Submission Deadline: June 28,2024

Note: Students Failing to submit the assignment will be evaluated accordingly .

Group A

1. List the operating characteristics for the following display technologies: raster refresh systems, vector refresh systems, plasma panels, and LCDs.

2. Differentiate between Raster and Vector Display Technology

3. Consider three different raster systems with resolutions of 640 by 400, 1280 by 1024,and 2560 by 2048. What size frame buffer (in byte) is needed for each of these systems to store 12 bits per pixel? **How** much storage: is required for each system if 24 bits per pixel are to be stored?

4. Suppose an RGB raster system is to be designed using an 8-inch by 10-inch screen with a resolution of 100 pixels per inch in each direction. If we want to store 9 bits per pixel in the frame buffer, how much storage (in bytes) do we need for the frame buffer?

5. How long would it take to load a 640 by 480 frame buffer **with 12** bits **per** pixel, if $\mathbf{10^5}$ bits can be transferred per second? How long would it take to load a 24-bit per pixel frame buffer with a resolution of 1280 by 1024 using this same transfer rate?

6. Consider two raster systems with resolutions of 640 by 480 and 1280 by 1024. How many pixels could be accessed per second in each of these systems by a display controller that refreshes the screen at a rate of 60 frames per second? What is the access time per pixel in each system?

7) A raster system can produce a total number of 1024 different levels of intensities from a single pixel composed of red, green and blue phosphor dots. If the total resolution of the screen is 1280 x 1024, what will be the required size of frame buffer for the display purpose?

8) Differentiate between Sonic touch panel and Sonic tablet

9) Derive Bresenham's line drawing algorithm for slope $|m| > 1$.

10) Write short notes on Refresh rate, Aspect Ratio, Resolution, Persistence .

Group B

1. Digitize a line with end points A(11,9) and B(29,17) using Bresenham's Line drawing algorithm.
2. Derive necessary equations for mid point circle algorithm. Digitize a line with end points A(11,9) and B(29,17)
3. A triangle with vertices A(5,2),B(4,1),C(6,1) is required to be rotated in a clockwise direction by 45 degrees about any arbitrary point (4,4). Find out thefinal coordinate positions of the triangle after performing the desired transformation.
4. Reflect a Triangle A(1,0) B(3,1) C(1,2) about the line y = - x + 5
5. A triangle with vertices A(5,2),B(4,1),C(6,1) is required to be reflected about an arbitrary line y = 2x + 1. Find out the final coordinate positions of the triangle after performing the desired transformation.
6. A triangle with vertices A(5,2),B(4,1),C(6,1) is required to be rotated by 45 degrees in counter clockwise direction about i. origin and ii. line y = 5
7. Clip a line with end point coordinates A(-1,6) B(5,-8) against a clip window with its

lower left corner at (-2,-5) and upper right corner at (4,8) using Cohen-Sutherland algorithm.

8. Rotate triangle A(0,0), B(1,1), C(5,2) about origin and about point P(-1,-1) by 45 degrees in a counter clockwise direction.
9. Derive the composite transformation matrix that reflects an object about line 'L' with necessary figures.
10. Find scaling transformation matrix to scale s_x, s_y, s_z units with respect to a fixed point P(x,y,z).
11. Use Cohen Sutherland's algorithm to clip two lines (60,50) (100,10) against window (50,10) (80,40).
12. Show that 2D reflection thru x axis followed by 2D reflection thru line y = -x is equivalent to a

    pure rotation (90 degrees) about origin.
13. Prove that two successive rotation transformations commute.
14. Triangle with vertices A(1,1), B(7,1),C(4,3) is required to be rotated about any arbitrary fixed point (4,2) in a counter clock wise direction by 90 degrees. What will be the final coordinates of the triangle?