

NOORUL ISLAM COLLEGE OF ENGG, KUMARACOIL

DEPT OF COMPUTER SCIENCE AND ENGINEERING

GRAPHICS AND MULTIMEDIA

2 Marks Qn and Answers

UNIT I

1. Define Multimedia?

Multimedia is defined as a Computer based Interactive Communication process that incorporates text, numeric data, record based data, graphic art, video and audio elements, animation etc. It is used for describing sophisticated systems that support moving images and audio. Eg. Personal Computer.

2. Give the applications of Multimedia?

- Document Imaging
- Image Processing and Image Recognition
- Full Motion Digital Video Applications
- Electronic messaging
- Entertainment
- Corporate Communications

3. What are the data elements of MM?

- Facsimile
- Document Images
- Photographic Images
- Geographic Information System Maps(GIS)
- Voice Commands and Voice Synthesis
- Audio Messages
- Video Messages
- Full motion stored and Live Video
- Holographic Images
- Fractals

4. State the resolution of Facsimile, Document Images and Photographic Images?

- Facsimile – 100 to 200 dpi
- Document images – 300 dpi (dots/pixels per inch)
- Photographic images – 600 dpi

5. What is the compression technique used in Facsimile and Document Images?

- Facsimile - CCITT Group3
- Document Images - CCITT Group4

6. What are the applications of Photographic Images?

- Photographic images are used in Imaging Systems that are used for identification such as
- Security Badges
 - Fingerprint Cards
 - Photo Identification Systems
 - Bank Signature Cards
 - Patient Medical Histories

7. What is the use of Document Images?

It is used for storing business documents that must be retained for long periods of time and accessed by large number of people. It removes the need for making several copies for storage or distribution.

8. Explain about GIS Systems?

GIS means Geographic Information System Maps. It is used for natural resource and wild life management and urban planning.

9. What are the two technologies used for storage and display of GIS systems?

- Raster Storage
- Raster Image (Raster Image has basic color map, vector overlay and text display)

10. Explain about Voice Synthesis?

This approach breaks down the message completely to a canonical form based on phonetics. It is used for presenting the results of an action to the user in a synthesized voice. It is used in Patient Monitoring System in a Surgical Theatre.

11. What is Isochronous Playback?

Isochronous playback is defined as a playback at a constant rate. Audio and Video systems require isochronous playback.

12. Explain about Full motion and Live video?

Full motion video refers to prestored video clip. i.e., video stored in CD
Eg: games, courseware, training manuals, MM online manuals etc

Live video refers to live telecast. It is live and must be processed while the camera is capturing it i.e., Instant occurring is transferred at the same time. Eg: Live Cricket Show (in television)

13. Explain the terms Holography and Hologram?

Holography is defined as the means of creating a unique photographic image without the use of lens.

The photographic recording of the image is called a Hologram.

14. State the use of Holographic images?

It is used in design and manufacturing tasks. Holographs on credit cards are used to ensure authenticity.

15. State the properties of Holographic images?

Holographic images are

- not clear diagrams
- 3-dimensional
- can also be recorded on materials other than photographic plates
- records intensity of light and phase
- created by coherent light using a laser beam

16. Define Fractals?

Fractals are regular objects with a high degree of irregular shapes. It is a lossy compression technique but it doesn't change the shape of the image. Fractals are decompressed images that result from a compression format

17. Explain Fractal Compression?

Fractal Compression is based on image content i.e., it is based on similarity of patterns within an image. The steps in Fractal compression are

- a digitized image is broken into segments
- the individual segments are checked against a library of fractals
- the library contains a compact set of numbers called iterated function system codes.
- these system codes will reproduce the corresponding fractal

18. State the applications of Document Imaging?

Document Imaging is used in organizations such as

- Insurance agencies
- Law offices
- Country and State Governments
- Federal Government
- Department of Defence (DOD)

19. Define Compression Efficiency?

Compression Efficiency is defined as the ratio in bytes of an uncompressed image to the same image after compression.

20. What is Image Processing?

Image Processing refers to processing a digital image using a digital computer. An image processing system will alter the contents of the image. It involves Image Recognition, Image Enhancement, Image Synthesis and Image Reconstruction.

21. Explain Image Calibration?

The overall image density is calibrated. In Image calibration the image pixels are adjusted to a predefined level.

22. What is Grayscale Normalization?

The overall grayscale of an image or picture is evaluated to determine if it is skewed in one direction and if it needs correction.

23. What is Frame Averaging?

The intensity level of the frame is averaged to overcome the effects of very dark or very light areas by adjusting the middle tones.

24. What is Image Animation?

Images are displayed sequentially at controlled display speeds to provide image animation. Image Animation is the basic concept of displaying successive images at short intervals to give the perception of motion. Image Animation is a technology developed by Walt Disney and brought to every home in the form of cartoons.

25. How Image Annotation is done?

Image Annotation can be performed in two ways

- as a text file stored along the image.
- as a small image stored with the original image.

26. Explain Optical Character Recognition (OCR)?

Optical Character Recognition is used for data entry by scanning typed or printed words in a form. OCR technology is now available in software it has the capability to decipher a large number of printed fonts used in many document image applications. It is used for reading the number of invoice or for capturing entire photographs of text.

