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**Presidency University**

**Bengaluru**

 **School Of Computer Science and Engineering & Information Science**

**End-Term Examinations, Aug 2024**

**Date**: 09-08-2024

**Time**: 01.00pm to 04.00pm

**Max Marks**: 100

**Weightage**: 50%

**Odd Semester**: 2023 - 24

**Course Code**: CSE 2066

**Course Name**: COMPUTER GRAPHICS

**Department:** COMPUTER SCIENCE AND ENGINEERING

 **Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

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| **Q.No** | **Questions** | **Marks** | **CO** | **RBT** |
| 1 | 1. Define computer Graphics and its types.
 | 4 | CO1 | L1 |
| 1. Explain the different types of output devices. Differentiate between the different types of hardcopy devices available in output devices.
 | 6 | CO1 | L2 |
| 1. Calculate the points between the starting point (9,18) and ending point (14, 22) using Bresenham’s line drawing algorithm.
 | 10 | CO1 | L3 |
| OR |
| 2 | 1. Define the following:
	1. Interactive Graphics
	2. Character Printers
	3. Thin Film Electroluminescent Display
	4. Light Emitting Diode (LED)
 | 4 | CO1 | L1 |
| 1. Write in short about Liquid crystal display (LCD). Mention the advantages and disadvantages for LCD.
 | 6 | CO1 | L2 |
| 1. Write the steps of Digital Differential Analyzer (DDA) algorithm and use it to calculate the points between the starting point (5, 6) and ending point (13, 10).
 | 10 | CO1 | L3 |

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| 3 | 1. Define 2D clipping. List the components of the 2D Viewing Pipeline Architecture.
 | 4 | CO2 | L1 |
| 1. Explain with an example how pivot point scaling is a case of composite transformation and derive the transformation matrix.
 | 6 | CO2 | L2 |
| 1. Solve the following:
	1. Given a square object with coordinate points A (0, 3), B(3, 3), C(3, 0), D(0, 0). Apply the scaling parameter 2 towards X axis and 3 towards Y axis and obtain the new coordinates of the object. Show the transformation with a neatly labelled diagram.
	2. Determine the region codes for a line segment with endpoints A(2,3) and B(18,20) given a rectangular clipping window with boundaries (xmin,ymin) = (5,5) and (xmax,ymax)= (15,15) to determine the visible portion of the line segment.
 | 10 | CO2 | L3 |

OR

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| 4 | 1. List the types of clipping used in computer graphics and the applications of clipping.
 | 4 | CO2 | L1 |
| 1. Summarize the 2D Transformations. Explain the difference between clockwise and counterclockwise rotations in terms of their matrix representations.
 | 6 | CO2 | L2 |
| 1. Given a polygon with vertices at (2, 2), (6, 2), (6, 5), (4, 7), and (2, 5), and a rectangular clipping window defined by the corners (3, 3), (5, 6), apply the Sutherland-Hodgman polygon clipping algorithm to clip the polygon against the window. Calculate the new vertices of the clipped polygon.
 | 10 | CO2 | L3 |

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| 5 | 1. Define Axonometric projection and list its types.
 | 4 | CO3 | L1 |
| 1. Indicate the types of projection with the help of a graphical representation. Explain the concept of Oblique projections in technical drawing and computer graphics.
 | 6 | CO3 | L2 |
| 1. Demonstrate that two successive 3D scaling transformations are multiplicative in nature. Represent in terms matrix.
 | 10 | CO3 | L3 |

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| 6 | 1. Define the term "composite 3D translation" with a neatly labelled diagram.
 | 4 | CO3 | L1 |
| 1. Predict the effect of applying scaling factors (2, 3, 1) and (0.5, 2, 4) on a point P (10,10,10) with respect to origin in homogeneous coordinates.
 | 6 | CO3 | L2 |
| 1. Determine the new coordinates of the point P(1, 1, 0) after two successive rotations of 30 degrees and 45 degrees around the z-axis and write the rotation matrices for each transformation.
 | 10 | CO3 | L3 |

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| 7 | 1. List two types of quadric surfaces.
 | 4 | CO4 | L1 |
| 1. Explain the difference between parametric and non-parametric representations of a sphere and ellipsoid.
 | 6 | CO4 | L2 |
| 1. Apply Bresenham’s circle drawing algorithm to generate all the points needed to form a circle with a center at coordinates (0, 0) and a radius of 8.
 | 10 | CO4 | L3 |

OR

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| 8 | 1. Describe the surface of a sphere in Cartesian coordinates.
 | 4 | CO4 | L1 |
| 1. Explain the conditions under which an ellipsoid becomes a sphere.
 | 6 | CO4 | L2 |
| 1. Apply Bresenham’s circle drawing algorithm to generate all the points needed to form a circle with a center at coordinates (3, 3) and a radius of 5.
 | 10 | CO4 | L3 |

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| 9 | 1. State the formula for a 3D rotation matrix around the z-axis.
 | 4 | CO1 | L1 |
| 1. Explain the difference between perspective and parallel projections.
 | 6 | CO1 | L2 |
| 1. Determine the result of applying a series of transformations on a point P (1,1,1,) scaling by (2, 2, 2), followed by a translation of (3, 3, 3).
 | 10 | CO1 | L3 |

OR

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| 10 | 1. Define the following terms:
	1. Convex Hull
	2. Control Points
 | 4 | CO2 | L1 |
| 1. Describe the difference between geometric and parametric continuity in spline curves.
 | 6 | CO2 | L2 |
| 1. Apply Bresenham’s circle drawing algorithm to generate all the points needed to form a circle with a center at coordinates (0, 3) and a radius of 6.
 | 10 | CO2 | L3 |