MCA (Revised)

Term-End Examination

June, 2012

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) What is Raster Scan and how is it different from Random Scan ?  
(b) What is aliasing ? Explain how Antialiasing overcome the problem of aliasing.  
(c) Find the transformed point $p'(x,y)$, caused by rotating $P(5,1)$ about the origin through an angle of $90^\circ$.  
(d) Derive a general transformation Matrix for scaling transformation with respect to a fixed point $P(h,R)$.  
(e) What are the benefits of Bresenham's line drawing algorithm over DDA algorithm.  
(f) Find the coordinates (pixel position) of a circle in the first quadrant having centre at point $O(0,0)$ and a radius 4 using mid-point circle generation algorithm.
(g) Given \( P_0(0,40), P_1(40,40), P_2(60, 20), P_3(60, -10) \) as Vertices of Bezier Curve, find the general expression to express a cubic Bezier curve?

(h) Differentiate between the following:

(i) Zero Acceleration Vs. Non zero Acceleration for simulating Motion.

(ii) Hypertext Vs. Hyper Media

(iii) GIF Vs. JPEG

(iv) Key Frame Vs. Cel Animation

2. (a) Write Integer Bresenham's line drawing algorithm and show how it draw a line, whose start point is (4,4) and end point is (-3,0).

(b) How much time is spent scanning across each row of pixels during screen refresh on a raster system with a resolution of 1280 by 1024 and a refresh rate of 60 frames per second?

(c) Explain the specular Reflection with the help of suitable diagram.

(d) Define the term parallel projection. Categorise various types of parallel projection.
3. (a) Perform reflection of a triangle A(0,0), B(2,0) and C(1,5).

   (i) about the horizontal line \( y = 5 \)

   (ii) about the line \( y = x + 5 \).

(b) What is shearing transformation? Explain x-shearing, y-shearing with suitable example(s).

(c) Explain, the 3 cases of line visibility in cohen-Sutherland line clipping algorithm.

4. (a) Write any three properties of Bezier curve. What are the limitation(s) of Bezier curve?

(b) What is video conferencing? Discuss the challenges related to such facilities

(c) Explain how Z buffer method and scan line methods differ to find the visible surface detection.

(d) The pyramid defined by the coordinates A(0,0,0), B(1,0,0), C(0,1,0) and D(0,0,1) is rotated 90° about the line L that has direction vector \( \vec{v} = \hat{i} + \hat{j} + \hat{k} \) and passing through the origin. Find the coordinates of rotated pyramid ABCD.
5. (a) Consider a shiny surface with diffused reflection coefficient of 0.6 and ambient reflection coefficient of 0.5, the surface has normal in the direction of \(4i+6j+5k\); say some light is incident on it from the direction \(i+j+k\) such that the ambient and diffused intensities are of order 3 and 4 units. Determine the intensity of the reflected light.

(b) Explain the following terms:

(i) Card (or page) based authoring tools.
(ii) Frame buffer.
(iii) Virtual Reality.
(iv) Animation Tools.
(v) Video file formats.
(vi) Ray Tracing
(vii) Sound editing tools.