27. Explain about Handwriting Recognition?

It is used for recognizing hand written characters. The key consideration of these systems is the ability to recognize the writer-independent cursive handwriting in real time. It has been evolved from pen-based systems and it allows the user to write commands on an electronic tablet.

28. How does a Handwriting engine work?

The Handwriting engines use the following techniques

- Complex Algorithms - to capture data in real time
- Shape Recognizer - to determine the geometry and topology of stroke
- Prototype Character set - the strokes are compared with the predefined

- Context Analyzer prototypes until a match is found
- used to check a collection of characters treated as a word
- Dictionary - the word is checked here and corrections are indicated based on potential matches

29. What is Vector Data?

Vector data is the collection of points and some mathematical functions. It treats an image as a series of points (or collection of dots) and mathematical functions that describe the figures such as line, circles, arcs etc.

30. Define Vectorisation?

The process of converting rastered (scattered) data into vector data is known as Vectorisation.

31. What are the properties of Full-motion video clip?

- Full-motion video clips should be sharable
- It is possible to attach Full-motion video clips to other documents such as memos, text, presentations etc
- Full-motion video clips should be indexed
- Users should be able to place their own indexing
- It should be possible to view the same clip on a variety of display terminal types with varying resolutions
- It should be possible for users to move and resize the window displaying the video clip
- Users should be able to adjust the contrast, brightness and volume of the video clip
- Users should be able to suppress sound or mix sound from other sources
- When video clips are spliced the sound components are spliced separately

32. Explain the infrastructure required by a multimedia enabled E-mail system?

- Message store and forward facility
- Message Transfer agents
- Message Repositories(servers)
- Repositories
- Electronic Hypermedia messages
- Dynamic access and Transaction managers
- Local and Global directories
- Automatic Database Synchronization
- Automatic Protocol Conversions
- Administrative tools

33. State the applications of Non-Textual Image Recognition?

- Recognition of human faces
- Interpretation of facial expressions

- Designing, Manufacturing and Medical fields
- Security systems

34. What is Hypermedia?

The linking of media for easy access is called Hypermedia. The media may be of any type such as text, audio, video etc. A hypermedia document contains a text and any other sub objects such as images, sound, full-motion video etc

35. What is Hypertext?

The linking of associated data for easy access is called Hypertext. It is an application of indexing text to provide a rapid search of specific text strings in one or more documents. It is an integral component of Hypermedia. Hypermedia document is the basic object and text is a sub object.

36. State the types of Multimedia System Architecture?

- Multimedia Workstation Architecture
- The IMA Architectural Framework
- Network Architecture for Multimedia Systems

37. Explain VGA mixing?

In VGA mixing the image acquisition memory serve as the display source memory. It fixes the position and size on the screen.

38. Explain VGA mixing with scaling?

In VGA mixing with scaling the use of scalar IC's allows sizing and positioning of images in predefined windows. Resizing the window will cause the image to be retrieved again.

39. Explain Dual-buffered VGA mixing/scaling?

Dual-buffered VGA mixing/scaling is a double buffered scheme. It contains two buffers namely Decompression buffer and Display buffer. It maintains the original image in decompression buffer and resized image in a display buffer. Dual-buffered schemes are memory hungry but it decouples acquisition and display function so both can operate concurrently and independently.

40. Explain about IMA?

IMA means Interactive Multimedia Association. IMA has a task group with a charter. It defines the architectural framework for multimedia to provide interoperability of multimedia products. The task group concentrates on two things

Desktops – Define the interchange formats. It allows the multimedia objects to be displayed in any workstation or personal computer.

Servers – Define class libraries. It enables the distributed multimedia applications across multivendor platforms.

41. State the causes that lead to Network Congestion?

- Number of users accessing the network
- Increasing computing power of desktop systems, workstations and PC's
- Business needs for complex networks
- Increased traffic loads
- Use of client/server architectures
- Graphics intensive applications
- Voice and voice based multimedia applications

42. Explain Task based multilevel networking?

In Task based multilevel networking the tasks are broken down into the following types based on their requirement for volume of data, potential sources of data and transfer speeds

- Data transfer for text
- Data transfer for images
- Data transfer for audio and video clips
- Data Duplication to user workstations
- Data Replication among servers

43. What is Data Duplication?

Data Duplication is the process of duplicating an object that the user can manipulate. It does not require any synchronization of the duplicate object with the master object.

44. What is Data Replication?

Replication is defined as the process of maintaining two or more copies of the same object in the network. It is periodically resynchronized to provide the user faster and more reliable access to the data. Every change in replicated copy of an object is immediately reflected in master copy. Replication is done periodically ranging from 1 minute to 24 hours.

