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Q1(i) What is Multimedia and how it helps in the field of education?

Ans: Multimedia is media and content that uses a combination of different content forms. The term can be used as a noun (a medium with multiple content forms) or as an adjective describing a medium as having multiple content forms. The term is used in contrast to media which use only rudimentary computer display such as text-only, or traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video, or interactivity content forms.

Multimedia is usually recorded and played, displayed or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance. *Multimedia* (as an adjective) also describes electronic media devices used to store and experience multimedia content. Multimedia is distinguished from mixed media in fine art; by including audio, for example, it has a broader scope. The term "rich media" is synonymous for interactive multimedia. Hypermedia can be considered one particular multimedia application.

Type of Multimedia:

Multimedia may be broadly divided into linear and non-linear categories. Linear active content progresses often without any navigational control for the viewer such as a cinema presentation. Non-linear uses interactivity to control progress as with a video game or self-paced computer based training. Hypermedia is an example of non-linear content.

Multimedia presentations can be live or recorded. A recorded presentation may allow interactivity via a navigation system. A live multimedia presentation may allow interactivity via an interaction with the presenter or performer.

The development and use of multimedia technologies in education. Particular emphasis is put on the instructional uses of multimedia. Interest and investment in this technology are increasing, and indications are that it has appeal to both teachers and students.

Multimedia can be defined generically as any combination of two or more media such as sound, images, text, animation, and video. For educational technology purposes,*multimedia* refers to computer-based systems that use associative linkages to allow users to navigate and retrieve information stored in a combination of text, sounds, graphics, video, and other media.

Howard Gardner's theory of multiple intelligences establishes a theoretical framework for using multimedia in instruction. His theory relates to other widely recognized theories on learning styles and modalities of learning.

Multimedia literacy is a growing concern among educators as American society continues to depend on image technologies such as television, video, and film. Educators need to prepare children to live and function in a society that relies on multimedia for information storage and dissemination.

Components of multimedia systems are reviewed in this chapter. Hardware components include a variety of both basic and specialized equipment. Software components include authoring languages, image handling software, and digital animation packages.

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Multimedia can be used in instruction in a variety of creative and stimulating ways. Applications include teacher presentations, student projects, and discovery learning. Although teachers are encouraged to develop their own

materials, many excellent educational multimedia products are also available.

When developing original multimedia applications, educators should be aware of copyright issues and infringements, especially when incorporating video, images, and sound from other sources. The chapter concludes with a discussion of media distribution systems.

1Q.(ii) Write about authoring tools in multimedia?

Ans: Multimedia authoring tools refers to that process of developing a multimedia project and multimedia product using specialized package. Authoring tools are software package with slandered user interface element that are used to product contains for publishing.

Authoring software provides and integrated environment for building together content and function of our project and typically includes everything need to create edit and import specifies type of data assemble row data into playback sequence and provides a structure method or language for responding to the user import.

Multimedia authoring tools provides the important framework we need for organizing and editing the element of out multimedia project including graphics sound, animation and video clip.

(i)   Video production

(ii)   Kiosk application

(iii)   Animation

(iv)   Games

(v)   Interactive wed site

(vi)   Presentation

(vii)   Demo disk and guiding tools

(viii)   Interactive training

(ix)   Simulation prototype and technical visualization

Types of Authoring Tools: Multimedia authoring tools is the final stage of multimedia project production, it is the most important phases of multimedia project design and development because the output of this phase will replicated and introduce in the market all ateration modification revision consideration and redesigning ends with this pash.

When a multimedia application is produce via and authoring system the author goes through several stage.

The various authoring tools are categories into:

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   (i)   Card or page base authoring tools
   (ii)   Icon base authoring tools
   (iii)   Time base authoring tools

Card or page base authoring tools: In this authoring system multimedia elements are organized as pages of book or stack of cards.

      Every page of the book may contain many media elements includeing sound video and animation as the user and consumer proceeds with the project the page progress in sequence as determine by the user integration.

      Indivisible pages can be linked so that it is possible to move over from one page to move over from this type of authoring method is based suited for these projects whose contact can be arrange and individual sequence of all frame are independent of another.

      Since the educational software is based on page based tools these are very useful in developing education application.

      Tools break is an example of page based multimedia development software.

Icon based authoring tools: In these authoring tools multimedia element and events are organized as a structure or flow chart. In their authoring system multimedia element an interaction used as project in a structural framework or process. Icon or object based event driven tools simplify the organization of our project and typically display flow diagram of activity as long branching path. In complete notational structure this charting is particularly useful during development.

Time base authoring tools: Time base authoring tools allow the designer to arrange various media element and event of the multimedia sequency along as well as define time line. As the time advance from zero second (which will starting point of the project) the event also begin occur, one after the another. The event may include media file updating and playbacks as well as transition of informal from one present another. The speed at which these transition occur can also be accurately control. This type of authoring methodology can be very well adopted for these projects where in the information flow can be directed from being to end much like movie, song, etc.

      Macromedia director is and example of multimedia authoring system that max use of this methodology.

2Q.(a). Describe briefly about the different types of software in multimedia?

Ans: Multimedia is media and content that uses a combination of different content forms. The term can be used as a noun (a medium with multiple content forms) or as an adjective describing a medium as having multiple content forms. The term is used in contrast to media which use only rudimentary computer display such as text-only, or traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video, or interactivity content forms.

