Importance of graphics

The introduction of the apple Macintosh computer and the Microsoft windows program changed the way we worked with computers. Using a mouse and a desktop; we click on icons and drop down menus, drag folder and resize windows. We are accustomed to working with graphical images on the screen and, in fact, expect to see them. Graphics such as drawings and photographs are integral to multimedia titles. **Visualization** is an **important part of the communications process, and graphical images can be used to add emphasis, direct attention, illustrate concepts and provide a background for the content.**

It is said that a picture is worth of thousand words of text.

1. Pictures, photographs and 3D pictures

2. Background

3. Button

4. Charts

5. Flow charts

6. Organization charts

Graphics are used in various field of our life such as:

- **Web Designing**
- **Education**
- **Business**
- **Entertainment**
- **At Home**
- **Medical and Engineering**
- **Research**

Generally we use graphics for web designing to fulfill various type of need for many person of different type of field such as Education, Business, Entertainment, Medical and Engineering, Research etc. So we are going to explain importance of graphics in Web Designing mainly.

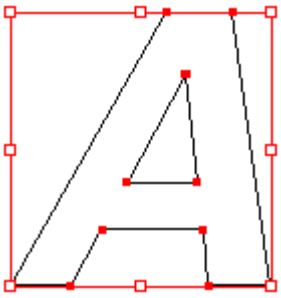
Draw type (vector) and bitmap graphics and Difference between the two

There are **two** categories of graphics: **draw-type** and **bitmaps**. Draw-type graphics, also called **vector graphics**, **represent an image as a geometric shape made up of straight line, ovals and arcs.** When a line is drawn, a set of instructions is written to describe its size, position, and shape. If more than one line is drawn, it has a precise relationship to the other parts. If a change is made, say, in the size of the circle, the relationship between the circle and the lines stays the same as the original graphics. The ability to resize and rotate a graphic without distortion is a major advantage of draw-type graphics. Another advantage is their smaller file size. Because these graphics are stored as sets of instructions the file sizes can be significantly smaller than bitmaps. One of the drawbacks of the draw-type graphics is that the more complex they are, the larger the file size and the longer they take to appear on the screen. Another disadvantage is that they cannot display photorealistic quality.

A **bitmap** represents the **image as an array of dots**, called **pixels**. The screen is made up of a grid, and each part of the grid is a **picture element**. Color information, called **color depth**, is recorded for each pixel. Depending on the number of colors used, a bitmap file can be relatively small.

Bitmap Image:

Vector Graphic:



Graphic image quality

Because draw-type graphics are displayed using a set of instructions that define a line, they are not as discrete as bitmaps. The quality of the image is therefore lower, creating a circle with a draw-type program allows us to specify only one color for the entire circle, but creating a bitmap circle allows us to change the color of every pixel in the circle. Thus the bitmap can more photorealistic. The trade-off is that bitmap graphic files are larger than vector graphics file. File size is a function of the image size and the color depth.

Attributes of Image

Size: The digital size of an image, measured in **kilobytes (K), megabytes (MB), or gigabytes (GB).** File size is proportional to the pixel dimensions of the image. Images with more pixels may produce more detail at a given printed size, but they need more disk space to store and may be slower to edit and print.

For instance, a **l-by-1-inch, 200 dpi** image contains four times as many pixels as a l-by-1-inch, l00-dpi image and so has four times the file size. Image resolution thus becomes a compromise between image quality (capturing all the data you need) and file size. Another factor that affects file size is file format--due to varying compression methods used by GIF, JPEG, and PNG file formats, file sizes can vary considerably for the same pixel dimensions. In the same way, color bit-depth and the number of layers and channels in an image affect file size.

Color: Think of a channel as analogous a plate in the printing process, with a plate applying each layer of color. In addition to these default color channels, channel called alpha channels, can be added to an image for storing and editing selections as masks, and spot color channels can be added to add spot color plates for printing.

An image can have up to 24 channels. By default, Bitmap-mode, grayscale, duotone, and indexed-color images have one channel; RGB and Lab images have three; CMYK images have four. You can add color channels to all image types except Bitmap mode images.

