Total No. of printed pages = 3

CSE 1815 PE 14

Roll No. of candidate | | | | | | | | | |

2023

B.Tech. 5th Semester End-Term Examination

CSE

COMPUTER GRAPHICS

Full Marks – 70 Time – Three hours

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

Answer question No. 1 and any *four* from the rest.

1. (i) Which of the following is a Computer Graphics type? (10 × 1 = 10)

   (a) Raster and Vector (b) Raster and Scalar

   (c) Scalar only (d) All of the above

   (ii) Plane is used for 2D transformations is:

   (a) Three-dimensional plane (b) Two-dimensional plane

   (c) One-dimensional plane (d) Four-dimensional Plane

   (iii) The purpose for using clipping in computer graphics is to:

   (a) Copy (b) Zoom

   (c) Add graphics (d) Remove objects and lines

   (iv) The operation used to zoom in or out around any axis on a 3D object is:

   (a) Rotation (b) Shearing

   (c) Scaling (d) Translation

   (v) The process of digitizing a given picture definition into a set of pixel-intensity for storage in the frame buffer is:

   (a) Scan conversion (b) True color system

   (c) Encoding (d) Rasterization

[Turn over

(vi) Select the correct abbreviation for DDA algorithm:

(a) Data differential analyzer (b) Direct differential analyzer

(c) Digital difference analyzer (d) Digital differential analyzer

(vii) The type of perspective projection used in drawings of railway lines is:

(a) Three-point (b) Two-point

(c) One-point (d) None of the above

(viii) For a raster system with resolution 640 by 480, the approximate size of the frame buffer(in bytes) for this system to store 12 bits per pixel is:

(a) 460 kilobytes (b) 500 kilobytes

(c) 350 kilobytes (d) 400 kilobytes

(ix) The terms used for the area of the monitor captured by an application is called ————————

(a) Display (b) Window

(c) Viewport (d) None of the above

(x) What is the 4-bit code of the bottom-region among the nine regions divided using the Cohen-Sutherland algorithm?

(a) 0000 (b) 0010

(c) 0110 (d) 0101

2. (a) What is Computer Graphics? State the major components (hardware and software) of a typical computer graphics system. (2 + 4 = 6)

(b) Discuss about the working of Refresh cathode ray tube (CRT) with a suitable diagram. (5)

(c) What do you mean by the terms bitmap and pixmap? (4)

3. (a) What is an output primitive? List the names of various basic output primitives. (2 + 3 = 5)

(b) What do you mean by attributes of output primitives? Mention the various character attributes. (2 + 2 = 4)

(c) Describe about the different techniques of displaying colour pictures in a CRT monitor. (6)

4. (a) Discuss about the mechanism of 2D Window-to-viewport transformation. (6)

(b) Explain briefly about the following basic 2D transformations.

(i) Translation

(ii) Scaling

(iii) Rotation $(3 \times 3 = 9)$

5. (a) Describe the Brasenham's Line drawing algorithm. Also mention its advantages and disadvantages over DDA line drawing algorithm. $(4 + 2 = 6)$

(b) Rasterize a line using Bresenham's line drawing algorithm having end points with coordinates as (20, 10) and (30, 18) showing all the intermediate steps. (5)

(c) Explain the various clipping operations in brief. (4)

6. (a) Define Homogeneous coordinates. What is the need of homogeneous coordinates? $(3 + 3 = 6)$

(b) Differentiate between parallel and perspective projection. (4)

(c) Discuss the Z-Buffer method for hidden surface detection. (5)

7. (a) Describe the Cohen-Sutherland Line clipping algorithm. (8)

(b) Explain the Boundary-Fill and Flood-Fill algorithms to fill polygons. (7)

Total No. of printed pages = 2

CSE 1815 PE 14

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2021

B.Tech. 5th Semester (Regular) End-Term Examination

CSE

COMPUTER GRAPHICS

(New Regulation & New Syllabus)

Full Marks – 70 Time – Three hours

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

Answer any *five* questions.

1. (a) What do you mean by Computer Graphics? What are the major components (hardware and software) required for a typical computer graphics system? $(2 + 2 = 4)$

(b) Illustrate the working of Refresh cathode ray tube with a suitable diagram. (6)

(c) Briefly explain about the logical classification of input devices. (4)

2. (a) What is an output primitive? Give some examples of output primitives. $(2 + 2 = 4)$

(b) What do you mean by attributes of output primitives? Mention the various attributes of line output primitives. $(2 + 2 = 4)$

(c) Describe how colour pictures are displayed in a CRT using the shadow mask method. (6)

3. (a) What do you mean by two-dimensional transformations? What are the different types of two-dimensional transformations? $(2 + 3 = 5)$

(b) Explain briefly about : $(3 \times 3 = 9)$

(i) Translation

(ii) Scaling

(iii) Rotation

4. (a) Explain in detail about the DDA algorithm. What are the disadvantages of DDA algorithm? (6 + 2 = 8)

(b) Rasterize a line using Bresenham's line drawing algorithm having end points with co-ordinates as (2, 4) and (8, 12) showing all the intermediate steps. (6)

5. (a) Explain the Cohen Sutherland Line Clipping Algorithm in detail. (8)

(b) Define Homogeneous coordinates. What is the need of homogeneous coordinates? (3 + 3 = 6)

6. (a) Discuss about the different major projection techniques used in computer graphics. (8)

(b) Describe the procedure to fill a polygon with Flood fill algorithm. (6)

7. Write short notes (any *two*) : (2 × 7 = 14)

(a) Display Controller

(b) Hierarchical Modelling

(c) RGB Color model

(d) OC Tree

(e) Fractal

$p > 0$ $p_{x+1} = p_x - 2\Delta y - 2\Delta y$

$p < 0$ $p_{x+1} = p_x + 2\Delta y$