Multimedia is usually recorded and played, displayed or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance. *Multimedia* (as an adjective) also describes electronic media devices used to store and experience multimedia content. Multimedia is distinguished from mixed media in fine art; by including audio, for example, it has a broader scope. The term "rich media" is synonymous for interactive multimedia. Hypermedia can be considered one particular multimedia application.

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Photo editing, <u>media player</u>, and video editing programs are part of daily life for many people. If a person rotates or brightens photos or listens to music on a computer, he or she is already familiar with some types of multimedia software. In addition, <u>presentation software</u> is commonly found in business, educational, and entertainment environments to aid communication in meetings. These types of multimedia software come pre-installed on some operating systems, are available free online, or taught in classrooms.

Also known as graphic editing or photo <u>retouching</u> software, photo <u>editing software</u> is a type ofmultimedia software that allows the user to alter images. These programs can be simple or incredibly advanced; in fact, sometimes higher education institutions offer courses in the most popular photo editing software. This type of multimedia software gives a user the ability to manipulate photos in countless ways, including changing its color, removing objects, and tweaking the features of people and objects.

Multimedia is the encompass of all media used in electronics, particularly with computers. The use ofcomputers to present text, graphics, video, animation, and sound in an integrated way. Long touted as the future revolution in computing, multimedia applications were, until the mid-90s, uncommon due to the expensive hardware required. With increases in performance and decreases in price, however, multimedia is now commonplace. Nearly all Personal Computers are capable of displaying video, though the resolution available depends on the power of the computer's Video adapter and microprocessor.

Interactive Multimedia is the means to interface with these media typically with a computer keyboard, mouse, touch screen, on screen buttons, and text entry allowing a user to make decisions as to what takes place next.

With Scala products you can present multimedia by creating presentations which can include text, graphics, video, animation, and sound in the manner you wish. You can setup how your presentation is interactive with a computer keyboard, mouse, touch screen, on screen buttons, and text entry. Your presentations can be published to display on the internet, a stand-alone CD or large plasma screen to present advertisements or information.

2Q (b) What are the hardware tools and peripherals required for multimedia?

Ans: What is multimedia? Let's break the word down. Multi- means many and -Media means showing information. So, put them together and multimedia is showing information, using many different methods to get across those ideas.

Many people think, "Oh, that's a Powerpoint presentation, right?" Well, it could be, but there are many other programs that let you create multimedia shows. True, Powerpoint is the most widely used, but once you learn how to use one type of multimedia presentation software, you should be able to use those skills on other, similar software.

A few years ago, purchasing a multimedia computer was quite complicated, but because of the tremendous growth of multimedia applications, most computers that you buy today are already designed to run multimedia applications. If you are interested in developing multimedia applications, however, you should consider a more powerful computer. If your computer is too slow, productivity will be lost; and in today's fast-paced technological society, you need a fast computer to keep up.

Effectively developing and delivering multimedia applications requires a more powerful personal computer than one used to write a letter, prepare a budget, or answer e-mail. Because personal computers are becoming more and more powerful, most of those purchased today have built-in multimedia capabilities that allow you to deliver and display multimedia applications. However, if creation of high-end multimedia applications is your goal, you will definitely want to consider certain specifications that have been established specifically for multimedia.

VIDEO CAMERAS

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With the right adapters, software, and hardware, camcorders and digital video cameras can be used to capture full-motion images. Although regular camcorders store video on film, digital video cameras store images as digital data. This enables the digital images to be transferred directly into the product being created. Digital video cameras range in price from under a hundred dollars for small desktop cameras like the Connectix QuickCam, to thousands of dollars for higher-end equipment.

Digital video cameras offer an inexpensive means of getting images into your computer, however, you should be aware that the resolution is often quite low and the color is sometimes questionable.

DIGITAL CAMERAS

Digital cameras allow you to take pictures just as you would with a regular camera, but without film developing and processing. Unlike regular cameras, photographs are not stored on film but are instead stored in a digital format on magnetic disk or internal memory. The photographs can be immediately recognized by the computer and added to any multimedia product.

A graphics tablet is similar to a digitizing tablet, however, it contains additional characters and commands. Like the digitizing tablet, each location on the graphics tablet corresponds to a specific location on the screen.

MICROPHONES

As is true with most equipment, all microphones are not created equal. If you are planning to use a microphone for input, you will want to purchase a superior, high-quality microphone because your recordings will depend on its quality.

Next to the original sound, the microphone is the most important factor in any sound system. The microphone is designed to pick up and amplify incoming acoustic waves or harmonics precisely and correctly and convert them to electrical signals. Depending on its sensitivity, the microphone will pick up the sound of someone's voice, sound from a musical instrument, and any other sound that comes to it. Regardless of the quality of the other audio-system

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components, the true attributes of the original sound are forever lost if the microphone does not capture them,

Macintosh computers come with a built-in microphone, and more and more PCs that include Sound Blaster sound cards also include a microphone. These microphones are generally adequate for medium-quality sound recording of voiceover's and narration. These microphones are not adequate for recording music

MIDI HARDWARE

MIDI (Musical Instrument Digital Interface) is a standard that was agreed upon by the major manufacturers of musical instruments. The MIDI standard was established so musical instruments could be hooked together and could thereby communicate with one another.

To communicate, MIDI instruments have an "in" port and an "out" port that enables them to be connected to one another. Some MIDI instruments also have a "through" port that allows several MIDI instruments to be daisy chained together.

STORAGE

Multimedia products require much greater storage capacity than text-based data. All multimedia authors soon learn that huge drives are essential for the enormous files used in multimedia and audiovisual creation. Floppy diskettes really aren't useful for storing multimedia products. Even small presentations will quickly consume the 1.44 MB of storage allotted to a high-density diskette.

