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3-D Object Representation,Geometric Transformations and Viewing Part-2

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INTRODUCTION

Multimedia is a new aspect of literacy that is being recognized as technology expands the way people communicate. The concept of literacy increasing, is a measure of the ability to read and write. In the modern context, the word, means reading and writing at a level adequate for written communication. A more fundamental meaning is now needed to cope with the numerous media in use, perhaps meaning a level that enables one to function successfully at a certain status in society. Multimedia is the use of several different media to convey information. Several different media are already a part of the canon of

global communication and publication: (text, audio, graphics, animation, video, and interactivity). Others such as

GRAPHICS

Graphics is one of the core component of any multimedia application. We all have heard a famous saying that “one picture conveys a message of 1000 words”, so without graphics the multimedia is quite expressionless. So let us discuss the topic of graphics from multimedia point of view.

What is Graphics

It is a team, which refers to any computer device or program that makes a computer capable of displaying and manipulating pictures. The term also refers to the images themselves.

For example, laser printer and plotters are graphics devices because they permit the computer to output pictures.

It is a display monitor that can display pictures.

Examples of environments where interactive multimedia is being use.

- Touch screen kiosks (museums, hospitals, bank lobbies)
- Distance education (via computer, compressed video , satellite….)
- Interactive, educational software on CDROM or videodisk
- Virtual Reality “ theatres”.

Importance of Multimedia

it is fast emerging as a basic skill that will be important to life in the twenty-first century as reading is now. In fact, multimedia is changing the way people read, interact and distribute information. Instead of limiting one to the linear representation of text as printed in books, multimedia makes reading enjoyable

with a whole new dimension by giving words an important new dynamics. Words in multimedia serve as triggers that readers can use to expand the text in order to learn more about a topic. This is not skilled only by providing more text but by bringing it to life with audio, video and graphics.

Role in education and training

Multimedia giving a considerable way to introduce new concepts or explain a new technology. Individuals find it easy to understand and use.

It can be used for education, training, simulations, digital publications, museum exhibits and so much more. With occurrence of multimedia authoring applications like flash, shockwave and director amongst a host of other equally enchanting applications are available in the market today. Your application of multimedia is only limited by your imagination. Training or institutional methods and advancement in technologies have always gone hand in hand. For example:

Historical method - Oral tradition:

