

**SUBJECT: GRAPHICS AND MULTIMEDIA**

**CS1354**

**CLASS: S& IT**

## **UNIT I PART A**

### **1. What is the purpose of presentation graphics?**

Presentation graphics is used to produce illustrations for reports or to generate 35-mm slides or transparencies for use with projectors. Presentation graphics is commonly used to summarize financial, statistical, mathematical, scientific, and economic data for research reports, managerial reports, consumer information bulletins, and other types of reports.

### **2. Define refresh buffer/frame buffer.**

The memory area where in picture definition is stored is called Refresh buffer. This memory area holds the set of intensity values for all the screen points. On a black and white system with one bit per pixel, the frame buffer is called a bitmap.

### **3. What is pixel?**

Each screen point in a monitor is called a pixel/pel. It is also called picture element.

### **4. Define aspect ratio.**

It is a property of video monitors. This number gives the ratio of vertical points to horizontal points necessary to produce equal-length lines in both directions on the screen.

### **5. What is Output Primitive?**

Basic geometric structures that describe a scene are referred to as Output Primitives. Points and straight line segments are the simplest geometric components of pictures. Additional output primitives that can be used to construct a picture include circles and other conic sections, quadric surfaces, spline curves and surfaces, polygon color areas, and character strings.

### **6. What is DDA?**

The Digital Differential Analyzer is a scan-conversion line algorithm based on calculating either difference in y-coordinate (dy) or difference in x-coordinate. We sample the line at unit intervals in one coordinate and determine corresponding integer values nearest the line path for the other coordinate.

### **7. What are the disadvantages of DDA algorithm?**

- Round-off error in successive additions of the floating-point increment can cause the calculated pixel positions to drift away from the true line path for long line segments.

- Rounding operations and floating-point arithmetic in procedure are still time-consuming.

### **8. What is attribute parameter?**

Any parameter that affects the way a primitive is to be displayed is referred to as an attribute parameter.

### **9. What are the basic line attributes?**

Basic attributes of a straight line segment are its type, its width, and its color.

### **10. What is meant by aliasing?**

The distortion of information due to low frequency sampling (Under sampling) is called aliasing. We can improve the appearance of displayed raster lines by applying antialiasing methods that compensate for the under sampling process.

### **11. Define Translation.**

A translation is applied to an object by repositioning it along a straight line path from one coordinate location to another. We translate a two-dimensional point by adding translation distances,  $t_x$  and  $t_y$ , to original coordinate position  $(x, y)$  to move the point to a new position  $(x', y')$ .  $x' = x + t_x$ ,  $y' = y + t_y$ . The translation distance pair  $(t_x, t_y)$  is called a translation vector or shift vector.

### **12. Define Rotation.**

A 2-D rotation is applied to an object by repositioning it along a circular path in the  $xy$  plane.

### **13. Define Scaling.**

A scaling transformation alters the size of an object. This operation can be carried out for polygons by multiplying the coordinate values  $(x,y)$  of each vertex by scaling factors  $s_x$  and  $s_y$  to produce the transformed coordinates  $(x', y')$ .  $x' = x \cdot s_x$ ,  $y' = y \cdot s_y$ .

### **14. Define Reflection.**

A Reflection is a transformation that produces a mirror image of an object. The mirror image for a 2D reflection is generated relative to an axis of reflection by rotating the object 180 degree about the reflection axis.

### **15. Define Shear.**

A transformation that distorts the shape of an object such that the transformed shape appears as if the object were composed of internal layers that had been caused to slide over each other is called a shear.

**16. Define Window.**

A world-coordinate area selected for display is called a window.

**17. Define view port.**

An area on a display device to which a window is mapped is called a view port.

**18. What is viewing transformation?**

The mapping of a part of a world-coordinate scene to device coordinates is referred to as viewing transformation.

**19. Define Clipping.**

Any procedure that identifies those portions of a picture that are either inside or outside of a specified region of space is referred to as a clipping algorithm or simply clipping. The region against which an object is clipped is called a clip window.

