

H/28/11/2023

BCA/5/CC/26

Student's Copy

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 ()

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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 :

$$\begin{array}{ll} x_w \text{min} = 10 & x_v \text{min} = 20 \\ x_w \text{max} = 70 & x_v \text{max} = 50 \\ y_w \text{min} = 20 & y_v \text{min} = 30 \\ y_w \text{max} = 50 & y_v \text{max} = 70 \end{array}$$

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

(a) Perform window-to-viewport transformation based on the following values

$x_w \text{ min} = 10$ $x_w \text{ max} = 70$
 $x_v \text{ min} = 20$ $x_v \text{ max} = 80$
 $y_w \text{ min} = 20$ $y_w \text{ max} = 50$
 $y_v \text{ min} = 30$ $y_v \text{ max} = 70$

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

OR

(b) What is clipping in computer graphics? What are the different types of clipping?

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