The teacher was the only source of information

The teacher served as a role model

The teacher was the primary resource to meet individual learning

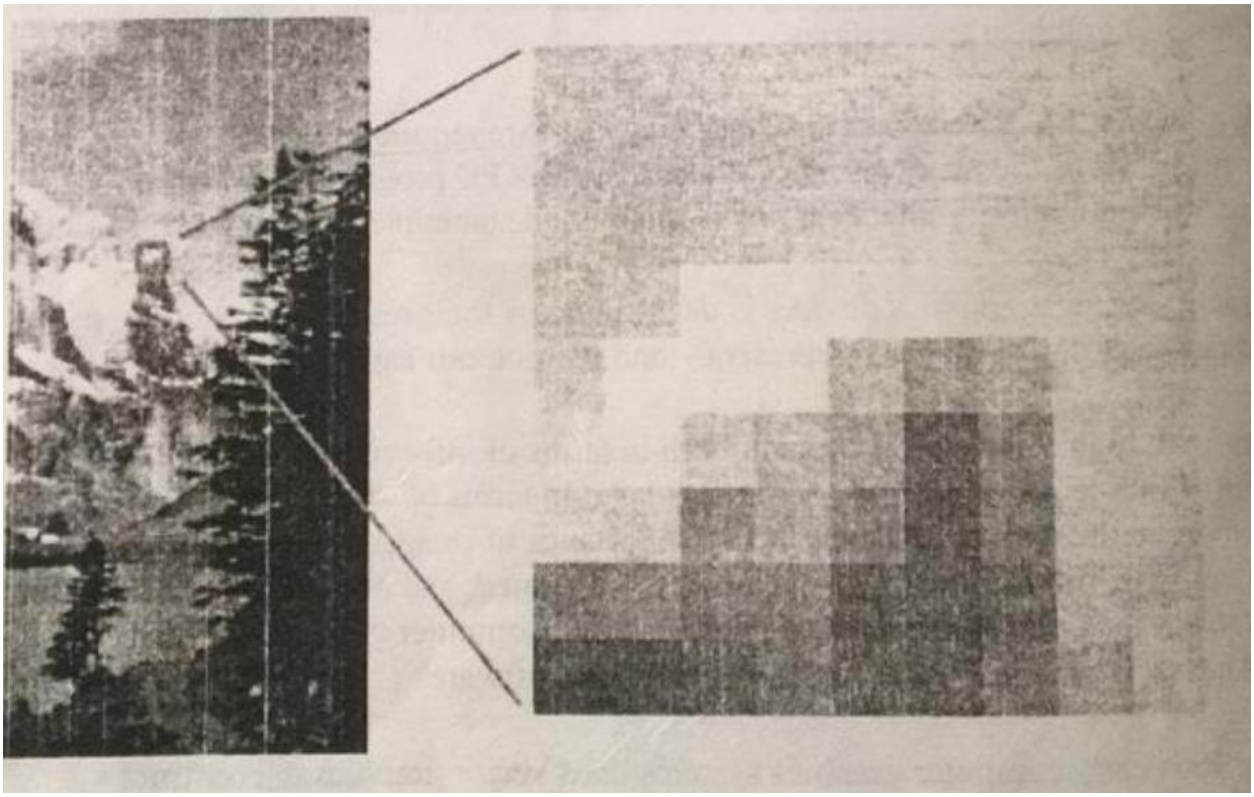
Graphics: It is one of the core component of any multimedia application. We all have heard a famous saying that “one picture conveys a message of 1000words”, so without graphics the multimedia is quite expressionless.

Types of Graphic Images

They have been processed by a computer can usually be divided into two distinct categories. Such images are either bitmap files or vector graphics

As a general rule, scanned images are bitmap files while drawings made in applications like Corel draw or illustrator are saved as vector graphics. But images between these two data types can be converted and it is even possible to mix them in a file.

Bitmap graphics : They are a collection of bits that form an images. The image consists of a matrix of individual dots that have their own color



described using bits.

To the left you see an image and to the right a 250 percent enlargement of the top of one of the mountains. The image consists of hundreds of rows and columns of small elements that all have their own color. One such element is called a pixel. The human eye is not efficient of seeing every individual pixel so we perceive a picture with smooth gradations.

Application of the image decides the number of pixels you need to get a realistic looking image.

Types of bitmap images

They can contain any number of colors but we distinguish between four main categories:

1. **Line art:** These are images that contain only two colors, usually black and white.

2. **Gray scale images**, which contain various shades of grey as well as pure black and white.

3. **Multi tones**: Such images contain shades of two or more colors.

4. **Full over images**: The color information can be described using a number of color spaces: RGB, CMYK for instance.

Characteristics of bitmap data

Bitmap data can take up a lot of room. A CMYK A4-size picture is optimized for medium quality printing (150 lpi) takes up 40 MB, compression can reduce the size of the file.

The images with the enlargement showed one of the main disadvantages of bitmap images: once they are enlarged too much, they look unnatural and blocky. But reducing a picture too much also has a bad influences as it looses sharpness.

Application that can handle bitmap data

There are hundreds of applications on the market that can be used to create or modify bitmap data. For example, Adobe Photoshop, Corel photo-paint etc.