45. Give some Networking Standards?

- ATM – Asynchronous Transfer Mode
- FDDI – Fiber Distributed Data Interface

46. What are the evolving technologies of Multimedia?

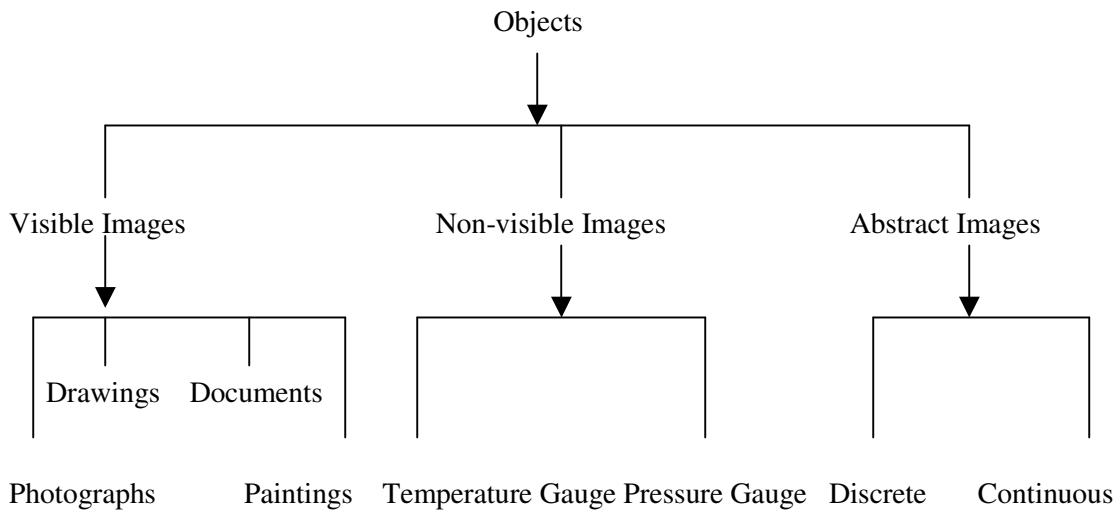
- Hypermedia Documents
- Hypertext
- Hyperspeech
- HDTV & UDTV
- 3D Technologies and Holography
- Fuzzy logic
- Digital Signal Processing

47. What are the objects of Multimedia?

- Text
- Images
- Audio and Voice
- Full-motion and Live video

48. State the datatypes of image and write the Image Hierarchy?

The datatypes of image are document images, fractals, facsimile systems, bitmaps, metafiles and still pictures.



Photographs Paintings Temperature Gauge Pressure Gauge Discrete Continuous

49. Explain about Visible Images?

Visible Images include

- Drawings such as
 - Blueprints
 - Engineering Drawings
 - Space maps for Offices
 - Town Layouts
- Paintings
- Photographs
- Documents
- Still Frames

50. Explain about Non-visible Images?

Non-visible Images are not stored as images but it is displayed as images. The examples include

- Pressure Gauges
- Temperature Gauges
- Other metering displays

51. Explain about Abstract images?

Abstract Images are not really images. They exist as real world objects or representations. They are computer generated images based on some arithmetic calculations. The examples are

- Fractals – Fractals are the result of computer generated algorithms it shows different patterns that can be created
- Kaleidoscope – Shows different patterns due to relative positions of glass beads when it is rotated

52. State the mathematical used for generating Abstract Images?

- Discrete Functions – It results in still images that remain constant on a temporal scale
- Continuous Functions – It is used to show animated images and operations such as image fading or dissolving into another image

53. What are the benefits of Multimedia Databases?

- Significant reduction of time and space
- Increased productivity
- Simultaneous document access
- Multidimensional information flow
- Reduction of time and money
- Facilitation of rapid and correct responses
- Documents are manageable

54. Explain about Massive Data Volumes?

In this storage technology only 20% of all strategic information is automated. More than 80% resides on paper or performed interactively in meetings, discussions and presentations.

55. Explain Microfiche and Microfilm?

Microfiche and Microfilm is used as a medium for storage of paper documents. Both have high level of mechanical failure and physical deterioration. Microfiche and Microfilm leaves a lot of noise on documents.

Microfiche is a 4x6 sheet of film that holds hundreds of document pages. Microfilm is a continuous film strip that holds several thousands of document pages.

56. Give the two Mass Storage technologies?

The Mass storage technologies are used for storage of multimedia documents. They are

- Optical disk storage systems
- High speed magnetic storage

57. What is a BLOB?

BLOB means Binary Large Object. Relational Database has adopted a data type commonly known as BLOB. It is used for objects such as images or other binary datatypes.

58. What is the key limitation of Relational database in implementing MM applications?

The key limitation of Relational database in implementing Multimedia applications falls on two areas

- Relational Data model
- Relational Computational model

59. What is Inheritance?

Inheritance is the ability to create new objects derived from existing object classes. New classes can be created by inheriting the attributes and methods of existing classes.

60. What is Encapsulation?

Encapsulation is the ability to deal with software entities as units that interact in predefined and controllable manner.

61. What is Message Passing?

The process of handing off data from one component of the application to another is called Message passing. It allows objects to interact by invoking each others methods.

62. Define Extensibility?

Extensibility means the set of operations, structures and constraints that are available to operations are not fixed, developers can define new operations as needed to their applications.

63. Explain Association?

Association is the ability to define a software entity in terms of its difference from another entity.

64. What is Classification?

Classification is the ability to represent a single software entity with a number of data items that all have the same behaviour and the same state attributes.

65. What are the advantages of Encapsulation?

- Encapsulation hides the inner functionality of each component
- Provides Autonomy
- Allows the development of truly open systems

66. Explain about Transaction management in Multimedia?

Multimedia transactions are very complex. It is defined as a sequence of events that starts when a user makes a request to display, edit or print a hypermedia document. The transaction will complete when the user releases the hypermedia document. Transaction is managed by the server and it provides the storage of data.

67. What is Image Compression?

Image Compression is the process of reducing the size of the image by removing redundant information in a lossless or lossy manner to conserve storage space and transmission time.

