

VALLIAMMAI ENGINEERING COLLEGE
SRM NAGAR, KATTANKULATHUR

DEPARTMENT OF INFORMATION TECHNOLOGY
CS2401- COMPUTER GRAPHICS

Class: VII SEM

Academic Year :2014-2015

UNIT-1

1. Write down any two line attributes?
2. Define region code. State its use.
3. What is composite transformation?
4. Write an algorithm for midpoint circle drawing in which decision parameter P is updated using x_{i+1} & y_{i+1} instead of x_i , y_i
5. A polygon has four vertices located at A(20,10), B(60,10), C(60,30), D(20,30). Indicate a transformation matrix to double the size of the polygon with point 'A' located at the same place.
6. List the attributes of 2D graphics primitives?
7. Use DDA algorithm to rasterize the line from (0,0) to (6,7)
8. What will be the effect of scaling factors $S_x = 1/2$ and $S_y = 1/3$ on a given triangle ABC whose co-ordinates are A=[4,1] B=[5,2] C=[4,3]
9. Write the three dimensional transformation matrix for Z-axis shear
10. What is meant by viewport mapping?
11. What is scan conversion?
12. What do you mean by octant symmetry of circles?
13. Give the transformation matrix for reflection with respect to the line $Y=X$.
14. Show that the composition of two translation is additive by concatenating the matrix operation for $T(x_1, y_1)$ & $T(x_2, y_2)$ to obtain $T(x_1+x_2, y_1+y_2)$.
15. How do you correct the shape of lines for very thick and inclined lines?
16. State the difference between window and viewport.
17. Define three dimensional viewing pipeline.
18. What is surface rendering?
19. What is an Basic point behind midpoint circle algorithm?
20. Explain the Disadvantages of DDA line drawing algorithm?
21. Digitize a line from (10,12) (15,15) on a raster screen using Bresenham's straight line algorithm.
22. List the different types of text clipping methods available

PART-B

1. Derive Bresenham's algorithm for line with slope magnitudes >1 Use the above algorithm to find all Points on a triangle in the first quadrant with vertices at (0,2), (6,2) and (3,6).
2. Using mid point circle drawing algorithm determine the pixel that will be put ON for an origin centered circle of radius 4.
3. Derive and write the Midpoint ellipse drawing algorithm
4. Explain Two dimensional transformation with an example.
5. Apply Cohen Sutherland line clipping algorithm to Clip a line with end points (1,7) and (7,5) against a window with boundaries.
6. When Four way symmetry is used to obtain a full ellipse from pixel coordinates generated for first quadrant does overstrike occur? Where?
7. Construct a triangle ABC whose coordinates are A(1,1), B(5,2) and C(4,3)
 - I. Reflect the given triangle about X axis
 - II. Reflect the given triangle about Y axis
 - III. Reflect the given triangle about $Y=X$ axis
 - IV. Reflect the given triangle about $X=Y$ axis In each case find the Coordinates of reflected triangle
8. Perform a 45 degree rotation of object A(2,1),B(5,1), C(5,6) in clockwise direction and give the coordinate of the transformed objects.
9. Find the reflection of the point (2,4) with respect to the line $x=x+1$
10. Obtain a Transformation matrix for rotating an object about a specified pivot point
11. At R be Rectangular window whose lower left head corner is at L(-3,1) and upper right head corner is at R(2,6). Find the region codes for the endpoints A(-4,2),B(-1,7),C(-1,5),D(3,8),G(1,-2),H(3,3),I(-4,7) and J(-2,10).
12. A clipping window PQRS has left corner at (3,4) and upper right corner at (10,9). Find the section of the clipped line AB (2,11),(9,2) using Cohen Sutherland line clipping algorithm.
13. Calculate the pixel location approximating the first octant of a circle having center at (4,5) and radius 4 units using Bresenham's algorithm
14. Discuss in brief : Antialiasing techniques.
15. A polygon has four vertices located at A(20,10) B(60,10)C(60,30) D(20,30). Calculate the vertices after applying a transformation matrix to double the size of polygon with point A located on the same place.
16. The reflection along the line $y=x$ is equivalent to the reflection along the X axis followed by counter clockwise rotation by θ degrees. Find the value of θ .

UNIT-II

1. Distinguish between Parallel and perspective projections
2. Define Morphing
3. Write down the shear transformation
4. Define text clipping
5. Define oblique and orthogonal projections
6. Define spline curves
7. Define quadratic surface
8. What is the use of Digitizer?
9. Define Vanishing point with an example
10. List any four Animation techniques
11. Give the matrix representation of scaling and translation
12. Define surface rendering
13. List the types of representation scheme for solid objects
14. Define black face detection
15. List the methods to specify spline
16. Define 3d rotation
17. Define 3d shearing
18. Define 3d scaling
19. Define 3d translation
20. Give the matrix representation for 3d scaling and reflection
21. Give general expression of Beizer Bernstein polynomial
22. give a single –point perspective projection transformation matrix when projectors are placed on the z-axis