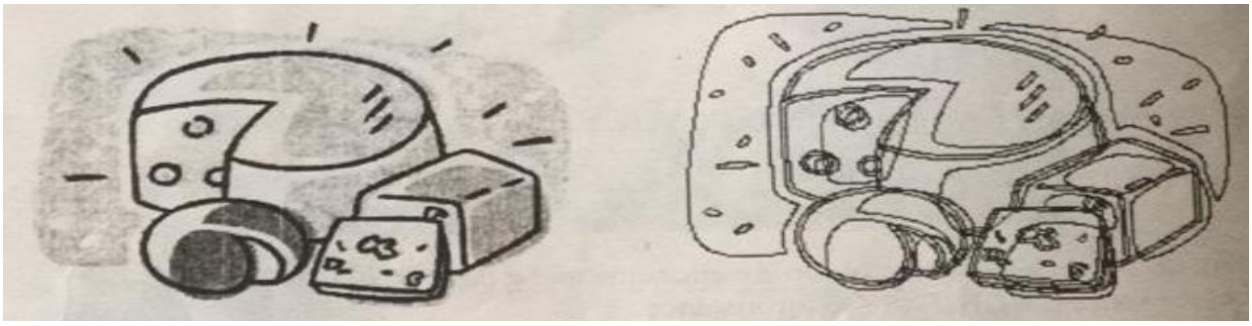
File formats that are used for bitmap data

Bitmap data can be saved in a wide variety of file formats. Among these are:

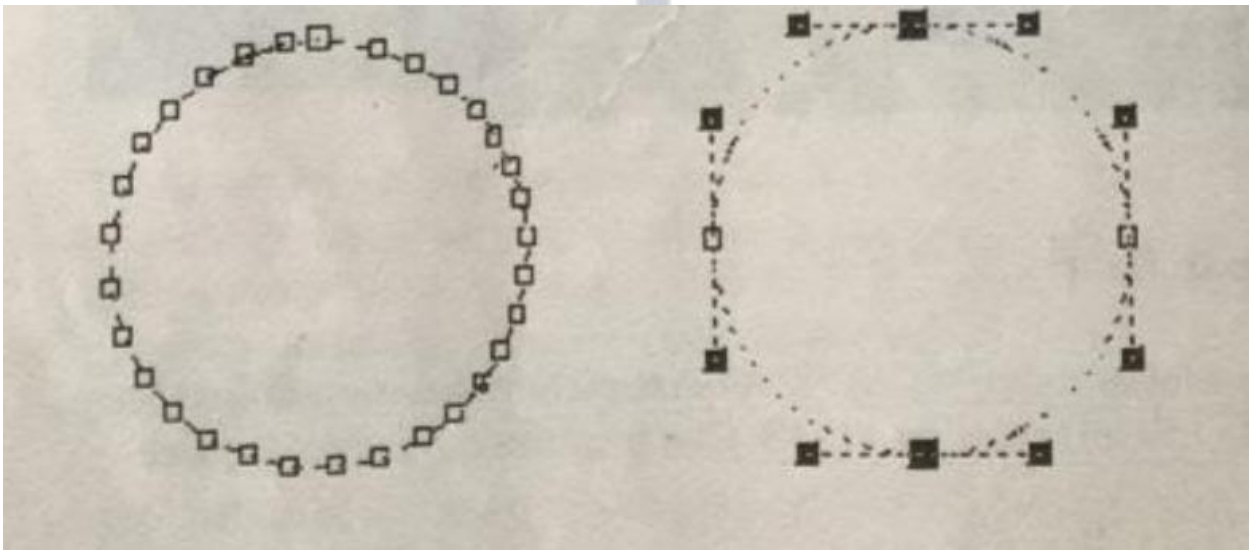
- BMP: It has limited file format that is not suitable for use in prepress
- EPS: It has flexible file format caary both bitmap and vector data.
- JPEG: The JFIF file format, that is mainly used for internet graphics.
- GIF: It is mainly used for internet graphics.
- PDF: It is versatile file format holds any type of data including complete pages, not yet widely used to exchange just images.
- PICT: file format carry both bitmap and vector data but that is mainly used in on Macintosh computers and is not very suitable for prepress.
- TIFF: It is popular bitmap file format in prepress.

Vector graphics: They are images that may be entirely described using mathematical definitions. The image below show the principle. To the left you

see the image itself and to the right you see the image itself and to the right you see the actual lines that make up the drawing.