68. What is the need for Compression?

- To manage large multimedia data objects efficiently
- Reduce file size for storage of objects
- Compression eliminate redundancies in the pattern of data

69. State the two types of Compression?

- Lossy Compression
- Lossless Compression

70. What is Lossy Compression?

Lossy compression causes some information to be lost. Even if some data is lost it does not affect the originality of the image. It is used for compressing audio, greyscale or color images and video objects in which absolute data accuracy is not essential. it is used in Medical Screening Systems, Video teleconferencing and Multimedia Electronic messaging systems

71. What is Lossless Compression?

Lossless compression preserves the exact image throughout the compression and decompression process. Lossless Compression techniques are good for text data and for repetitive images in images like binary and greyscale images.

72. What are the advantages of Compression?

Compressed data object

- Require less disk memory space for storage
- Takes less time for transmission over a network

73. State the types of Lossy Compression?

- JPEG (Joint Photographic Experts Group)
- MPEG (Moving Picture Experts Group)
- Intel DVI (Digital Video Interface)
- CCITT H.261(P*64)
- Fractal

74. State the types of Lossless Compression?

- Packbits Encoding
- CCITT Group3 1D
- CCITT Group3 2D
- CCITT Group 4
- Lempel-Ziv and Welch Algorithm (LZW)

CCITT – International Consultative Committee for Telephone and Telegraph

75. What is A Binary Image?

Binary Images contain black and white pixels and generated when a document is scanned in a binary mode.

76. What is Cadecs?

Compression and decompression software or programs are called cadecs.

77. What is Cadence?

Cadence is the term used to define the regular rise and fall in the intensity of sound. Examples are the beats in music, changes in intensity of sound as a person speaks.

78. Explain about Busy Image and Continuous-tone Images?

In a Busy image adjacent pixels or group of adjacent pixels change rapidly. The grayscale or color images or known as Continuous-tone images

79. What is Negative or Reverse Compression?

If the number of bytes is increased than the bytes in runlength encoding,i.e. If the number of bytes is increased than the original image during Compression then it is called Negative Compression.

80. Give some applications of compression and Decompression Techniques?

- Facsimile Systems
- Printer Systems
- Document Storage and Retrieval Systems
- Video Teleconferencing Systems
- Electronic Multimedia Messaging Systems
- Medical Screening Systems

UNIT IV

1. Explain Magnetic Media Technology?

In magnetic media data is stored on magnetic medium by magnetization of particles in the medium. Magnetization is caused by passing current through a coil in the read write head.

2. Mention the advantages of hard drives?

- High capacity storage
- Availability of low cost

3. Explain ST506 and MFM hard drives?

It is an interface developed by Seagate. ST506 defines the operation of signals between a hard disk controller and the hard disk. It is used to control platter speed and the movement of heads for a drive. ST506 have two ribbon cables i.e., a 36-pin and 20-pin cable. The encoding schemes used are MFM, FM and RLL (Run Length Limited).

4. What is MFM?

MFM means Modified Frequency Modulation. Parallel data is converted to a series of encoded pulse by MFM.

5. Explain ESDI hard drive?

ESDI means Enhanced Small Device Interface. It converts the data into serial bit streams. It uses two ribbon cables, 36-pin cable for control signal and a 20-pin cable for data signal.

6. Explain IDE?

IDE means Integrated Device Electronics. IDE interface supports two drives; one acts as master and other as slave. A jumper on drive electronics configures the drive as master or a slave.

7. Explain SCSI?

SCSI means Small Computer System Interface. It was developed by X3T9.2 Standard. It defines both hardware and software interfaces.

8. Explain SCSI 1?

SCSI1 defines an 8-bit parallel data path between a host adapter and a device. The SCSI1 specification calls the host adapter as initiator and the device as target. There can be a combination of up to eight initiators and targets daisy chained on the bus.

9. State the different phases of a SCSI bus and its uses?

- Arbitration phase - an initiator starts arbitration and tries to acquire the bus
- Selection phase - selects the target to which it needs to talk
- Command Phase - request a command from the initiator

- Data Phase - request data transfer with the initiator
- Status Phase - indicates the end of data transfer to the initiator
- Message Phase - target enters this phase to interrupt the initiator's signaling & completion of the read command
- Bus free Phase - phase without any activity on the bus ; the bus can settle down before the next transaction

10. Explain SCSI 2?

SCSI2 has faster data transfer rates. The new command defined for SCSI2 is tagged command. The tagged command was defined to queue up commands; up to 256 commands can be queued up for a single device.

11. State the two types of latency?

- Seek latency
- Rotational latency

12. State the types of Seek latency?

- Overlapped seek
- Midtransfer seek
- Elevator seek

13. What is Overlapped seek?

Seek on one drive and then on second drive and then reconnect to first drive when seek is complete.

14. What is Midtransfer seek?

In midtransfer seek device controller can be set to seek during data transfer through a separate port provided on the SCSI chip.

15. What is elevator seek?

A track close to the head will be read first and then a more distant track even though the distant track was requested first.

16. State the two methods used to reduce latency?

- Zero latency read/write
- Interleave factor

16. Define Transfer rate?

Transfer rate is defined as the rate at which data is transferred from the drive buffer to the host adapter memory.

