

2012

M.Sc.

1st Semester Examination

COMPUTER GRAPHICS

PAPER—COS-104

Full Marks : 50

Time : 2 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.

All notations have their usual meaning.

Module—1

(Computer Graphics)

(Marks : 25)

Answer any two questions.

1. (a) Stepwise illustrate the circle generation algorithm of Bresenham's. The illustration should contain code along with precise narrative description.
- (b) The endpoints of a given line are (0, 0) and (6, 18). Compute each value of y as x steps from 0 to 6 and plot the result using DDA method. 5+5

2. (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 co-ordination of matrix for 45° clockwise rotation followed by reflection about X-axis and finally by counter clockwise rotation by 45° degree (about origin).

- (b) Applying a 2D rotation followed by a scaling transformation is same as applying first the scaling and then the rotation — Justify. 6+4
3. (a) Write an algorithm for Cohen-Sutherland line clipping.
 (b) What is Oblique Projection? How is it differ from Perspective projection? 6+(2+2)
4. (a) Given a window A(20, 20), B(60, 20), C(60, 40), D(20, 40). Use any clipping algorithm to find the visible portion of the line P(30, 50) to Q(70, 30) inside the window.
 (b) What is the difference between flood fill and boundary fill process?
 (c) What is the major difference between Bezer curve and B-spline curve? 5+2 $\frac{1}{2}$ +2 $\frac{1}{2}$

[Internal Assessment — 5 marks]

Module—2
(Computer Science)
(Marks : 25)

Answer any four questions : 4×5

1. (a) How many bits require to store a digitized image of 128×128 with 64 gray levels. 1
- (b) What is checker board effect? 2
- (c) What is m-connectivity? 2

2. (a) Let $V = \{1, 2\}$ and compute the D_4 , D_8 and D_m distance between P and Q : 3

(q)

| | | | |
|---|---|---|---|
| 3 | 1 | 2 | 1 |
| 2 | 2 | 0 | 2 |
| 1 | 2 | 1 | 1 |
| 1 | 0 | 1 | 2 |

(P)

- (b) How and why contrast stretching is used in image processing? 2

3. Explain the usefulness of histogram processing and histogram equalization. 5

4. (a) What is median filter? Why this filter is used? 1+1
- (b) Show two operator (i) Roberts and (ii) Prewitt for filtering. What will be the effect after filtering?
1+1+1

5. What is Dilation and Erosion? Show the relation between them. 2+2+1
6. (a) What is thresholding? Why this thresholding is used? 1+1
- (b) What are the disadvantage of Laplacian function for edge detection? What are the possible solution when we have to use Laplacian function for edge detection? 2+1
7. Write short note (any two) : $2\frac{1}{2} \times 2$
- (a) Frequency domain enhancement ;
- (b) Opening and Closing morphological operator ;
- (c) Image Compression ;
- (d) Histogram Matching.

[Internal Assessment — 05]