Every individual line is made up of highest number of small lines that interconnect a large number of or, just a few control points that are connected using Bezier curves. Process that generates the best results and that is used by most drawing programs.



This drawing demonstrates the two principle. To the left circle formed by connecting a number of points using straight lines. To the right, you see the same circle that is now drawn using 4 points only.

Characteristics of vector drawings

They are usually pretty small files because they contain only data about the Bezier curves that form the drawings.

The file size of viewing image is larger than the actual Bezier data themselves. Vector drawings can usually be scaled without any loss in quality. This makes them ideal company logo's maps or other objects that have to be resized frequently.

Applications that can handle vector data

There are hundreds of applications on the market that can be used to create or modify vector data. In prepress, adobe illustrator, Corel draw are the most popular.

File formats that are used for vector data

This data can be saved in a wide variety of file formats. Among these are:

- PDF: It is versatile file format that carry about any type of data including complete pages, not yet widely used to exchange just images.
- PICT: It is a file format that holds both bitmap and vector data but that is mainly used in on Macintosh computers
- EPS: It IS flexible file format that carry both bitmap and vector data.

It is often necessary to convert images from bitmap data to vector data or back. Some possible uses include:

- Vector drawings often have to be converted to bitmaps if they will be used on a web page.
- If you scan logo, it is a bitmap image but if it is going to be resized time and again depending upon its application then, it becomes practical to have logo as

a vector drawing so its file area is lower and you can change the size without worrying about any loss in quality.

- Vector drawings are complicated for a RIP to be output on film or plate. Sometimes converting them to bitmap simplifies the file.

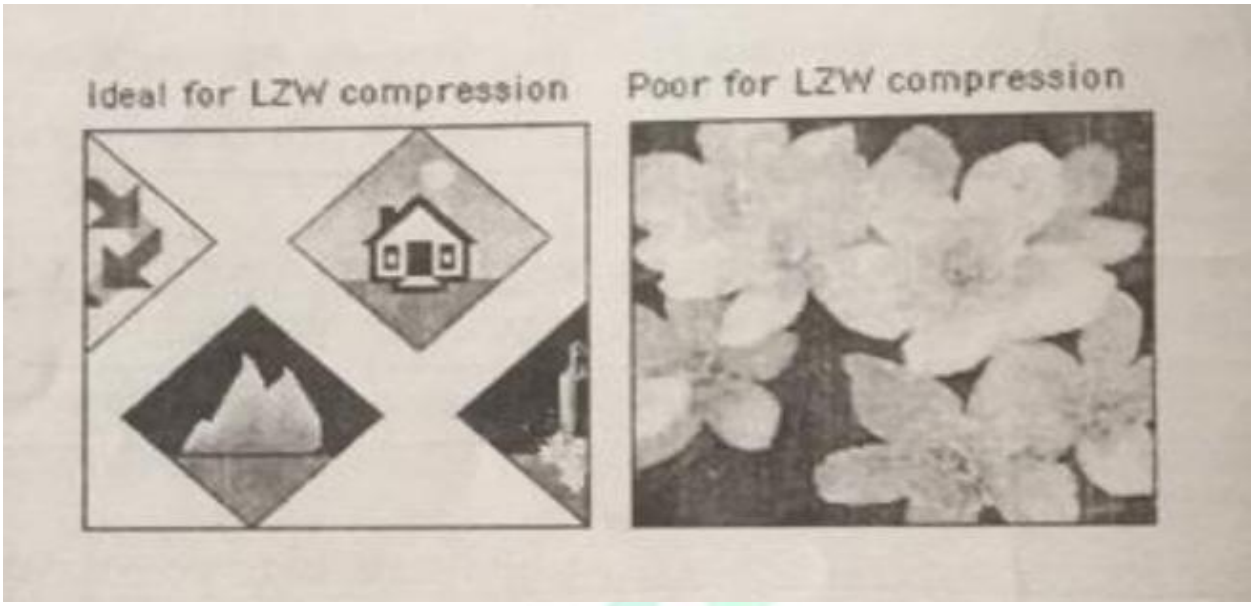
Graphic file compression formats

Web graphics are by necessity compressed because of the bandwidth issues surrounding networked delivery of information and because image files containing so much information. File format is the specific format in which the image is saved. The format is identified by the three-letter extension at the end of the file name. Every format has its own characteristics, advantages and disadvantages. By defining the file format it may be possible to determine the number of pixels and additional information. Each file format will have a reference to the numbers of bits per pixel that the format is capable of supporting.