**20. What are the types of Clipping?**

- Point clipping
- Line clipping
- Area clipping
- Curve clipping
- Text clipping

**PART B**

**1.Explain DDA algorithm for line.**

- Algorithm
- Definition
- Diagram
- Theory
- Implementation

**2.Explain Bresenham's algorithm for line, circle, ellipse.**

Algorithm, Definition, Diagram, Theory Implementation

**3. Explain Attributes of Output primitives.**

Line attributes, Curve attributes area-fill attributes, character attributes

#### **4. Explain 2D Transformations.**

- Translation
- Rotation
- Scaling
- Shear
- Reflection

#### **5. Explain 2D viewing.**

- Definition
- Diagram
- Theory

## **UNIT II PART A**

#### **1. Categorize the 3D representations?**

Boundary representation (B-reps) and space-partitioning representations.

#### **2. What Boundary representation?**

It describes a 3D object as a set of surfaces that separate the object interior from the environment. e.g. polygon facets and spline patches.

#### **3. What space-partitioning representation?**

This is used to describe interior properties, by partitioning the spatial region containing an object in to a set of small, non-overlapping, contiguous solids. e.g.octree.

#### **4. What is Blobby Object?**

Some objects do not maintain a fixed shape, but change their surface characteristics in certain motions or when in proximity to other objects. Examples in this class of objects include molecular structures, water droplets and other liquid effects, melting objects and muscle shapes in the human body. These objects can be described as exhibiting "blobbiness" and are often simply referred to as blobby objects, since their shapes show a certain degree of fluidity.

#### **5. What is projection?**

The process of displaying 3D objects on a 2D display is called as Projection

#### **6. What are the types of projection?**

- Perspective projection
- Parallel projection

### 7. What is parallel projection?

In a parallel projection, coordinate positions are transformed to the view plane along parallel lines.

### 8. What is Perspective projection?

For a perspective projection object positions are transformed to the view plane along lines that converge to a point called the projection reference point.

### 9. What is chromaticity?

The term chromaticity is used to refer collectively to the two properties describing color characteristics: Purity and dominant frequency.

### 10. Define Color model.

A Color model is a method for explaining the properties or behavior of color within some particular context.

### 11. What are the uses of chromaticity diagram?

The chromaticity diagram is useful for the following:

- Comparing color gamuts for different sets of primaries.
- Identifying complementary colors.
- Determining dominant wavelength and purity of a given color.

### 12. Give the transformation matrix for conversion of RGB to YIQ.

$$\begin{bmatrix} Y \\ I \\ Q \end{bmatrix} = \begin{bmatrix} 0.299 & 0.587 & 0.144 \\ 0.596 & 10.275 & -0.321 \\ 0.212 & -0.528 & 0.311 \end{bmatrix} \cdot \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

### 13. What is HSV model?

The HSV(Hue,Saturation,Value) model is a color model which uses color descriptions that have a more intuitive appeal to a user. To give a color specification, a user selects a spectral color and the amounts of white and black that are to be added to obtain different shades, tint, and tones.

**14. What for CMY color model used?**

A color model defined with the primary colors cyan, magenta, and yellow is useful for describing color output to hard-copy devices.

**15. What are the parameters in the HLS color model?**

Hue, Lightness and Saturation.

**16. Define Computer animation.**

Computer animation refers to any time sequence of visual changes in a scene. In addition to changing object position with translations or rotations, a computer generated animation could display time variations in object size, color, transparency, or surface texture.

**17. What are the steps in animation sequence?**

- Story board layout
- Object definition
- Key-frame specifications
- Generation of in-between frames

**18. How frame-by-frame animation works?**

Here each frame of the scene is separately generated and stored. Later the frames can be recorded on film or they can be consecutively displayed in "real-time playback" mode.

**19. What is morphing?**

Transformation of object shapes from one form to another is called morphing.

**20. What are the methods of motion specifications?**

- Direct motion specification
- Goal-directed Systems
- Kinematics and Dynamics.

