SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

VIII SEMESTER

1908010 COMPUTER GRAPHICS AND MULTIMEDIA

Regulation – 2019

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QUESTION BANK

SUBJECT   : 1908010 Computer Graphics And Multimedia

SEM / YEAR: VIII/IV

UNIT I - OUTPUT PRIMITIVES AND COLOR MODELS
Introduction to computer graphics and applications- Output primitives – points and lines, line drawing algorithms, circle and ellipse generating algorithms, filled are aprimitives. Light sources - basic illumination models – halftone patterns and dithering techniques; Properties of light - Standard primaries and chromaticity diagram; Intuitive colour concepts - RGB colour model - YIQ colour model - CMY colour model - HSV colour model - HLS colour model; Colour selection.

PART – A (2 marks)

Q.No	Questions	BT	Competence
1	Explain pixel	BTL2	Understand
2	What are the major application areas of Graphics?	BTL1	Remember
3	Define aspect ratio.	BTL1	Remember
4	Give the governing equation of circle	BTL2	Understand
5	Define is DDA?	BTL1	Remember
6	Give the contents of a display file	BTL2	Understand
7	What is loading a frame buffer?	BTL1	Understand
8	What is meant by antialiasing?	BTL1	Understand
9	Generalize on filled area primitive	BTL2	Understand
10	What is pixel addressing and object addressing?	BTL1	Understand
11	What are the disadvantages of DDA algorithm?	BTL1	Understand
12	Give the color model HLS double cone	BTL2	Understand
13	What is dithering?	BTL1	Remember
14	Distinguish CMY and HSV color models	BTL2	Understand
15	What is Ambient light?	BTL1	Remember
16	Define Depth Cueing	BTL1	Remember
17	What are the types of reflection of incident light?	BTL1	Remember
18	Define shading	BTL1	Remember
19	What is texture? Mention its application.	BTL1	Remember
20	Distinguish flat and smooth shading	BTL2	Understand
21	What are subtractive colors?	BTL1	Remember
22	Describe flat shading.	BTL2	Understand
23	Define rendering	BTL1	Remember
24	How will you convert from YIQ to RGB color model?	BTL1	Remember
PART – B (13 marks)			
1	Point out various attributes of points and line	BTL-4	Analyze

2	i) Explain the steps in mid-point circle drawing algorithm with an example (7)	BTL-6	Create
	ii) Generalize in brief Antialising techniques (6)	BTL-6	Create
3	Given input ellipse parameter Rx =8 Ry =6. Illustrate in the midpoint ellipse algorithm by determining the raster position along the ellipse path in the first quadrant.	BTL-3	Apply
4	i) Describe Boundary Fill Algorithm . (7)	BTL5	Evaluate
	ii) Derive and Analyze the decision parameter P0 for the circle. (6)	BTL 4	Analyze
5	Describe Breshanham's line drawing algorithm with suitable example	BTL5	Evaluate
6	Describe the decision parameter for the ellipse and write down the algorithm steps	BTL5	Evaluate
7	i)Illustrate about filled area primitives (7)	BTL-3	Apply
	ii)Explain and classify character attributes (6)	BTL-3	Apply
8	i)Explain DDA and Bresenham's line drawing algorithms (7)	BTL5	Evaluate
	ii)Describe about output primitives (6)	BTL5	Evaluate
9	Illustrate the following i)RGB color models (7) ii) HSV color models (6)	BTL-3	Apply
10	Describe on the various color models in detail.	BTL5	Evaluate
11	Compare and contrast the various color models in detail	BTL 4	Analyze
12	i) Explain briefly the RGB color model (7) ii) Explain how refraction of light in a transparent object changes the view of the three dimensional object (6)	BTL 4	Analyze
13	Compare and contrast between RGB and CMY color models (13)	BTL 4	Analyze
14	Explain about shading models. (13)	BTL5	Evaluate
15	Write short notes on i) How do you create shaded objects (7) ii) draw shadows (6)	BTL6	Create
16	Explain Reflection and transparency (7) Explain the properties of light (6)	BTL 4	Analyze
17	Explain chromaticity with diagram (7) Write short notes on Color selection (6)	BTL5	Evaluate

PART – B (15 marks)		
1	Write and explain Bresenham's line drawing algorithm and trace the algorithm for the given points (2,1) to (10,12). Also List the advantages of Bresenham's algorithm over DDA algorithm. (15)	BTL 6	Create
2.	Evaluate and explain the midpoint circle drawing algorithm. Assume 10 cm as the radius and co-ordinate origin as the center of the circle Draw the circle and deduce the answer (15)	BTL5	Evaluate
3.	Demonstrate various method of color selection (15)	BTL5	Evaluate
4.	Explain various properties of light with respect to illumination of objects (15)	BTL6	Create
5	Explain the features of various color models in detail. (15)	BTL5	Evaluate