PART - B

1. Derive the Outline projection of coordinate position(x,y,z) to position (x0,y0) on the view plane.
2. Explain different types of projection in detail
3. Derive the transformation matrix for oblique parallel projections
4. Explain various 3D object representation schemes in detail
5. Write a note on 3D viewing, How transformation will be carried out from world to viewing coordinates explain
6. Explain the various three dimensional transformations in detail with an example
7. Explain briefly about Z buffer method with diagram and detailed steps
8. Explain briefly about octree structure
9. Explain about the composite transformation in detail
10. Explain briefly about visible surface detection algorithms
11. Discuss on Area subdivision method of hidden surface identification algorithm
12. Calculate a new coordinates of a blockrotated about x axis by an angle of =30 degrees.
The original coordinates of the block are given relative to global xyz axis system.
A(1,1,2) B(2,1,2) C(2,2,2) D((1,2,2,) E(1,1,1) F(2,1,1) G(2,2,1) H(1,2,1)

UNIT III

1. What is Color gamut?
2. What does Y, I, Q Represent in YIQ color model?
3. What is color model?
4. Define morphing
5. List any four Animation techniques
6. What is animation?
7. Define keyframes.
8. State the difference between CMY and HSV color models
9. Differentiate between additive and subtractive color models
10. Define complementary colors and primary colors
11. Define chromaticity
12. Discuss the properties of light
13. What is meant by hue and saturation?
14. What are keyframe systems
15. What is meant by raster animation
16. What is OPENGL?
17. Define Computer graphics animation
18. Write down the skeleton of OPENGL code
19. Write down the OPENGL code segment to draw polyline
20. What are the steps involved in designing an animation sequence?
21. List any four real time animation techniques
22. How are mouse data sent to an OPENGL application?

PART -B

1. Explain different Types of color model in detail
2. Discuss the computer animation techniques
3. Explain how 3D objects are drawn. Write down the Methods to draw 3D objects.
4. Discuss the methods used in OPENGL for handling a window and also write a simple program to display a window on the screen.
5. Explain about the basic graphics primitives of OpenGL
6. Compare HLS and HSV color models
7. Write notes on RGB and HSV color models.
8. Explain RGB color model in detail
9. Draw the CIE chromaticity diagram and explain
10. Design a Storyboard layout and accompanying key frame for an animation of
11. a single polyhedron.
12. How to specify Object motion in an animation system?
13. Define Animation. Explain in detail about the animation language

UNIT IV

1. What is meant by rendering?
2. What do you mean by shading of objects?
3. What is texture?
4. What is shadow?
5. What is meant by ambient light?
6. What is a shading model?
7. What is diffuse reflectivity?
8. What is meant by Texture Mapping?
9. What are the rendering techniques for shaded images?
10. What is Gouraud shading?
11. What is Fast Phong shading?
12. Define achromatic light
13. Define specular reflections.
14. State Lambert's law.
15. What does sliding means?
16. What is meant by omni directional scattering ?
17. How to define the camera in OPENGL
18. List down the methods to add shadow to an object
19. What is meant by chrome and reflection mapping
20. Differentiate bitmap and procedural Textures
21. Which shading method is faster and easier to calculate? Why?
22. What are the types of reflection of incident light?

PART - B

1. Differentiate flat and smooth shading with respect to their characteristics and types?
2. Discuss the methods to draw and add shadows to objects
3. Explain to adding texture to faces of real objects
4. Explain about adding shadow to object Explain in detail
5. How to use light source in OPENGL explain in detail
6. Explain in detail for building a camera in a program
7. Explain in detail about bump mapping and reflection mapping
8. Explain Rendering the texture in detail
9. Explain in detail about methods for computing shadows
10. Explain the following
 - a. Ambient
 - b. Diffuse
 - c. Specular

UNIT V

1. Define peano curves
2. Define fractals.
3. Differentiate Mandelbrot and Julia sets.
4. What is random and geometric fractal?
5. What is Koch curve?
6. Write the type of texturing
7. What is a fractal dimension?
8. What is super sampling?
9. Define Snell's law
10. Define constructive solid geometry
11. Explain the process of fractal image Compression and regeneration
12. What are self squaring fractals?
13. What are self-Inverse fractals?
14. What is computer graphics realism?
15. How realistic pictures are created in computer graphics?
16. What is a fractal dimensions
17. Write the string production commands and its purpose
18. Write a pseudo code for ray tracer
19. Define index of refraction
20. How to allow branching in string production
21. Where does the ray $r(t)=(4,1,3) + (-3,-5,-3)t$ hit the generic plane?
22. How objects are modeled using constructive solid geometry technique?

PART -B

1. Write notes on Peano curves.
2. Write about random fractals in detail.
3. What is CSG objects? Explain the Boolean operation on CSG objects.
4. Explain in detail about Mandelbrot sets
5. Explain in detail about Julia set
6. What is Iterated Function System ? Explain in detail.
7. Define Koch Curve. How do you construct the Koch curve? Brief it with example.
8. Describe in detail about ray tracing methods
9. Explain about different surface textures
10. Write in detail about Transparency
11. Dicuss the ray tracing process with an example
12. Explain how refraction of light in a transparent object changes the view of three dimensional object