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Roll No.

TMC-401

**M. C. A. (FOURTH SEMESTER)
END SEMESTER**

EXAMINATION, May, 2022

GRAPHICS AND VISUAL COMPUTING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among
(a), (b) and (c) in each main question.

(iii) Total marks in each main question are
twenty.

(iv) Each sub-question carries 10 marks.

1. (a) What is aliasing and anti-aliasing ? (CO2)
- (b) Calculate the pixel points along a straight
line whose end points are A (30, 40) and
B (50, 60). (CO2)
- (c) Discuss Bresenham ellipse drawing
algorithm. (CO2)

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2. (a) Write mid-point circle algorithm and apply that algorithm to find the pixel values of the circle whose radius $r = 4$ and center of the circle is $(0, 0)$. (CO4)
- (b) Explain Cohen Sutherland Line clipping method with an example. (CO4)
- (c) Explain Weiler Atherton Polygon Clipping method. (CO4)
3. (a) Define Window and Viewport. Derive window to viewport transformation. (CO1)
- (b) What is meant by parallel and perspective projection ? Derive the matrix for perspective projection. (CO1)
- (c) What is the difference between geometric and coordinate transformations ? Discuss the various 2D geometric transformations. (CO1)
4. (a) Given control points $(10, 100)$, $(50, 100)$, $(70, 120)$, $(100, 150)$. Calculate coordinates of any *four* points lying on the corresponding B-spline curve. (CO3)

(3)

- (b) What is shading ? Discuss various forms of shading. (CO3)
- (c) Describe the boundary fill algorithm with 4 connected pixels. Discuss with a suitable example. (CO3)
5. (a) What is Visualization and discuss its application ? (CO5)
- (b) Discuss Painter's algorithm. (CO5)
- (c) Write short notes on the following : (CO5)
 - (i) Morphing
 - (ii) Shading
 - (iii) Fractal Graphics

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(b) For a given triangle of coordinates A (10, 30), B (30, 30), C (20, 15) find the following : (CO5)

(i) Reflection about X-axis

(ii) Scaling about point A

(c) Explain Bresenham circle drawing algorithm. Why is circle divided in octants in circle drawing algorithms ? (CO1)

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**M. C. A. (FOURTH SEMESTER)
END SEMESTER**

EXAMINATION, May, 2023

GRAPHICS AND VISUAL COMPUTING

Time : Three Hours

Maximum Marks : 100

Note : (i) Each question has three parts (a, b, c).
(ii) Attempt any *two* parts of each question.

(iii) All questions carry equal marks.

1. (a) Digitize the pixel points using DDA algorithm for a line segment A (20, 12), B (31, 19) using DDA line drawing algorithms. (CO1)

(b) Write short notes on any *two* the following : (CO3)

(i) Shearing Transformation

(ii) Oblique Projection

(iii) Principle of Animation

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- (c) What is inside-outside test ? Explain odd-even parity and winding number rule for checking if a point is inside or outside a given area. (CO2)
2. (a) What are convex and concave polygons ? Describe the Sutherland-Hodgeman polygon clipping algorithm. (CO2)
- (b) Consider two raster systems with the resolutions of 640×480 , 1280×1024 . What size frame buffer (in kB) is needed for each of these systems to store 12 bits/pixel, if 10 seconds video with 30 fps is loaded. (CO1)
- (c) Briefly explain the Cohen-Sutherland line clipping algorithm. (CO2)
3. (a) Explain parallel projection. How is perspective projection different from parallel projection ? What is the importance of vanishing point in projection ? (CO4)

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- (b) Calculate the coordinates of a given unit cube having a point A, at center (0, 0, 0) rotated about z-axis by 90 degree anticlockwise. Show the transformation of the rotated cube. (CO3)
- (c) What do you understand by back face detection ? Explain Z-buffer algorithm. (CO4)
4. (a) Derive Bresenham line algorithm ? What are the limitations of Bresenham algorithm ? (CO1)
- (b) Explain 4-connected and 8-connected model for filling. Explain boundary fill algorithm. (CO2)
- (c) Explain the working of LCD and LED. How is raster scan different from random scan ? (CO1)
5. (a) What is ROTATIONAL transformation ? Rotate a line AB, A(50, 50) and B (100, 150) by an angle 90 degree with respect to mid point of the line. (CO3)

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TMC-502

M. C. A. (Fifth Semester)

End Semester EXAMINATION, 2017

COMPUTER GRAPHICS AND ANIMATION

Time : Three Hours] [Maximum Marks : 100

Note : (i) This question paper contains *five* questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are **twenty**.