In addition to a hefty storage capacity, a fast drive is also important. This is because large files, even if they are compressed, take a long time to load and a long time to save and back up. Consequently, if the drive is slow, frustration and lost productivity will undoubtedly follow. When purchasing a storage medium, consider the speed of the device-how fast it can retrieve and save large files as well as the size of its storage capacity.

OPTICAL DISKS

Optical storage offers much higher storage capacity than magnetic storage. This makes it a much better medium for storing and distributing multimedia products that are full of graphics, audio, and video files. In addition, reading data with lasers is more precise. Therefore, when working with multimedia, optical storage media such as Magneto-Optical Disks (MO) and CD-ROM (CD) is more common than magnetic media. Digital Versatile Disk (DVD), a newer optical storage medium with even greater storage capacity than a CD, will probably take the place of these other optical media within the next few years.

CD'S
CD-ROM stands for compact disk read only memory. A CD-ROM can hold about 650MB of data. Because CDs provide so much storage capacity, they are ideal for storing large data files, graphics, sound, and video. Entire references such as encyclopedias complete with text and graphics, as well as audio and video to further enhance the information, can be stored on one CD-ROM. In addition, interactive components that enable the user to respond to and control the medium ensure that the user will be even more attentive and likely to retain information. For these reasons, CDs have been the medium of choice for publishing multimedia applications.

DVDS
DVD, which in some places stands for Digital Versatile Disk, but really doesn't stand for anything, is the newest and most promising multimedia storage and distribution technology. DVD technology offers the greatest potential to multimedia because its storage capacity is extensive.

MONITORS
The image displayed on the computer monitor depends on the quality of the monitor and software, as well as the capability of the video adapter card. For multimedia applications, it is critical that all of these elements work together to create high quality graphic images. However,

because all display systems are not the same, you will have very little control over how your images appear on other

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people's systems. Consequently, it is a good idea to test your projects on different display systems to see how your digital images appear.

3Q (a) What are the different types of file format and images used in multimedia?
Ans:
 Following file format use in multimedia is given bellow

Images

A single still video image, whether created by a drawing or paint program or scanned from a book or grabbed with a video camera, can be stored in any of a wide variety of file formats. The data will be stored in a raster or a vector file format. A raster image is one composed of a field of pixels, each characterized by a color, and is usually created in paint programs, by scanning a picture or by grabbing an image. A vector format is created almost always by a drawing/CAD program and consists not of pixels, but objects such as curves, shades, and characters.

Raster formats can be generally separated into two categories. Lossy formats lose resolution (sharpness) when converted to, while lossless formats preserve image information. For example, when converting from a GIF (lossless) to a JPEG (lossy), some informationis lost. However, lossy formats tend to be much smaller than their lossless counterparts, and for most photographic images, there will be almost no subjective difference.

The following list of image file formats is not inclusive, but describes the formats that comprise the majority of files encountered on theInternet. All of the following formats are raster formats unless otherwise stated.

.gif

GIF, which stands for Graphics Interchange Format, is a graphics file format originally popularized by Compuserve. GIF files are encoded, 256 color (8-bit) images which use a lossless compression technique and can be opened by almost all graphics programsincluding xv, Lview, and Photoshop.

.jpg, .jpeg, .jfif

JPEG stands for Joint Photographics Experts Group. JPG (more accurately JFIF) files are true color (16.7 million colors, or 24-bit)images that are compressed using a lossy compression algorithm called JPEG. This means that files may degrade in quality when they are JPEG encoded. However, this degradation is not noticeable for most scanned photographs and images with smoothly colored areas. Do not use JPEG encoding on line art or cartoon images. JPEG files are significantly smaller than most other formats and can be opened and saved with many graphics programs on all platforms.

.ps, .eps, .epsi

Postscript (PS), Encapsulated Postscript (EPS), and Encapsulated Postscript with preview image (EPSI) are all *vector* graphics fileformats. They are mainly used to store printed or printable documents and are in widespread use.

.pdf

PDF stands for Portable Document Format and is created by Adobe Acrobat. An Enhancement of the Postscript language, PDFfiles contain all the same text and page layout information but can include many WWW features such as images, links, and heading references. PDF files can be viewed using Adobe Acrobat software.

.tif, .tiff

TIFF (Tagged Image File Format) files are uncompressed true color images. Most graphics programs allow you to store TIFFs with compression. These files can be opened by many graphics programs including xv, Lview, and Photoshop.

.bmp

BMP files are Windows Bitmap files. They are usually 8-bit color images (256 colors) and can be viewed by many programsincluding Windows Paintbrush. BMP files can be used as backgrounds for the Windows desktop.

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.pcx

A PCX is a Zsoft paint file. PCXs are openable by Windows Paintbrush.

.pbm,.ppm,.pgm

Portable Bitmap, Portable Pixmap, and Portable Graymap are all file formats used by the PBMtools set of Unix graphics utilities. Most commonly used on Unix workstations, they are openable by Photoshop in addition to xv.

.psd

PSD signifies an Adobe Photoshop graphic file. They are openable on Pentium and Macintosh systems by Adobe Photoshop.

Movies

Movies, as they are labelled here, consist of a series of still images, sometimes with embedded audio information, united in such a way as to produce a single playable file. MPEG and QuickTime are the two most commonly encountered movie formats on the Internet.

.avi

AVI is a file format developed by Microsoft and primarily used in Windows. AVIs are compressed movies that can be viewed inWindows environments with Media Player and on Unix workstations with xanim.

