B.Tech.

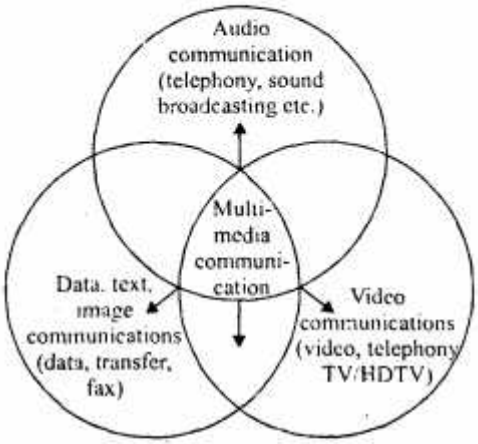
Fourth Semester Examination

Multimedia Technologies (IT-204-F)

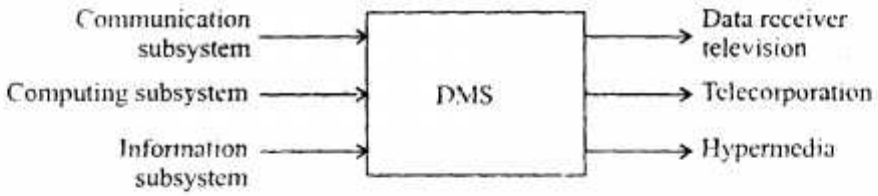
Note : Attempt any five questions. All questions carry equal marks.

Q. 1. Define multimedia. What are distributed multimedia systems? Explain its applications in various domains.

Ans. Multimedia communication is the field referring to the representation, storage, retrieval and dissemination of machine processable information expressed in multiple media, such as text, image, graphics, speech, audio, video, animation, hand writing and data files. With the advent of high capacity storage devices, powerful and yet economical computer workstations and high-speed Integrated Services Digital Networks (ISDNs), providing a variety of multimedia communications services is becoming not only technically, but also economically, feasible in addition. The broadband ISDN (BISDN) has been given special attention as a next generation communication network infrastructure that will be capable of transmitting full motion pictures and high speed data at 150 and 600 MB/s and voice, as well as data, throughout the world.



Distributed Multimedia Systems : A DMS is an integrated communications, computing and information system that enables the processing, management, delivery and presentation of synchronized multimedia information that the quality of service guarantees. It integrates and manages the information communications and computing subsystems to realize multimedia applications. Such a system enhances human communications by exploiting both visual and aural senses and provides the ultimate flexibility in work and entertainment by allowing you to collaborate with remote participants, view movies on demand and access online digital libraries from the desktop. An example of DMS is a number of multimedia PCs and/or workstations interconnected with continuous media servers using the Internet that allows users to retrieve, browse and manipulate video or audio. Besides constraints or bit error rates, packet loss probabilities and delivery delays required in a point-to-point information delivery system, additional constraints are introduced in a DMS, such as synchronization among mu iple media streams from distributed sources to achieve a meaningful presentation, summaries a DMS.



Main Features of DMS : (i) Technology Integration : Integrates information, communication and computing systems to form a unified digital processing environment.

(ii) Multimedia Integration : Accommodates discrete data as well as continuous data in an integrated environment.

(iii) Real-time Performance : Requires the storage systems processing systems and transmission systems to have real-time performance. Hence, huge storage volume, high network transmission rate and high CPU processing rate are required.

(iv) Interactive : Requires duplex communications between the users and the system and allows each users to control the information.

Distributed Multimedia Applications : (i) The traffic requirements can be satisfied by the use of resource management mechanisms. They establish a relationship between transmitted data and resources and ensure that the audio-visual data are transmitted in a timely manner.

(ii) For various multimedia applications, multiple receivers are interested in receiving the same data. For instance, in a table distributed using the network, all listeners must receive the same data.

(iii) The delivery of audio-visual data to large receiver groups, such as the distribution of Internet Engineering Task Force (IETF) meetings across the multicast backbone, must also take into account that the resource capabilities and the participants can vary widely from high-speed narrow line and fast workstations to low end personal computers connected using relatively narrow band links. Therefore, support for heterogeneous system must be provided (heterogeneous is with respect to network as well as to end-system capabilities).

Q. 2. Differentiate between :

(a) ATM & ADSL

(b) BMP & PNG

(c) Shading & morphing

(d) Rolling ball animation & bouncing ball animation

Ans. (a) ATM & ADSL :

ATM : Asynchronous Transfer Mode is a cell-based switching technique that uses asynchronous time division multiplexing. It encodes data into small fixed-sized cells and provides data link layer services that run over OSI layer 1 physical links. This differs from other technologies based on packet-switched networks in which variable sized packets are used. ATM exposes properties from both circuit switched and small packet switched networking, making it suitable for wide area data networking as well as real-time media transport. ATM uses a connected-oriented model & establishes a virtual circuit between two endpoints before the actual data exchange begins.

ADSL : Asymmetric Digital Subscriber Line is one form of the digital subscriber lines than a conventional voice band modem can provide. It does this by utilizing frequencies that are not used by a voice telephone call. A splitter-or-micro filter allows a single telephone connection to be used for both ADSL service and voice calls at the same time. ADSL can generally only be distributed over short distance from the central office, typically less than 4 kilometer, but has been known to exceed 8 kilometer if the originally laid wire gauge allows for farther distribution. In 2005, the ability to transmit copper ADSL/DSL services over a fibre optic cable became possible by utilizing the RLD ADSL/DSL fibre optic link, providing distance from one point to the opposite end of the system of more than 30 miles.

