CBCS SCHEME

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18CS62

Sixth Semester B.E. Degree Examination, Dec.2024/Jan.2025
Computer Graphics and Visualization

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is DDA? With the help of a suitable example demonstrate the working principle of Bresenham's Line drawing algorithm for different slopes of a line. **(10 Marks)**

b. With a neat diagram, explain the basic design and operation of Cathode Ray tube. **(10 Marks)**

OR

2 a. Explain with diagram the different Cartesian reference frames are used in the process of constructing and displaying a scene. **(10 Marks)**

b. With a neat diagram, explain the architecture of a raster display system with integrated display processor. **(10 Marks)**

Module-2

3 a. Give the reason to convert transformation matrix to homogeneous co-ordinate representation and show the process of conversion. Shear the polygon A(2, 2), B(4, 2), C(4, 4), D(3, 5), E(2, 4) along X-axis with a shearing factor of 0.2 **(10 Marks)**

b. Explain General scan line polygon fill algorithm support your claim with a neat diagram. **(10 Marks)**

OR

4 a. Explain with example any two algorithms used to identify the interior area of a polygon. **(10 Marks)**

b. Develop composite homogenous transformation matrix to rotate an object with respect to a pivot point. For the triangle A(3, 2), B(6, 2), C(6, 6) rotate it in anticlockwise direction by 90° degree keeping A(3, 2) fixed, draw the new polygon. **(10 Marks)**

Module-3

5 a. Explain basic illumination models. **(10 Marks)**

b. Obtain the matrix representation for rotation of a object about an arbitrary axis. **(10 Marks)**

OR

6 a. Explain RGB and CMY color models with examples. Explain the transformation between CMY and RGB color spaces. **(10 Marks)**

b. Explain Cohen Sutherland line clipping Algorithm clip. The lines with coordinates, $(X_0, Y_0) = (60, 20)$, $(X_1, Y_1) = (80, 120)$, given the window boundaries. $(X_{wmin}, Y_{wmin}) = (50, 50)$ and $(X_{wmax}, Y_{wmax}) = (100, 100)$ **(10 Marks)**

Module-4

7 a. Explain 2 classifications of visible surface detection algorithm. **(05 Marks)**

b. Compare perspective and parallel projection. **(05 Marks)**

c. What is 3D viewing? With the help of block diagram, explain 3D viewing pipeline architecture. **(10 Marks)**

OR

8 a. Design the transformation matrix for perspective projection and give OpenGL 3D viewing function. **(10 Marks)**

b. Explain perspective projections with reference point and vanishing point with neat diagram. **(10 Marks)**

Module-5

9 a. List the properties of Bezier curve and also explain Bazier techniques of generating curves. **(10 Marks)**

b. Explain Request, sample and event input modes with block diagram. **(10 Marks)**

OR

10 a. With the help of a suitable programming construct, explain event driven input menu picking and building interactive models. **(10 Marks)**

b. With the role of glCallList( ) function in creating DisplayLists in OpenGL. Write OpenGL code for rendering a Simple Animated face. **(10 Marks)**

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