.flc, .fli

An FLC is an Autodesk Flick movie and is a raw, uncompressed series of frames. They take up more space than other formats, but the image quality is higher. You can play them within Windows with Media Player.

.mov, .MooV, .qt

Any of these file extensions means that the file is an Apple Quicktime movie. Applications that can view QuickTime video include: Simple Text, WordPerfect, and Microsoft Word. Flattened QuickTime video clips can be viewed on Unix workstations with xanim and on IBM-compatible personal computers with Media Player.

.mpg, .mpeg

MPEG files use the MPEG-1 video compression routine, a universal protocol for creating and displaying time coded data created by the Motion Picture Experts Group. MPEG video clips can be viewed with **mpeg_play** on Unix workstations, Sparkle on Macintoshes, and MPEG_PLAY on IBM-compatible personal computers.

Sound

Files containing data used to recreate audio on a computer are called audio files and are also available in many different formats. Similar to image formats, audio files can either store a digital sampling of the sound wave (sound files, like a raster image) or contain a digital encoding of the type, shape, and timing of all the notes used in the composition (music files, like vector images).

.au

An AU is an audio sound file native to Sun workstations. It is playable by wplany on Pentium computers or with Netscape's built-inAU player. .

.iff

An IFF is a sound file playable on Pentium computers with wplany and on Unix workstations with xanim.

.mid, .rmi

MIDI files can be played with the Windows MIDI sequencer. They are music files that conform to the MIDI standard. Play them with Media Player on the Pentium computers, or load them into MusicProse or Finale on a Macintosh.

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.wav

WAV (wave) files are Microsoft's native audio sound format. WAV files can include 8-bit or 16-bit sound, in mono or

stereo. They can be played on Pentium computers with Media Player and wplany.
Music software packages such as MusicProse and Finale, can also be used to compose music, but they use their own proprietary music formats.

3Q. (b) Explain about the digital imaging regarding still and moving pictures?

Ans: Digital imaging or **digital image acquisition** is the creation of digital images, typically from a physical scene. The term is often assumed to imply or include the processing, compression, storage, printing, and display of such images. The most usual method is by digital photography with a digital camera but other methods are also employed.

How Digital Imaging work: Digital imaging has the capabilities of producing surrealistic, out of this world, yet fully believable images. The technology behind a typical photograph and digital image are very different from one another. Photography that is film-based contains, "a number of chemical reactions to produce a print or transparency," [2]. Whereas, a digital image is associated with, "the capturing of an image, uploading it to a computer, manipulating it, and finally outputting the finished picture," . The digital imaging process begins with the acquisition of an electronic or photographic image. Regardless of the type of image, after it is captured, it must be converted to digital data . The digital data is then fed into a computer, where a professional quality image is produced. Digital imaging can do anything from, "anchor pictured objects" to "bend, twist, stretch and contort physical objects in cartoonlike ways," . Once in the hands of a powerful machine, like a computer, digital imaging has endless possibilities. According to Grotta, every pixel can be changed, moved or deleted, and that is the very essence of what digital imaging is all about.

Still Image: Still images are visual representations that do not move. Text is ideal for transmitting information in a highly articulate manner that can be consistently interpreted irrespective of the user. Still images, however, allow the content creator to convey information which can be more freely interpreted by the user. A picture does indeed paint a thousand words but the meaning of the picture will vary from user to user.

Bit Depth

Pictures are often described in terms of the number of colors found in the image. A simple black and white line drawing is considered to be a 1-bit picture. The word "bit" is a contraction for "binary digit" and refers to a digit in the binary number system. Humans most often use the decimal system in which each digit can have one of 10 values (0 through 9). Computers use the binary system in which each digit can have one of two values (0 or 1), just as one light bulb can represent only two values (on or off). In the binary system a set of two bits (binary digits) can represent four values, just as two light bulbs can represent four values (on-on, on-off, off-off, off-on). The number of values that can be represented increases by a power of 2 with the addition of each bit. The use of more bits per pixel (picture element) adds more color possibilities to an image and increases the file size for the image as well.

Table 1 - Bit Depths and Sample Applications

Bits per Pixel	Number of Colors	Applications
1	2	Black and White Drawings
2	4	Simple Color Icons

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3	8	Simple Color Icons
4	16	Simple Color Icons
5	32	Simple Color Icons
6	64	Color Icons
7	128	Color Icons
8	256	Icons, Low-res Photographs
16	65,536	Photographs, Video
24	16,777,216	True-color Photographs, Video

Pixels

The unit of measurement used for computer graphics is the pixel. The term "pixel" is a contraction for "picture element". A computer screen can be measured in pixels. Most 15-inch monitors today can be set to display a grid of pixels 640 wide by 480 tall. The horizontal and vertical pixel dimensions are referred to as the resolution. By using smaller pixels, a 15-inch monitor can also be set to display a grid of 800 by 600 pixels or 832 by 624 pixels. Larger monitors (17-inch or 20-inch) typically can use these resolutions as well as 1024 by 768. When creating a graphic for use on a computer screen, therefore, wise content creators take care to observe the lowest common denominator and avoid creating individual graphics larger than 600 pixels wide and 400 pixels tall. The size of the graphic in pixels and the number of colors found in the graphic are both important factors in the size of the file used to store the image.

Moving Image: The MPEG standards are an evolving set of standards for video and audio compression and for multimedia delivery developed by the Moving Picture Experts Group (MPEG).