UNIT II TWO DIMENSIONAL GRAPHICS		
Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.		
PART A (2 marks)		
1	Define Transformation	BTL1	Remember
2	Give short notes on active and passive transformations	BTL2	Understand
3	Describe Translation and its uses.	BTL1	Remember
4	Explain Rotation and is uses.	BTL2	Understand
5	Explain about Scaling	BTL2	Understand
6	Explain the matrix representation and Homogeneous coordinates	BTL2	Understand
7	Describe Composite transformation.	BTL1	Remember
8	Give the different types of Reflection.	BTL2	Understand
9	Give the two common Shearing.	BTL2	Understand
10	Describe Window.	BTL2	Understand
11	Define view port.	BTL1	Remember
12	What is Window to view port coordinate transformation?	BTL1	Remember
13	Define Clipping.	BTL1	Remember
14	What are the types of Clipping?	BTL1	Remember
15	Explain about Polygon clipping	BTL2	Understand
16	List Various types of Polygon clipping	BTL1	Remember
17	What is the purpose of presentation graphics?	BTL1	Remember

18	Define frame buffer	BTL1	Remember
19	Explain Affine transformation	BTL1	Remember
20	What is covering (exterior clipping)?	BTL1	Remember
21	Give the matrix for 3D Scaling.	BTL2	Understand
22	Give the matrix for 3D Reflections.	BTL2	Understand
23	Give the two-dimensional viewing transformation pipeline.	BTL2	Understand
24	Give the equation for scaling factors of viewport.	BTL2	Understand
PART B (13 marks)			
1	i)Illustrate the following basic two dimensional geometric transformations Traslation and Rotation (6) ii)Demonstrate composite transformation for translation and rotation (7)	BTL3	Apply
2	i)Analyze matrix representation and homogeneous coordinates (7) ii)Give a brief note on two dimensional viewing transformation pipeline (6)	BTL4	Analyze
3	i) Explain in detail the Sutherland-Hodgeman clipping algorithm with an example. (7) ii) Compare between window port and view port (6)	BTL4	Analyze
4	Examine about Cohen-Sutherland line clipping algorithm with an example.	BTL4	Analyze
5	i) Illustrate about Nicholl-Lee-Nicholl line clipping (7) ii) Explain about point clipping (6)	BTL5	Evaluate
6	(i) Describe the following basic two dimensional geometric transformations Scaling and Reflection (7) (ii) Give composite transformation for translation and rotation (6)	BTL5	Evaluate
7	i)Design Liang-Barsky Line clipping algorithm with an example (7) ii)Write a generalize note on polygon clipping algorithm (6)	BTL6	Create
8	i) Create the matrix representation of composite transformation. (7) ii) What are the stages involved in 2D viewing transformation pipeline? Describe briefly about each stage. (6)	BTL6	Create
9	i) Describe Curve clipping (7) ii) Describe text clipping (6)	BTL5	Evaluate
10	Explain the following (i) General Pivot point rotation (7) (ii)General Fixed Point Scaling (6)	BTL6	Create
11	i)The reflection along the line y=x is equivalent to the reflection along the X axis followed by counter clockwise rotation by θ. Find the value of θ (7) ii)Explain in detail about Weiler-Atherton Polygon Clipping (6)	BTL6	Create

12	i) Brief on viewing Pipeline (7) ii) Explain any algorithm for polygon clipping. (6)	BTL5	Evaluate
13	**i)**Generate local scaling taking scaling vectors along the x,y,z axes as 2,3,1 respectively for a cube with homogeneous position vectors (7) ii)Write short notes on exterior clipping (6)	BTL6	Create
14	i) Compare and contrast Cohen-Sutherland and Nicholl-Lee-Nicholl line clipping (7) ii) Explain about splitting concave polygon (6)	BTL4	Analyze
15	Illustrate Polygon Fill-Area Clipping (13)	BTL3	Apply
16	Illustrate Weiler-Atherton Polygon Clipping. (13)	BTL4	Analyze
17	Illustrate Polygon Clipping using Nonrectangular Polygon clip Windows. (13)	BTL4	Analyze
PART C (15marks)			

1	Explain about Composite transformation in general and Explain the following with matrix representation:
	    (i) Two Successive Translation
	    (ii) Two Successive Rotations
	    (iii) Two Successive Scaling
	    (iv) General Pivot Point Rotation
	    (v) General Fixed Point Scaling
		BTL6	Create