Depth: Bit depth--also called pixel depth or color depth or only depth-measures how much color information is available to display or print each pixel in an image. Greater bit depth (more bits of information per pixel) means more available colors and more accurate color representation in the digital image.

For example, a pixel with a bit depth of 1 has two possible values: black and white. A pixel with a bit depth of 8 has 28, or 256, possible values. And a pixel with a bit depth of 24 has 224, or roughly 16 million, possible values. Common values for bit depth range from 1 to 64 bits per pixel.

Image resolution: The number of pixels displayed per unit of printed length in an image, usually measured in pixels per inch (ppi). In Photoshop, you can change the resolution of an image; In Photoshop, image resolution and pixel dimensions are interdependent. The amount of detail in an image depends on its pixel dimensions, while the image resolution controls how much space the pixels are printed over. Now let us see an example, you can modify an image's resolution without changing the actual pixel data in the image--all you change is the printed size of the image. On the other hand, if you want to maintain the same output dimensions, changing the image's resolution requires change in the total no. of pixels. Increasing the resolution of lower resolution image only spreads the original pixel information across a greater no. of pixels; it rarely improves image quality.

Relationship with Image size, color depth and file size

Image size- is size of image in pixel or in inch (72 pixels is normally 1")

Color depth- is range of colors available for pixel.

File size in bytes= (Image size in pixel X color depth in bit)/8

Image size in pixel	Screen size	Color depth in bits	Number of available colors	File size in bytes (Approx.)
640x480	Full screen	8	256	300,000
320x240	Quarter screen	8	256	77,000
1024x768	Full screen	24	16.7 million	2,400,000

Sources of Graphic Images

Clip art, stock photographs and fine arts: some program com with clip art and stock photographs, but these are often limited or of poor quality. Photodisc, a leader in digital stock images, provides more than 50,000 photographs that can be purchased on CD.

Video images: pictures from video sources such as VCRs, video discs and video camera can be transferred to a computer using video capture card.

Still images: digital cameras can be used to capture images in a digital form are useful in generating graphics. You can take picture as you would with any still camera. Then the camera is connected to a computer and the images are transferred from the camera to the computer.

Scanner Images: Using scanner you can scan pictures from a book, magazine etc. you can adjust color, brightness, contrast. You can crop, zoom and rotate image.

Screen Capture Program: whatever graphics appear on screen can be captured in both Mac and windows computers.

Software for creating and editing graphics

Graphics programs can be categorized as drawing, paint and image-editing programs:

1. Drawing programs- these provides facility for free hand drawing as well as geometric shapes and are useful in creating designs where precise dimension and relationship are important.

E.g. CorelDraw, adobe illustrator for 2d drawings, AutoCAD for 2d and 3D drawings

2. Paint programs-these are the programs who provide the tolls brushes, pens, spray paint used by artists e.g. paint shop pro, Microsoft paint

3. Image editing programs- these are useful for making changes to existing images, such as manipulating the brightness or contrast, or applying textures or patterns.

E.g. Photoshop, photo paint

Features of Graphics Programs

Following are the list of features available on high-end graphics programs.

Type of graphics program- the program is primarily a drawing, a paint, or an image-editing program. Many programs allow to create both draw and paint-type graphics.

Cross-Platform compatibility- the program comes in both windows and Mac version and/or is able to create graphics that can be used on both the ma and windows platforms.

Graphics file support-the program allows saving and/or converting graphics images using several of the popular file formats such as TIFF, BMP, PCX, PICT, JPEG, and GIF.

Layers- the program provide layering of object. Different objects can be stacked in layers. Layers can be made visible/invisible, current etc.

Image enhancement- these programs have brush, airbrush, text and line tools, user defined brushes and the ability to preview the brush size; and an option to paint with texture and pattern.

Selection tools- wide range of selection tools are provided.

Color adjustment- allows adjustment of color of image using color models.

Image manipulation the program can stretch, skew and rotate an image.

Filters- the program has filter for sharpening, softening and stylizing the image.

