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MCS-053

MCA (Revised)

Term-End Examination

06503

December, 2018

MCS-053 : COMPUTER GRAPHICS AND MULTIMEDIA

Time : 3 hours *Maximum Marks : 100*

Note : *Question number **1** is **compulsory**. Attempt any **three** questions from the rest.*

1. (a) Differentiate between Calligraphic display device and Raster scan display device. Use suitable diagram/table to discuss, how frame buffer is used to control color of the pixel. *5*

   (b) Explain the Cohen-Sutherland line clipping algorithm. Give suitable diagram in support of your explanation. *5*

   (c) Write Bresenham's line generation algorithm ? Compare the Bresenham line generation algorithm with the DDA algorithm. *5*

   (d) Briefly discuss the essential elements of getting projection of any object. Use suitable diagram in support of your answer. *5*

(e) Write the Rotational Transformation matrix for clockwise and anticlockwise rotation for 2D Euclidean system. Verify the statement, "Two successive rotations are additive in nature." 5

(f) Why do we need the concept of shading in computer graphics ? Briefly discuss different types of shading techniques. 5

(g) Briefly describe any ***two*** of the following file formats : 5

(i) MPEG

(ii) BMP

(iii) GIF

(h) How do 'Computer graphics' differ from 'Animation' ? Discuss the basic elements of computer animation. 5

2. (a) Derive the 2D-transformation matrix for reflection about the line $y = mx$, where m is a constant. Use this transformation matrix to reflect the triangle (ABC) about line $y = 2x$, where A, B, C are (0, 0), (1, 1) and (2, 0) respectively. 10

(b) Determine the final coordinates of the perspective projection of an object, when the object is first rotated w.r.t. y axis by $-30°$ and w.r.t. x axis by 45°, and finally projected on $z = 0$ plane with the centre of projection at $(0, 0, -5)$. 10

3. (a) Write the Pseudocode for Bresenham's circle generation algorithm. Use this algorithm to produce a circle of radius (r) equal to four units, in the first quadrant from x = 0 to x = y. *10*

(b) "Simultaneous shearing is not the same as shearing in one direction, followed by shearing in another direction." Justify the statement mathematically. *5*

(c) Draw a taxonomy tree for classification of different types of projections. *5*

4. (a) Prove any ***two*** of the following properties of Bezier curve : *5*

(i) $P(u = 0) = P_0$

(ii) $P \sum B(n, i) = 1$

(ii) $P'(0) = n(P_1 - P_0)$

(b) What are geometric continuities ? How do geometric continuities differ from parametric continuities ? Discuss each type of geometric continuity. *7*

(c) Explain scan line polygon fill method, with suitable diagram to support your explanation. Compare the scan line polygon fill method with flood fill method. *8*

5. (a) Differentiate between any ***two*** of the following : *10*

(i) Ray tracing and Ray casting

(ii) Printer and Plotter

(iii) Hypertext and Hypermedia

(b) Write short notes on any ***two*** of the following : *10*

(i) Specular Reflection

(ii) Bezier Surfaces

(iii) Z-Buffer Algorithm

(iv) Windowing Transformations