MPEG-1 was designed for coding progressive video at a transmission rate of about 1.5 million bits per second. It was designed specifically for Video-CD and CD-i media. MPEG-1 audio layer-3 (MP3) has also evolved from early MPEG work.

MPEG-2 was designed for coding interlaced images at transmission rates above 4 million bits per second. MPEG-2 is used for digital TV broadcast and DVD. An MPEG-2 player can handle MPEG-1 data as well.

MPEG-1 and -2 define techniques for compressing digital video by factors varying from 25:1 to 50:1. The compression is achieved using five different compression techniques:

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1. The use of a frequency-based transform called Discrete Cosine Transform (DCT).

2. Quantization, a technique for losing selective information (sometimes known as lossy compression) that can be acceptably lost from visual information.

3. Huffman coding, a technique of lossless compression that uses code tables based on statistics about the encoded data.

4. Motion compensated predictive coding, in which the differences in what has changed between an image and its preceding image are calculated and only the differences are encoded.

5. Bi-directional prediction, in which some images are predicted from the pictures immediately preceding and following the image.

The first three techniques are also used in JPEG file compression.

A proposed MPEG-3 standard, intended for High Definition TV (HDTV), was merged with the MPEG-2 standard when it became apparent that the MPEG-2 standard met the HDTV requirements.

MPEG-4 is a much more ambitious standard and addresses speech and video synthesis, fractal geometry, computer visualization, and an artificial intelligence (AI) approach to reconstructing images. MPEG-4 addresses a standard way for authors to create and define the media objects in a multimedia presentation, how these can be synchronized and related to each other in transmission, and how users are to be able to interact with the media objects.

MPEG-21 provides a larger, architectural framework for the creation and delivery of multimedia. It defines seven key elements:

- Digital item declaration
- Digital item identification and declaration
- Content handling and usage
- Intellectual property management and protection
- Terminals and networks
- Content representation
- Event reporting

Q4(a) What is video compression? Explain LZW and DCT?

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Ans: **Video Compression:** Video compression uses modern coding techniques to reduce redundancy in video data. Most video compression algorithms and codecs combine spatial image compression and temporal motion compensation. Video compression is a practical implementation of source coding in information theory. In practice most video codecs also use audio compression techniques in parallel to compress the separate, but combined data streams.

The majority of video compression algorithms use lossy compression. Large amounts of data may be eliminated while being perceptually indistinguishable. As in all lossy compression, there is a tradeoff between video quality, cost of processing the compression and decompression, and system requirements. Highly compressed video may present visible or distracting artifacts.

Video compression typically operates on square-shaped groups of neighboring pixels, often called macroblocks. These pixel groups or blocks of pixels are compared from one frame to the next and the video compression codec sends only the differences within those blocks. In areas of video with more motion, the compression must encode more data to keep up with the larger number of pixels that are changing. Commonly during explosions, flames, flocks of animals, and in some panning shots, the high-frequency detail leads to quality decreases or to increases in the variable bitrate.

LZW(Lempel ziv welch): Lempel–Ziv–Welch (LZW) is a universal lossless data compression algorithm created by Abraham Lempel, Jacob Ziv, and Terry Welch. It was published by Welch in 1984 as an improved implementation of the LZ78 algorithm published by Lempel and Ziv in 1978. The algorithm is simple to implement, and has the potential for very high throughput in hardware implementations.

Encoding

A high level view of the encoding algorithm is shown here:

1. Initialize the dictionary to contain all strings of length one.

2. Find the longest string W in the dictionary that matches the current input.

3. Emit the dictionary index for W to output and remove W from the input.

4. Add W followed by the next symbol in the input to the dictionary.

5. Go to Step 2.

A dictionary is initialized to contain the single-character strings corresponding to all the possible input characters (and nothing else except the clear and stop codes if they're being used). The algorithm works by scanning through the input string for successively longer substrings until it finds one that is not in the dictionary. When such a string is found, the index for the string less the last character (i.e., the longest substring that *is* in the dictionary) is retrieved from the dictionary and sent to output, and the new string (including the last character) is added to the dictionary with the next available code. The last input character is then used as the next starting point to scan for substrings.

In this way, successively longer strings are registered in the dictionary and made available for subsequent encoding as single output values. The algorithm works best on data with repeated patterns, so the initial parts of a message will see little compression. As the message grows, however, the compression ratio tends asymptotically to the maximum.

Decoding

The decoding algorithm works by reading a value from the encoded input and outputting the corresponding string from the initialized dictionary. At the same time it obtains the next value from the input, and adds to the dictionary the concatenation of the string just output and the first character of the string obtained by decoding the next input value. The decoder then proceeds to the next input value (which was already read in as the "next value" in the previous pass) and repeats the process until there is no more input, at which point the final input value is decoded without any more additions to the dictionary.

In this way the decoder builds up a dictionary which is identical to that used by the encoder, and uses it to decode subsequent input values. Thus the full dictionary does not need be sent with the encoded data; just the initial dictionary containing the single-character strings is sufficient (and is typically defined beforehand within the encoder and decoder rather than being explicitly sent with the encoded data**.)**

DCT(Discrete cosine transform):A **discrete cosine transform** (**DCT**) expresses a sequence of finitely many data points in terms of a sum of cosine functions oscillating at different frequencies. DCTs are important to numerous applications in science and engineering, from lossy compression of audio (e.g. MP3) and images (e.g. JPEG) (where small high-frequency components can be discarded), to spectral methods for the numerical solution of partial differential equations. The use of cosine rather than sine functions is critical in these applications: for compression, it turns out that cosine functions are much more efficient (as described below, fewer functions are needed to approximate a typical signal), whereas for differential equations the cosines express a particular choice of boundary conditions.