2	Explain in detail on any two basic two dimensional geometric transformations. Rotate the point P(2,-4) about the origin 30^0 in anti-clockwise direction.	BTL5	Evaluate
3	Clip the given line A(1,3) B(4,1) against a window P(2,2) ,Q(5,2), R(5,4),S(2,4) using Liang Barsky line Clipping algorithm. Also explain window to viewport coordinate transformation.	BTL6	Create
4	Clip a quadrilateral ABCD with coordinates(10,18) (22,18) (34,27) and (10,37) against a window QRST with coordinates (5,15) (30,15),(30,25) and (5,25) using Cohen Sutherland algorithm.	BTL6	Create
5	Develop a text-clipping algorithm that clips individual characters, assuming that the characters are defined in a pixel grid of a specified size.	BTL6	Create

UNIT III THREE DIMENSIONAL GRAPHICS
Three dimensional concepts; Three dimensional object representations – Polygon surfaces-Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces. TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible

	surface detection methods.		
PART A (2 marks)			
1	List the various representation schemes used in three dimensional object	BTL1	Remember
2	Tabulate polygon surfaces ,polygon tables and polygon equations	BTL1	Remember
3	Distinguish parallel projection from perspective projection.	BTL2	Understand
4	Summarize shear transformation	BTL2	Understand
5	Name some of the advantages of BSpline over Bezier curves	BTL1	Remember
6	Define quadric surfaces.	BTL1	Remember
7	Explain spline curves.	BTL2	Understand
8	Describe the applications of Bezier Splines	BTL2	Understand
9	Give the single point perspective projection transformation matrix when projectors are placed on the z axis	BTL2	Understand
10	Generalize space-partitioning representation	BTL2	Understand
11	What is Transformation? **Give** the steps involved in 3D transformation	BTL2	Understand
12	State the types of transformations	BTL1	Remember
13	Explain projection and the types of projection	BTL2	Understand
14	Give the matrix for 3D z-axis rotation.	BTL2	Understand
15	Describe the matrix for 3D translation.	BTL2	Understand
16	Give the parametric representation of a cubic Bezier curves	BTL2	Understand
17	Describe a Blobby object and Brep	BTL1	Remember
18	Define Polygon mesh	BTL1	Remember
19	What do you mean by view plane?	BTL1	Remember
20	What are the various visible face detection methods or hidden surface elimination method?	BTL1	Remember
21	What is view distance?	BTL1	Remember
22	Explain orthogonal projection.	BTL2	Understand
23	Explain oblique parallel projection.	BTL2	Understand
24	Distinguish Cavalier and Cabinet Oblique Parallel projection.	BTL2	Understand
PART B (13 marks)			
1	Write short notes and analyze on the list given below i) Polygon surfaces and Curved line surfaces (7) ii) Quadric surfaces. (6)	BTL4	Analyze
2	i)Describe in detail formulation of Bspline surfaces (7) ii)Explain and Examine 3D transformation pipeline from modeling coordinate to final device coordinate (6)	BTL5	Evaluate
3	i)Describe B spline and Bezier surfaces. (7) ii)Tabulate the advantages and disadvantages of B spline surfaces over Bezier surfaces (6)	BTL5	Evaluate

4	i)Explain and Classify three dimensional display methods with example (7) ii)Illustrate Blobby objects and examples (6)	BTL3	Apply
5	i) Illustrate parallel projections with examples (7) ii) Illustrate perspective projections with examples (6)	BTL3	Apply
6	Analyze the following. (i) Interpolation and Approximation splines. (6) (ii) Parametric Continuity Conditions. (7)	BTL4	Analyze
7	Analyze the following. (i) Geometric Continuity Conditions (6) (ii) Spline Specifications (7)	BTL4	Analyze
8	i)Show the general characteristics of B spline curves (7) ii)Demonstrate uniform and cubic periodic B splines curves (6)	BTL3	Apply
9	i) Analyze open uniform and non-uniform B splines curves (7) ii) Analyze B splines curves with multiple knots (6)	BTL4	Analyze
10	Explain depth sorting method of visible surface detection. (13)	BTL5	Evaluate
11	i) Explain Area Subdivision method of hidden surface identification algorithm (7) ii)Summarize on curved surface method in visible surface Detection method (6)	BTL5	Evaluate
12	Explain and analyze on Clipping in 3D i) Normalized view volumes and Viewport clipping (7) iii) Clipping in homogeneous coordinates (6)	BTL4	Analyze
13	Describe the following visible surface detection methods (i) Octree method (7) (ii) Ray Tracing method (6)	BTL5	Evaluate
14	With suitable examples describe the following i) Reflection and Scaling (7) ii) Shearing (6)	BTL5	Evaluate
15	With suitable examples **describe** 3D transformations. i) Rotation (7) ii) Translation (6)	BTL5	Evaluate
16	Describe on the following visible surface detection methods. (i) Depth –Buffer method and A-Buffer method (7) (ii) Back face detection (6)	BTL5	Evaluate
17	Summarize on the following hidden surface elimination methods (i) Scan line Method and Painter's algorithm (7) (ii) BSP-tree method (6)	BTL6	Create
PART C (15 marks)			
1	Determine the 3D transformation matrices to scale a line PQ in the x direction by 3 by keeping point P fixed. Then rotate this line by 45^0 anticlockwise about the Z axis. Given P(1,5,2) and Q(4,5,6)	BTL5	Evaluate