**PART B**

**1. Explain various 3D object representations.**

Categories with one example in each.

**2. Explain 3D Transformations.**

- a. Translation
- b. Rotation
- c. Scaling

**3. Explain 3D viewing.**

Definition  
Diagram  
Theory

**4. Explain Color models.**

- RGB color model
- YIQ
- CMY
- HSV
- HLS

**5. Explain computer animation.**

Theory, definition and diagrams.

**UNIT III  
PART A**

**1. Give some Multimedia applications.**

- Document imaging
- Image processing and Image recognition
- Full-Motion Digital Video Applications
- Electronic Messaging

**2. What are the multimedia elements?**

Facsimile, Document images, Photographic images, Geographical information system maps, Voice commands and voice synthesis, Audio messages, Video messages, Full-motion stored and live video, Holographic images, Fractals.

**3. What is Holography?**

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

**4. What is hologram?**

The photographic recoding of the image is called a hologram, which appears to be

an unrecognizable pattern of stripes and whorls but which when illuminated by coherent light as by a laser beam, organizes the light into a 3D representation of the original object.

**5. What are the important processes in image processing?**

Image recognition, image enhancement, image synthesis, and image reconstruction.

**6. What are complex image enhancement capabilities?**

Image calibration, Real-time alignment, Gray-scale normalization, RGB hue intensity adjustment, Color separation, Frame averaging.

**7. What is VGA mixing?**

Here, the image acquisition memory also serves as the display source memory, thereby fixing its position and size on screen.

**8. What is Dual-buffered VGA mixing / scaling?**

Double buffer schemes maintain the original images in a decompression buffer and the resized image in a display buffer.

**9. What is hypermedia documents?**

In hypermedia documents in addition to text, embedded or linked multimedia objects such as image, audio, hologram, or full-motion video.

**10. What are the sub-systems in DSP?**

Memory management, hardware-interrupt handling, Multitasking, Inter task synchronization and communication, Multiple timer services, Device-independent I/O.

**11. What are the types of images based on multimedia?**

Visible images, non-visible images, abstract images.

**12. What does non-visible images refer?**

Non-visible images are those that are not stored as images but are displayed as images e.g. pressure gauges, temperature gauges.

**13. What are abstract images?**

Abstract images are really not images that ever existed as real-world objects or representations. Rather they are computer-generated images based on some arithmetic calculations. e.g. fractals.

#### **14. What is DVI?**

The Digital Video Interface (DVI) standard was defined to provide a processor-independent specification for a video interface that could accommodate most compression algorithms for fast multimedia displays.

#### **15. What is MIDI?**

This is the interface standard for file transfer between a computer and a musical instrument such as a digital piano.

#### **16. What is Apple's Quick time?**

The QuickTime standard, developed by Apple Computer, is designed to support multimedia applications. Apple's QuickTime is viewed as a multimedia interface that is evolving to become a standard part of the Apple as well as MS-Windowsbased systems.

#### **17. What is JPEG?**

The Joint Photographic Experts Group, formed as a joint ISO and CCITT working committee, is focused exclusively on still-image compression.

#### **18. What is called Asymmetrical compression based on Compression?**

These are applications that need to be compressed once but are read many times.

#### **19. What are the considerations in Multimedia storage?**

Massive storage volumes, large object sizes, multiple related objects, temporal requirements for retrieval.

#### **20. What are the strengths of object oriented s/w?**

Encapsulation, Association, Classification.

### **PART B**

#### **1. Give the multimedia applications and explain.**

- Document imaging
- Image processing and Image recognition
- Full-Motion Digital Video Applications
- Electronic Messaging

#### **2. What are the multimedia elements? Explain.**

Facsimile, Document images, Photographic images, Geographical information system maps, Voice commands and voice synthesis, Audio messages, Video messages, Full-motion stored and live video, Holographic images, Fractals.