In particular, a DCT is a Fourier-related transform similar to the discrete Fourier transform (DFT), but using only real numbers. DCTs are equivalent to DFTs of roughly twice the length, operating on real data with even symmetry (since the Fourier transform of a real and even function is real and even), where in some variants the input and/or output data are shifted by half a sample. There are eight standard DCT variants, of which four are common.

The most common variant of discrete cosine transform is the type-II DCT, which is often called simply "the DCT", (N. Ahmed, T. Natarajan and K.R.Rao, 1974; K.R.Rao and P.Yip, 1990); its inverse, the type-III DCT, is correspondingly often called simply "the inverse DCT" or "the IDCT". Two related transforms are the discrete sine transform (DST), which is equivalent to a DFT of real and *odd* functions, and the modified discrete cosine transform (MDCT), which is based on a DCT of *overlapping* data.

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4Q. (b) Explain the use of hypertext and hyperlink in multimedia?

Ans: Use of Hypertex in multimedia: Hypertext is text displayed on a computer or other electronic device with references (hyperlinks) to other text that the reader can immediately access, usually by a mouse click, keypress sequence or by touching the screen. Apart from running text, hypertext may contain tables, images and other presentational devices. Hypertext is the underlying concept defining the structure of the World Wide Web.[1] It is an easy-to-use and flexible format to share information over the Internet.

A THEORETICAL DESCRIPTION OF HYPERTEXT is provided and three applications of hypertext: Electronic Studying, Literary Exploration, and Qualitative Research are discussed. Hypertext is defined as a form of writing with three characteristics: discernable free standing content nodes, links between nodes, and the expectation of active choice by readers. Some applications discussed are communication tasks, interrelating data of differing types, formats, and medium of representation; tasks where either the form of the data and/or the particular uses of the data are not known in advance, or for which there are multiple, simultaneous uses; tasks reproducing physical and/or metaphorical structures, and tasks juxtaposing information in new contexts. In electronic studying, students using hypertext are able to link information recorded on electronic note cards into study webs appropriate for report writing and for interrelating concepts among several disciplines. Literary explorations using hypertext are possible where readers construct their own stories and interpretation of literary elements provided by others. Hypertext can be applied to qualitative research during the process of analyzing field notes and interview protocols. The use of hypertext in these three areas will create a pool of experienced hypertext authors and readers who will be capable of measuring the effectiveness of hypertext

Types and uses of hypertext:
Hypertext documents can either be static (prepared and stored in advance) or dynamic (continually changing in response to user input). Static hypertext can be used to cross-reference collections of data in documents, software applications, or books on CDs. A well-constructed system can also incorporate other user-interface conventions, such as menus and command lines. Hypertext can develop very complex and dynamic systems of linking and cross-referencing. The most famous implementation of hypertext is the World Wide Web, first deployed in 1992.

Use of Hypermedia in multimedia: Hypermedia is used as a logical extension of the term hypertext in which graphics, audio, video, plain text and hyperlinks intertwine to create a generally non-linear medium of information. This contrasts with the broader term *multimedia*, which may be used to describe non-interactive linear presentations as well as hypermedia. It is also related to the field of electronic literature. The term was first used in a 1965 article by Ted Nelson.

The World Wide Web is a classic example of hypermedia, whereas a non-interactive cinema presentation is an example of standard multimedia due to the absence of hyperlinks.

The first hypermedia work was, arguably, the Aspen Movie Map. Atkinson's HyperCard popularized hypermedia writing, while a variety of literary hypertext and hypertext works, fiction and nonfiction, demonstrated the promise of links. Most modern hypermedia is delivered via electronic pages from a variety of systems including Media players, web browsers, and stand-alone applications (i. e., software that does not require network access). Audio hypermedia is emerging with voice command devices and voice browsing.

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Hypermedia development tools: Hypermedia may be developed a number of ways. Any programming tool can be used to write programs that link data from internal variables and nodes for external data files. Multimedia development software such as Adobe Flash, Adobe Director, Macromedia Authorware, and MatchWare Mediator may be used to create stand-alone hypermedia applications, with emphasis on entertainment content.

Some database software such as Visual FoxPro and FileMaker Developer may be used to develop stand-alone hypermedia applications, with emphasis on educational and business content management.

Hypermedia applications may be developed on embedded devices for the mobile and the Digital signage industries using the Scalable Vector Graphics (SVG) specification from W3C (World Wide Web Consortium). Software applications such as Ikivo Animator and Inkscape simplify the development of Hypermedia content based on SVG. Embedded devices such as iPhone natively support SVG specifications and may be used to create mobile and distributed Hypermedia applications.

5Q. Describe the role of Multimedia in the field of medicine. Explain the advantage of video conferencing as well?

Ans: Multimedia is media that uses multiple forms of information content and information processing like text, audio, graphics, animation, video, interactivity) to inform or entertain the audience. *Multimedia* also refers to the use of electronic media to store and experience multimedia content. Multimedia is similar to traditional mixed media in fine art, but with a broader scope. The term "rich media" is synonymous for interactive multimedia. Multimedia means that computer info can be represented through audio, graphics, image, video and animation in addition to traditional media (text and graphics). Hypermedia can be considered one particular multimedia application.

Multimedia use in medicine: In Medicine, doctors can get trained by looking at a virtual surgery or they can simulate how the human body is affected by diseases spread by viruses and bacteria and then develop techniques to prevent it.

