About Graphics/Digital Images

Digital images are found in lots of file formats (types) that are used for various reasons. I liken the file formats to flavors of ice-cream, which you might or might not choose to consume on any given day. One day chocolate is more important than mint; another day you might use vanilla, and on another day you might decide to combine more than one flavor in the same bowl. Likewise, you might choose one type of graphic file for a particular project, but it might be completely inappropriate for another project. What works well for display purposes (keeping it on the computer, or for publication to the internet) might not print well. Something that prints well might be too big a file to post to the internet, or may make your program run too slowly. Also, some authoring programs (like Boardmaker or Classroom Suite) might be written to only understand certain types of image files. Some file types are more common than others, and are more likely to be recognized by the "parent" program (the one you use to display, edit or print your image). Whatever type you pick ultimately depends on how you plan to use the image.

The more technical definitions provided below are taken from the glossary found at http://www.photoshopelementsuser.com/glossary.php?letter=B

The additional comments I have added, and hopefully let you know why you would care about any of this, anyway.

The two biggest types of images I describe here fall loosely into two categories: **vector** images and **bitmap** images. You are most likely to be working with bitmaps if you do any image editing, but it is important to know about vector images as well. Since I have less to say about vector images, I'll include that discussion first. You can at least glance at it before you go on to the more common (and complicated) bitmap discussion. Whether you use vector images, bitmap images, or both, it is important to know what the program you are using them in understands (can open and use).

Vector Images

Definition:

Vector: An electronic or computer-readable image format incorporating a formulate representation of graphical line art. Vector format is used during the markup process, to keep redlines separate from images and to facilitate easy modifications. This format is also often used during the edit process.

Why you might care:

The great thing about vector images is that the lines that comprise them are created mathematically. The reason you would care about this is that a vector image can be resized indefinitely without loss of quality because some magic calculation behind the scenes is redrawing it perfectly. Vector images take very little room on your hard drive, and never get the "jaggies" that you see in bitmap images (described below). However, images that look like photographs are VERY hard to do as vector images. Vector images are best used as drawings. Drawing programs like CorelDraw or Adobe Illustrator can be used to create vector images.

Vector images can be shared with the following file extensions:

- .cdr (for CorelDraw extension)
- .eps (The EPS file format is used to transfer PostScript language artwork between applications and is supported by most illustration and page-layout programs. Typically, EPS files represent single illustrations or tables that are placed onto a host page, but an EPS file can also represent a complete page. Because EPS files are based on the PostScript language, they can contain both vector and bitmap graphics.
- .wmf (Windows Metafile) Can also save text and bitmaps as wmf.
- .swf (The *Flash* format)… this is the most common type of vector image found on the internet at this time.

Bitmap Images

Definition:

The method of storing information that ***maps*** an image pixel, ***bit*** by bit. *(The word pixel comes from "picture element").* There are many bitmapped file formats: .bmp, .pcx, .pict, .pict-2, tiff, .tif, .gif (89a), and so on. Most image files are bit mapped. This type of file gives you the ´jaggies´. In other words, when examined closely you can see the line of pixels that create edges. Bitmap images are used by all computers. The desktop or screen information for all Windows machines uses .bmp files, while the Macintosh uses pict files.

Why you might care:

Most digital images you run across will be bitmap images. The most confusing thing about bitmap images is the many flavors they come in (the definition included only a partial list). The most important thing to remember is that a bitmap image is composed of pixels, which are sort of like puzzle pieces, with each pixel containing only one color. The more pixels per inch (ppi) are contained in the image, the smoother the picture will look when really enlarged. However, the more ppi in a file, the bigger the file size.

More about bits…(only for the truly interested… otherwise skip down to image types).

Bit Depth: *This refers to the color or gray scale of an individual pixel. A pixel with 8 bits per color gives a 24 bit image. (8 Bits X 3 colors is 24 bits.) CCD are colored in a pixel by pixel method.*

30/32 bit color is billions of colors. (Only supported with high-end CPU´s.)
24 bit color resolution is 16.7 million colors.
16 bit color is 32,000 colors. (this is the Macintosh Standard)
8 bit color is 256 color. (this is the Windows Standard)
8 bit gray scale is 256 shades of gray
4 bit 64 colors or gray
2 bit black or white.

Kinds of bitmaps

The most common kind of bitmap image captured by digital cameras today is the .jpg or JPEG image.

