# ICTWEB303 – Produce digital images for the web

## Session 1

Introduction, housekeeping, OH&S and saving / directory tree use.

### IMAGE FORMATS

Various image formats have been developed over time specific to the required use. Usually, each format has been developed with specific requirements like small file sizes, high quality, image composition tools inclusion etc.

Below I will briefly describe the most common formats used on the web.

#### JPEG (.jpg) – (pronounced “jay peg”)

Named after its creator the Joint Photographic Expert Group (seen most often with the **.jpg** extension) is a commonly used method of lossy compression for digital photography (i.e. images). The degree of compression can be adjusted, allowing a selectable tradeoff between storage size and image quality. JPEG typically achieves 10:1 compression with little perceptible loss in image quality, and is the file type most often produced in digital photography.

JPEG compression is used in a number of image file formats. JPEG/[Exif](http://en.wikipedia.org/wiki/Exif%22%20%5Co%20%22Exif) is the most common image format used by digital cameras and other photographic image capture devices; along with JPEG/JFIF, it is the most common format for storing and transmitting photographic images on the World Wide Web. These format variations are often not distinguished, and are simply called JPEG.

The term "JPEG" is an acronym for the Joint Photographic Experts Group, which created the standard. The MIME media type for JPEG is *image/jpeg* (defined inRFC 1341), except in Internet Explorer, which provides a MIME type of *image/pjpeg* when uploading JPEG images.

JPEG/JFIF supports a maximum image size of 65535×65535 pixels.

The JPEG compression algorithm is at its best on photographs and paintings of realistic scenes with smooth variations of tone and color. For web usage, where the amount of data used for an image is important, JPEG is very popular. JPEG/[Exif](http://en.wikipedia.org/wiki/Exif%22%20%5Co%20%22Exif) is also the most common format saved by digital cameras.

On the other hand, JPEG may not be as well suited for line drawings and other textual or iconic graphics, where the sharp contrasts between adjacent pixels can cause noticeable artifacts. Such images may be better saved in a [lossless graphics format](http://en.wikipedia.org/wiki/Lossless_data_compression#Graphics) such as [TIFF](http://en.wikipedia.org/wiki/TIFF), [GIF](http://en.wikipedia.org/wiki/Graphics_Interchange_Format), [PNG](http://en.wikipedia.org/wiki/Portable_Network_Graphics), or a [raw image format](http://en.wikipedia.org/wiki/Raw_image_format). The JPEG standard actually includes a lossless coding mode, but that mode is not supported in most products.

As the typical use of JPEG is a [lossy compression](http://en.wikipedia.org/wiki/Lossy_compression) method, which somewhat reduces the image fidelity, it should not be used in scenarios where the exact reproduction of the data is required (such as some scientific and medical imaging applications and certain technical [image processing](http://en.wikipedia.org/wiki/Image_processing) work).

To read more about the technical specifications, follow the below link.

 (<http://en.wikipedia.org/wiki/JPEG>)

##### When would I use a JPEG on the web?

JPEGs would be used when an image requires millions of colours, such as photography, photos of people or products.

#### GIF– (pronounced “gif” as in “gift” without the “t”)

The **Graphics Interchange Format** (better known by its acronym **GIF** is a bitmap image format that was introduced by CompuServe in 1987and has since come into widespread usage on the World Wide Web due to its wide support and portability.

The format supports up to 8 bits per pixel for each image, allowing a single image to reference its own palette of up to 256 different colors chosen from the 24-bitRGB color space. It also supports animations and allows a separate palette of up to 256 colors for each frame. These palette limitations make the GIF format unsuitable for reproducing colour photographs and other images with continuous colour, but it is well-suited for simpler images such as graphics or logos with solid areas of colour.

GIF images are compressed using the Lempel-Ziv-Welch (LZW) lossless data compression technique to reduce the file size without degrading the visual quality. This compression technique was patented in 1985. Controversy over the licensing agreement between the software patent holder, Unisys, and CompuServe in 1994 spurred the development of the Portable Network Graphics (PNG) standard. All the relevant patents have now expired.