Antialiasing the program support antialiasing

Format	Color Mode	B/W 1 bit	Grayscale	Color	Alpha Channel	Background Transparency provided
BMP	RGB, Indexed, Grayscale, Bitmap	1		4,8,16,24 bit color		
EPS	LAB. CMYK, RGB, Indexed, Duotone, Grayscale, Bitmap					
DIB		1		4,8 bit color with RLE compression		
PICT	RGB, Indexed, Grayscale, Bitmap		2,4,8 bit grayscale	16,24 bit color	Only with RGB	
PNG	RGB, Indexed, grayscale and bitmap	1	8	8,16,24,32 bit color	Only with Indexed color	24 bit rgb mode, and grayscale
JPG	RGB, grayscale and CMYK		8	8,16, 24, 32 bit rgb	Only with 32 bit RGB	
TIFF	CMYK, LAB, RGB, Indexed color, Grayscale	1	8	4,8,24,32 bit color	Only with Grayscale	
GIF	Indexed Color	1	1	4, 8 bit		
PCX	Index, RGB	1	8	4,8(index),24(rgb) bit color		
TGA	Bitmap, RGB		8	8,32 bit	RGB	

GIF format:

The graphics interchange format (GIF) was invented in 1987 by CompuServe to allow images to be displayed. This format allows for 256 colors, compressions, interlacing and animation. This is very powerful form, suitable for various types of images. GIF uses LZW (Lampel Zev Welch) compression algorithm. There are two GIF standards are available GIF87a and GIF89B. The GIF89a allow multiple images to be included in a single file.

Advantage/Feature:

- **Very powerful format**
- **It provides the option to specify how many number of colors will be saved, which to decrease the size of an image.**
- **Files are compact it uses transparency concept and supports streaming of image. You can get rid of rectangular border of image.**
- **It allows interlacing and animation.**
- **Uses a non-lossy compression technique.**
- **Suitable for on-line transmission and interchange of graphics data.**
- **GIF file format is independent on computer hardware and operating system.**

Disadvantage/Limits:

- Decompression is slower than RLE.
- It uses only palette colors and has no provision for 24-bit RGB color files.
- It has no provision for 4 or 8 bit gray scale and no grayscale or color correction data.

PCX format

Also known as PC paint brush file format. This format was created by ZSoft (Zsoft packbits format). This is widely used for storage of images. PCX supports 256 colors. The current version of PCX format has the ability to store 24 bit color images. It is widely used on scanners, fax and softwares like Photoshop and PageMaker. It supports index and RGB color model.

Bitmaps may be black and white, 16 colors, grayscale (8-bit), paletted (8-bit), or RGB color (24-bit).

Run-length encoding (RLE) compression is supported, and the maximum image size is 64,535 x 64,535 pixels.

These files may contain one, two, or four color planes.

BMP format:

A bitmap file (BMP) contains an exact pixel by pixel mapping of an image, which can then be reconstruct the by rendering application on the display surface on an output device. It can't be compressed. It image is resized quality of image drops drastically. BMP files are Microsoft Windows bitmap files. These files can be created in and read by Windows Paint; all Windows applications can import them.

The BMP file format or bitmap image file is a raster graphic file format for storing digital images. Microsoft developed this format to store bitmap files in a device-independent bitmap or DIB format, thus allowing the Windows operating system to display the digital image on any display output device.

Advantages

- The BMP file format supports various color depths, alpha channels, color profiles, and optional data compression, thus making it relatively versatile.
- An array of software or applications support this format ranging from standard image viewer and web browsers to editing software such as Adobe Photoshop.
- The files can be uncompressed or compressed with lossless compression. Hence, when compared to the JPEG standard, the BMP can be edited, manipulated, and moved without losing image quality.
- An uncompressed BMP file is considerably simple to read. Not that other compressed image file formats are compressed and difficult to decompress.
- Furthermore, the format can be used for storing crisp and high-quality images because it can store color data for each pixel in the image without any compression.
- It is also important to note that the JPEG and GIF formats are also bitmaps, but they use image compression algorithms to decrease their file size.

Disadvantages

- Although uncompressed BMP image files retain their image quality, their large file sizes make them unsuitable for use on the web or for storing in

limited spaces. An alternative is the PNG format, which is also a lossless format, that has a significantly smaller file size.