(b) BMP & PNG :

BMP : The BMP file format, sometimes called bitmap or DIB file format, is an image file format used to store digital still images, especially on Microsoft Windows and OS2 operating systems.

Many older graphical user interfaces used bitmap in the their built-in graphics subsystem. The bits representing the bitmap pixels are packed within rows. Depending on the colour depth, a pixel in the picture will occupy at least n/8 bytes. The approximate size of a n-bit BMP file in bytes can be calculated, including the effect of starting each word on a 32-bit word boundary as :

$$\text{Row size} = 4.\left\lceil \frac{\text{BPP. width}}{32} \right\rceil$$

$$\text{File size} \approx 54 + 4.2^{BPP} + \text{Row size . Height for BPP} \leq 8$$

PNG : Portable Network Graphics is a bitmapped image format that employs lossless data compression. PNG was created to improve upon and replace GIF as an image-file format not requiring a patient license. The PNG acronym is optionally recursive, unofficially standing with PNG's not .GIF. PNG supports palette-based grayscale, grayscale with alpha, RGB or RGBA images. PNG was designed for transferring images on the internet, not for print graphics and so does not support non-RGB colour spaces. PNG files nearly always use file extension "PNG"or "png" & are assigned MIME media type "image/png", it was approved for this use by the Internet Engineering Steering Group.

(c) Shading and Morphing : In computer graphics shading refers to the process of altering a colour based on its angle to lights and its distance from lights to create a photo realistic effect. Shading is performed during the rendering process. Shading alters the colour of faces in a 3D model based on the angle of the surface to the sun or other light sources. The very first image below has the faces of the box rendered, but all in the same colour edge lines have been rendered here as well which makes the image easier to see. Flat shading is a lighting technique used in a 3-D computer graphics. It shades each polygon of an object based on the angle between the polygon's surface normal and the direction of the light source, their respective colour and intensity of the light source.

Morphing means that you start out with some object, which can be anything, and over the course of a number of frames change this object into something different. Its kind like what from Deep Space I could do, albeit on a slightly smaller scale.

Morphing really is a bit of a fuzzy term, since every operation which changes the geometry of an object can be considered morphing. Even the squashing of a rubber ball when it is hit to the ground. In general though, simple deformations like this are not considered morphing. The morphing is done, to make sure that the original object and the object it is morphed into have the same number of vertices, same number of faces, and the faces are constructed from same vertic. .

(d) Rolling Ball Animation & Bouncing Ball Animation : The bouncerw 3edom. html file stimulates the world best superball-its bounces forever. Of course you may change that by pressing a key. The ball will bounce lower and lower until comes to a rest. The variables are :

(i) x is the horizontal coordinate.

(ii) y is the vertical co-ordinate.

(iii) h is the horizontal increment (+ or -); initial value is 10.

(iv) v is the vertical increment value (+ or -): initial value is 2.

(v) g is the force of gravity, initial value is 2.

(vii) r and g are variables for saving the y value from one move ago.

(viii) gg is a flag to remind gravity variable (g) to get a lot more powerful (change from 2 to 5) since a key has been pressed.

Her's the bouncing ball div. and the CSS styles for it from the head section :

<div id = ''ball'' class = ''b'' > <img src = ''ball.gif'' width = ''20'' height = ''20'' >

<style type = ''text/css''>

.b {position:absolute; left:0px; top; 0px; width: 20px; height: 20px;}

</style>

Q. 3. Discuss JPEG standard for image compression with its DCT encoding and Quantization, Predictive lossless coding and its performance.

Ans. JPEG 2000 is an emerging standard for still-image compression. It is not only intended to provide rate distortion and subject image quality performance superior to existing standards, but also to provide functionality that current standards can either not address efficiency or not address at all. The compression advantages of JPEG 2000 are a direct result of the inclusion into the standard of a number of advanced and attractive features, including progressive recovery, loss/lossless compression and region of interest capabilities. These features lay the foundation for JPEG 2000 to provide tremendous benefits to a range of industries. Some of the applications that will benefit directly from JPEG 2000 are image archiving, Internet, web browsing, document imaging, digital photography, medical imaging and remote sensing. Functionally, JPEG 2000 includes many advanced features :

(i) Component precision of 1 to 127 bits/sample.

(ii) Components that may each have a different precision & sub-sampling factor.

(iii) Use of image data that may be stored compressed or uncompressed.

(iv) Lossy and lossless compression.

(v) Progressive recovery by fidelity or resolution.

(vi) Filing

(vii) Error resilience

(viii) Region of interest coding

(ix) Random access to an image in a spatial domain.

(x) Security.

Image compression must not only reduce the necessary storage and bandwidth requirements, but also must allow extraction for editing, processing and targeting particular devices and applications. JPEG 2000 allows extraction of different resolutions, pixel fidelities, regions of interest, components and more, all from a single compressed bit stream. This allows an application to manipulate or transmit only the essential information for any target device from any JPEG 2000 compressed source image. Some of the technologies highlights for JPEG 2000 are the following :

(i) Wavelet subband coding.

(ii) Reversible integer-to-integer and non-reversible real-to-real wavelet transforms.

(iii) Reversible integer-to-integer and non-reversible real-to-real multi-component transforms.

(iv) Bit-plane coding.

(v) Arithmetic coding.

(vi) Use of Embedded Block Coding with Optimized Truncation (EBCOT) coding scheme.

(vii) Code stream syntax similar to JPEG.

(viii) File format syntax.