### **3. Explain about Multimedia databases.**

Multimedia storage and retrieval, db management systems for multimedia system, db organization for multimedia applications, transaction management for multimedia systems.

### **4. Explain about defining objects for multimedia system.**

Text, Images, Audio and video, Full-motion and live video.

### **5. Explain about Multimedia data interface standards?**

File formats for multimedia systems, video processing standards, Microsoft's AVI.

## **UNIT IV PART A**

### **1. Define Cadence.**

Cadence is a term used to define the regular rise and fall in the intensity of sound.

### **2. Say some loss less compression standards?**

Pack bits encoding, CCITT Group3 1D, CCITT Group3 2D, CCITT Group4, Lempel-Ziv and Welch algorithm LZW.

### **3. Say some lossy compression standards?**

JPEG(Joint photographic Experts Group),MPEG(Moving Picture Experts Group),Intel DVI,CCITT H.261 video coding algorithm, Fractals.

### **4. What are the advantages of CCITT Group 3 1D?**

- It is simple to implement in both h/w and s/w.
- It is a world wide standard for facsimile, which is accepted for document imaging application. This allows document-imaging applications to incorporate fax documents easily.

### **5. What is the disadvantage of CCITT Group 3 2D Scheme?**

It is complex and relatively difficult to implement in software.

## **6. What is Luminance?**

Luminance refers to brightness. This is a measure of the brightness of the light emitted or reflected by an object.

## **7. What are the levels of definition in JPEG standards?**

Baseline system, Extended system, special loss less function.

## **8. Define Quantization.**

It is a process of reducing the precision of an integer, thereby reducing the number of bits required to store the integer.

## **9. What are the controls in VCR paradigm?**

play, fast, forward, rewind, search forward, and rewind search.

## **10. What are types of moving picture?**

Intra picture, Unidirectional predicted pictures, Bi-directional predicted pictures.

## **11. What are the factors that affect video performance?**

Microprocessor speed, Play back window size, Frame rate.

## **12. What is fractal?**

A fractal is a multidimensional object with an irregular shape or body that has approximately the same shape or body irrespective of size. i.e., irrespective of whether it gets smaller or bigger in size.

## **13. What are multimedia file formats?**

Rich-Text Format(RTF), Tagged image file format(TIFF), Resource image file format(RIFF), Musical instrument digital interface(MIDI), Joint Photographic Experts Group, Audio Video Interchanged Indeo file Format(AVI), TWAIN.

## **14. What is digital pen?**

A digital pen is a powerful input device that allows the user to write, draw, point and gesture.

## **15. What are the components of PEN?**

Electronic pen and digitizer, Pen driver, Recognition context manager, Recognizer, Dictionary, Display driver.

**16. What are the display performance issues?**

N/w b/w, Decompression or decoding, Display technology.

**17. What is roping?**

Roping causes straight lines to appear twisted or helical. This is caused by poor convergence as successive pixels in the line show different edge colors.

**18. Write the four basic technologies used for flat panel displays.**

Passive-matrix monochrome, Active-matrix monochrome, Passive-matrix color, Active-matrix color.

**19. What are the components of Laser printer?**

Paper feed mechanism, Laser assembly, Corona assembly, Fuser, Toner cartridge.

**20. What are the main characteristics of voice recognition system?**

Separation b/w words, Speaker dependency and speaker-independent recognition, Use of phonemes, Vocabulary size.

**PART B**

**1. Give in detail Huffman encoding.**

Algorithm, Diagram, explanation.

**2. Explain fractal compression.**

Algorithm, Diagram, explanation.

**3. Explain data and file format standards.**

- TIFF
- RIFF
- MIDI
- JPEG
- MPEG
- TWAIN

**4. Explain about Digital pen.**

Electronic pen,  
digitizer,  
RCM,  
recognizer,  
dictionary,  
display driver.

**5. Explain about cache management for storage systems.**

- Low-level disk caching
- Cache organization for hierarchical storage systems
- Cache organization for distributed client-server systems

**UNIT V  
PART A**

**1. What are the design issues for multimedia authoring?**

Display resolution, Data formats for captured data, Compression algorithms, Network interfaces, and Storage formats.