- Note that everything that can be done with BMP can also be done with TIFF. The TIFF is more flexible and has advantages over other formats such as JPEG standard and PNG format.
- The format is also not suitable for prepress production because it is limited to RGB. Note that prepress requirements should be based on CMYK.
- Remember that there are alternatives to BMP file format that have advantages depending on their use. JPG is suitable for web and file storage, while PNG is ideal for image editing, storage, and web. TIFF provides better flexibility.

TIFF format:

It is acronym for tagged image file format. Almost every graphics application can read and write TIFF files. There are many variations of TIFF, considering that TIFF supports six different encoding routines and three different image modes: black and white, grayscale, and color. Uncompressed TIFF images may be 1, 4, 8, 24,32 bits per pixel. TIFF images compressed using the LZW algorithm may be 4, 8, or 24 bits per pixel. TIFF files can save RGB, CMYK, and Lab color mode information, but not duotones.

The TIFF format differs significantly from other image file formats presented so far. Most web browsers do not support this format, which makes it **unsuitable for images displayed on the web**. However, TIFF offers **significant advantages** when it comes to editing images. The format supports both RGB and CMYK color models and has a high color depth of up to 32 bits per color component. In addition, layers, masks, and transparencies can be saved.

Lossless compression allows you to store or copy files without any loss of quality. The TIFF format is therefore ideal for printing high quality images. Image information is either not compressed at all or compressed without any loss of data. However, the high-quality means that images require **more storage space**. This property also virtually rules out the use of image formats for web.

Advantages	Disadvantages
Lossless compression	Not compatible with many browsers
High image quality	Requires more storage space
Ideal for photograph printouts	
Transparencies and layers	

JPG/JPEG: Joint Photographic Experts Group

The JPG format is the most commonly used image file format. The files are characterized by high compatibility and universal application possibilities. This format can be opened and converted with almost any application. In addition, JPGs offer the full color spectrum with up to 16 million colors. The disadvantage is that compression of an image file leads to the loss of image data due to the combination of similar pixels, which in turn leads to a loss of quality. This is also the main difference between JPG files and the PNG format.

For web use, the quality of a JPG file is sufficient in many cases, and lets you benefit from a fast loading time thanks to the small file size. So-called progressive JPEGs offer an additional advantage in terms of the user experience, as images are loaded pixel by pixel, so that unwanted white areas are avoided on websites. A JPG can also be sent quickly and easily by email as a preview. Without compression, high-quality JPG files are also suitable for printing.

Advantages	Disadvantages
High compatibility	Lossy compression
Widespread use	Doesn't support transparencies and animations
Quick loading time	No layers
Full color spectrum	

TIFF: Tagged Image File Format

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Transparencies and layers	

PSD: Photoshop Document

PSD is the format of the leading image editing program Adobe Photoshop and a format frequently used by graphic designers. However, editing requires the appropriate software. Therefore, the PSD format is often unsuitable for individuals and for collaborative work. You can work around this problem by using Adobe Photoshop and converting the file to another image file type. Conversion is also necessary before printing.

With the PSD format, each image consists of several layers that can be easily edited. In principle, these files are raster graphics, but they can also contain vector graphics. This image file format is therefore ideal for extensive image editing.

Advantages	Disadvantages
Extensive editing of image layers	Photoshop is a prerequisite
Creation of videos and animations possible	Large storage capacity due to layers
Raster and vector graphics	
Conversion to other formats possible	

PDF: Portable Document Format

The PDF image file format is developed by Adobe, but, unlike other Adobe formats, **does not require any company-specific software** (although Acrobat Reader is the corresponding standard). The PDF format has established itself as a reliable exchange format and can be viewed without paid editing software – on any device, any operating system, and any web browser. The format is particularly popular to **showcase print files**.

With the Adobe range of programs, which are subject to a fee, PDFs can be processed in a **versatile and flexible way**. The foundation of this picture format particularly shows its strength for vector graphics, but also maps pixel graphics. Even in the free version, PDFs can be expanded on with **additional features** such as notes, comments, or file attachments. Appropriate security settings can be used to prevent editing by third parties.

Advantages	Disadvantages
High compatibility, independent of platform	Editing only possible with payed version
No chargeable software necessary	Text is recognized as images
The standard for print files	Often high storage space required
Additional features	

EPS: Encapsulated PostScript

In 1987, Adobe published the EPS format in the PostScript programming language. Today, the image format has largely been **replaced by the more widely used PDF**, which is also based on PostScript.