JPEG Standards :

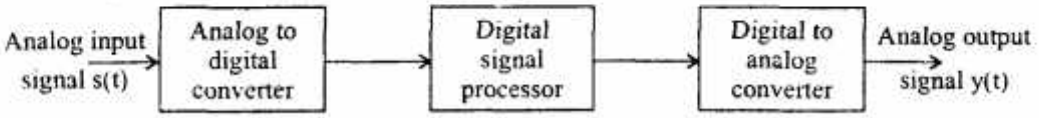
(i) MPEG-4 VTC : It is the algorithm used in MPEG-4 standard in order to compress the texture information in photo-realistic 3D models. Because the texture in a 3D model is similar to a still picture, this algorithm can also be used for compression of still images. It is based on the DWT, scalar quantization, zero-tree coding and arithmetic coding. MPEG-4 VTC supports SNR scalability through the use of different quantization strategies : Single Quantization (SQ), Multiple Quantization (MQ) and Bilevel Quantization (BQ). SQ provides no SNR scalability. MQ provides limited SNR scalability and BQ provided scanning instead of traditional zero-tree-scanning or tree-depth, which is also supported.

(ii) JPEG : This is a very well known ISO/ITO-T standard created in late 1980s. There are several modes defined for JPEG, including baseline, lossless, progressive and hierarchical. Baseline mode is most popular and supports lossy coding only. It is based on the 8×8 block DCT, zig-zag scanning, HVS weighting uniform scalar quantization and Huffman coding. The lossless mode is based on a predictive scheme and Huffman coding. The progressive and hierarchical modes of JPEG are both lossy and differ only in the way that the DCT coefficients are coded or computed, respectively, when compared to the baseline mode. They allow a reconstruction of a lower quality or lower resolution version of the image by partial decoding of the compressed bit stream. Progressive mode encodes the quantized coefficients by a mixture of spectral selection and successive approximation and hierarchical mode uses a pyramidal approach to computing the DCT coefficients in a multiresolution way.

(iii) JPEG-LS : It is the latest ISO/ITO-T standard for lossless coding of still images. It also provides for near-lossless compression. It is based on adaptive prediction, context modeling and Golomb coding. In addition, it features a flat-region detector to encode these in run lengths. Near lossless compression is achieved by allowing a fixed maximum sample errors. This algorithm was designed for low complexity while providing high lossless compression ratios. However, it does not provide support for scalability, error resilence or any such functionality.

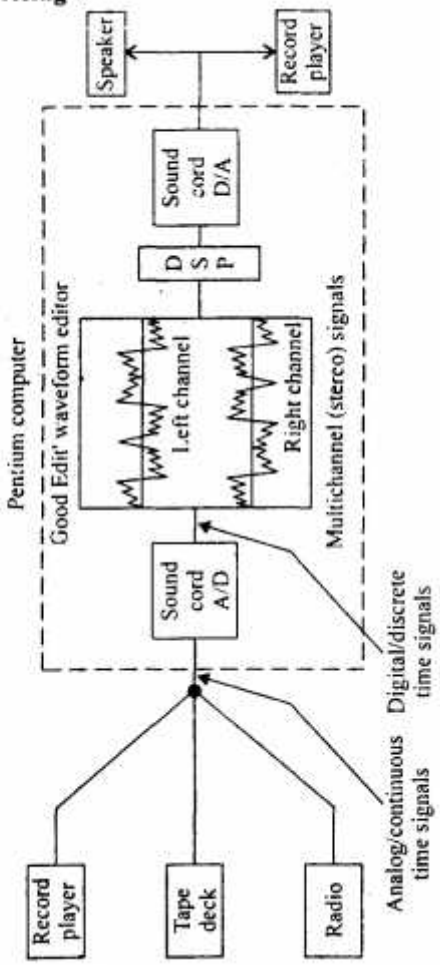
Q. 4. (a) What is Digital Signal Processing? Discuss Stereophonic and quadraphonic signal processing techniques.

Ans. Digital Signal Processing comprises of three words. Digital signal processing is defined as changing or analysing information which is measured as discrete sequences of number. DSP is concerned with the representation of signals by sequences of numbers or symbols and processing of these sequences. Processing means modification of sequences into a form which is in some sense more desirable. In another words, DSP is a mathematical manipulation of discrete-time signals to get more desirable properties of the signal such as less noise or distortion. DSP is a field of numerical mathematics that is concerned with the processing of discrete signals. This area of mathematics deals with the principles that underline all digital systems. DSP represent signals in sequences of numbers and perform numerical operations such as addition, multiplication, data transfer and delay and logical operations.



