BG/K/TX

Reg. No: [redacted]

VIT
Vellore Institute of Technology

Final Assessment Test – November 2024

Course: **CSI3011 - Computer Graphics and Multimedia**

Class NBR(s): **1832/1838/1851** Slot: **B1+TB1**

Time: **Three Hours** Max. Marks: **100**

- **KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE**
- **DON'T WRITE ANYTHING ON THE QUESTION PAPER**

Answer ALL Questions

(10 X 10 = 100 Marks)

1. i) Nowadays flat-panel displays such as LCD and LED-based monitors replace CRT-based monitors of TVs, Computers, and gaming consoles. Why LCD monitors are better than CRT-based monitors? Explain the working principle of LCD monitor with necessary diagrams. **[6]**

   ii) Consider a computer graphics application reads an input image in RGB model that contains pixels of colors Cyan, Green, and White. However, the expected output image is CMY model. What are the corresponding colors in the output image and how they are obtained from the input image? **[4]**

2. Determine and plot the points between the lines with endpoints P(8,10) and Q(16,13) by tracing Bresenham's line drawing algorithm. Also, explain the role of the decision parameter in the incremental calculation of the scan-conversion process.

3. Explain the properties of the Circle in the context of the Midpoint Circle generating algorithm. Trace the Midpoint Circle drawing algorithm to find the points in one Octant of the Circle with Centre (0,0) and radius using the midpoint circle generation algorithm and plot the points in the whole circle using the circle symmetry concepts.

4.a) Let the clipping window vertices are A(100, 10), B(160, 10), C(160, 40), D(100, 40). Trace the Sutherland-Cohen clipping algorithm to find the visible portion of the line segments EF, GH, and IJ where E(50,0), F(70,80), G(120, 20), H(140, 80), I(120, 5) and J(180, 30). Compute the region code of each endpoint and intersection point coordinates. Draw the effects of clipping.

OR

4.b) Clip the polygon with vertices A(5,6) B(5,0)C(9,3) against each edge of the clipping window with coordinates (Xwmin,Ywmin) (2,1) and (Xwmax, Ywmax)(8,5) using the Sutherland-Hodgeman algorithm. Find the coordinates of the intersection point and show the output of clipping against left, right, bottom, and top boundaries in order.

5.a) i) Imagine a square with vertices (0,0,1), (1,0,1), (1,0,2) (0,0,2). Find out its projected coordinates on the view plane aligned with the xy-plane under Orthographic parallel projection and Oblique parallel projection with $\alpha=\phi=45°$. [6]

ii) Compare orthographic and oblique parallel projection. [4]

OR

5.b) Imagine a 3D object with coordinate points A(0,3,3),B(3,3,6),C(3,0,1), D(0,0,0). Perform 90^0 X-axis rotation of 3D object with the fixed point (1,2,2). Use homogeneous matrix representation to find the coordinates of the final transformed object.

6. "Depth-Sorting method uses object and image space functions to find the visible surfaces". Justify the statement by highlighting the characteristics of both object and image space functions present in the Depth sorting algorithm.

7. How does Phong Shading differ from Gouraud Shading? Explain with an illustration how Phong shading determine the intensity of every point on the surface.

8. Consider the website of XYZ National University. This website contains information in the form of hypertext and hypermedia. Identify the multimedia components in that website and explain the characteristics of each component especially file format, and storage requirements.

9. Internet Radio normally broadcasts songs, news, and other information digitally from the station end to the receiver end. Explain with a block diagram the complete process of digitization of sound waves and transmission and specify how the quality of received sound is measured at the receiver end.

10. Mr.Alex usually downloads and saves video study materials in his laptop. To optimize the storage space of his computer, he saves the videos using one of the standard video file formats. Identify the video file format and explain how the video contents are compressed and decompressed.

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