Code No: RR320502 **Set No. 1**

III B.Tech II Semester Supplementary Examinations,
November/December 2005
COMPUTER GRAPHICS
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Assuming that a certain full color (24-bit per pixel) RGB raster system has a 512×512 frame buffer, how many distinct intensity levels would have been available in each primary color. How many different colors could we display. [16]

2. (a) Briefly explain about different image compression techniques.
   (b) Explain the steps involved in simple parity scan conversion algorithm. [10+6]

3. (a) Prove that the multiplication of two successive rotation matrices is commutative.
   (b) Show that the reflection about the line y=x is equivalent to a reflection relative to the x-axis followed by a counter clock wise rotation of 90^0. [8+8]

4. (a) Under what circumstances would mid point clipping be preferable to use, rather than Cohen-Sutherland outcode algorithm.
   (b) Explain the algorithm to determine whether the vector passing through points $P(x_1, y_1)$ and $Q(x_2, y_2)$ is intersecting another vector passing through $R(x_3, y_3)$ and $S(x_4, y_4)$. [8+8]

5. Derive the matrix form for perspective projection transformation using 3-demensional homogenous representation. With a neat sketch, describe various parameters involved in the matrix representation. [16]

6. Explain the steps involved in z-buffer algorithm. Estimate the memory requirements for the implementation of z-buffer algorithm. [16]

7. (a) Prove that a Bezier curve in the plane is axis independent.
   (b) Demonstrate that B-spline curve follows local control. [8+8]

8. (a) Explain the constraint-based controlling animation.
   (b) Distinguish between procedural control and constraint based controlling. [8+8]

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Code No: RR320502 **Set No. 2**

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COMPUTER GRAPHICS
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) What is meant by gray level. If 10 bits of frame buffer memory is allocated to each pixel, how many gray levels are possible per pixel.
   (b) Explain how the frame buffer is logically organized to display color images on video display unit. [8+8]
2. (a) Discuss the steps involved in the ordered edge list algorithm.
   (b) What are the advantages of edge flag algorithm. [8+8]
3. (a) What is meant by homogeneous representation of transformation matrices. Why it is necessary.
   (b) List the homogeneous representation of all the basic transformations.
   (c) Find the transformation matrix that represents rotation of an object by 30^0 clock wise, about the origin. [5+5+6]
4. (a) Explain the line-clipping algorithm using mid-point sub-division approach.
   (b) How the stack size and length of the line segment are related in the context of mid-point subdivision algorithm?
   (c) Explain how the visibility test is performed with respect to a given vector. [8+4+4]
5. (a) Distinguish between isometric, diametric and trimetric projections.
   (b) Explain with a neat sketch, how the view plane is defined with respect to centre of projections and the object defined is 3-D space. [8+8]
6. (a) What are the advantages of mini max test in z-buffer algorithm?
   (b) A polygon has a plan equation ax + by + cz + d = 0. Suppose that we know the value of 'z' at a point (x, y). What is the easiest way to calculate the value of z at (x + 1,y) and at (x, y + 1)? [8+8]
7. (a) Briefly explain the steps involved in Bezier's curve generation.
   (b) Discuss how the Bezier's curve algorithm is extended to generate surfaces. [8+8]
8. (a) Discuss about the following:
      i. Slow-in and Slow-out

ii. Moving-points path

iii. Euler angles.

(b) Discuss about the algebraic structure-"quaternions". [9+7]

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Code No: RR320502 **Set No. 3**

III B.Tech II Semester Supplementary Examinations,
November/December 2005
COMPUTER GRAPHICS
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Assuming that a certain full color (24-bit per pixel) RGB raster system has a 512×512 frame buffer, how many distinct intensity levels would have been available in each primary color. How many different colors could we display. [16]

2. (a) If a line is drawn from (0,0) to (10,5) using DDA algorithm, how many iterations are performed? How many distinct points are displayed?
   (b) Explain about the run length encoding algorithm for image compression. [8+8]

3. (a) Distinguish between geometric transformations and coordinate transformations.
   (b) Describe the transformation using symbolic notations, that rotates an object point Q (x,y), θ degrees about a fixed center of rotation P(h,k). [8+8]

4. Explain the steps involved in the following line clipping algorithms:
   (a) Mid-point subdivision algorithm.
   (b) Cohen-Sutherland outcode algorithm. [8+8]

5. Derive the transformation matrix for aligning the vector V =I+J+K with the vector K. [16]

6. (a) What are the advantages of mini max test in z-buffer algorithm?
   (b) A polygon has a plan equation ax + by + cz + d = 0. Suppose that we know the value of 'z' at a point (x, y). What is the easiest way to calculate the value of z at (x + 1,y) and at (x, y + 1)? [8+8]

7. (a) Discuss about the luminosity function of three primary colors.
   (b) Briefly discuss about chromaticity diagram. [8+8]

8. Discuss about the techniques to achieve the simple animation effects. [16]

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Code No: RR320502 **Set No. 4**

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(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. List the operating characteristic of the following display technologies:
   (a) Raster refreshes systems
   (b) Vector refresh systems
   (c) Plasma panels and
   (d) LCD. [4×4]
2. What is meant by aliasing? Discuss about the two antialiasing methods. [16]
3. (a) Derive mathematically, the transformation that rotates an object point θ^0 anti-clock wise, about the origin. Write the matrix representation for this rotation.
   (b) Rotate the point P(2,-4) about the origin 30^0 in anti-clockwise direction. [8+8]
4. (a) Determine whether the vector joining the points A (5,7), B (10,8) intersects the line segment P(1,4) Q(20,4) using the Sutherland-Hodgeman algorithm. If intersects, find the coordinates of intersection point.
   (b) Justify with suitable examples that the Sutherland-Hodgeman algorithm is suitable for clipping any polygon but the clipping polygon must be always convex shaped. [8+8]
5. Find the transformation matrix which aligns the vector V=I+J+K with the vector N 2I-J-K. [16]
6. (a) What is minimax text used in z-buffer algorithm? When the mini-max test fails?
   (b) In the depth buffer algorithm, how many bite must allocated to each entry in depth array and inframe buffer. [8+8]
7. Discuss in detail about Hermite spline with the sketches for Hermite blending functions. [16]
8. (a) What is meant by animation? Explain.
   (b) Discuss the characteristics of key-frame animation. [8+8]

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