17. Give the formula for maximum throughput?

Max throughput for I/O = Block transfer size / Total latency

where,

$$\text{Total latency} = T1 + T2 + T3 + T4 + T5$$

- T1 - Seek latency
- T2 - Rotational latency
- T3 - Time required to transfer data from disk to system memory
- T4 - Firmware latency
- T5 - Final action on data

18. Define I/O per second?

I/O per second is a measure of the number of Input / Output transactions performed in a second. It is defined as

$$\text{I/O per second} = \text{Maximum throughput} / \text{Block size}$$

19. What is Command Queuing?

Command queuing allows execution of multiple sequential commands with system CPU intervention. It helps in minimizing head switching and disk rotational latency.

20. Define Disk spanning?

Disk spanning is a method of attaching multiple drives to a single host adapter. In this approach all drives appear as a single contiguous logical unit. Data is written to the first drive first and when the first drive is full the controller switches to second drive and so on.

21. Explain RAID?

RAID – Redundant Array of Inexpensive Disks. RAID is a storage subsystem. It is an array of multiple disks. Here data is spread across multiple drives.

RAID is used to achieve

- Large storage capacity
- Fault tolerance
- Performance improvement
- Mass storage systems

22. What are the key objectives of RAID systems?

- Hot backup of disk systems
- Large volume storage at lower cost
- Higher performance at lower cost
- Ease of data recovery

23. State some applications of RAID systems?

- Mainframe and N/w systems
- Super computers and Multimedia systems
- Data server applications

24. State the types of RAID systems?

- RAID level 0 - Disk striping
- RAID level 1 - Disk mirroring
- RAID level 2 - Bit Interleaving of data
- RAID level 3 – Parallel Disk Array
- RAID level 4 – Sector Interleaving
- RAID level 5 – Block Interleaving

25. What is Disk Striping?

RAID level 0 has multiple drives connected to a single disk controller. Data is striped to spread segments of data across multiple drives. The data being written to the disk is broken into segments. The first segment is written to first drive, second segment to second drive and so on. It is used in database applications.

26. What is Disk Mirroring?

RAID level 1 causes two copies of every file to be written on two separate drives. Each main drive has a mirror drive. All data written to main drive is written to the mirror drive at the same time. Complete data redundancy is achieved. It is used in mainframe and network systems.

27. Explain RAID level 2?

RAID level 2 is called as Bit Interleaving of data. It contains arrays of multiple drives connected to a disk array controller using SCSI channels. Data is written one bit at a time and it is interleaved across multiple drives. It also contains multiple check disks to detect and correct errors. It uses Hamming Error Correction Codes to detect and correct errors.

28. Explain about Parallel Disk Array?

RAID level 3 is called as Parallel Disk Array or Bit Interleaving with dedicated parity drive. Data is bit or byte interleaved across multiple drives. Here parity bits are written into data stream. It uses On-the-fly parity generation and parity checking technique. It is used in super computers, multimedia systems and data server applications.

29. Explain On-the-fly parity generation and parity checking?

During data writes a parity bit is generated and written to the parity drive. During data reads parity checking takes place. This process is called On-the-fly parity generation and parity checking.

30. Explain Sector Interleaving?

RAID level 4 is called as Sector Interleaving. It writes successive sectors of data on different drives. Employs multiple data drives and a single dedicated parity drive. The first sector of data is written to first drive, second sector of data to second drive and so on. In RAID level 4 data is interleaved at sector level.

31. Explain Block Interleaving?

RAID level 5 is called as Block Interleaving. Data is block interleaved and it does not use a dedicated parity drive. Parity data is spread across multiple drives in the data stream. Multiple concurrent reads and writes can be performed in RAID 5.

32. What is the use of Optical Media?

Optical media is used for storing large volumes of data. It is indestructible and unaffected by magnetic field or water. E.g. Optical drives such as CD-ROM, WORM, and Rewriteable Optical Systems.

33. How Optical media is classified?

Optical media can be classified as follows

- CROM - Compact Disc Read Only Memory
- WORM - Write Once Read Many
- Rewriteable
- Multifunction

34. State the reasons for the growth of CD-ROM's?

- Ease of use and durability of data
- Random access capability
- Very high sound fidelity
- High storage volumes

35. What are the Physical layers in CD-ROM's?

- Polycarbonate Substrate
- Reflective Aluminium layer
- Protective coat of lacquer

36. Explain about the Polycarbonate Substrate layer?

CD-ROM's contain polycarbonate disc, which is 120mm in diameter, 1.2 mm in thickness and has a 15 mm spindle hole in center. Polycarbonate substrate contains lands and pits.

37. Explain the terms land and pit?

Polycarbonate substrate contains lands and pits. The space between two adjacent pits is called a land. Pits represent binary zero. Binary one represents the transition from land to pit and from pit to land.

38. What is the use of Reflective and Protective layer?

The polycarbonate substrate is covered by reflective aluminium alloy or gold to increase the reflectivity of the recorded surface. The reflective surface is protected by a coat of lacquer to prevent oxidation.

39. State the CD-ROM Standards

- CD-DA Red Book
- CD-ROM Mode 1 Yellow book
- CD-ROM Mode 2 Yellow book
- CD-I Green book
- CD-ROM XA
- CD-MO Orange book part 1
- CD-R Orange book part 2
- Photo CD

40. What are the components of Recordable phase change CD-ROM?

- Objective lens
- Polarized histogram
- Photodiode detector
- Laser diode
- Mirror Optics

41. What are the physical layers of Recordable CD-ROM's?

- Polycarbonate Substrate
- Dye Recording layer
- Reflective Aluminium layer
- Protective coat of lacquer

42. Explain the CD-DA Red book standard?

CD-Digital Audio Red book standard was developed by Philips and Sony in 1976. It is a basic medium for audio industry. This standard specifies multiple tracks with one song per track.

