Total No. of printed pages = 5

63/2 (SEM-3) CSIT 3·4

2022

(Held in 2023)

CSIT

(Theory Paper)

Paper Code : CSIT-3·4

(Computer Graphics)

Full Marks – 80

Pass Marks – 32

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct options : 1×6=6

(a) In computer graphics, clipping is performed to

(i) Copying

(ii) Zooming

(iii) Add graphics

(iv) Remove lines and objects

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(b) In a graphical system, an array of pixels in the images are stored in

(i) Frame buffer (ii) Processor

(iii) Memory (iv) Monitor

(c) How many type(s) of translation(s) can be performed in computer graphics ?

(i) 4 (ii) 3

(iii) 2 (iv) 1

(d) What is a Bitmap ?

(i) Algorithms

(ii) Collection of bits

(iii) Collection of pixels

(iv) Colors

(e) Which of the following operation is used to increase or decrease the size of an object ?

(i) Rotation (ii) Schearing

(iii) Scaling (iv) Translation

(f) If the boundary is specified with a single color and the algorithm proceeds pixel by pixel until the boundary color is encountered is known as

(i) Parallel curve algorithm

(ii) Flood-fill algorithm

(iii) Scan-line algorithm

(iv) Boundary fill algorithm.

2. Answer the following questions : 2×5=10

(a) What is Horizontal retrace ?

(b) Mention the polygon filling methods.

(c) Write the matrix representation of 3D translation.

(d) Explain the Raster Scan System.

(e) What is translation in computer graphics ?

3. Answer any *six* of the following questions : 5×6=30

(a) Find the co-ordinates of the points of the straight line between the points (0, 2) and (4, 5) using Bresenham's line drawing algorithm.

(b) Draw circle having center at (0, 0) and having radius 10 using the midpoint circle generation algorithm.

(c) A square with corner co-ordintes A (0, 3), B (3, 3), C (3, 0) and D (0, 0) is given, apply translation of distance 2 towards X-axis and 2 towards Y-axis. Find the new co-ordinates of the corner.

(d) A triangle with corner co-ordinates A (3, 4), B (6, 4) and C (5, 6) is given. Apply reflection on the triangle over the Y-axis and find the new co-ordinates of the corners of the triangle.

(e) A square with corner co-ordinate A (0, 0), B (4, 0), C (4, 4), D (0, 4) is given, at first scaling is applied to the object with factor $S_x = S_y = 1$, then apply rotation in anticlockwise direction by 90 degree about the origin, then find the new co-ordinates of the corners.

(f) Derive the equation and transformation matrix of a point rotated in anticlockwise direction about an arbitrary pivot point.

(g) Write the basic principles of reflection transformation and find the transformation matrix of an object reflected about X-axis.

(h) Clip a line A (–2, 4) and B (4, 8) using Cohen Sutherland line clipping algorithm with viewing window co-ordinates (–4, 2) and (3, 7). Find the endpoint co-ordinates of the clipped line.

(i) A triangle with corner points R (1, 1), S (0, 0) and T (1, 0). Apply shear parameter 2 on X-axis and 2 on Y-axis and find out the new co-ordinates of the corners.

4. Answer any *two* of the following questions : 10×2=20

(a) Describe flood fill and boundary fill algorithms.

(b) Explain the steps involved in midpoint ellipse drawing algorithm.

(c) Evaluate the endpoint co-ordinates of a line clipped by using Liang Barsky line clipping algorithm.

5. Answer any *one* of the following questions : 14×1=14

(a) Describe the various color display techniques in a CRT monitor.

(b) Explain the working of Direct View Storage Tubes and flat panel displays.