**2. What are the types of Multimedia authoring Systems?**

Dedicated Authoring system, Timeline-Based Authoring, Structured Multimedia Authoring, Programmable Authoring Systems, Multisource Multi-User Authoring systems, Telephone Authoring Systems.

**3. Classify the User interface development tools?**

Media editors, An authoring application, Hypermedia object creation, Multimedia object locator and browser.

**4. What is the purpose of zooming?**

Zooming allows the user to see more detail for a specific area of the image.

**5. What is panning?**

Panning implies that the image window is unable to display the full image at the selected resolution for display. In that case the image can be panned left to right or right to left as well as top to bottom or bottom to top. Panning is useful for finding detail that is not visible in the full image.

**6. What are the steps needed for Hypermedia report generation?**

Planning, Creating each component, Integrating components.

### **7. Define mail message.**

Mail message is a message of a well-defined type that must include a message header and may include note parts, attachments, and other application-defined components. Note parts may include text, bitmaps, pictures, sound, and video components.

### **8. What are the components of a distributed Multimedia system?**

Application s/w, Container object store, Image and still video store, Audio and video component store, Object directory service agent, Component service agent, User interface service agent, Networks.

### **9. What are the characteristics of Document store?**

Primary document storage, Linked object storage, Linked object management.

### **10. What are key issues in data organization for multimedia systems?**

Data independence, Common Distributed Database Architecture, Multiple Data servers.

### **11. What are the key elements in object server architecture of multimedia applications?**

Multimedia application, Common object management, Object request broker, Object name server, Object directory manager, Object server, Object manager, Network manager, Object data store.

### **12. What are the functions performed by object request broker?**

Object recompilation, Playback control, Format conversion.

### **13. What are the issues in database replication techniques?**

sharing of all data objects by all users on the networks, Providing acceptable performance to all users, allowing all users to update the database depending on the tasks being performed by them.

### **14. What are the types of database replication?**

Round-robin replication, manual replication, scheduled replication, immediate replication, replication-on-demand, predictive replication, replicating references, no replication.

**15. What are the primary n/w topologies used for multimedia?**

traditional LANS, extended LANS, High-speed LANS, WANS.

**16. Give the primary goal of MAPI.**

Separate client applications from the underlying messaging services, Make basic mail-enabling a standard feature for all applications, Support messaging-reliant workgroup applications.

**17. What is the purpose of MIME?**

Multipurpose Internet Mail Extension specification defines mechanisms for generalizing the message content to include multiple body parts and multiple data types.

**18. What are the characteristics of image and still video stores ?**

Compressed information, Multi-image documents, Related annotations, Large volumes, Migration b/w high-volume media such as an optical disk library and high-speed media such as magnetic cache storage, shared access.

**19. What are the services provided by a directory service agent?**

Directory service, Object assignment, Object status management, Directory service domains, Directory service server elements, n/w access.

**20. What are the services provided by User Interface Agent?**

Window management, Object creation and capture, Object display and play back, Services on workstations, Using display s/w

**PART B**

**1. Explain hypermedia messaging.**

- Mobile messaging
- Text messages
- rich-text messages
- voice messages
- Full motion video management

**2. Explain the components of distributed multimedia systems.**

Application software, Document store, Image and Still Video store, Object directory service agent, Component service agent, user interface service agent.

**3. Give the multiserver n/w topologies.**

- Traditional LANS
- Extended LANS
- High-speed LANS
- WANS

#### **4. Explain Distributed Client-server operation.**

Clients in distributed workgroup computing, Servers in distributed workgroup computing, Database operations, middleware in distributed workgroup computing .

#### **5. How to manage Distributed objects.**

- Inter server communications
- Object server architecture
- Object identification
- Object revision management
- Optimizing n/w location objects
- object directory services
- multimedia object retrieval
- database replication techniques