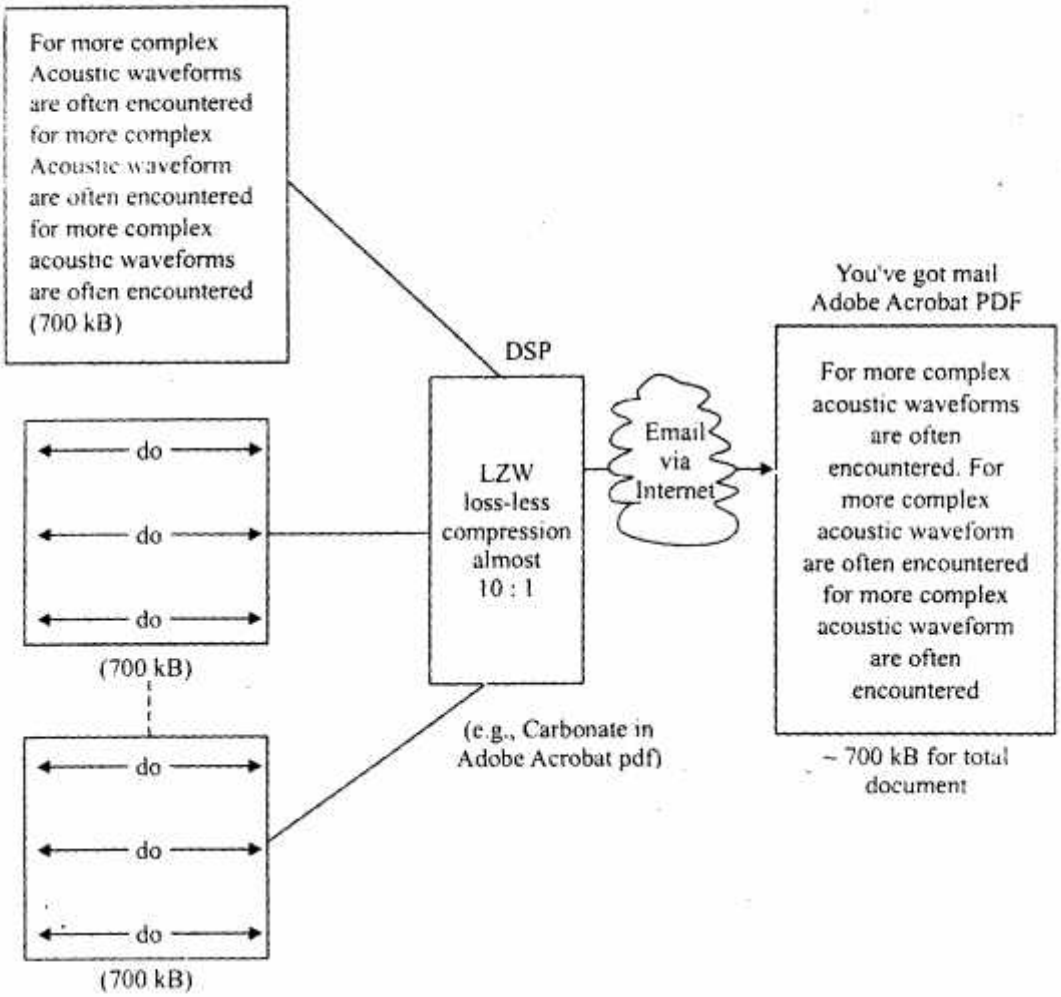
(Block diagram of a digital signal processing system)

(i) Stereophonic Signal Processing :



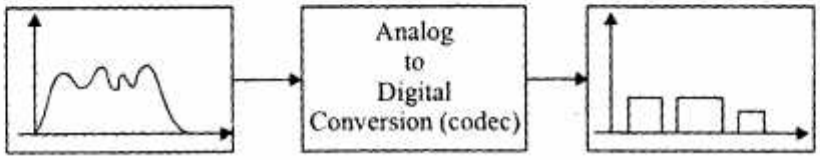
(ii) Quadraphonic Signal Processing :

Digital Signal : Scanned Hand Copy



Q. 4. (b) How analog signal is converted into digital signal? Discuss encoding and quantization in detail.

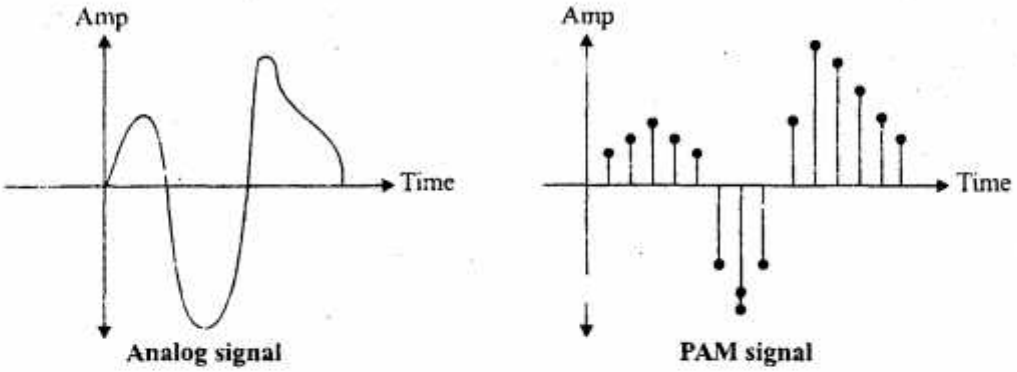
Ans. To send human voice over a long distance, we need to digitize it since digital signals are less prone to noise. This is called analog-to-digital conversion or digitizing an analog signal. This requires a reduction of the potentially infinite number of values in an analog message so that they can be represented as a digital system with a minimum loss of information.



In analog-to-digital conversion, we are representing the information contained in a continuous wave form as a series of digital pulses (1s or 0s)

The first step in analog-to-digital conversion is called pulse amplitude modulation (PAM). This technique takes an analog signal, samples it and generates a series of pulses based on the results of the sampling. The term sampling means measuring the amplitude of the signal at equal intervals. The method of sampling used in PAM is more useful to other areas of engineering than it is to data communication. However, PAM is the foundation of an important analog to digital conversion method called Pulse Code Modulation.

