Roll No ....

CS - 504

B.E. V Semester

Examination, December 2012

COMPUTER GRAPHICS & MULTIMEDIA

Time : Three Hours

Maximum Marks : 70/100

Note: (1) The Question paper is divided into five units. Each unit carries an internal choice

     (2) Attempt one question from each unit. Thus attempt five Questions in all.

     (3) All Questions carries equal marks

     (4) Assume suitable data whenever necessary.

UNIT - I

1. (i) Compute the following :

    (a) Size of 800×600 image at 240 pixels per inch.

    (b) Resolution of 2×2 inch image that has 512×512 pixels.

    (c) Height of the resized image 1024×768 to one that is 640 pixels wide with the same aspect ratio.

    (d) Width of an image having height of 5 inches and an aspect ratio 1.5.

  (ii) For a 10×10 frame buffer interpret the Bresenham's Algorithm to find which pixel are turned on for the line segment between

(a) (1, 2) & (7,6)

(b) (3, 2) & (6, 4)

(c) (5, 8) & (9, 5)

OR

2. (i) Write Bresenham's Circle drawing algorithm to draw one eighth part of a circle with centre 0, 0 and Radius R.

(ii) Describe the graphics system interface at different levels that enables users to inherit the application program best suited to process the desired output.

(iii) How can Bresenham's line drawing algorithm be modified so that the antialiasing effects are produced while generating a straight line?

UNIT - II

3. (i) Let R be the rectangular window whose lower left hand corner is at L(-3, 1) and upper right hand corner is at R(2,6). Find the region codes for the points A (-4, 2), B(-1, 7), C(-1, 5), D(3,8), E(-2,3), F(1,2), G(1, -2), H(3, 3), I(-4, 7) and J(-2, 10). Find whether the line segments AB, CD, EF, GH and IJ require clipping or not.

(ii) Explain the Sutherland-Hodgeman polygon clipping algorithm with an example.

OR

4. (i) Draw the square (0, 0) (0, 1) (1, 1) (1, 0). Form a new image transformed which will show the image rotated 45 degree counter clock wise and scaled by 0.5 from the last image displayed. The image should remain centered on the screen.

(ii) What do you understand by homogeneous coordinates? What are their applications in computer graphics?

UNIT - III

5. (i) Find a matrix for parallel projection onto the plane $3x + y + 4z + 1 = 0$ when

    (a) An orthographic projection is used

    (b) An oblique projection is used.

  (ii) What do you understand by Bezier Curves? What are the properties of cubic Bezier Curves which makes them useful for curve design? How do they differ from B - Splines?

OR

6. (i) The given control points $(60,40)(70,40)(80,60)(80,0)$ find Bezier curve equation and find the four points at $t = 0.2, 0.4, 0.6$.

  (ii) In Z-buffer algorithm how do you find the depth of one plane of the polygon? What are the drawbacks of z-buffer algorithm?

UNIT - IV

7. (i) Explain how curves are described by means of polynomials. Obtain the implicit functions for an ellipse, a parabola and a hyperbola.

  (ii) A mirror is placed such that it passes through $(2,0)$ and $(0, 2)$. Find the reflected view of a triangle with vertices $(3, 4), (5,5)$ and $(4,7)$ in this mirror.

OR

8. (i) A polygon has three vertices, $V_0 = (1, 1)$, $V_1 = (5, 5)$ and $V_2 = (11, 2)$.

    (a) What will be the intensity at (7,3) using Gouraud shading if the intensities at the three vertices are $I_0 = 2$, $I_1 = 12$, and $I_2 = 9$?

    (b) What will be the unit normal vector at (4, 3) using Phong shading if the normal vectors at the three vertices are $N_0 = (0, 1, 0)$, $N_1 = (1, 0, 0)$, and $N_2 = (1, 1, 1)$?

  (ii) Explain three different approaches of color encoding of an image.

UNIT - V

9. (i) With the help of a block diagram, explain MPEG audio compression algorithm.

  (ii) Explain channel messages and system messages with reference to MIDI.

OR

10. (i) Describe the characteristics of a multimedia database management system and its objects when handling multimedia data.

  (ii) What are the steps involved in image preparation used in JPEG image compression. Explain them with the help of a diagram.

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