2	i)**Express** the different types of data with the techniques of visualization applied over the data (8) ii)Write down and discuss the details to build a camera in a program (7)	BTL6	Create
3	Find the points on the Bezier curve which has starting and ending points P_0 (2, 3) and P_3 (4,-3) and is controlled by P_1 (5,6) and P_2 (7,1) for u=0.9.	BTL5	Evaluate
4	i) Create and explain the different 3D object representation in detail (7) ii) **Show** that the Bezier curve always touches the starting point(for u=0) and the ending point (for u=1) (8)	BTL6	Create
5	Devise an algorithm for viewing a single sphere using the ray-casting method.	BTL6	Create

UNIT - IV: MULTIMEDIA SYSTEM DESIGN & MULTIMEDIA FILE HANDLING			
Multimedia basics − Multimedia applications − Multimedia system architecture – Evolving technologies for multimedia − Defining objects for multimedia systems − Multimedia data interface standards − Multimedia databases. Compression and decompression − Data and file format standards − Multimedia I/O technologies − Digital voice and audio − Video image and animation − Full motion video − Storage and retrieval technologies.			
PART A (2 marks)			
1	List any 5 multimedia applications	BTL1	Remember
2	What is meant by multimedia?	BTL1	Remember
3	Give the diagram of Multimedia work architecture.	BTL2	Understand
4	List any five graphics standards of high resolution graphics display.	BTL1	Remember
5	What is HDTV and UDTV?	BTL1	Remember
6	What is 3D Holographic displays?	BTL1	Remember
7	List the defining objects for Multimedia systems.	BTL1	Remember
8	Give the diagram for Image Hierarchy.	BTL2	Understand
9	Give the expansion for the following RIFF, PAL,WAVE, WMF	BTL2	Understand
10	Give the expansion for the following DVCS, DV-MCI, VIM, SDTS GIS	BTL2	Understand
11	Explain Non-lossy compression for images.	BTL2	Understand
12	Explain Lossy compression for photographs and video.	BTL2	Understand
13	Give the expansion for the following JPEG, MPEG, TIFF, MIDI	BTL2	Understand

14	Give a diagram to represent various Multimedia standards for Video	BTL2	Understand
15	Give the diagram for TIFF file format header.	BTL2	Understand
16	What is animation?	BTL1	Remember
17	List the various animation techniques.	BTL1	Remember
18	Explain toggling between images.	BTL2	Understand
19	Explain rotating through several image frames.	BTL2	Understand
20	What is delta frame animation?	BTL1	Remember
21	What is palette animation?	BTL1	Remember
22	Explain Audio compression.	BTL2	Understand
23	What is RAID?	BTL1	Remember
24	Explain WORM optical drives.	BTL2	Understand

PART B (13 marks)			
1	Illustrate the following with neat diagram. (i) Multimedia Workstation Architecture (6) (ii) Multimedia Architecture based on Interface Bus. (7)	BTL3	Apply
2	Construct the Network Architecture for Multimedia Systems.(13)	BTL6	Create
3	Illustrate the evolving technologies for multimedia systems.(13)	BTL3	Apply
4	Summarize the defining objects for multimedia systems. (13)	BTL5	Evaluate
5	Analyze the various Multimedia data interface standards with a table of various file formats(13)	BTL4	Analyze
6	Analyze the need for data compression. (13)	BTL4	Analyze
7	Compare and explain the Non-Lossy compression and Lossy compression. (13)	BTL5	Evaluate
8	Explain various compression techniques for image, audio and video. (13)	BTL5	Evaluate
9	Explain JPEG compression. (13)	BTL5	Evaluate
10	Demonstrate the Discrete Cosine Transform. (13)	BTL3	Apply
11	Summarize Quantization with necessary equations and diagrams. (13)	BTL5	Evaluate
12	Demonstrate video image compression. (13)	BTL3	Apply