Graph interchange format: it is an efficient means to transmit images across data networks. In the early 1990s the original designers of the world wide adopted GIF for its efficiency and widespread familiarity. The overwhelming majority of images on the web are now in GIF format, and virtually all web browsers that support graphics can display GIF files.

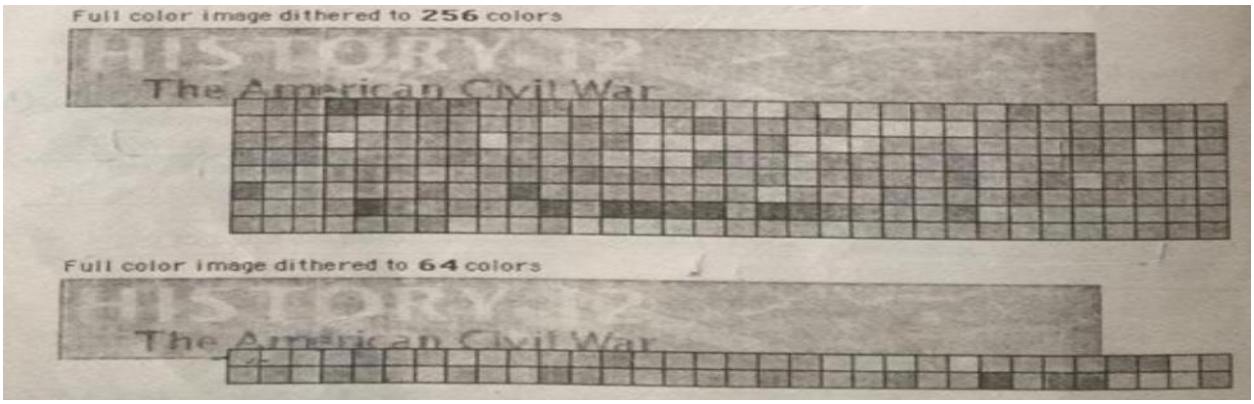
GIF file compression

The GIF format uses a relatively basic form of file compression that squeezes out inefficiencies in the data storage without losing data or distorting the image. The LZW compression scheme is best at compression scheme used in GIF format. It is less efficient at compressing complicated pictures with many colors and complex textures.



Improving GIF compression

Characteristics of LZW compression can be used to improve its efficient and thereby reduce the size of your GIF graphics. The policy is to decrease the number of colors in your GIF image to the minimum number necessary and to remove stray colors that are not required to represent the image. It can not have more than 256 colors but it can have fewer colors, down to a minimum of two(black and white). Images with fewer colors will compress more efficiently under LZW compression.