"Graphic Design" encompasses a whole range of media services. Website Outsourcing is your one stop shop for all kinds of graphic designing services. With many years of experience designing high quality professional graphics and advertising material, we are well suited to be your long-term graphics partner. As your company grows and therefore you graphics needs, you will find it makes more sense to associate your firm with a vendor who is experienced in all aspects of graphics designing.

Advantage of video cofrencing

Video Conferencing Increases Productivity

Used effectively, video conferencing has a dramatic effect on the way people do business and the productivity gains they can derive. So, how are these improvements achieved? Today, video conferencing systems transcend the simple "talking heads" on a screen. The ability to easily share any type of information has added another dynamic to video communications, often previously not even possible in a local meeting. The result? Decisions are made faster; bringing products or services to market quicker; and enabling you to stay ahead of your competitors.

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Video Conferencing Saves Money

Although productivity increases are the most valuable, an additional tangible effect of using video is that you start saving substantial money due to reduced travel. In today's environment, where many employees are concerned with the safety and time-related issues with traveling, video conferencing will benefit your company in ways you would never have imagined.

Improves Communication and Reinforce Relationship:

During a videoconference you can see the facial expressions and body language of conference participants. These are both important aspects of communication that are lost with a basic telephone call. Videoconferencing also allows the opportunity for more of your staff to have contact with your customers. From your customer's perspective, the only person ever seen is the salesperson from your company. Wouldn't it improve your business relationship with your best customers if they got to meet more of your internal employees?

Reduces Travel Expenses:

In today's economy, cutting down on company travel expenses is usually a real attention grabber. In practice, the results are mixed. Individuals still like to go places and visit clients and associates in person. Nothing can replace meeting someone face to face for the first time and shaking hands. There are, however, numerous situations where you can save a lot of money on airfare and hotel costs, not to mention saving the loss in productivity from being out of the office.

Improves Effectiveness:

We all know that "a picture is worth a thousand words." Videoconferencing is the perfect example of how true this statement is. A live video call is much more effective than a phone call in many situations. For example, your engineering staff needs to show one of your vendors a problem with a purchased component. Visually seeing the part during a videoconference is far more effective and meaningful than trying to describe it over the phone.

Video Conferencing Saves Time

Video conferencing can be used to achieve significant benefits beyond increased productivity and reduced costs. Notable examples are reduction of "downtime" and increased "quality of life" for traveling personnel, and shortening hiring cycles for key employees. Video conferencing should also be viewed as a telephone and travel enhancement—a way to strengthen bonds with remote colleagues and customers between personal visits and telephone calls.

Our factory-trained sales and technical staff install and support telepresence, video conferencing, audio visual, and IP network projects across the country and around the world. IVCi provides clients with one point of contact for video conferencing, audio visual, and IP network sales, installation, service, management and support.

Q6. Explain the different techniques for video capture, processing and video recovery?

Ans: After collecting your footage from a variety of sources, the first step in video editing (after planning) is to transfer the video to your computer. This process is known as *video capture*, and the result of this process should be a transfer of the video from your camcorder to your computer into a digital format. This article will deal strictly with digital camcorders.

Two things to remember:

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Digital video takes up a tremendous amount of disk space on your computer. Ensure that you have a lot of free space. If you are running a computer with Windows 95/98/ME, you will be limited in the size of any one file. This is dependent on your disk format - either 2 gigabytes (9 minutes of DV) for **FAT16**, or 4 gigabytes (19 minutes of DV) for **FAT32**. Windows 2000 and NT use the **NTFS** disk format, which has no file size limitations. However some capture cards will automatically create a new file once the limit is reached, so you will have virtually unlimited file size.

Capturing video

There are three different methods to capturing video in the Video Capture program. The first, **automatic capturing**, operates by setting a start point and capturing either for a predetermined time or until you press the ESC key. Automatic capturing is good for when little precision is needed. **Manual capturing** works along the same principle, but allows you much greater control over how the frames are captured. What I want to concentrate on, however, is a wonderful tool called **batch capturing**.

Batch capturing allows you to define multiple precise start and end points of the clip to be captured (such a clip is known as a **reel**). After setting these points, you press a button and the computer controls everything - it actually fast forwards or rewinds the camera automatically to the exact point of the capture, and captures the reel. The most significant point of this exercise is that if you know the points you want to capture (of course, they don't have to be exact, you can refine the start and end points in editing), then you can submit an entire list of reels to the batch capture program and it will capture your entire tape for you in separate clips. However, batch capturing requires some planning of what footage you need.

Your best bet is to start with automatic capture, and once you're comfortable with that, experiment with batch capture. A final piece of advice - try and name your clips with names that are relevant to the content. There's nothing worse than seeing thirty files named video0001 to video0030 and have to figure out which one has little Ricky's precious smile!

Different Types of Video Processing :

There are several different ways edit video and each method has its pros and cons. Although most editors opt for digital *non-linear* editing for most projects, it makes sense to have an understanding of how each method works.

This page provides a very brief overview of each method — we will cover them in more detail in other tutorials.

Film Splicing

Technically this isn't video editing, it's film editing. But it is worth a mention as it was the first way to edit moving pictures and conceptually it forms the basis of all video editing.

Traditionally, film is edited by cutting sections of the film and rearranging or discarding them. The process is very straightforward and mechanical. In theory a film could be edited with a pair of scissors and some splicing tape, although in reality a splicing machine is the only practical solution. A splicing machine allows film footage to be lined up and held in place while it is cut or spliced together.

