Code No: RR311203 **Set No. 1**

III B.Tech I Semester Regular Examinations, November 2006
COMPUTER GRAPHICS
(Common to Information Technology and Electronics & Computer Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the design issues in color CRT monitors.
   (b) Distinguish between CRT monitors and direct view storage tube (DVST) devices. [8+8]
2. (a) Distinguish the merits and demerits of scan line algorithm and flood fill algorithm.
   (b) Discuss about the super sampling approach followed for antialiasing. [10+6]
3. (a) Show that the composition of two rotations is additive that is, $R(\varphi_1).R(\varphi_2) = R(\varphi_1 + \varphi_2)$.
   (b) Characterize the transformation with suitable matrix formulation, for the following operations: $x^{'} = x + a.y, \quad y^{'} = bx + y$. [8 + 8]
4. (a) Disprove with suitable example that the Sutherland-Hodgeman algorithm is not suitable for clipping when the clipping polygon is concave shaped.
   (b) What are the applications of viewing transformation? [8+8]
5. Drive the matrix form for the geometric transformations in 3-D graphics for the following operations.
   (a) Translation
   (b) Scaling
   (c) Mirror reflections. [5+5+6]
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) Explain the conversion formulae to convert HLS to RGB system.
   (b) What are the characteristics of HSV color model? [8+8]
8. Give a detailed note of the following rules of animation.
   (a) Slow-in and Slow-out
   (b) Stage the action. [8+8]

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Code No: RR311203 **Set No. 2**

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the terms
   i. Framebuffer
   ii. Resdution
   (b) Suppose an RGB raster system is to be designed using and 8 inch by 10 inch screen with a resolution of 100 pixels per inch in each direction. If we want to store 6 bits per primary color per pixel, how much storage (in bytes) do we need for the frame buffer? [10+6]
2. What is meant by aliasing? Discuss about the two antialiasing methods. [6+5+5]
3. (a) What is meant by composite transformations?
   (b) Write the general form of a scaling matrix with respect to a fixed point P(h,k) where the scaling factors in x and y directions are a and b respectively. [6+10]
4. (a) Draw a flow chart illustrating the logic of the Sutherland-Hodgeman algorithm.
   (b) Demonstrate the working of Sutherland-Hodgeman algorithm with a suitable example. [8+8]
5. Distinguish the transformations performed in 2-D graphics and 3-D graphics. Explain how many matrices are needed to define each of the basic transformations. [8+8]
6. (a) Show how the calculations of the intersection of an edge with a scan line can be made incremental as opposed to absolute.
   (b) What difficulties are encountered in implementing the painter's algorithm? [8+8]
7. (a) Discuss the properties of natural cubic splines.
   (b) Discuss about the parametric function followed in Hermite spline. [8+8]
8. (a) What is meant by temporal aliasing?
   (b) Discuss about the linear interpolation based animation techniques. [6+10]

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Code No: RR311203 **Set No. 3**

III B.Tech I Semester Regular Examinations, November 2006
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain with suitable sketches, the role of frame buffer in the quality of graphical display of video display unit. [16]

2. (a) Distinguish the merits and demerits of scan line algorithm and flood fill algorithm.
   (b) Discuss about the super sampling approach followed for antialiasing. [10+6]

3. (a) Show that the composition of two rotations is additive that is, $R(\varphi_1).R(\varphi_2) = R(\varphi_1 + \varphi_2)$.
   (b) Characterize the transformation with suitable matrix formulation, for the following operations: $x^{'} = x + a.y, \quad y^{'} = bx + y.$ [8 + 8]

4. Explain the approaches followed in different line clipping algorithms: compare and contrast the characteristics. [8+8]

5. A unit cube is defined such that the three of its planes are aligned with three principle planes. Determine the perspective transformation when the distance between the viewport and view plane is 10 units. [16]

6. (a) Discuss the steps involved in computation of surface normal at a vertex when
      i. the plane equations of surrounding polygons in given and
      ii. the coordinates of vertices are given.
   (b) Discuss how the Mach-band effects are eliminated in Phong shading. [4+4+8]

7. Explain the steps involved in Bezier's method for curve generation. [16]

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

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Code No: RR311203 **Set No. 4**

III B.Tech I Semester Regular Examinations, November 2006
COMPUTER GRAPHICS
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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. (a) Write an algorithm to derive the straight line using Bresenham's algorithm when the slope of the line(m) is less than 45^0.
   (b) Distinguish between simple DDA and Bresenham's algorithm for line generation. [8+8]
3. (a) What is meant by composite transformations?
   (b) Write the general form of a scaling matrix with respect to a fixed point P(h,k) where the scaling factors in x and y directions are a and b respectively. [6+10]
4. (a) Using steps followed in Sutherland-Hodgeman algorithm, determine the intersection point of the line segment P_1 P_2 against a clipping window P_3P_4 where coordinate of end points are $P_1(0,0)$ $P_2(3,2)$ $P_3(3,0)$ and $P_4(0,2)$.
   (b) Why the Sutherland-Hodgeman algorithm is called as re-entrant algorithm. [8+8]
5. Distinguish the transformations performed in 2-D graphics and 3-D graphics. Explain how many matrices are needed to define each of the basic transformations. [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) What is the blending function used in Bezier's method for curve generation? Explain the terms involved in it?
   (b) What are the properties of Bezier curve? [10+6]
8. (a) Discuss the procedural control methods of animation.

(b) What are the advantages of procedural control over full explicit control. [8+8]

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