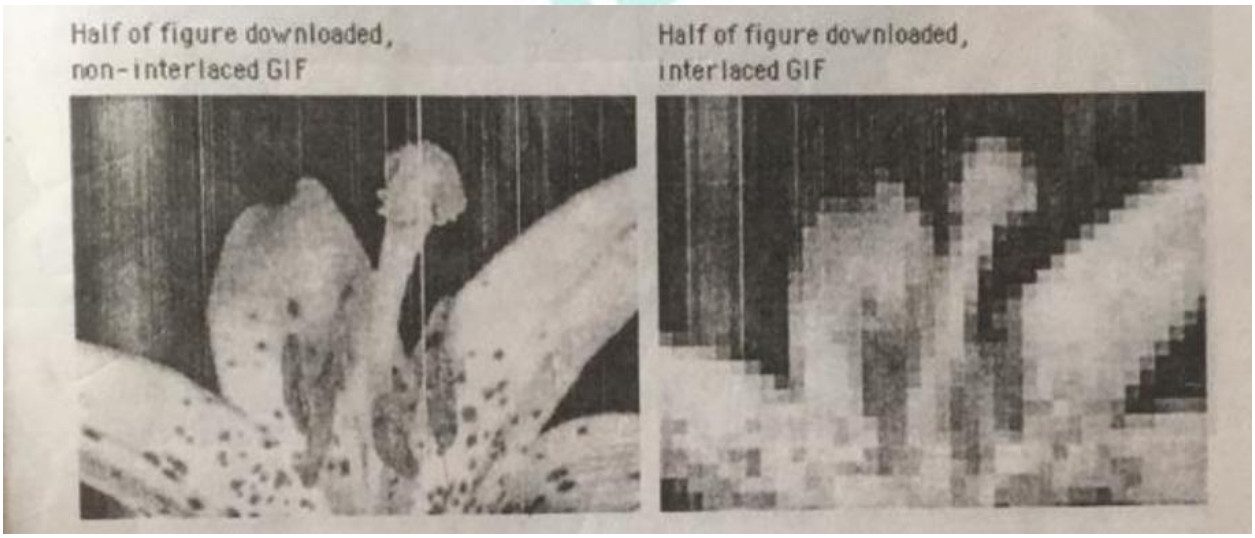


Interlaced GIF

The conventional i.e., not interlaced GIF graphic downloads one line of pixels at a time from top to bottom and browsers display each line of the image as it gradually builds on the screen.

In interlaced GIF files the images data is stored in a format that allows browsers to build a low-resolution version of the full-sized GIF picture on the screen while the file is downloading. The most important benefit of interlacing is that it gives the reader a preview of the full area of the picture while the picture downloads into the browser.

It is best for larger GIF images such as illustrations and photographs. It is poor choice for small GIF graphics such as navigations bars, buttons, and icons.



Animated GIF

For combining the multiple GIF images into a single file to create animations, GIF file format is used

There are a number of drawbacks to this functionality.

The GIF format applies no compression between frames, so if you are combing four 30-kilobyte images into a single animation, you will end up with a 120 KB GIF file to push through the wire.

Another drawback of GIF animation is that there are no interface controls for this file format. GIF animations play whether you want them to not. And if looping is enabled the animations play again and again.