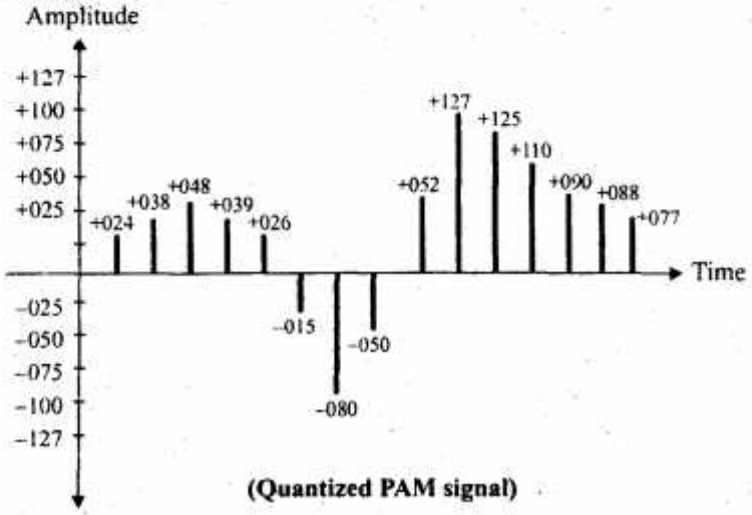
In PAM, the original signal is sampled at equal intervals as shown :



Analog signal **PAM signal**

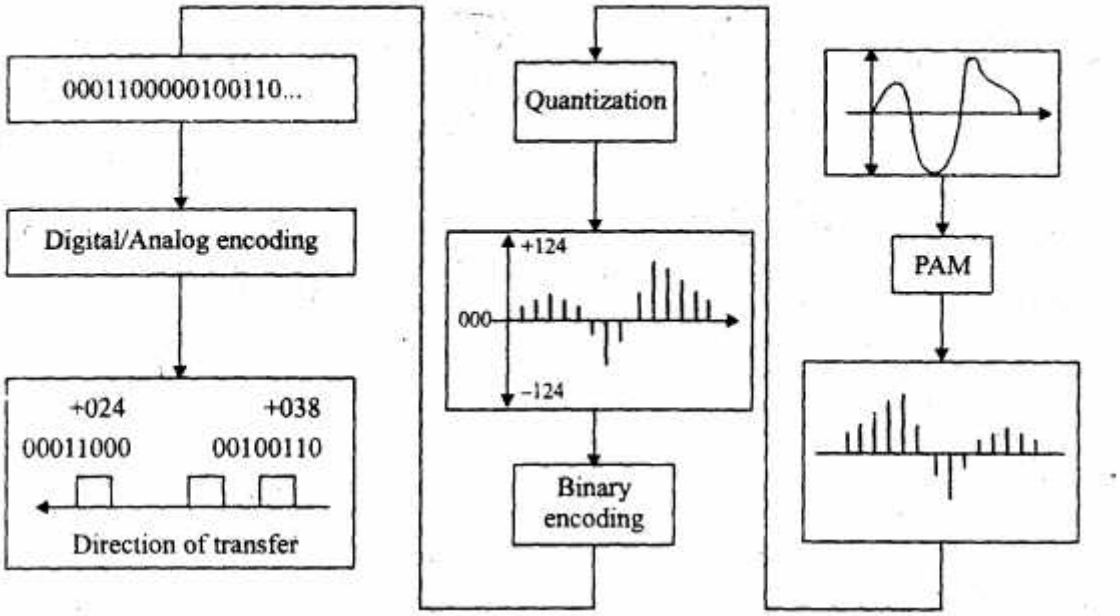
PAM uses a technique called sample and hold. At a given moment, the signal level is read, then held briefly. The sampled value occurs only instantaneously in the actual waveform, but is generalized over a still short but measurable period in the PAM result. The reason PAM is not useful to data communications is that, although it translates the original waveform to a series of pulses, these pulses are still of any amplitude. To make them digital, we must modify them by using pulse code modulation (PCM).

Pulse Code Modulation (PCM) : PCM modifies the pulses created by PAM pulses. Quantization is a method of assigning internal values in specific range to sampled instances. The result of quantization is presented in figure below :



(Quantized PAM signal)

The binary digits are then transformed in a digital signal using one of the digital-to-digital encoding techniques. PCM is actually made up of four separate processes. PAM, quantization, binary encoding, and digital-to-digital encoding. Figure shows the entire process in graphic form.



(From analog signal to PCM digital code)

Q. 5. (a) What do you mean by Virtual reality? Discuss its areas of application.

Ans. Virtual Reality (VR) : It is the one of the most exciting technologies being researched today. Virtual reality allows a user or viewer to be placed in a virtual setting. Where they can experience a new or different situation by receiving computer controlled visual and audio feedback based on their responses. As the technologies of virtual reality evolve, the applications of VR become literally unlimited. It is assumed that VR will reshape the interface between people and information technology by offering new ways for the communications of information the visualization of processes and the creative expression of idea.

Now that a virtual environment can represent any 3-D world that is either real or abstract. This includes real systems like buildings, landscape, underwater shipwreck, spacecrafts, archaeological excavation sites, human anatomy, sculptures, crime scene reconstructions, solar systems and so on of special interest is the visual and sensual representation of abstract systems lets magnetic field turbant flow structures, molecular models, mathematical systems, auditorium, acoustics, stock market behaviour, populations densities, information flows and any other commutable system including artistic and creative work abstract nature. These virtual worlds can be animated, interactive shared and can expose behaviour and functionally.

Useful applications of VR include training in a variety of areas (military, medical, equipment operation etc), education, design evaluation (virtual prototyping), architectual walk through, human factor and organic studies, simulation of assembly sequences and maintenance tasks, assistance for the handicapped, study or treatments of phobias (e.g. : fear of height), entertainment and much more.