43. Explain the CD-ROM Mode 1 Yellow book standard?

This standard provides error correction. It contains 288 bytes for error detection and error correction codes.

44. Explain CD-ROM Mode 2 Yellow book standard?

This standard was developed for compressed audio and video applications. The frame structure does not contain error detection and error correction codes.

45. Explain CD-I Green book standard?

CD-I is a system with a Motorola 68000 processor to manage resources such as audio output, video output and disk accesses. It incorporates MPEG compression/decompression standards for real time video compression and decompression.

46. Explain the CD-ROM XA standard?

XA stands for Extended Architecture. It contains multiple tracks. Each track content is described by a mode. Mode0 track contains standard CD audio. Mode1 track contains computer data. Mode2 is used for describing a track containing user data.

47. Explain the CD-MO Orange book part 1 standard?

This standard defines two types of area on CD-ROM i.e., Optical premastered area and Recordable area.

48. Explain the CD-R Orange book part 2 standard?

Philips and Sony developed this standard. It allows writing data once to a writeable disk. CD-R writeable CD contains

- Polycarbonate Substrate
- Recording layer
- Reflective Gold layer
- Protective lacquer layer

49. Explain about the Photo-CD?

Kodak developed a new class of CD-ROM called Photo-CD. It allows viewing Photographic quality images on television sets. The photo-CD access software is capable of editing; cropping and exporting photo-CD images to Window file formats.

50. What is Mini-Disk?

Mini-Disk (MD) is the data version of the new rewriteable storage format developed by Sony Corporation for both business and entertainment as a convenient medium for carrying music, video and data. The MD can be used in three formats

- A premastered optical disk
- A recordable magneto-optical disk
- A hybrid that is partially mastered and partially recordable

51. What is WORM?

WORM – Write Once Read Many Optical Disk. It records data using a high power laser beam to create permanent recording of data. Once the information is written it cannot be written over and cannot be erased. Once the disk is full it becomes read only memory.

52. State the advantages of WORM?

- Removable and Portable
- High Security

53. State the Applications of WORM?

- Legal and Stock Trading Management
- Medical Applications
- Online Catalogs
- Large Volume Distribution

- Transaction logging
- Multimedia Archival

54. State the layers of WORM drive?

- Polycarbonate substrate
- Recording layer is made up of
 - A Bismuth Tellurium layer
 - Two layers of Antimony Selenide
- Reflective layer
- Protective layer

55. How data is recorded in WORM drive?

- Input signal is fed to laser diode
- Laser beam strikes the three recording layers
- Laser beam is absorbed by Bismuth-Tellurium layer and generates heat
- The heat diffuses the atoms in the recording layers and forms a four element alloy (Sb, Se, Bi, and Te) which is the recorded area.

56. How data is read from WORM drive?

- Weak Laser beam is focused to the disk
- It is not absorbed due to reduced power level and reflected back
- The beam splitter mirror and lens arrangement sends the reflected beam to Photo detector
- The Photo sensor detects the beam and converts it into electrical signal

57. What is RLL?

RLL - Run-Length Limited. RLL is an encoding scheme. The benefit of RLL is that it packs 50% more bits than the MFM scheme, resulting in 26 sectors per track with a 6.4 Mbits/sec or 798 Kbytes/sec transfer rate.

58. Explain about Rewriteable Optical Disk technology?

Rewriteable optical media technology allows erasing old data and rewriting new data over old data. It behaves like a magnetic hard disk where data can be written and erased repeatedly. Two types of Rewriteable technology are

- Magneto-optical technology
- Phase change rewriteable optical disk

59. Explain about Magneto-optical technology?

Magneto-optical technology uses a combination of magnetic and laser technology to achieve read/write. The disk recorded layer is magnetically recordable. It uses a weak magnetic field to record data under high temperatures. It requires two passes to write data. In the first pass, the magneto optical head goes through an erase cycle. In the second pass it writes the data.

60. Explain the Phase Change technology?

In phase change technology the recording layer changes the physical characteristics from crystalline to amorphous under the influence of heat from a laser beam. The benefits of phase change technology are

- Require only one pass to write the data.
- No magnetic technology is needed.

61. What is a multifunction drive?

A multifunction drive is a single drive unit. It is capable of reading and writing a variety of disk media i.e., CD-ROMS, WORM drives and rewriteable disks. It provides permanence of read-only device and flexibility of a rewriteable device. It is used in product documentations.

62. Explain Hierarchical storage Management?

The primary goal of hierarchial storage is to route data to lowest cost device that will support the required performance of that object.

63. Draw the Hierarchical Storage pyramid?

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64. Define Migration?

The process of moving an object from one level in the storage hierarchy to another level in that hierarchy is called migration.

65. What is archiving?

Migration of objects to offline media and removal of these objects to on-line media is called archiving.

66. What is a cache?

Cache is a area in memory for temporary storage of data objects. It is a private memory used for storing disk data temporarily. Cache memory is located on either a disk controller or system memory and when the disk I/O request takes place the host CPU obtains the block of data from the cache.