EPS was the first format that made it possible to display documents exactly as they appear in print. EPS files, like PDFs, can be opened with free software **across all platforms**. The most common program to open EPS files is Adobe Acrobat Reader, but there is a wide range of alternatives available. The lossless format integrates pixel and vector graphics and is characterized by a particularly **high degree of adaptability and scalability**. One of the disadvantages is that EPS files are limited to one document page and do not distinguish between vector and bitmap.

Advantages	Disadvantages
High quality images suited for print	Replaced by PDF files
Compatible with almost every design software	Limited to one page
	Doesn't distinguish between vector and bitmap

PNG: Portable Network Graphics

The PNG image file format was developed as an advanced alternative to GIFs. Unlike a GIF, a PNG can be saved with a transparent or semi-transparent background and supports the alpha channel. In addition, the PNG format adapts to optimized computers, meaning that it adjusts itself to a growing range of colors. The color spectrum covers up to 16 million colors, which is significantly more than a GIF. However, this image format is not suitable for printing because PNGs do not support the CMYK color model. This is where the name "Portable Network Graphics" comes from, which implies the primarily digital use.

PNG is a typical **image format for the web** that is characterized by **lossless compression**. Even small files are able to retain their high quality and resolution and show fine nuances. Accordingly, PNGs are suitable for logos or other small images with many shades, making them ideal for further processing and for saving

in different sizes. However, this also means that they **require more memory space**. A PNG file is up to ten times larger than a comparable JPG.

Advantages	Disadvantages
Lossless compressions	Not suitable for print
Supports (semi)-transparency and the alpha channel	Requires more memory space
Full color spectrum	Not universally supported
	Animations are not possible

DIB (Device Independent Bitmap)

A Device-Independent bitmap (DIB) is a raster image file that is similar in structure to the standard Bitmap files (BMP/image/bmp/)). It contains a color table that describes the mapping of RGB colors to the pixel values. This enables DIB to represent image on any device. It can be opened with almost all applications that can open a standard BMP file on Windows as well as macOS. DIB are binary files and have a complex file format similar to BMP. DIB images are independent of the output capabilities of rendering devices in terms of color depth and pixel-per-inch.

A DIB contains the following color and dimension information:

- The color format of the device on which the rectangular image was created.
- The resolution of the device on which the rectangular image was created.
- The palette for the device on which the image was created.
- An array of bits that maps red, green, blue (RGB) triplets to pixels in the rectangular image.
- A data-compression identifier that indicates the data compression scheme (if any) used to reduce the size of the array of bits.

CIF

CIF (*Common Intermediate Format* or *Common Interchange Format*), also known as **FCIF** (*Full Common Intermediate Format*), is a standardized format for the picture resolution, frame rate, color space, and color subsampling of digital video sequences used in video teleconferencing systems. It was first defined in the H.261 standard in 1988.

As the word "common" in its name implies, CIF was designed as a common compromise format to be relatively easy to convert for use either with PAL or NTSC standard displays and cameras. CIF defines a video sequence with a resolution of 352 × 288, which has a simple relationship to the PAL picture size, but with a frame rate of 30000/1001 (roughly 29.97) frames per second like NTSC, with color encoded using a YCbCr representation with 4:2:0 color sampling. It was designed as a compromise between PAL and NTSC schemes, since it uses a picture size that corresponds most easily to PAL, but uses the frame rate of NTSC. The compromise was established as a way to reach international agreement so that video conferencing systems in different countries could communicate with each other without needing two separate modes for displaying the received video.

TGA

A file with .tga extension is a raster graphic format and was created by Truevision Inc. It was designed for the TARGA (Truevision Advanced Raster Adapter) boards and provided Highcolor/truecolor display support for IBM-compatible PCs. It supports 8, 16, 24 and 32 bits per pixel and 8-bit alpha channel. It also supports lossless RLE compression that can be applied to reduce the image size. Digital photos and textures use the TGA image format.

