SET - 1

Code No: 2420306

IV B. Tech II Semester Regular Examinations, April/May 2009

COMPUTER GRAPHICS

(Mechanical Engineering)

Time: 3 Hours **Max. Marks 80**

Answer any FIVE questions

All questions carry equal marks

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1. Consider three different raster systems with resolutions of 640 by 480, 1280 by 1024, and 2560 by 2048. What size frame buffer is required in bytes for each of these systems to store 12 bits per pixel?
2. Implement the polyline function using DDA algorithm, given any number of input points. A single point is to be plotted when n=1
3. Write an algorithm to find the composite transformation matrix of scaling and translation.
4. Derive the window to viewport transformation equations by first scaling the window to the size of the viewport and then translating the scaled window to the viewport position.
5. Write an algorithm for calculating normal vector for a Bezier surface at point P(u, v)
6. Prove that multiplication of two successive translation matrices in three dimensions is commutative.
7. Develop an algorithm for back face detection technique, for identifying the visible faces of a convex polyhedron that has different colored faces.
8. Write short notes on the following
    a. Keyframe systems
    b. Motion specifications
    c. Illumination models

SET - 2

Code No: 2420306

IV B. Tech II Semester Regular Examinations, April/May 2009

COMPUTER GRAPHICS

(Mechanical Engineering)

Time: 3 Hours **Max. Marks 80**

Answer any FIVE questions

All questions carry equal marks

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1. Suppose an RBG raster system is to be designed using an 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 pixel in the frame buffer , how much storage in bytes is required?

2. Provide generalized Bressenham's algorithm to generate lines with any slope.

3. Write an algorithm to find the composite transformation matrix of rotation and translation.

4. Derive the matrix transformation for a workstation transformation.

5. Determine the blending functions for uniform periodic B-spline curves of degree 4.

6. Prove that multiplication of two successive scaling matrices in three dimensions is commutative.

7. Develop an algorithm for displaying the visible faces of a convex polyhedron using depth buffer method.

8. Write short notes on the following
   a. Raster animation
   b. General computer animation languages
   c. Polygon rendering methods

SET - 3

Code No: 2420306

IV B. Tech II Semester Regular Examinations, April/May 2009
COMPUTER GRAPHICS
(Mechanical Engineering)

Time: 3 Hours **Max. Marks 80**

Answer any FIVE questions
All questions carry equal marks
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1. How long would it take to load a 640 by 480 frame buffer with 12 bits per pixel , if 10^5 bits can be transferred per second? How long would it take to load a 24 bit per pixel frame buffer with a resolution of 12280 by 1024 using the same transfer rate?

2. Write a procedure for filling the interior of any specified set of "polygon" vertices using the non-zero winding number rule to identify interior regions

3. An object is rotated successively by 30 degrees and 15 degrees respectively. Verify that the composition of rotations is additive .

4. Illustrate Cohen Sutherland line clipping algorithm with four examples.

5. Determine the blending functions for uniform periodic B-spline curves of degree 3.

6. Prove that two successive rotations about any one of the coordinate axes in three dimensions is commutative.

7. Provide scanline algorithm, for displaying the visible faces of a convex polyhedron and explain with an example.

8. Write short notes on the following
   a. Motion specifications
   b. General computer animation functions
   c. Gourand shading

SET - 4

Code No: 2420306

IV B. Tech II Semester Regular Examinations, April/May 2009

COMPUTER GRAPHICS

(Mechanical Engineering)

Time: 3 Hours **Max. Marks 80**

Answer any FIVE questions

All questions carry equal marks

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1. Suppose we have a computer with 32 bits per word and a transfer rate of 1 million instructions per second. How long would it take to fill the frame buffer of a 300 dots per inch laser printer with a page size of 8.5 inches by 11 inches?
2. Develop a flood fill algorithm to fill the interior of any specified area.
3. Show that the composition of two rotations is additive by concatenating the matrix representations for $R(\theta_1)$. and $R(\theta_2)$ to obtain

   $R(\theta_1).R(\theta_2) = R(\theta_1+\theta_2)$
4. Illustrate Sutherland-Hodgeman polygon clipping algorithm with two examples.
5. Determine the quadratic Bezier blending functions for five control points.
6. Derive the transformation matrix for scaling an object by a scaling factor s in a direction defined by the direction angles α, β, and γ.
7. Write the algorithm for depth sorting method and explain the working with an example.
8. Write short notes on the following
   (a) Design of animation sequences
   (b) Morphing
   (c) Phong's shading