlarged beyond that number of pixels as the computer will have to 'make up' the missing information.
- This is usually the cause of the image becoming fuzzy or "steppy".




550 x 398 pixels, 24 bit RGB colour, 642k in memory and 50k on disk
(12:1 compression) - total pixel count is 218,900 andoriginal resolution
240.

Statistics - 200 x 145 pixels, 24 bit RGB color, 85K in memory and 5K on disk (17:1 compression). Total pixel count is 29,000.

Starting with a fairly ordinary "snapshot" type of picture, reduced in size and compressed



This enclosed area in the mask is then enlarged back up to the 200 x 145 size, thus magnifying the pixel structure.

We now have a magnification or enlargement of some 4 times. This now is an all but unintelligible image - content unknown, and is unusable but shows clearly the make up of pixels as colour blocks within the image.

Statistics - 200 x 145 pixels, 24 bit RGB color, 85K in memory and 5K on disk (17:1 compression). Total pixel count is 29,000.

Here is a high resolution of the original

Here is a purposely "pixelized" version of the original - whereby we have artificially decreased resolution over the whole picture.

Bits, Pixels and Resolution

Bit Depth

- The term "bit depth" is used to describe the number of bits used to store information about each pixel of an image. The higher the depth, the more colours that are available for storage.

Resolution

- Resolution refers to the number of pixels in an image, and is a measurement of the output quality of an image, usually in terms of samples, pixels, dots, or lines per inch.

Resolution (continued)

- **PPI (pixels per inch)** refers to screen resolution (monitors)
- **DPI (dots per inch)** refers to print resolution
- **SPI (samples per inch)** refers to scanning resolution
- **LPI (lines per inch)** refers to halftone (often newspapers) resolution.

Resolution (continued)

- Images are displayed on your computer screen at 72 ppi resolution (low resolution).
- A printer needs much more image data than a monitor at 150-300 dpi (high resolution).
- An image for use on the internet should only be 72 dpi (the minimum display resolution) to minimise download time.

Image Formats

- There are primarily 5 basic types of **Raster graphic formats** for the internet

- **JPEG** - **J**oint **P**hotographic **E**xperts **G**roup
- **BMP** - **B**it**m**a**p**
- **GIF** - **G**raphics **I**nterchange **F**ormat
- **TIFF** – **T**agged **I**mage **F**ile **F**ormat
- **PNG** - **P**ortable **N**etwork **G**raphics

JPEG - (Joint Photographic Experts Group)

- JPEG is designed for compressing either full-colour or greyscale images of natural, real-world scenes.
- It works well on photographs, naturalistic artwork, and similar material.
- It does not do well on lettering, simple cartoons, or line drawings.
- JPEG handles only still images, but there is a related standard called MPEG for motion pictures.
- As a generalisation, the **.JPG** format permits a large colour range (up to 16 million colours) and higher degrees of compression.

- A JPEG file is encoded by using an adjustable lossy compression approach.
- This means that to achieve smaller file sizes, image data is actually thrown away.
- The JPEG format will support the **RGB, CMYK, and grayscale colour spaces with 32 bit**.
- The use of JPEG images is supported in HTML and Web applications.
- However, unlike a GIF file, all of the colour information is stored in the file. There is no support for transparency in a JPEG file.

BMP - Bitmap

- The most basic format is **BMP** (bitmap).
- Here, every pixel is saved ''as is' and there is no compression.
- The file size stored is the same as file size in memory when displayed.
- The file only supports the **RGB & Grayscale** colour space with 1, 4, 8, or 24 bits per channel. These attributes make bitmap images unsuitable for use in a high-end print production workflow.
- They are not supported by any Web browsers or Web coding languages.
- **BMP** is of little use generally for web display because of sheer file size relative to image size!
- Never post Bitmaps!

GIF - (Graphics Interchange Format)

- **GIF**s are popular for compressing images to a file size that's manageable.
- **GIF** is limited to **8 bit - 256 colours of the RGB** colour gamut and has some compression.
- One of its most useful attributes is the ability to select one specific colour and make that **transparent** - very useful for use on web pages.
- It is possible to "sequence" a set of **GIF** images to make small animations .... everyone is familiar with the animated smilies on email and Internet Messengers.

TIFF (Tagged Image File Format)

- A Tagged Image File Format (TIFF) file is the most widely used file format in desktop publishing today.
- It is a raster-based file that supports the following RGB, CMYK & Grayscale.
- Because TIFF format supports multiple pages, multi-page documents can be saved as single TIFF files rather than as a series of files for each scanned page.