Q. 5. (b) What are intelligent VR software systems? Discuss the requirements of visually coupled systems.

Ans. Virtual Reality (VR) : It is one of the most exciting technologies being researched today virtual reality allows a user or a viewer to be placed in a virtual setting where they can experienced a new or different situation by receiving computer controlled visual and audio feedback closed on their responses. As the technologies of virtual reality evolve, the applications of VR become literally unlimited. It is assumed that VR will reshape the interface between people and information technology by opening new ways for the communications of informations. The visualization of process of the creative expression of ideas.

Note that a virtual environment can request any 3D world that is either real or abstract. This includes real systems like buildings landscapes. underwater shipwrecks, spacecraft, archaeological excavation sites, human anatomy, sculptures, crime scene reconstruction, solar systems and so on of special interest is the visual and sensual representation of abstract system like magnetic fields, turbulent flow structures, molecules models, mathematical systems, auditorium, acoustics, stock market behaviour, population, densities, information flows and any other executable system including artistic and creative work of abstract nature. This virtual worlds can be animated, interactive, shared, and can expose behavior and functionality.

Useful applications of VR include training in a variety of areas (military, medical, equipment operation etc), education design evaluation (virtual proto typing), architectual walk-through, human factor & orgonomic studies.

A visually coupled system is more correctly a special system that integrates the natural visual and motor skills of an operator with the machine he is controlling. An operator visually searches for, finds, and tracks an object of interest. His line of sight is measured and used to aim sensors and weapons or central data sources is fed back directly to his vision by special display so as to enhance his task performance. In other words he looks at the target and the sensor weapons automatically point at the target simultaneously with the display, he verifies where sensor/weapons are looking. He visually fine-tunes their aim and he shoots at what he sees.

Two functions are performed, a line-of-sight sensing/control function and a display feedback function. Although each may be used separately, a fully visually coupled subsystem in which man's line of sight is measured and used for control and visual information in fed back directly to his eyes for his attention and use currently a helmet-mounted sight is used to measure head position and line of sight. An early version of a helmet sight was used in an in flight evaluation Jyndall AFB in 1969. Various experimental sights have undergone flight tests. The US Navy has produced a similar sight for operational use in F-4ɔ and F-48 aircraft.

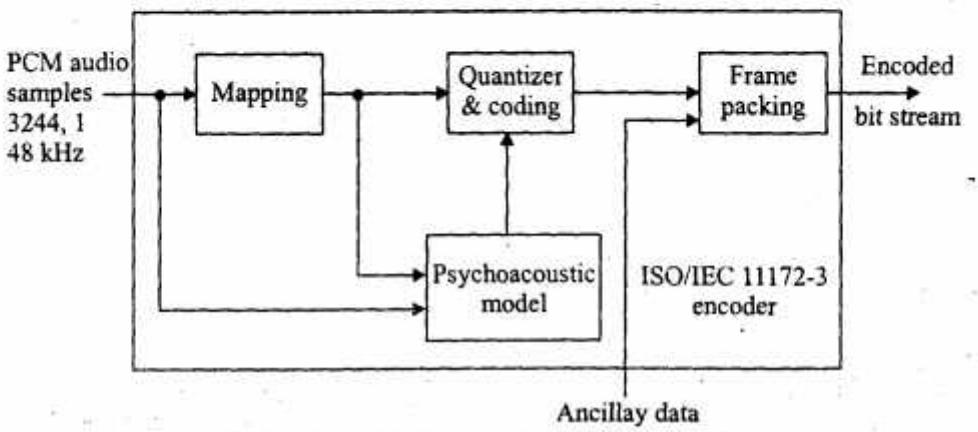
A helmet-mounted display is used to feed back information to the eye. As early bulk experimental display completely occluded outside version to the right eye. Later version permit a see-through capability, which allows simultaneously viewing of the display and the outside world scene. Many experimental display improvement are under study, but display flight-test experience is still limited research and development efforts are under way to reduce sizes, weighs and profile to increase the performance of future visual coupling devices.

Q. 6. (a) Discuss the structure of the encoder for MPEG layers I & II.

Ans. The different layers have been defined because they all have their merits. Basically, the complexity of the encoder and decoder, the encoder delay and the coding efficiency increase when going from Layer I through Layer II to Layer III. Layer I has the lowest complexity and is specifically suitable for applications where the encoder complexity also plays an important role. Layer II requires a more complex

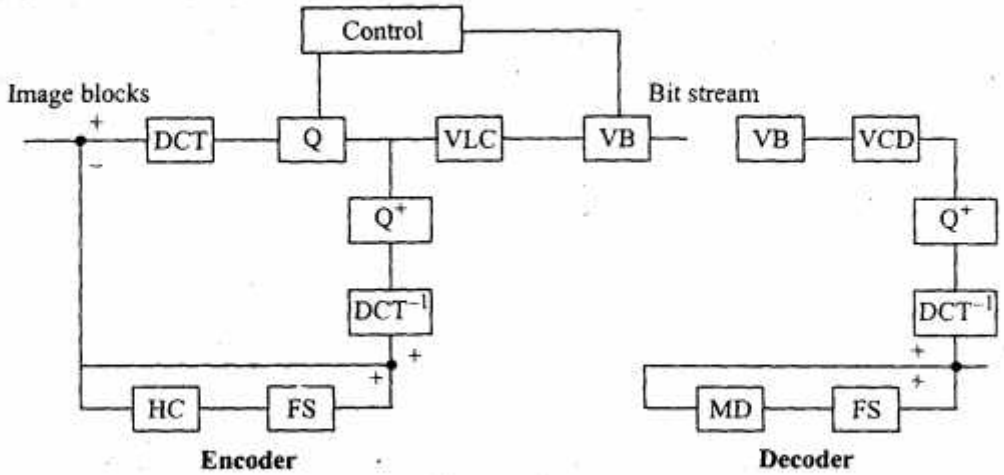
encoder and a slightly more complex decoder and is directed towards one-to-many applications, that is, one encoder serves many decoders. Compared to Layer I, Layer II is able to remove more of the signal redundancy and applies the psychoacoustic threshold more efficiently. Layer III is again more complex and is directed toward lower bit-rate applications due to the additional redundancy and irrelevancy extraction from enhanced frequency resolution in its filter band.