To read more about the specification of this format, visit the below link.

<http://en.wikipedia.org/wiki/GIF>

##### When would I use a GIF on the web?

GIFs would be used when an image requires animation or for the display of simple graphics like logos or images with large areas of single block colour.

#### PNG– (pronounced “ping”)

**Portable Network Graphics** is a raster graphics file format that supports lossless data compression. PNG was created as an improved, non-patented replacement for Graphics Interchange Format (GIF), and is the most used lossless image compression format on the Internet.

PNG supports palette-based images (with palettes of 24-bit RGB or 32-bit RGBA colours), grayscale images (with or without alpha channel), and full-colour non-palette-based RGB[A] images (with or without alpha channel). PNG was designed for transferring images on the Internet, not for professional-quality print graphics, and therefore does not support non-RGB colour spaces such as CMYK.

PNG files nearly always use file extension PNG or png and are assigned MIME media type image/png. PNG was approved for this use by the Internet Engineering Steering Group on 14 October 1996, and was published as an ISO/IEC standard in 2004.

To read more about the specification of this format, visit the below link.

<http://en.wikipedia.org/wiki/Portable_Network_Graphics>

##### When would I use a PNG on the web?

PNG’s would be used when an image does not require animation. The format can be used for all types of images including photographs and graphics. The 24bit version offers varying levels of transparency (opacity) which is very useful for blending in back grounds. 24bit PNG’s can be very large in file size so this needs to be accounted for when using this format.

#### PSD– (pronounced as the letters “p s d”)

**PSD** is the native file format from the graphics application Adobe Photoshop. **Adobe Photoshop** is a graphics editing program developed and published by Adobe Systems.

Photoshop files have default file extension as **.PSD**, which stands for "Photoshop Document." A PSD file stores an image with support for most imaging options available in Photoshop. These include layers with masks, transparency, text, alpha channels and spot colours, clipping paths, and duotone settings. This is in contrast to many other file formats (e.g. .JPG or .GIF) that restrict content to provide streamlined, predictable functionality. A PSD file has a maximum height and width of 30,000 pixels, and a length limit of 3 Gigabytes.

Photoshop files sometimes have the file extension **.PSB**, which stands for "Photoshop Big" (also known as "large document format"). A PSB file extends the PSD file format, increasing the maximum height and width to 300,000 pixels and the length limit to around 4 Exabytes. The dimension limit was apparently chosen arbitrarily by Adobe, not based on computer arithmetic constraints (it is not close to a power of two, as is 30,000) but for ease of software testing. PSD and PSB formats are documented.

Because of Photoshop's popularity, PSD files are widely used and supported to some extent by most competing software. The .PSD file format can be exported to and from Adobe's other apps like Adobe Illustrator, Adobe Premiere Pro, and After Effects, to make professional standard DVDs and provide non-linear editing and special effects services, such as backgrounds, textures, and so on, for television, film, and the web. Photoshop's primary strength is as a pixel-based image editor, unlike vector-based image editors. Photoshop also enables vector graphics editing through its Paths, Pen tools, Shape tools, Shape Layers, Type tools, Import command, and Smart Object functions. These tools and commands are convenient to combine pixel-based and vector-based images in one Photoshop document, because it may not be necessary to use more than one program. To create very complex vector graphics with numerous shapes and colours, it may be easier to use software that was created primarily for that purpose, such as Adobe Illustrator or CorelDraw. Photoshop's non-destructive Smart Objects can also import complex vector shapes.

To read more about the specification of this format, visit the below link.

<http://en.wikipedia.org/wiki/Adobe_Photoshop#File_format>

#### Other formats

Some other formats not normally associated with web graphics are .eps (Illustrator documents), .bmp (Bitmap documents)

## RASTER v’s VECTOR IMAGES

Photoshop is raster based.

