2011

4th SEMESTER EXAMINATION

MCA

GRAPHICS AND MULTIMEDIA

PAPER—CS/MCA/2401

Full Marks : 70

Time : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer any *seven* questions.

1. (a) Write an algorithm to draw a circle using Bresenham's circle drawing algorithm.

(b) The end points of a given line are (0, 2) and (4, 5). Compute each value of x, y and plot the result using Bresenham's line drawing algorithm. 5+5

2. (a) A triangle is defined by the vertices $\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 0 \end{bmatrix}$ and the 2×2 translation matrix is $\begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$

(i) Find the area of the triangle;

(ii) Find the vertices of the transformed triangle;

(iii) Find the area of the transformed triangle;

(iv) Find the relation between area original, area transformed and the determinant of the transformed matrix. 4×2

(b) What is frame grabbers ? Are frame grabbers different from frame buffer. 1+1

3. (a) What is homogeneous coordinate. What is the advantage of using homogeneous coordinate system. 2+2

(b) Explain the working principle of LCD. 6

4. (a) What is refresh rate ? Some monitors use a technique called "Interlacing" to increase the refresh rate, what is the mechanism behind this technique. 2+3

(b) Explain the term : (any *two*) $2\frac{1}{2}\times2$

(i) Bit plane;

(ii) Bitmapped image;

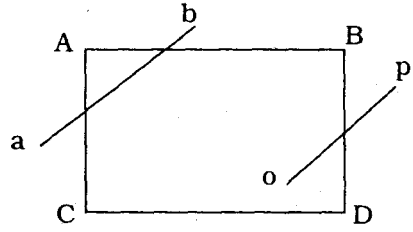
(iii) Video adapter;

(iv) Video frame & Frame rate.

5. (a) Mention all the standard of 3D reflection.

(b) 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. 6+4

6. Explain the Sutherland-cohen line clipping algorithm. Using this algorithm clip the following lines against the window ABCD as given below. 6+4



7. (a) What is projection? Explain the different types of Axonometric projection? How orthographic projection differs from oblique projection. 2+3+3

(b) Explain the concepts of world coordinates, local coordinates & device coordinates. 2

8. (a) Compare & contrast between any two of the following :

(i) Beam penetration method & shadow mark method.

(ii) Raster scan & Random scan display system.

(iii) Hypertext and Hypermedia. 2×3

(b) Define the term :

(i) morphing and

(ii) object editing. 2+2

9. (a) In 2D graphics the following transformation matrix would reflect a point about the diagonal line passing through the origin and (10, 10)

$$\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Show that this is same as coordination of matrix for 45° clockwise rotation followed by reflection about X-axis and finally by counter clockwise rotation by 45° about origin. 6

(b) "Successive translation & rotation are not commutative" justify. 4

10. Write short notes on (any *two*) : 5×2

(i) Touch panel ;

(ii) Data gloves ;

(iii) Light pen.