ST.ANN'S COLLEGE OF ENGINEERING & TECHNOLOGY: CHIRALA

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COMPUTER GRAPHICS(R-16)

FREQUENTLY ASKED QUESTIONS (FAQ's)

UNIT-1

1. List the steps required to plot a line whose slope is between 0 to 45^o using Bresenham's method.
2. What are the merits and demerits of flood-fill and scan-line algorithms?
3. List the steps required to scan-convert a circle using mid-point circle algorithm
4. Using Bresenham's algorithm, generate the intermediate points of the line segment, if the two end-points are given as (30, 18) and (20, 10).
5. List the steps required to fill a region using the boundary-fill method.
6. Generate the intermediate points on the line segment with end-points (20,10) and (30,18) using DDA algorithm.
7. List the steps required to fill a region using the flood-fill method.
8. Draw the flow chart for Bresenham's incremental circle algorithm in the first octant.
9. Use the mid-point method to derive a decision parameter for generating points along a straight line path with slope in the range $0 < m < 1$.
10. Use the mid-point method and symmetry considerations propose a solution to scan convert the parabola. $x=y^2$ for the interval $-10 \leq y \leq 10$.
11. Explain the algorithm for circle generation using mid-point circle generation.
12. Generate the points on the first octant of first quadrant, starting from (0,10), where the radius of the circle, r=10.
13. When 8-way symmetry of circle is used to obtain a full circle from pixel co ordinates generated from first octant, does overstrike occur? Where?
14. What is meant by aliasing? Discuss the antialiasing methods.
15. Consider a polygon with following vertices. (10,8) (5,15) (20,40) (18,5) (15,10).Prepare the active edge list for scan-line filling algorithm. Also identify the vertices to be double counted.
16. Distinguish the merits and demerits of scan line and flood fill algorithms.
17. Discuss the super sampling approach followed in antialiasing.
18. Digitize a line from (1, 2) to (12, 18) on a raster screen using Bresenham's straight line

Algorithm. Compare it with line generated using a DDA algorithm.

19. Derive the transformation matrix for rotation about origin
20. Give the relationship between the rotations R_{θ}, $R_{-\theta}$ and R^{1}_{θ}
21. Show that the transformation matrix for a reflection about the line $y=-x$ is equivalent to a reflection relative to the y-axis followed by a counter clock-wise of 90^0
22. What is meant by homogeneous representation of transformation matrices, why is it Necessary
23. Describe the composite transformations matrices for translation, rotation and scaling
24. Perform a 45^0 rotation of a triangle A(0,0), B(1,1) and c(5,2) about P(-1,-1)
25. Magnify the triangle with vertices A(0,0), B(1,1) and c(5,2) to thrice its size while keeping B(1,1) fixed
26. P.T a uniform scaling $(S_{x=} S_y)$ and a rotation form a commutative pair of operations, but that in general, scaling and rotation are not commutative
27. P.T the multiplication of two successive rotation matrices is commutative
28. Derive the transformation matrix about the origin
29. Rotate the point P(2,-4) about the origin 30^0 in anti-clockwise direction
30. Give the homogeneous coordinate transformation matrices for the following transformations
    a) Entire picture three times as large
    b) Counter clockwise rotation about the origin by 90^0
31. Show that the order in which the transformations are performed is important by the transformation of triangle A(1,0), B(0,1), C(1,1) by

(a) Rotating 450 about the origin and then translating in the direction of vector I by 4 units and

(b) Translating and then rotation.

32. Prove that the multiplication of transformation matrices for two successive translations is commutative.
33. Show that transformation matrix, for a reflection about the line y= x is equivalent to a reflection relative to the x axis followed by a counterclockwise rotation of 90 degrees.
34. Write the general form of a scaling matrix with respect to a fixed point P(h,k) where the Scaling factors in x and y directions area and b respectively.

UNIT-2

PART-A

1. What is the procedure for reflecting about an arbitrarily selected plane?
2. P.T multiplication of 3D transformation matrices for each of the following sequence of operations is commutative.

(a) Any two successive translations

(b) Any two successive scaling operations

(c) Any two successive Rotations about any one of the coordinate axes

3. How can scaling with respect to a point $P_0(X_0, Y_0, Z_0)$ be defined in terms of scaling with respect to origin
4. Derive the matrix form for the basic geometric transformation in 3D graphics

   (a) Rotation (c) Translation

   (b) Reflection (d) Scaling
5. Write the transformation matrix to rotate a point (X, Y, Z) about the z-axis through an angle 'θ' in clockwise direction
6. Discuss briefly about 3D composite transformations?

PART-B

1. Explain the scan line method for visible surface detection with an example.
2. What are the merits and demerits of z-buffer?
3. Show how the calculations of the intersection of an edge with a scan line can be made incremental as opposed to absolute.
4. Implement the depth-buffer method to display the visible surfaces of a given polyhedron.
5. Explain the Back face detection method for hidden surface removal with an example.
6. How the storage requirements for the depth buffer can be determined from the definition of the objects to be displayed?
7. Write an algorithm to display the visible surfaces of a convex polyhedron using the depth-sort (painter's) algorithm.
8. Compare and contrast depth-buffer and depth-sort methods.

9. What is meant by edge coherence? What is its significance in depth-buffer algorithm?
10. A polygon has a plane equation ax + by + cz + d = 0. Suppose that we know the value of z at a point (x, y). What is the easiest way to calculate the value of z at (x + 1,y) and at (x, y + 1)?
11. Explain any two back-face detection methods with examples.

UNIT-3

1. Explain the steps in design of animation sequence in detail with an example.
2. Briefly explain the characteristics of each of categories of animation languages.
3. Explain the mechanism followed for tracking live action in animated scenes.
4. What are the various types of interpolation used in animation? Explain.
5. Illustrate the features of animation language key frame systems with suitable examples.
6. Explain raster animation in detail.
7. Discuss about different methods of controlling animation.
8. Explain about Motion specifications
9. Give a brief note about graphical languages for animation.