Here's a logo you'd recognise. You might think it's Photoshop but it's all vector. Every line is just point connected with an angle of a curve, a vector. That way you can scale them to the size of the moon and you won't lose a single detail. If a curve is closed (both ends join) then you can fill it with a colour. Many different closed curve layers on top of one another can imitate a graduated screen or colour ramp like Photoshop would do. You can't do really complex or photorealistic things in vector without spending days doing it, but in a logo you want simplicity anyway.

Below is the wireframe of a logo, followed by the same vector - filled with colours.





These files are usually shared as EPS format. They're incredibly small and easily distributed over the internet because of their size. You only record the point on the lines, their angles and what colour they are filled with which is usually much less data than a raster image.



This is a closeup of a raster image, you'll know this from Photoshop. A raster image is made up of pixels (little squares) with a numerical value for their colour. All the squares are the same size and places in a grid pattern. Each one needs at least three numbers (for RGB) to calculate it's colour (4 for cmyk and 1 number for 8 bit colour like a gif) unless there is compression (like a gif, where large areas of the same colour are assigned a beginning and an end point and the colour value is assigned only once, or jpg's where an area of 8 or more pixels are assigned one of many algorithms built into the jpg codec).

Raster images cannot be scaled up in size because they will look pixelated (like the image above) when printed. And files that are high enough resolution for the printing process are usually very large. We use these for photographs or completed files when we can output a raster image at exactly the size required for printing.

As a vector, any colours can be assigned to the curves, including rgb, cmyk and spot colours. You could have a logo as pantone 567, pantone 490, 303 and more... In a raster you usually use a CMYK colour model or RGB. Sometimes you'll run across a duotone or tritone but these are not very common and definitely will not be usable in most office programs.

Gif and jpg are great for small office programs and for use in a little office type setting but for printing on a press, proper graphic design, signage etc. you'll need a vector based logo so that the outfit can work with it and have the cleanest image possible.

You'll also need to be able to create logos that can be easily printed in one or two colours. Your clients might have a wonderful red-on-black 3D logo, but try printing it in the newspaper in one colour and it will just be a solid black mush.

As far as what you create for your clients - it's as simple as asking them. Do they just want a logo and they'll do all their own letterhead etc. themselves or do they want a full package? Charge accordingly. Sometimes if you just do the logo you can get more business by showing a sample of a card and/or letterhead design and telling you'll do additional design for only $X more. And sometimes you're just shooting yourself in the foot too!

The best thing is to always set up the rules of the game BEFORE playing it.

Source: <http://www.graphicdesignforum.com/forum/forum/graphic-design/resources/89-an-explanation-of-raster-vs-vector>

## IMAGE RESOLUTION

Image resolution is a reference to the number of physical picture elements (pixels) contained within an image. The standard monitor displays 72 pixels per inch, also referred to as DPI (dots per inch).

Images with a low resolution may look good on a computer monitor but are not suited to other applications like printing.

The standard printer may print an image at 300dpi. Think about an image you may want to print out from the internet. Let’s say it’s a wallpaper of 1024 pixels across and 768 pixels down. This image would take up the entire screen of a standard 4:3 aspect ratio monitor.

Once printed though, remembering that a printer in this example prints 300dpi, the printer would print an image only 3.41 inches across.

When creating an image for the web, it is best practice to start with the highest resolution you can, say, 600 dpi then from this original artwork, you can scale and resize images for their intended purpose. As a general rule, you can never get resolution back, so you should always save the original artwork in its highest resolution.

### PHOTOGRAPHY FOR WEB IMAGES

Much of the images you create for the web will include photography. Simply put, the better the quality of photography you use, the more professional your final artwork will look.

Often, you will be required to work with photography with is of a low standard or not exposed correctly. In these cases, it is recommended that you invest in new photography which will better suit the design brief or web images you wish to create.

A intermediate level of understanding of photography is advantageous when working with web images as this will enable you to control the design process from start to finish, and also probably save much money on the employment of a photographer or copyright fees from using image stock.