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MCS-053

MASTER OF COMPUTER APPLICATION

(REVISED) (MCA)

Term-End Examination

December, 2019

MCS-053 : COMPUTER GRAPHICS AND MULTIMEDIA

Time : 3 Hours *Maximum Marks : 100*

***Note** : Question No. 1 is **compulsory**. Attempt any **three** questions from the rest.*

1. (a) Differentiate between Raster scan display device and Calligraphic display device. 5

(b) What is Staircase Effect ? How the problems of DDA algorithm is resolved by Bresenham's line generation algorithm ? 5

(c) Compare Cyrus Beck line clipping algorithm with Cohen-Sutherland line clipping algorithm. 5

(d) What is the advantage of homogeneous co-ordinate system, over the Euclidean system of co-ordinates ? Explain with suitable example. 5

(e) Differentiate Orthographic and Oblique Projections. Give classification for both projections. 5

(f) What are sweep representations ? Discuss the advantages of sweep representation, with suitable example. 5

(g) How does frame spacing affect any animation ? Discuss with suitable example. 5

(h) Differentiate between vector graphic images and bitmap graphic images. 5

2. (a) Write DDA line generation algorithm and Bresenham's line generation algorithm. Apply these algorithms to produce line segment from point (0, 0) to point (6, 6). Compare their results, respectively. 10

(b) Write matrix representations of the following transformations in 3D homogeneous co-ordinate systems : 10

(i) Translational transformation

(ii) Rotational transformation

(iii) Scaling transformation

(iv) Reflection transformation

(v) Shear transformation

Show that the simultaneous shearing sh_{xy} (a, b) is not same as the shearing in x-direction, $sh_x(a)$, followed by shearing in y-direction, $sh_y(b)$.

3. (a) Prove the following properties of Bezier curves : 5

(i) $P(u = 1) = P_n$

(ii) $\sum_{i=0}^{n} B_{n,i}(u) = 1$

(b) Determine the perspective projection of point $P(x, y, z)$ on $Z = d$ plane, given the centre of projection is at point Q $(0, 0, -d)$. Give suitable diagram to exhibit your execution. 5

(c) Compare and contrast Gourand Shading and Phong Shading. 5

(d) What is the problem of aliasing ? How the techniques of antialiasing resolves this problem of aliasing ? 5

4. (a) Explain the term parametric continuity. How does parametric continuity differ from the geometric continuity ? Discuss the types of parametric and geometric continuities. (Use suitable expression and diagrams in your discussion). 10

(b) Expand the following abbreviations : 4

(i) jpeg

(ii) tift

(iii) bmp

(iv) gif

(c) Differentiate between the following : 6

(i) Graphics and Animation

(ii) Printer and Plotter

(iii) Hypertext and Hypermedia

5. Write short notes on any ***five*** of the following : 20

(a) Z Buffer algorithm

(b) Sutherland-Hodgman algorithm

(c) Authoring tools

(d) Morphing

(e) Windowing transformations

(f) Video Compression