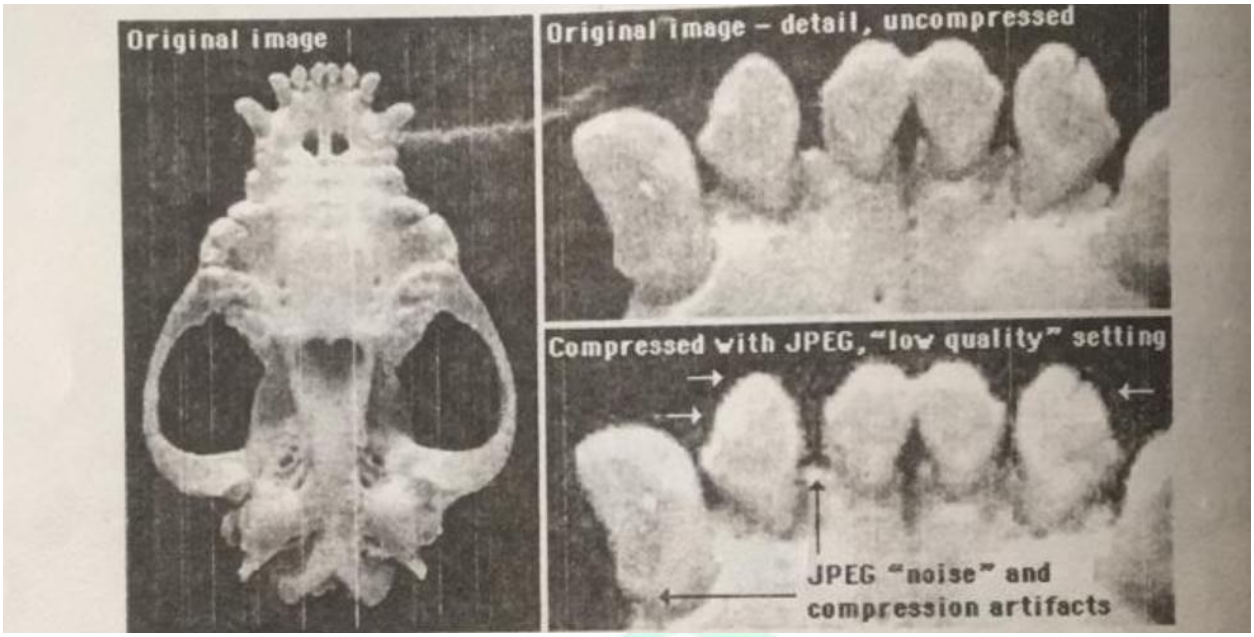
JPEG graphics

The other graphic format commonly used on the web to minimize graphics file size is the joint photographic experts group compression scheme. Unlike, GIF graphics, JPEG images are full-color images. JPEG images find great acceptability among photographers, artists, graphic designers and other groups for whom image quality is paramount and where color fidelity can not be compromised.

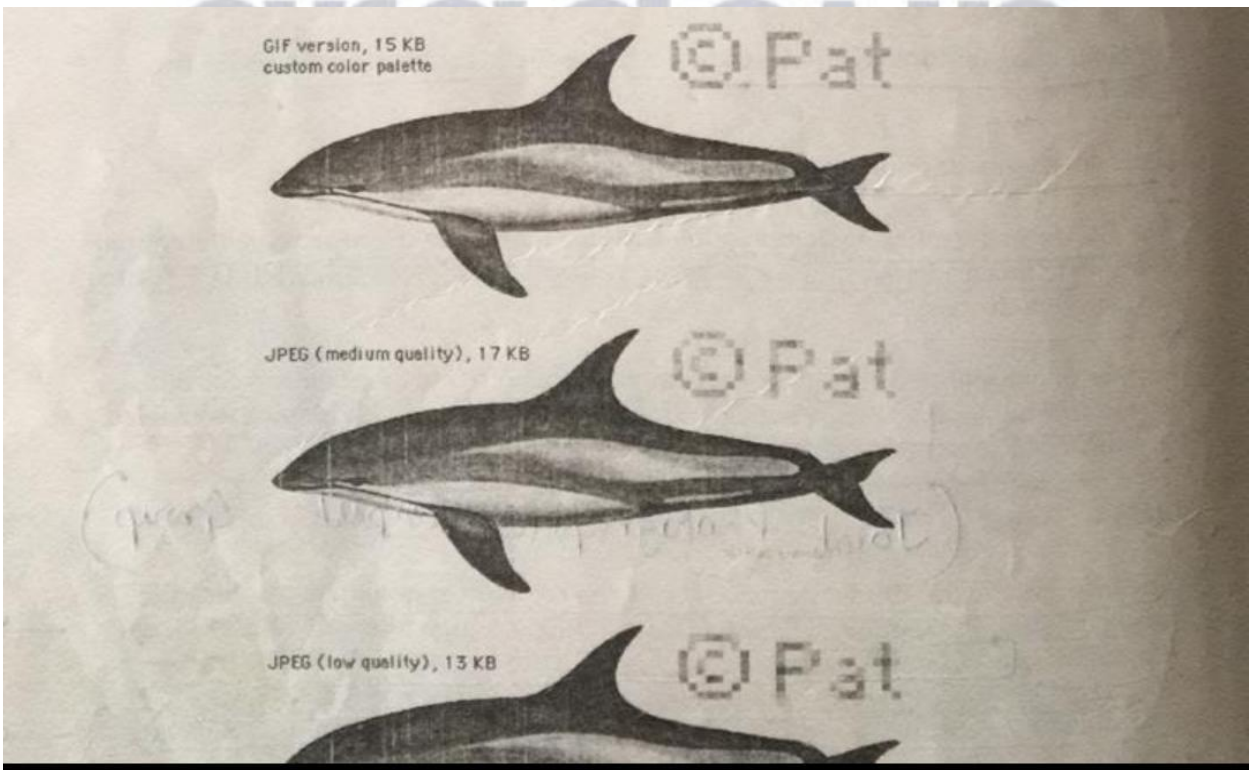
JPEG compression uses a complex mathematical technique called a discrete cosine transformation to produce a sliding scale of graphics compression. The degree of compacting can chosen but it is inversely proportional to image. The new you compress a picture with JPEG compression, the more you degrade its quality.