67. What is the role of on-line caches?

The role of on-line cache is to provide high speed online storage of data.

68. What happens when the disk cache is full and there is no space for newly requested data in the Cache?

The caching controller utilizes the least recently used algorithm and most recently used algorithm to discard the least recently used blocks of data and keep the most recently used blocks of data. Space is created for the new blocks by discarding the existing data on the cache that has not been accessed for long period of time.

69. What is cache hit and cache miss?

If the requested data is in the disk cache and no disk accesses are required then it is called cache hit. If the requested data is not in the disk cache then it is called cache miss.

70. What are the different types of storage in Hierarchical storage management?

- System memory cache
- On-line high-speed magnetic disk storage
- Near-line optical disk libraries
- Off-line optical tape storage

71. What is a dirty cache?

Cache areas containing updated objects are frequently called dirty cache.

72. State the three stages of cache in a LAN based system?

- Disk cache
- Hard disk cache
- Network cache server

73. What is caching?

Using memory or disk storage as cache to speed information processing by storing information from one transaction for use by later transactions or as fast intermediate storage.

74. What is CD-ROM? State the most commonly used CD standard?

A read-only CD used to store text or graphics for computer use is referred to as CD-ROM, to distinguish it from disks inside the computer that can be erased and reused. The most commonly used CD standard is four-and-three-quarter-inch CD and its memory amounts to 640 megabytes.

75. What is host adapter?

A controller (such as SCSI controller) that routes data between the CPU and the disk drive.

76. What is a Juke Box?

A jukebox is an optical disk device that can automatically load and unload optical disks. A device that holds over ten to thousands of CD's and DVD's. It allows storage and fast access to large amounts of data.

77. What is disk drive?

The mechanical assembly used for writing to or reading from a magnetic or optical disk.

78. What is the use of CD-R?

CD-R (recordable) is a recordable CD developed by Marantz and Tandy which use magneto-optical technology for recording. It is expensive and used for video applications.

79. What is the use of Servo-controlled Electromechanical Robotics Elevator mechanism?

Servo-controlled Electromechanical Robotics Elevator mechanism is used in jukebox for moving the optical platters between their slots on a disk stack and the drives.

80. State the uses of juke box?

- Used for storing large volumes of multimedia information
- Jukebox based optical disk libraries can be networked so that multiple users can access the information
- Serve as near-line storage for infrequently used data
- Used in high capacity storage environments such as imaging, archiving and hierarchical storage management.

81. State some applications of (HSM) Hierarchical storage management?

Banks, insurance companies, hospitals, state governments, manufacturing companies, business, Police departments, Insurance Companies and service organizations use HSM to permanently store large volumes of records.

82. What is a cylinder?

Concentric circular layout of tracks on a drive's platter is called cylinder. A cylinder is a vertical combination of concentric circular tracks when a disk has multiple platters; that is same track on each platter is a part of a cylinder.

83. What is a sector?

Circular cylinders are divided into equal chunks called sectors.

84. What is constant linear velocity?

The speed at which the sector passes the head is constant and it is called the constant linear velocity.

85. State the seek time, latency, data transfer rate and burst transfer rate of WORM?

Average seek time – 70 to 120ms
Average latency - 40ms
Data transfer rate – 800 Kbytes/sec
Burst transfer rate – 5 Mbytes/sec

UNIT V

1. What is workflow?

Workflow is the sequence of events that determine the flow and processing of data. Workflow allows business process management in a predetermined organized manner and allows the flow of information from a desktop or a system to another desktop or system.

2. What are the classifications of workflow?

- Production workflow or Transaction based workflow
- Mail enabled or Adhoc workflow
- Document-based workflow
- Knowledge-based workflow
- Object-oriented workflow

3. What are the classes of multimedia application classes?

- Game systems
- Multimedia Information Repositories
- Interactive TV
- Video and Phone conferencing & Hypermedia Mail Messages
- Shared Workspaces and Shared Execution Environment
- Business Process Workflow Applications

4. Explain about Cable convertor?

A Cable convertor is a small electronic channel convertor. It is connected between a cable of satellite dish and television. It allows user to select broadcast stations. Cable convertor consists of analog demodulation and switching circuits. It can select 60 or more analog channels.

5. What is Set-top system?

Set-top box is the short name for the next generation of digital information processing systems. Set-top system acts as a cable converter as well as programmable interface between user and service provider. It allows users to connect a computer system to a television set.

6. State the classifications of Business systems?

- Dedicated Systems
- Departmental Systems

- Enterprise-wide Multipurpose Systems

7. Explain about dedicated system?

In a dedicated system the creation, storage and manipulation of multimedia objects are performed completely within the system. A dedicated system is dependent on a network or external storage management. In a dedicated system there is no communication with other systems.

8. Explain about departmental system?

Departmental systems use a LAN to provide shared object storage management. Here capturing of multimedia objects may be for local use or for distribution to other users in the department. It also provides some level of shared processing of multimedia objects.

9. Explain about enterprise-wide systems?

Enterprise-wide multipurpose systems consist of large number of LAN's and WAN's that are interconnected. It allows sharing of departmental level or enterprise level storage management. An enterprise-wide system supports a combination of dedicated local applications, departmental applications and interdepartmental applications such as e-mail and corporate information repositories.

