

II B.Tech. II Semester Regular Examinations, April/May -2005
COMPUTER GRAPHICS
(Mechatronics)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define:
 - i. Aspect ratio
 - ii. Resolutions(b) What is the aspect ratio of 12-inchX16 inch display?
(c) Explain the functioning of the vector refresh display system.
2. Write an algorithm for interpreting the display file.
3. Prove that the two successive 2D rotations are additive
 $R(\theta_1)R(\theta_2) = R(\theta_1+\theta_2)$.
4. (a) What is the utility of segments? Explain the use of segment table for organizing information about the segments.
(b) What are the various data structures that are used for storing segments? Comment on their relative merits and demerits.
5. What is line segment clipping? Describe the various clipping categories into which the line segments are categorized. What is the significance of each category?
6. Prove that any two successive 3-D rotations about a given rotation axis is commutative.
7. Outline the z-buffer algorithm. List the advantages and disadvantages of the z-buffer algorithm.
8. (a) Write about pipeline and parallel front end architecture.
(b) Explain about Bezier curves.

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1. Explain briefly about various display devices used in computer graphics.
2. Explain the following:
 - (a) world, screen and normalised coordinates.
 - (b) 2D graphics primitives.
3. Prove that the two successive 2D rotations are additive
 $R(\theta_1)R(\theta_2) = R(\theta_1 + \theta_2)$.
4. Write procedures for creating and closing segments.
5. Explain the following:
 - (a) Generalised clipping
 - (b) Multiple windowing.
6. (a) Explain the perspective projection for projecting 3D objects on a 2D view surface.
(b) Write a procedure for rotating a given object about any specified rotation axis.
7. Write an 3D clipping algorithms for Parallel and Perspective projections.
8. (a) Explain display processor system.
(b) Write about B-splines.

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1. (a) Apply the Bresenham's algorithm to turn up pixels along the line segment determined by points (5,7) and (12,11).
(b) Give parametric equation of a line between points (1, 1, 2) and (14,14,10).
2. Explain the scan-line algorithm for polygon filling.
3. Give 3x3 homogeneous-coordinate transformation matrix which will have the same effect as each of the following transformation techniques:
 - (a) Scale the image to be twice as large and then rotate counter-clockwise by 90 degrees about the origin.
 - (b) Rotate clockwise about the origin by 45 degrees and then scale the y-direction to be one-half as large.
4. (a) What is the utility of segments? Explain the use of segment table for organizing information about the segments.
(b) What are the various data structures that are used for storing segments? Comment on their relative merits and demerits.
5. Explain the following:
 - (a) Generalised clipping
 - (b) Multiple windowing.
6. Explain briefly the transformation steps for obtaining a composite matrix for rotation about an arbitrary axis with the rotation axis projected on to the z-axis
7. Explain the following:
 - (a) Painter's algorithm
 - (b) Warnock's algorithm.
8. (a) What are the advantages of B-splines over Bezier Curves?
(b) Differentiate between interpolation and approximation in spline representations.
(c) Give the applications of raster scan graphics.

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1. (a) Explain an algorithm for ellipse generation.
(b) If a TV screen has 525 scan lines and an aspect ratio of 3:4, and if each pixel contains 8 bits worth of intensity information, how many bits per second are required to show 30 frames each second?
2. (a) Briefly explain the steps involved in flood-fill algorithm.
(b) Distinguish flood-fill and scan-line algorithms for polygon filling.
3. Is it possible to subject the following transformations on the characters, which are generated by a hardware character generator?
 - (a) a rotation
 - (b) a scaling
 - (c) a translation
4. (a) What is the utility of segments? Explain the use of segment table for organizing information about the segments.
(b) What are the various data structures that are used for storing segments? Comment on their relative merits and demerits.
5. Explain the following:
 - (a) Generalised clipping
 - (b) Multiple windowing.
6. Explain briefly the transformation steps for obtaining a composite matrix for rotation about an arbitrary axis with the rotation axis projected on to the z-axis
7. (a) Explain the basic concepts of hidden surfaces and line removal methods with suitable examples.
(b) Write about z-buffers.
8. Explain about the following:
 - (a) B-spline method
 - (b) Raster graphics architecture.