JPEG can achieve incredible compression ratios upto 1:100

This is possible because it discards “unnecessary” data as it compresses the image, and it is thus called a “lossy” compression technique.



Another example of JPEG compression is shown. Note, the extensive compression noise and distortion present in the bottom dolphin – the download time saved is not worth the degrading of the images.



Uses of JPEG and GIF files

Netscape navigator, Microsoft internet explorer , and most other browsers support both GIF and JPEG graphics.

In theory, you could use either graphic format for the visual elements of your web pages. In practice, however, most web developers still favour the GIF format for most page design elements, diagrams, and images that must not dither on 8-bit display screens.

Designers choose the JPEG format mostly for photographs and complex "photographic" illustrations.

Advantages of GIF files

- It is most widely supported graphics format on the web
- GIFs of diagrammatic images look better than JPEGs.
- It supports transparency and interlacing.

Advantages of JPEG images

- Huge compression ratios mean faster download speeds.
- It produces excellent results for most photographs and complex images.
- It supports full-color(24-bit. "true color")images.

Other file formats

BMP/DIB/RLE file formats

These are known as device independent bitmap files. They exist in two different formats

a) Format and b) windows format. BMP is the standard MS-windows raster format created with windows paintbrush and used as wallpaper for the background while running windows. DIB or device independent bitmap file are mainly

applied in computer multimedia systems and can be used as image files in the windows environment. RLE or run length coding files are actually DIB files that use one of the RLE compression routines.

IMG/MAC/MSP file formats

IMG files were originally designed to work with GEM paint program and can handle monochrome and grey level images only.

MAC files are used in Macintosh Mac paint application. This format has two basic options:

- Ported Mac paint files that include a Mac binary header, and
- They are used with PFS first publisher with no header.

MSP files derived in the pre-historic MS-paint and can be converted into BMP files.

WPG

It is used by word perfect. It is appeared with the release of word perfect 5.0. these files can contain bitmaps, line arts and vector graphics. It specification allows files up to 256 colors.

IFF (interchange file format)

It is used to transfer documents to and from commodore Amiga computers.

Audio and video

They are working as ear and eye of multimedia. Both of them are heavily contributing to any multimedia application. Let us discuss something about the association of these fields with multimedia.

Sound and audio

It is a mechanical energy disturbance that propagates through matter as a wave. It is characterized by the various properties which are frequency, wavelength, period, velocity or speed.

Noise and sound often mean the same thing but a noise is an unwanted sound in science and engineering, it is an undesirable component that obscures a signal.

It propagates as waves of alternating pressure, causing local regions of compression and rarefaction. Particles in the medium are displayed by the wave and oscillate as result of the displacement. The scientific study of sound is called acoustics. The sound portion of the program, or a track recorded on a videotape which contains sound, music, or narration is called audio.

Analog sound vs. digital sound

Sound engineers have been debating the respective merits of analog and digital sound reproduction ever since the appearance of digital sound recordings. This is one of the never ending controversies in the field, much like that compression of vacuum tube amplifiers against those of solid state electronics. In consumer audio, the opposition is usually between vinyl LP recordings and compact discs.

An analog recoding is one where the original sound signals modulated onto another physical signal carried on some media or the groove of a gramophone disc or the magnetic field of a magnetic tape. A physical quantity in the medium is directly related to the physical properties of the sound .

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