13	Illustrate MPEG compression. (13)	BTL3	Apply
14	Explain Audio compression in detail. (13)	BTL5	Evaluate
15	Analyze the following. (i) RTF (6) (ii) TIFF (7)	BTL4	Analyze
16	Construct the video Grabber Architecture and explain it in detail. (13)	BTL6	Create
17	Construct the Video Capture Board Architecture and explain the Full-motion video Controllers.	BTL6	Create
PART C (15 marks)			
1	Summarize RAID. (15)	BTL5	Evaluate
2	Construct MIDI Input and Output Circuitry and explain the MIDI interface. (15)	BTL6	Create
3	Explain sound board architecture in detail. (15)	BTL5	Evaluate
4	Compose the video and still image processing in detail. (15)	BTL6	Create
5	(i) Explain about video cameras. (7) (ii) Construct video capture board architecture and explain it in detail. (8)	BTL6	Create

UNIT - V: HYPERMEDIA
Multimedia authoring and user interface - Hypermedia messaging -Mobile messaging − Hypermedia message component − Creating hypermedia message − Integrated multimedia message standards − Integrated document management − Distributed multimedia systems. CASE STUDY: BLENDER GRAPHICS Blender Fundamentals – Drawing Basic Shapes – Modelling –Shading & Textures

PART A (2 marks)			
1	What is Hypermedia message?	BTL1	Remember
2	What is mobile messaging?	BTL1	Remember
3	List hypermedia message components.	BTL1	Remember
4	Give the context of hypermedia linking and embedding	BTL2	Understand
5	Explain linking object.	BTL2	Understand
6	Explain embedding object.	BTL2	Understand

7	Give Steps required to create hypermedia report.	BTL2	Understand
8	List the sources of input for preparing the hypermedia message.	BTL2	Understand
9	What are VIM messages?	BTL1	Remember
10	List the various VIM services.	BTL1	Remember
11	List the components of a typical multimedia application environment.	BTL1	Remember
12	List various multimedia object servers.	BTL1	Remember
13	List the primary multi-server network topologies.	BTL1	Remember
14	Explain distributed multimedia databases.	BTL2	Understand
15	Give the expansion for the following. ORB, OMG, TCO	BTL2	Understand
16	List key elements of Object Server Architecture.	BTL1	Remember
17	List types of Database replication.	BTL1	Remember
18	Give the various Database replication techniques.	BTL2	Understand
19	Give retrieval conflicts in accessing the multimedia objects.	BTL2	Understand
20	Explain optimizing server storage by Object types.	BTL2	Understand
21	Explain automatic load balancing.	BTL2	Understand
22	Explain versioned object storage.	BTL2	Understand
23	List the design issues for multimedia authoring.	BTL1	Remember
24	List the approaches to authoring.	BTL1	Remember

PART B (13 marks)			
1	Illustrate the design issues for Multimedia Authoring.	BTL3	Apply
2	Illustrate the design approaches to authoring.	BTL3	Apply
3	Explain the multisource multiuser authoring systems	BTL5	Evaluate
4	Analyze the various hypermedia application design consideration.	BTL4	Analyze
5	Demonstrate attaching sounds and video clips to objects.	BTL3	Apply
6	Create user interface design for multimedia application.	BTL6	Create
7	Explain special metaphors for multimedia applications.	BTL5	Evaluate
8	Illustrate the following. (i) Audio/Video Indexing Functions. (6) (ii) Information Access (7)	BTL3	Apply

9	Examine the Object Display/ Playback issues.	BTL4	Analyze
10	Explain the following. (i) Three Dimensional Object Display. (7) (ii) Virtual Reality (6)	BTL5	Evaluate
11	Explain Hypermedia Message Components.	BTL5	Evaluate
12	Demonstrate full-motion video management	BTL3	Apply
13	Explain Hypermedia linking and Embedding	BTL6	Create
14	Explain the process of Creating Hypermedia messages in detail.	BTL6	Create
15	Analyze integrated multimedia message standards.	BTL4	Analyze
16	Analyze X400 message handling service.	BTL4	Analyze
17	Explain various components of distributed multimedia systems.	BTL5	Evaluate
PART C (15 marks)			
1	Summarize workflow for Video messaging and video conferencing with a neat flow diagram.	BTL5	Evaluate
2	Design Object Server Architecture with neat diagram.	BTL6	Create
3	Summarize Distributed Client-Server Operation	BTL5	Evaluate
4	Explain Multimedia Object Servers with neat diagram.	BTL6	Create
5	Design various multi-server network topologies with neat diagrams.	BTL6	Create