Tape to Tape (Linear)

Linear editing was the original method of editing electronic video tapes, before editing computers became available in the 1990s. Although it is no longer the preferred option for most serious work, it still has a place and remains the better option in some cases. It is likely that linear editing will be a useful skill for a long time to come.

In linear editing, video is selectively copied from one tape to another. It requires at least two video machines connected together — one acts as the *source* and the other is the *recorder*. The basic procedure is quite simple:

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1. Place the video to be edited in the source machine and a blank tape in the recorder.

2. Press *play* on the source machine and *record* on the recorder.

The idea is to record only those parts of the source tape you want to keep. In this way desired footage is copied in the correct order from the original tape to a new tape. The new tape becomes the edited version.

This method of editing is called "linear" because it must be done in a linear fashion; that is, starting with the first shot and working through to the last shot. If the editor changes their mind or notices a mistake, it is almost impossible to go back and re-edit an earlier part of the video. However, with a little practice, linear editing is relatively simple and trouble-free.

Digital/Computer (Non-linear)

In this method, video footage is recorded (captured) onto a computer hard drive and then edited using specialized software. Once the editing is complete, the finished product is recorded back to tape or optical disk.

Non-linear editing has many significant advantages over linear editing. Most notably, it is a very flexible method which allows you to make changes to any part of the video at any time. This is why it's called "non-linear" — because you don't have to edit in a linear fashion.

One of the most difficult aspects of non-linear digital video is the array of hardware and software options available. There are also several common video standards which are incompatible with each other, and setting up a robust editing system can be a challenge.

The effort is worth it. Although non-linear editing is more difficult to learn than linear, once you have mastered the basics you will be able to do much more, much faster.

Live Editing

In some situations multiple cameras and other video sources are routed through a central mixing console and edited in real time. Live television coverage is an example of live editing.

Live editing is a fairly specialist topic and won't concern most people.

Video Recovery

Recover deleted videos, recover lost videos - FileRestore is the simple, fast, award winning solution for deleted video file recovery. FileRestore will scan for, and recover deleted videos or lost video files in seconds. LISTEN to and SEE your deleted videos before you buy!
✔ **Supports ALL video file types** - FileRestore supports Flash, avi, MPEG, mov, wmv, mp4, etc.

✔ **RECOVER deleted video files from corrupt & formatted drives** – Recover deleted video files from PCs, iPods, PSPs, etc.

✔ **File Discovery™** – Discover video files with lost file names that traditional recovery techniques cannot recover.

✔ **PREVIEW– SEE and HEAR** your deleted videos or lost videos before you buy! Now you can actually see your deleted videos before you buy!

File Discovery™
FileRestore includes exclusive File Discovery™ scanning technology. File Discovery™ will automatically scan a video camera, PC drive or memory card for traces of a video (video file signatures), even in instances where the video name

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no longer exists. Video file traces may be scattered throughout the video card etc., and are unlikely to be located using traditional file recovery methods

Video Recovery

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Q7. Distinguish between the following:
    (a) JPG and JPEG

Ans: JPEG stands for Joint Photographic Experts Group. JPG (pronounced jay-peg) is the most commonly used file extension used to identify files created with this lossy format, and is the same as .peg. Both JPEG (Joint Photographic Experts Group) and JPG (Joint Photographic Group) are bitmap compression formats for picture and image files with compression ratios ranging from 10:1 to 20:1. In fact, JPG and JPEF file formats are **identical**. Older DOS-based computers were designed to handle a maximum "3-character file extension" which is why JPG was attributed to compressed image files. Newer Operating systems such as Windows XP and Vista allow for longer file extensions as evidenced by ".html". Accordingly, the JPF file extension was upgraded to the JPEG file extension which is the true acronym for **J**oint **P**hotographic **E**xperts **G**roup.
Just as a side note, XP and Vista will also support the older JPG file extension.

Nothing; JPEG is a type of image compression which has multiple file extensions associated with it.

The reason to have .jpg after .jpeg exists is that for MS-DOS and FAT-16 file systems there is a very limiting restriction on directories and filenames: 8 characters with 3 characters for the extension. Thus .jpeg is also seen as .jpg (and as .jpe and .jif).

JPG and JPEG stand both for an image format proposed and supported by the Joint Photographic Experts Group. The two terms have the same meaning and are interchangeable.

Although there should be no difference, some applications will treat them differently. I have had problems uploading .jpg files to an application, then resaved as .jpeg and it has worked. I don't know the technical explanation for why this happens!

    (b) AVO and AVI formats

Ans: AVI is Microsoft's video format. AVI is popular because it can take advantage of newer, and better compression schemes as they are developed. The data inside an AVI file can be compressed in many different ways. This is possible

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because AVI is designed to work with software called "codecs." A codec decodes the compressed data into a movie. So, for example, if you have an AVI movie that was compressed with DIVX, Windows Media Player will use the DIVX codec to decompress the movie as it plays.

AVI's flexibility is also a drawback because if you download an AVI file, you often can't tell in advance if you will be able to play it. You may have to spend time hunting down and installing the proper codec.

QuickTime can play AVI's on the **Macintosh**, but you still need the proper codecs. Mac users should keep in mind that the people who create AVI's do so on Windows computers, and that sometimes the movies won't play properly on the Mac.

Another option for the Mac is the free VLC media player. At the time of this writing, Apple was not permitting VLC in the App Store. However, you can download it from the VideoLAN website. VLC has many codecs integrated, so chances are that it can play your AVIs right out of the box. VLC is free, open-source software, and highly recommended. Note: there are a bunch of scam sites out there charging money for VLC. Just ignore them. The program is definitely free.