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Discuss the working of 4 bit line clipping algorithm.

(b) What do you understand by the term computer graphics ? What are the different areas in which computer graphics can be used ?

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- (c) Explain the working of LCD. What is aspect ratio and resolution of the display device ?
2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Describe briefly Bresenham's circle drawing algorithm. Why do we prefer incremental algorithm over DDA ?
- (b) Calculate value of pixels, which is scan converted by DDA algorithm and end points of a line is (10, 10) and (3,0).
- (c) Briefly explain Sutherland-Hodgeman polygon clipping algorithm.
3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) What is filling in graphics ? Write flood fill algorithm and explain its working.
- (b) Write short notes on the following 2D :
- Scaling
 - Reflection
- (c) Perform a 45 degree rotation of a triangle A(0, 0), B(1, 1) and C(5, 2) :
- About the origin
 - About point (-1, -1)
4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Why do we need homogeneous co-ordinate system in transformation ? Translate a

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- triangle with co-ordinated A (0, 0) B(10, 10) C(10, 0) using translation parameters $t_x = 10$, $t_y = 5$.
- (b) What is importance of hidden line and surface removal algorithm ? Discuss the mechanism of Z-buffer surface removal algorithm and differentiate it with A-buffer surface removal algorithm.
- (c) What is Projection ? Derive oblique parallel projection and perspective projection matrices.
5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Give twelve basic principle of animation.
- (b) What is Animation ? Discuss the different types of animation.
- (c) Write short notes on any *two* of the following :
- 4 connected filling
 - Procedural animation system
 - Stochastic animation system

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M. C. A. (FIFTH SEMESTER)
END SEMESTER EXAMINATION, 2018
COMPUTER GRAPHICS AND ANIMATIONS

Time : Three Hours

Maximum Marks : 100

Note : (i) The question paper contains five questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Total marks assigned to each question are twenty.

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What are the advantages of interactive computer graphics ? Explain the working of refresh cathode ray tube.

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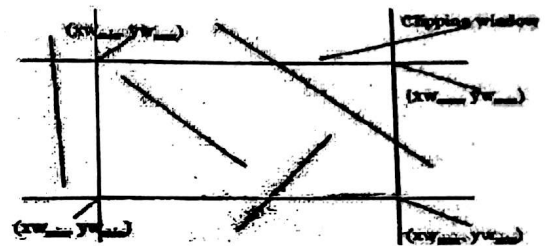
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- (b) Explain the differences between Random scan display and Raster scan display.
- (c) Write notes on the following :
- (i) Flat panel display and Plasma panel display
 - (ii) Beam-penetration technique and shadow mask technique
 - (iii) Liquid Crystal display
 - (iv) Pixel and Resolution
 - (v) Aspect ratio
2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Write Bresenham's algorithm for line. Consider the line from (2, 2) to (12, 10). Use the Bresenham's line algorithm to rasterize this line.
- (b) Explain mid-point circle drawing algorithm. Using this algorithm plot a circle whose radius = 9 units.
- (c) What is point and line clipping ? Consider the clipping window and the line shown in Fig. Find the region codes for each point and identify whether the line is completely visible, partially visible or completely

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invisible using Cohen-Sutherland Subdivision Line Clipping Algorithm.



3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Explain Boundary fill and Flood fill algorithm with example.
- (b) Give the 2-D transformation matrix for the following :
- (i) Translation
 - (ii) Rotation
 - (iii) Scaling
- Also find the resultant point when a point is rotated counterclockwise by an angle 45° .
- (c) Explain Reflection and sheering in 2D computer graphics with example.

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Explain Parallel projection and Perspective projection.

(b) What is a hidden surface remove algorithm ? Explain with suitable example.

(c) Describe the 3D display methods. Explain the depth cueing projection for 3D display methods.

5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is animation ? What are the steps and basic rules for using animation ?

(b) What are the various types of animation ? Explain Morphing and Storyboard.

(c) Describe the Phong's Illumination Model.