Professional Course Examination (Odd), 2023

(5th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course No. : BCA/5/CC/26

(Computer Graphics)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(PART : A—OBJECTIVE)

(*Marks* : 25)

SECTION—I

(*Marks* : 15)

I. Tick (✓) the correct answer in the brackets provided : 1×10=10

1. A type of printer that works by direct contact with an ink ribbon with paper is
   (a) inkjet printer ( )
   (b) impact printer ( )
   (c) non-impact printer ( )
   (d) plotter ( )
2. The smallest addressable element of a picture represented on a screen is
   (a) pixel ( ) *(b)* vector ( )
   (c) bitmap ( ) *(d)* raster ( )

3. Which of the following is the most basic graphical element in computer graphics?

(a) Line ( ) (b) Dot ( )

(c) Point ( ) (d) All of the above ( )

4. In the boundary fill algorithm of four connected approaches, which of the following pixels are tested?

(a) Left, right ( )

(b) Four diagonals ( )

(c) Left, right, above, below and four diagonals ( )

(d) Left, right, above, below ( )

5. Which of the following planes is used for 2D transformations?

(a) 1D plane ( ) (b) 2D plane ( )

(c) 3D plane ( ) (d) 4D plane ( )

6. The algorithm which can clip concave polygons without leaving any residue behind is

(a) Sutherland-Hodgman polygon clipping algorithm ( )

(b) Weiler-Atherton polygon clipping ( )

(c) Liang-Barsky clipping algorithm ( )

(d) Nicholl-Lee-Nicholl clipping algorithm ( )

7. How many types of projections are present in 3D graphics?

(a) 1 ( ) (b) 2 ( )

(c) 6 ( ) (d) 8 ( )

8. Choose the odd one.

(a) Reflection ( ) (b) Moving ( )

(c) Rotation ( ) (d) Shearing ( )

9. Which of the following best describes the process of streaming?

(a) The simultaneous downloading and playback of multimedia content over the Internet. ( )

(b) The process of compressing multimedia files for efficient storage. ( )

(c) The conversion of multimedia files from one format to another. ( )

(d) The integration of multiple media elements into a single presentation. ( )

10. A smaller version of an image is called a

(a) bitmap ( )

(b) clipart ( )

(c) thumbnail ( )

(d) portable network graphic ( )

II. State whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided : 1×5=5

1. Picture definition stored in a memory area is called a frame buffer.

(T / F)

2. Bresenham's algorithm is an incremental scan conversion algorithm and generates duplicate points sometimes.

(T / F)

3. The transformation that is used to alter the size of an object is called translation.

(T / F)

4. Orthographic projection and perspective projection are the two types of 3D parallel projection.

(T / F)

5. MIDI message includes a status byte and up to two data bytes.

(T / F)

SECTION—II

(*Marks* : 10)

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

1. *(a)* Explain the two types of computer graphics.

OR

(b) Write a short note on the emissive display system.

2. *(a)* What do you mean by primitives output?

OR

(b) What is a polygon? Give one example of a polygon with a diagram.

3. *(a)* What are the uses of the homogeneous coordinate system?

OR

(b) What are viewport and window in computer graphics?

4. *(a)* What is 3D modeling?

OR

(b) Write a short note on 3D projection.

5. *(a)* What is data compression and why do we need it?

OR

(b) Explain JPEG and MPEG.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

IV. Answer the following questions : 10×5=50

1. *(a)* What is computer graphics? What are the five applications of computer graphics? 1+4=5

   (b) Differentiate between beam penetration and shadow mask method in a color monitor. 5

OR

   (c) Distinguish between random scan and raster scan monitors. 5

   (d) Explain flat panel displays. 5

2. *(a)* Calculate and draw a line using the coordinates point from (5, 7) to (10, 15) using the DDA algorithm. 6

   (b) Explain the scan line polygon fill algorithm. 4

OR

   (c) Using the midpoint circle drawing algorithm, generate all the points to form a circle where the centre coordinate points (0, 0) and radius is 8. 10

3. *(a)* Perform window-to-viewport transformation based on the following values :

$$x_w min = 10 \qquad x_v min = 20$$
$$x_w max = 70 \qquad x_v max = 50$$
$$y_w min = 20 \qquad y_v min = 30$$
$$y_w max = 50 \qquad y_v max = 70$$

   where $x_w = 30$, $y_w = 80$, then find the value of (x_v, y_v) in the viewport. 10

OR

   (b) What is clipping in computer graphics? What are the different types of clipping? 1+3=4

   (c) Based on the coordinate points (0, 0), (2, 0), (0, 2), (2, 2), where $t_x = 2$, $t_y = 3$, find a new coordinate point using the translation transformation of 2D. 6

4. (a) Differentiate between parallel projection and perspective projection. 5

(b) Write a note on the 3D viewing pipeline with a diagram. 5

OR

(c) What is the difference between a 2D shape and a 3D shape with an example? 5

(d) Write a note on the shear transformation of 3D. 5

5. (a) What is multimedia? What are the different elements of multimedia? 1+4=5

(b) What is an animation? What are the different types of animation? 1+4=5

OR

(c) What are the different video and image formats used in multimedia? 5

(d) Write a note on digital audio. 5

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