A coded representation that can be used for compressing audio sequences, both mono and stereo, as shown in figure. Input audio samples are fed into the encoder. The mapping creates a filtered and sub sampled representation of the input audio stream. A psychoacoustic model creates a set of coding symbols from the mapped input samples. The block frame packing assembles the actual bit stream from the output data of the other blocks and adds other information if necessary.



(Basic structure of the MPEG-1 audio encoder)

The block diagram of basic hybrid DPCM/DCT MPEG-1 encoder and decoder structure is depicted as :



The first frame in a video sequencing is encoded in INTRA mode without reference to any past or future frames. At the encoder, the DCT is applied to each 8 × 8 luminance and chrominance block, and after output of the DCT, each of the 64 DCT coefficients in uniformly quantized (Q). The quantizer step size (SZ) used to

quantize the DCT-coefficients with a macro block is transmitted to the receiver. After quantization, the lowest DCT coefficient is treated differently from the remaining coefficients. The DC coefficient corresponds to the average intensity of the component block and is encoded using a differential DC prediction method.

Q. 6. (b) What is the difference between lossy and lossless Compression? What are the advantages and disadvantages of each?

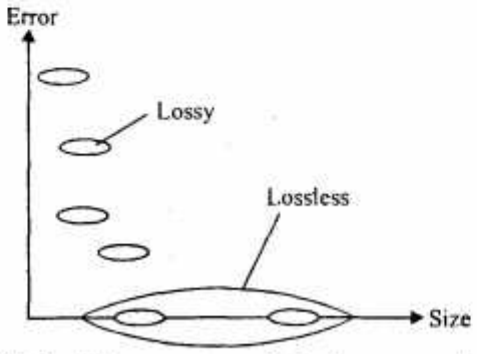
Ans. There are two types of compression :

(i) Lossless Compression : In Lossless compression, data are not altered or lost in the process of compression or decompression. Decompression produces a replica of the compressed object. This compression technique is used for test documents, databases and text-related objects. It is of higher quality, bigger in size. The following are some of the commonly used lossless standards :

(a) Huffman coding
(b) Adaptive Huffman coding
(c) Arithmetic coding
(d) Packbits coding
(e) CCITT group 31-D
(f) CCITT group 32-D
(g) CCITT group 4
(h) Lespel-Ziu and Wetch algorithm Lzw

(ii) Lossy Compression : There is a loss of source information when lossy compression is used. The loss of this data in such that the object looks more or less like the original. This method is used were absolute data accuracy is not essential. Lossy compression is the most commonly used for this compression technique is used for image documents, audio and video objects. It is in lower quality and smaller in size. The following are some of the commonly used lossy standards :

(i) Joint Photographic Experts Group (JPEG)
(ii) Motion Picture Experts Group (MPEG)
(iii) Adapline Differential Pulse Code Modulation (ADPCM)
(iv) CCITTH.261 CP × 641 Video Coding Algorithm
(v) Intel DVI (Digital Video Interactive)
(vi) Silence Compression



Relation between error and size in compression

Q. 7. (a) Explain how authoring tools and presentation tools helps in making multimedia projects?

Ans. Presentation Tools : Presentation is important thing for different purposes as presentation in classrooms, seminar halls, advertising etc. Presentation software was developed to computerized the creation and delivery of presentation to audiences and conferences as printed output that could be distributed on paper or shown on large screens by overhead projector, or digitally produced as 35 mm colour slides. As direct connection from computer monitor outputs to projector because common place, these same tools because useful for air computers-driven (interactive) presentations with or without printed handouts.

Presentation software might, indeed, be considered multimedia authoring software, because the publishers of these tools have made their products multimedia capable. On the other hand, the features of dedicated presentation software are being incorporated into three core office products—word processor, spreadsheet and database so many developers of these specialized tools have gone out of business. Mainly presentation are made on powerpoint.

Multimedia Authoring Tools : Multimedia authoring tools are those tool by which content and function of project is created.

(i) Authoring : The process of creating multimedia applications.

(ii) Authoring Metaphor : Also known as authoring paradigm is the methodology for authoring multimedia applications.

Authoring software provides an integrated environment for building together the content and functions of your project authoring system typically include the ability to create, edit and import specific types of data, assembles raw data into a playback sequence or all sheet and provide a structured method or language for responding to user input.

Some examples of Tools : Media Pro : PC multimedia authoring applications that claims to have "easy to use features and tools and drag and drop functionality".

Meta Card : A multimedia authoring tool and GUI development environment for Microsoft Windows 3.1/95/98/NT, Unix/XII and Macintosh systems can be used to build graphical applications, CBT, on-line documentations and wide variety of other products.

Trainersoft Professional for creating online browser, network and CD-Rom based training material.

W3 Kiosk—a web based solution for creating "remotely modifiable hypermedia applications".