10. Explain Virtual Reality Systems?

Virtual Reality systems are designed to produce the cognitive effect of feeling immersed in the environment. It is created by the computer using sensory inputs such as vision, hearing, feeling and sensation of motion.

11. State the key design issues that provide virtual reality functionality?

- Human factors
- Multimedia Inputs and Outputs
- Virtual Reality Modeling
- Virtual Reality Design considerations

12. What are the human factors involved in Virtual reality?

- Color, Brightness and Shading
- Object Recognition
- Navigation
- Motion Processing
- Depth Processing
- Lag

13. What is Depth Perception?

Perceiving the change in the distance of the object from the eye is called depth perception. The three important factors in depth perception are

- Motion
- Pictorial Clues
- Sensory Clues

14. Explain about Pictorial Clues?

Pictorial Clues consist of

- Changes in shapes and sizes
- Changes in gradient of surfaces
- Changes in density of objects
- Field of vision
- Change in brightness and light reflection from object surfaces

15. Define Lag?

Lag is defined as the time between the participant action and the associated application response. The design factors used to measure lag are

- Location of multimedia object server
- Network bandwidth
- Capability of workstation to process multiple streams concurrently

16. State the approaches used for designing concurrent operation of multiple devices and user feedback?

- Simulation Loops
- Multiple Processes
- Concurrent Objects

17. What is Simulation loop?

A set of objects such as sound clips, video clips, graphics and sensory stimuli participate in simulation. A procedure is created and timestep is allocated for each object. Each procedure is assigned a slot in the timeline for simulation. It is called loop because the main process loops around the simple logic of which the object is scheduled next. The simulation rate is bound to the display rate.

18. What are the disadvantages of Simulation loops?

- Method of controlling the duration of a procedure
- Prioritizing actions and determining when each device should be activated.

19. What are the design issues in Gesture recognition?

- Start and end of gesture
- Path recognition and velocity of movement
- Combination effects of multiple related gestures
- Environmental context in which the gesture was performed

20. State the User Interface design tools?

- Media Editors
- Authoring Application
- Hypermedia Object Creation
- Multimedia Object Locator and Browser

21. What is navigation?

Navigation refers to the sequence in which the application progress and objects are created, searched and used. It can be done in direct mode or browse mode.

22. State the different Metaphors used for Multimedia applications?

- Organizer Metaphor
- Telephone metaphor
- Aural User Interface(AUI)
- VCR Metaphor

23. Explain Organizer metaphor?

Organizer metaphor associates the concept of embedding multimedia objects in the appointment diary or notepad. The Lotus organizer was the first to use a screen representation of office-diary type organizer.

24. What is the use of Telephone metaphor?

The telephone metaphor combines normal windows user interface ideas with the telephone keypad. The telephone metaphor on a computer screen allows using the computer interface as telephone keypad is used.

25. Explain AUI?

Aural User Interface (AUI) allows computer systems to accept speech as direct input and provide an oral response to the user actions. The real challenge in AUI systems is to create an aural desktop that substitutes voice and ear for the keyboard and display.

26. What is the use of VCR metaphor?

VCR metaphor is used for video playback applications. This user interface shows all functions one would find in a video camera when it is in capture mode.

27. What is Scaling?

Scaling allows enlarging or shrinking the whole or part of an image. Image scaling is performed after decompression. The image is scaled to fit in a user defined window.

28. What is Zooming?

Zooming means enlarging a digital image to see it more clearly or make it easier to alter. It allows the user to see more detail for a specific area of the image.

29. What is Rubber Banding?

Rubber Banding is another form of zooming. The user can use a mouse to define two corners of a rectangle. The selected area can be copied to a clipboard, cut, moved or zoomed.

30. What is Frame Interleaving?

Frame Interleaving defines the structure of the video file in terms of the layout of sound and video components.

31. What is 1:1 interleaving?

1:1 interleaving means that the storage for every video frame is followed by storage for sound component of that frame.

32. What is programmed degradation?

The playback control can be exercised at the time of decompression and playback. This is called programmed degradation. Programmed degradation gets into effect when the client workstation is unable to keep up with the incoming data.

33. What is the use of Planar Imaging Technique?

Planar Imaging Technique is used in computer-aided tomography (CAT scan) systems. It displays a two-dimensional cut of X-ray images through multi-dimensional data.

34. Explain user workstation?

User workstation can serve as the input node for voice or video input. It can also serve as the output node for text, graphics, image, audio/voice or video.

35. What is the use of Gateway nodes?

The gateway node is a standard means of communication with other systems.

36. What is the use of Database server?

The database server supports the database requirements of the application and stores the attribute information for real-world objects in the application. Database servers are based on the UNIX OS/2 or Windows platform.

37. What is the use of Voice mail server?

Voice mail server is connected to a PBX (Private Branch Exchange). It is used for voice mail messages.

38. What is the use of Audio Server?

Audio Server manages all digitized voice and audio objects. Audio servers should be capable of maintaining isochronous playback of audio objects.

39. Explain about the Video Server?

Video Server manages video objects. Video servers should be capable of maintaining constant playback speed.

40. What is the use of Audio/Video Duplication?

Audio/Video Duplication node allows users to create audio or videotapes for transportation of multimedia documents.

41. What is the use of Duplication station?

Duplication station provides specialized high-speed duplication equipment such as diskettes, CD-ROM's, Recordable CD's, Optical disks, Optical tapes etc.