JPEG - Definition:

Abbreviation for **J**oint **P**hotographic **E**xperts **G**roup. File format for full-color and black-and-white graphic images. JPEG is the standard for image compression in a digital imaging device. JPEG, also known as JFIF takes areas of 8 x 8 pixels and compresses the information to its lowest common value. This is one of the reasons you can get as many images into digital cameras. The higher the compression ratio the more the pixelization or blockyness occurs. The greater the pixel count the less pixelization may occur. The Windows environment uses the file extension .jpg to label this type of file.

Why you might care:

Why you would want to know this: JPEG is a good way to view a digital image without the file size getting too big. However, the way the picture stays smaller is because it is compressed… and every time you compress it, you permanently lose image quality. If you want to keep as much detail as you can in the image, you should resave it as a .tif file. While this will make the size of the image much bigger, if doesn't compress the image, thus protecting the quality. This doesn't particularly matter the first time you save the file as JPEG, but if you keep working it and then resaving it as JPEG, your original picture will continue to lose quality and will end up looking really crummy. If all you want to do is email the picture, or post it on a website, jpg is the way to go. Most of the photographic images on the web today are stored as JPEG. Remember, JPEG is great for small file size and quick loading on the web, but not a good choice for keeping image quality. As an aside, there is a new type of JPEG file recently developed called JPEG 2000. The compression problems don't seem as bad with this.

TIFF - Definition:

TIFF: Tagged **I**mage **F**ile **F**ormat (TIFF) is an industry standard raster file format, which consists of the image and header information. TIFF is also supported by most desktop publishing and paint programs. In the Windows environment, the file extension is .tif

Why you might care:

TIFF is currently the best way to save your pictures if you want to keep the image quality for printing and you don't care about file size. If you plan on doing any editing to an image, it is a good idea to save the original as a .tif file, and save your subsequent changes with the "save as" command to the most appropriate file type.

GIF - Definition:

GIF: Graphic **I**nter**f**ace designed by CompuServe for using images on line. (pronounced with a "hard g" like in the word girl). This is a 256 color or 8 bit image. In the Windows environment, the file extension is .gif

GIF 89: The most recent GIF standard that allow the selection of area for transparency, primary use is on the internet and other on-line services. Like GIF it is 256 color or 8 bit imaging

Why you might care:

GIF files are the other currently most common type of image found on the internet. They don't compress like JPEGs do, so you don't lose image quality when you save as GIF. They keep the file size small, so that is good as well. The problem with GIF for photographs is that GIF will only save 256 colors. If your image has less colors in it than that, GIF would be your choice. Digital photographs usually contain LOTS more than that, though; so if you saved a photograph as GIF, the colors would get converted to the nearest neighbor in the palette of 256, making the overall look pretty bad. GIF is a great choice if your image has few colors and you need a small file size. GIF can also be animated (often the format you see on the internet when something is flashing or blinking).

***BMP* - Definition:**

Bit**M**a**P**. A bitmap image type that is common in Windows applications. Represented by the file extension .bmp

Why you might care:

The term bitmap sometimes gets confused with the .bmp file type, but this is only because Microsoft decided to take the name of their flavor of image from the generic image term itself. A .bmp file is indeed a bitmap file, but so is jpg, tif and gif, among others. The "paint" program, included as a Windows accessory defaults to .bmp. A .bmp file is commonly used in Windows applications, and there are still many programs that can only use .bmp graphic images.

***PICT* - Definition:**

Pict: The native bitmapped file format for Macintosh&153; images.

Pict 2: The native color bitmapped image format for Macintosh&153;, up to 32 bit color.

In the Windows environment, the file extension is .pct

Why you might care:

PICT files can be opened by many art editing software programs. They are the flavor Macintosh computers have liked best.

***PNG* - Definition:**

Stands for **P**ortable **N**etwork **G**raphics format, and is generally pronounced "ping." PNG is used for lossless compression and displaying images on the web. The advantages of PNG is that it supports images with millions of colors and produces background transparency without jagged edges. The disadvantages are that PNG images will not show up on older browsers, and still can be comparatively larger in file size than GIFs. In the Windows environment, the file extension is .png

Why you might care:

PNG files will likely show up more and more on the web as browsers (like Internet Explorer or Netscape Navigator) are upgraded, so they understand and can use this file format. The file size is smaller than JPEG, but PNG supports more colors than GIF. Also, image quality is not as compromised with PNG as JPEG by the compression. We aren't seeing too many .png files now, but probably will soon.