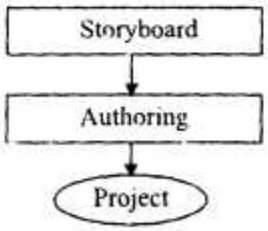


Fig. Development process of a project

Q. 7. (b) What is 3D drawing and rendering? Discuss its areas of application.

Ans. Drawing Techniques : The trick to create 3D effect in Flash is understanding how we can manipulate the drawing tools. All of the 3D movies we create with Flash are going to be viewed on a computer or electronic device. This gives an edge because the screen is flat. This prevents anyone from picking up 3D model and rotating in their hands. With the flat screen of the monitor being the constant that prevents

customers from reading in a grabbing models, we can create the illusion of 3D. This is done through manipulate the shape and design of an object on the screen.

Shape Design : The first step in creating 3D effects is to start simple. The most used 3D effect on the Internet is the drop shadow effect.A drop shadow is often used on text to give text additional depth. The following exercise explains how we can create a drop shadow effect in Flash. Later we will take this same technique and create a shadow for a bouncing ball :

(i) The first step is to open Flash and create a new file. Save the file and name it drop shadow.fla

(ii) Select the Text tool, from the properties panel, select the colour picker and change the colour of the text to # 999999.

(iii) On the stage write the words "Flash 3D".

(iv) Select the text we have just written on the stage and press CTRL+D (windows). Command-D, to duplicate the text. The new text will be offset from the original by ten pixels. This will become the shadow for the first text block.

(v) Select the new text, from the properties panel, select the colour picker and change the colour of the next text block to # CCCCCC.

(vi) The second text string is currently on the top of the original. This does not really work for a drop shadow, so we are now going to make it work, select the light text and choose Modify>Arrange> Send to Back. This moves the light gray text behind the dark grey text. Now, things will look better.

Now, we have a drop-shadow. In many ways this is arguably the most basic 3D effect, but even though it is seen thousand times, it is liked. The effect may not be mind blowing but it is engaging.

Colour : Colour in an additional tool we can use to create 3D depth to the objects we have on the stage. In the previous passage, 3D effect was added to text. The effect of drop shadow was heightened through two different colours. The lighter text adds depth.

In 3D programs we can change the depth of an object through light fall. First we define light source and then the 3D program will apply shadows where appropriate. Flash does not have a light source that enables us to do this. This make things more challenging. Fortunately, Flash does not have the colour mixer panel that enables use to mix gradient colours.

Q. 8. Write short notes on (any two) :

(a) Time based media representation

(b) CD Audio CD-I

(c) Video on demand

Ans. (a) Time Based Media Representation : Any data that changes meaningfully write time can be characterised as time-based media. Audio clips, 191DI sequences, movie clips, and animations are common forms of time-based media. Such, media data can be obtained from a variety of sources, such as local or network files, cameras, microphones and line broadcasts.

A key characteristics of time-based media is that it requires timely delivering and processing. Once the flow of media data begins, there are strict timing deadlines that must be met, both is terms of receiving and presenting the data for this reason, time-based media is often referred to as streaming-media—it is delivered in a steady stream that must be received and processed within a particular time frame to produce acceptable results.

The format in which the media data is stored is referred to as its content types. Quick time, MPEG and WAV are all examples of content types. Content type is essentially synonymous with file type—content type is used because media data is often acquired from sources other than local files.

Most time based media is audio or video data that can be presented through output devices such as speakers and monitors. Such devices are the most common destination for media data output. Media streams can also be sent to other destinations. For example, saved to a file or transmitted across the network. An output destination for media data is sometimes referred to as a data sink.

(b) CD Audio CD-I : The logical format of an audio CD (officially Compact Disk Digital Audio or CD-DA) is described in a document produced by the formats joint creators. The document is known colloquilly. The format is a two-channel 16-bit PCM encoding at an 44.1 kHz sampling rate per channel. Four-channel sound is an allowable option within the Red-Book format, but has never been implemented. The selection of the sample rate was primarily based on the need to reproduce the audible frequency range of 20 Hz-20kHz. The Nyquist-Shannon sampling theorem states that a sampling rate of more than double the maximum frequency of the signal to be recorded is needed, resulting in a required rate of at least 40 Hz. The exact sampling rate of 44.1 kHz was inherited from a method of converting digital audio into an analog video signal for storage on U-matic video tape, which was the most affordable way to transfer data from the recording studio to the CD manufacturer at the time the CD specification was being developed. The device that turns an analog audio signal into PCM audio, which in turn is changed into an analog video signal as called a PCM adaptor. The main physical parameters of the CD are as follows :

(i) Scanning velocity : 1.2-1.4 m/s

(ii) Track Pitch : 1.6 μm

(iii) Disc Diameter 120 mm

(iv) Disc thickness : 10.2 mm

(v) Inner Radius program area : 25 mm

(vi) Outer Radius program area : 58 mm

(vii) Contra spindle hole diameter : 15 mm

(c) Video on Demand : Video on demand or Audio Video or demand are systems which allow users to select and watch/listen to video or audio content on demand IPTV technology is often used to bring video on demand to televisions and personal computers. Television VOD systems either stream content through a set-top box, a computer or other devices, allowing viewing in real time, or download it to a device such as computer, digital video recorder or portable media player of viewing at any time. The majority of cable and telco-based television providers offer both VOD and streaming, including pay-per-view and free content, whereby a user buys or selects a movie or television program and it begins to play on the television set almost instantaneously, or downloading to a DVR rented from the provider, or downloaded onto a PC, for viewing in future. Download and streaming video on demand systems provides the user with a large subset of VCR functionality including pause, fast forward, fast rewind, slow forward, slow rewind, jump to previous / future frame etc.