Formation of TGA file format came into being in 1984 by AT&T EPICenter (later extracted and formed as an independent entity known as Truevision) that was working on marketing of new technologies developed by AT&T for color frame buffers. EPICenter was already working on its first two cards, the VDA (Video Display Adapter) and ICB (image capture board) for which work on two file types, .vda and .icb, was already in process. These file formats were codified and less broad specific file format TGA was introduced. TGA was an extension to what was already in use, and provided information such as width, height, pixel depth, associated color map and image origin.

Conversion of Graphics Format

Most of the popular graphics-image editing program allow saving an image from one format to other format. For example photoshop provides saving of image from one format to other format. To save image in different format we use file->save as command, when save as dialog appears we must choose file format in which we want to save.

After specifying file name and choosing file format one more dialog box appears where we have to specify different options for chosen file format then we have to click on ok.

Feature of Photoshop

• We use Photoshop to color correct and sharpen scans. Photoshop gives us the ability to make great looking reproductions of not-so-great looking photographs. After the photo is adjusted (or created) it is then imported into PageMaker or QuarkXPress.

• Photoshop 7.0 delivers new and enhanced tools to help you accomplish your creative best. Experiment with sophisticated painting effects and patterns to turn your ideas into images that stand out.

• It provides new controls and security settings for superior images, precise output, and worry-free file sharing.

• It Work more efficiently. With the help of Photoshop 7.0 we can move files freely between Photoshop and Adobe Illustrator- layers, masks, transparency, and compound shapes are preserved. Maintain rollovers and animation information when you import Photoshop files into illustrator, and export illustrator HTML tables with CSS layers to Photoshop.

•Photoshop 7.0 also allows to design and slice web page and then bring the sliced file directly into GoLive. Use the GoLive Smart Objects feature to generate variable designs automatically from Photoshop templates.

•We can also drag and drop layered Photoshop files into a LiveMotion composition and quickly converts them into animation-ready independent objects, groups, or sequences. Photoshop blending modes, layer masks, and effects are preserved, and the Photoshop artwork stays editable as you animate and code.

•Include transparency information in PDF files saved out of Photoshop, add password protection to secure your Photoshop PDF files, and use the Include Vector Data option to preserve text and vector graphics as resolution-independent objects.

•Photoshop 7.0 rounds out its comprehensive toolset with new capabilities that help you meet every creative challenge, master every production demand, and handle any image-editing task efficiently. With its comprehensive set of retouching, painting, drawing, and Web tools, Photoshop helps you complete any image-editing task efficiently. And with features like the History palette and editable layer effects, you can experiment freely without sacrificing efficiency.

Features of CorelDraw:

In CorelDraw You can choose a variety of new options when exporting a drawing to the SVG file format. You can choose a Unicode encoding method. You can also embed information in an SVG file, or store information in externally linked files. CorelDraw lets you optimize drawings for export to Microsoft Office or WordPerfect Office. CorelDraw Wallows users to exchange files effortlessly, regardless of the language or operating system in which the file was created, ensuring that text displays correctly. CorelDraw lets you can draw freehand strokes that are recognized and converted to basic shapes using the Smart drawing tool. CorelDraw automatically smoothes any unrecognized shapes or curves drawn with the Smart drawing tool. While you move or draw an object in CorelDraw, you can snap it to another object in a drawing.

You can snap an object to a number of snap points in the target object. When the pointer is close to a snap point, the snap point is highlighted, indicating it as the target that the pointer will snap to. CorelDraw has enhanced text alignment. You can align text objects to other objects using the first text baseline, last text baseline, or the bounding box. You can use the enhanced Eyedropper and Paint bucket tools to copy color, object properties, effects, and transformations from one object to another. You can delete portions of objects, called virtual line segments that are between intersections. CorelDraw has improved compatibility with many industry-standard file formats, such as Hewlett Packard Plotter (PLT), AutoCAD Drawing Interchange Format (DXF), and AutoCAD.

Drawing Database (DWG), Computer Graph Metafilee (CGM), Microsoft Word Document and many more.

Symbols are now easier to work with in CorelDraw. The Library is now called the symbol manager, allowing you to easily work with external symbols and symbol libraries. To distinguishing between a symbol and an object the selection handles around a symbol are now blue. As well, the controls for editing are easier to access. Cursor improvements to the 3-point drawing tools let you easily specify width and height as you draw rectangles, and curves.