PNG - (Portable Network Graphics)

- A new bit-mapped graphics format similar to GIF
- Use of a PNG file in a Web project is a good fit. However, because of the lack of support for the CMYK colour space, and the fact that there can be no colour separations, the PNG file is not a good fit in a print production cycle.

Vector Images

- A vector image is defined by objects which are made of lines and curves that are defined mathematically in the computer.
- Vectors can have various attributes such as line thickness, length and colour. For example, in a vector image, a square is drawn as four lines connected at the corners. Those lines can be set to different thickness and colours, AND can be empty or filled.
- Programs such as PowerPoint, Illustrator and Freehand all work with vectors.

Vector Images (continued)

- Vector graphics are resolution-independent because the vector objects are drawn mathematically in the computer. They can be made larger or smaller without any loss of quality to the image.
- Even though word processing programs such as MSWord are not drawing programs, they too use vectors because they use fonts and fonts are vector files.

Formatting Concerns

File Size

(The larger the file size the slower the graphic will be to download.)

vs

Image Quality

(The lower the quality the harder the graphic will be to decipher.)

- When formatting an image for the internet you must find the balance between the speed at which the graphic will download and the visual appearance of the image.
- In cases where speed is the most important, this will require a change in the design of the image or a loss of image quality.
- In cases where quality is most importance, this will require large file sizes.

Colour Facts

Your Monitor

Your monitor and image software works by using the “additive colour model” or **RGB –** i.e. the three primary colours of Red, Green and Blue.

They "add" to give three new colours (the "subtractives").

All other colours in between can be formed by appropriate mixes of the basic three.

Your Printer

Your printer on the other hand, works somewhat in reverse to this and usually is based on the **CMYK** (subtractive) model - here we have the three subtractive colours - cyan, magenta and yellow, which when mixed take us back to the additive primary colours of red, green and blue.

The "**K**" is actually a separate black because the mix of these subtractive colours does not give a full and satisfactory black unaided.

- All work should be in the CMYK (Cyan/Magenta/Yellow/Black) mode, as this is the mode required for the printing process.
- If an RGB (Red/Green/Blue) file is submitted, it must be converted to CMYK.
- When the conversion takes place, colour shifts can occur and the printers will generally try to reproduce as close of a match to your printed output as possible.

Acquiring Images

- Digital Camera
- Scanning
- Clip Art
- Internet

Clip Art - Finding It, Using It, and Copyright Concerns

- Clip art is readily available on the internet and elsewhere.
- The individuals who created those materials, however, have "creation rights" or copyrights for those materials. These "rights" are enforced with copyright infringement fines.

Always read the copyright info/agreement from the originator of the "borrowed" materials.

Often a message giving credit to the creator/owner and a link to the origin of the materials will suffice.

Materials should be in their complete and original form.

Remove the materials in question the moment the issue of a copyright infringement is brought to your attention.

Acquiring Images From A Digital Camera

- If you want to use your digital camera, make sure you use the best resolution.
- When taking pictures with a digital camera, set the resolution to its highest.
- If you can, rest on something or use a tripod. The biggest enemy of still photography is "camera shake" and even a small amount will mar perceived sharpness.

Acquiring Images From A Scanner

- **For the web**, **75 DPI** will often suffice.
- When scanning a photo, use the highest possible resolution (dpi) your set up will allow. The higher the resolution, the more information you will have to work with.
- **Images for Print**: Scan at **200 DPI** is about as far as you need go for other artwork purposes.
- If you have a monochrome image to scan or only require mono, then scan as greyscale. This will yield a smaller file straight away.

- If you are in doubt when you start scanning an image, err on the large size and maybe save (temporarily) as a bitmap (**BMP**).
- This way you will have an original which has all attributes, but, it WILL be a large file.
- You can then play around with it and save it as a **JPG** when you have finished and are satisfied, keeping a **BMP** copy as a back up.

Acquiring Images From The Internet or CD Rom – Clip Art

- **Finding clip art** - Clip art can be purchased as individual pieces or as a collection. Purchasing a collection of clip art will alleviate copyright concerns and give you a variety of images to choose from.
- Here are some links to clip art on the web:
  - www.ClipartInc.com
  - http://www.clipart.com
  - http://www.clip-art.com

Acquiring Images From The Internet

- Use your browser to navigate to the page that holds the image.
- At that point, right-click on the image and choose the ***Save As*** option.
- Save the image to the Desktop or ***Copy*** and ***Paste*** directly to your template.

Basic Photo Manipulation

Websites provide an excellent means by which to share your photos.

In this section, we will discuss the basics of digital photo manipulation and correction.

Basic Photo Manipulation

- Cropping
- Brightness / Contrast
- Colour Correction
- Orientation
- Resizing / Changing Resolution
- Noise Filters

Questions and Practical Workshop