

Roll No.

BCA–501 (DE1)

B. C. A. (Fifth Semester)

EXAMINATION, 2024-25

COMPUTER GRAPHICS

Time : $2\frac{1}{2}$ Hours

Maximum Marks : 60

Note : All questions have to attempted.

Section—A

1 each

(Multiple Choice Questions)

1. (a) Which of the following attributes does Bresenham's algorithm follow ? (CO2, BL-2)
 - (i) It is an incremental method
 - (ii) It chooses points randomly
 - (iii) It uses floating point operations
 - (iv) All of the above

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- (b) Which algorithm is used to color a pixel if it hasn't been colored yet and skips if it's already filled ? (CO3, BL-4)
- (i) Boundary fill Algorithm
 - (ii) Scan line polygon fill algorithm
 - (iii) Flood fill Algorithm
 - (iv) All of the above
- (c) Which function call set up the size of the output area ? (CO1, BL-1)
- (i) `glviewport()`
 - (ii) `gluPerspective()`
 - (iii) `glDisplayfunc()`
 - (iv) None of the above
- (d) The region code of a point within the window is (CO3, BL-2)
- (i) 1111
 - (ii) 0000
 - (iii) 1000
 - (iv) 0001

- (e) Which of the following device is used for the 3D positioning of an object ? (CO2, BL-1)
- (i) Trackball
 - (ii) Mouse
 - (iii) Spaceball
 - (iv) All of the above
- (f) Random Scan System is used for : (CO1, BL-1)
- (i) Color drawing application
 - (ii) Pixel drawing application
 - (iii) Line drawing application
 - (iv) None of the above
- (g) is a rigid body transformation that moves objects with deformation. (CO4, BL-1)
- (i) Rotation
 - (ii) Scaling
 - (iii) Translation
 - (iv) All of the above
- (h) In which system, the Shadow Mask methods are commonly used ? (CO1, BL-1)
- (i) Raster scan system
 - (ii) Random scan system
 - (iii) None of the above
 - (iv) Both (i) and (ii)

- (i) In Bresenham's line Drawing Algorithm, how is the decision parameter p_k updated when drawing a line with a slope between 0 and 1 ?

(CO2, BL-3)

- (i) $p_k + 1 = p_k + 2\Delta y$
 - (ii) $p_k + 1 = p_k + 2(\Delta y - \Delta x)$ if $p_k \geq 0$
else $p_k + 2\Delta y$
 - (iii) $p_k + 1 = p_k + 2\Delta x - 2\Delta y$ if $p_k \leq 0$,
else $p_k - 2\Delta y$
 - (iv) $p_k + 1 = p_k + 2\Delta x$
- (j) 3D Animation is done using

(CO5, BL-3)

- (i) Flash
 - (ii) Page Maker
 - (iii) Maya
 - (iv) None of the above
- (k) The clipping algorithm is used for polygon clipping :

(CO3, BL-1)

- (i) Liang-Barsky
- (ii) Sutherland Hodgeman
- (iii) Both (i) and (ii)
- (iv) None of the above

- (1) Which type of animations uses stop motion techniques ? (CO5, BL-3)
- (i) Production
 - (ii) HTML
 - (iii) Frame-based animation
 - (iv) All of the above
2. Attempt any *four* of the following : 3 each
- (a) Demonstrate plasma display in detail.
(CO1, BL-1)
 - (b) Explain down the two disadvantages of DDA line Drawing Algorithm over the Bresenham's. (CO2, BL-1)
 - (c) What do you mean by clipping ? Explain inside test. (CO3, BL-2)
 - (d) Explain principles of Animation. (CO5, BL-2)
 - (e) Define the concepts of translation, reflection and shearing in geometric transformations.

(CO4, BL-2)

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Section—B**(Long Answer Type Questions)**

3. Attempt any *two* of the following : 6 each
- (a) Using Bresenham's line Drawing Algorithm, determine the pixel coordinates for drawing a line from point (1, 1) to Point (8, 7). Show all steps involved in the algorithm, including the calculation of the decision parameter.
(CO2, BL-3)
 - (b) Define animation and elaborate on the concepts of scripting and procedural animation system in detail. (CO5, BL-1)
 - (c) Explain the Cohen-Sutherland line clipping algorithm with an example. (CO3, BL-3)
4. Attempt any *two* of the following : 6 each
- (a) Design a program to fill a polygon using Boundary filling Algorithm. (CO3, BL-6)
 - (b) What is the difference between beam penetration method and shadow mask method ? (CO1, BL-2)

- (c) Rotate a triangle placed at A(0, 0), B(1, 1) and C(5, 2) by an angle 45° with respect to origin.

(CO4, BL-5)

5. Attempt any *two* of the following : 6 each

- (a) Explain the concept of 3D transformation about an arbitrarily point. (CO4, BL-3)

- (b) If a line is drawn from (2, 3) to (6, 15) with use of DDA. How many points will needed to generate such lines ? (CO2, BL-3)

- (c) What is open GL and what are its primary applications in the field of computer graphics ? (CO5, BL-2)