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Third Semester MCA Degree Examination, June/July 2016
Computer Graphics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1
 - a. Explain the world coordinate and screen coordinate reference frame with an example. (05 Marks)
 - b. List the statements needed to setup an OpenGL display window whose top-left corner is at pixel position (100,100). With a window width of 300 pixels and a height 200 pixels. (04 Marks)
 - c. What is OpenGL display call back routine? Give an example. (03 Marks)
 - d. List and explain briefly OpenGL point functions and line functions with example. (08 Marks)

- 2
 - a. Derive the decision parameters by using mid-point method that can be used to generate a straight line segment with any slope. (08 Marks)
 - b. Write midpoint circle drawing algorithm which exhibits 8-way symmetry. (07 Marks)
 - c. Explain the boundary-fill algorithm in brief. (05 Marks)

- 3
 - a. What is inverse transformations? Write two-dimensional inverse matrix for translation, rotation and scaling transformations. (04 Marks)
 - b. What is composite transformation? Show that the composition of two rotations is additive and two scaling is multiplicative by concatenating the matrix representations for $R(\theta_1)$, $R_2(\theta_2)$ and (Sx_1, Sy_1) (Sx_2, Sy_2) . (08 Marks)
 - c. Explain general pivot-point rotation and general fixed point scaling transformations in 2-dimensional transformations. (08 Marks)

- 4
 - a. Explain basic three – dimensional geometric transformations. (08 Marks)
 - b. Write a program to create a triangle by implementing scaling algorithm by zooming/un-zooming i) x – axis ii) y – axis iii) xy- plane. (08 Marks)
 - c. List and explain the basic OpenGL geometric transformations. (04 Marks)

- 5
 - a. Explain briefly the mapping from window-to-viewport coordinate transformations. (08 Marks)
 - b. Write and explain Cohen-Sutherland line clipping algorithm. (08 Marks)
 - c. Write OpenGL function for the following : (04 Marks)
 - i) OpenGL project mode
 - ii) Current GLUT display window.

- 6
 - a. Explain 3-dimensional viewing pipeline. (06 Marks)
 - b. Define projection, depth cueing and surface rendering in 3-dimensional viewing. (06 Marks)
 - c. Explain the three-dimensional matrices from world to viewing coordinates. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

- 7 a. Explain the following :
- i) Orthogonal projection (10 Marks)
 - ii) Oblique parallel projection. (05 Marks)
- b. Explain perspective projections. (05 Marks)
- c. Explain viewport transformations and three dimensional screen coordinates. (05 Marks)
- 8 a. What is Bezier spline curve? Derive an equation for Bezier curve. (08 Marks)
- b. What is computer based animation? Explain the basic approach to design a animation sequence. (06 Marks)
- c. Write short notes on :
- i) Traditional animation technique
 - ii) General-computer animation technique. (06 Marks)

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