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18CS62

Sixth Semester B.E. Degree Examination, June/July 2024

Computer Graphics and Visualization

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat diagram, explain the working nature of CRT with its different parts. (08 Marks)
- b. Write an OpenGL program to draw a line segment. (06 Marks)
- c. With suitable OpenGL code segments and examples, define different OpenGL line primitive constants available. (06 Marks)

OR

- 2 a. Explain DDA line drawing algorithm with necessary equations. (06 Marks)
- b. Illustrate the logic of Bresenham's line generation algorithm by digitizing the line with endpoints (20, 10) and (30, 18). Find out all intermediate pixel points along the line. (06 Marks)
- c. Explain the classification of Flat-Panel display monitors with examples. (08 Marks)

Module-2

- 3 a. With suitable code segments, define different polygon fill primitives available in OpenGL. (06 Marks)
- b. Explain general scan-line polygon fill algorithm. (08 Marks)
- c. Briefly explain the data-structures with respect to polygon table with an example. (06 Marks)

OR

- 4 a. Prove that :
 - (i) Two successive translations are additive in nature.
 - (ii) Two successive rotations are additive in nature
 - (iii) Two successive scalings are multiplicative in nature
- b. Derive the matrix for rotation about a fixed point. (08 Marks)
- c. With syntax and examples, define OpenGL functions available for basic transformation methods. (06 Marks)

Module-3

- 5 a. Explain the concept of Cohen-Sutherland line clipping algorithm with necessary sketches and equations. (08 Marks)
- b. Explain Sutherland-Hodgeman polygon clipping algorithm. (06 Marks)
- c. Apply Sutherland-Hodgeman polygon clipping to clip the following polygon Fig.Q5(c) against the given clipping window.

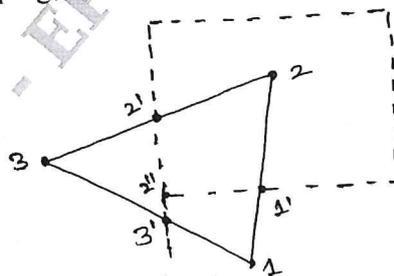


Fig.Q5(c)

(06 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.

OR

- 6 a. In detail explain the 3-D transformations in homogeneous coordinate system with necessary matrices. (08 Marks)
- b. Explain RGB and CMY color models. (06 Marks)
- c. Briefly explain the different light sources. (06 Marks)

Module-4

- 7 a. With a neat diagram, explain 3-D viewing pipeline. (08 Marks)
- b. Explain the transformation from world to viewing coordinates with necessary matrices and equations. (06 Marks)
- c. With a neat sketch, define types of projections. Also compare them. (06 Marks)

OR

- 8 a. With necessary sketches, define the syntax of following OpenGL functions in 3D:
 (i) For perspective projection
 (ii) For orthographic projection
 (iii) Look At function (08 Marks)
- b. Briefly explain different OpenGL visibility detection functions available in OpenGL. (06 Marks)
- c. Explain depth-Buffer algorithm in detail. (06 Marks)

Module-5

- 9 a. Explain the classifications of logical input devices. (06 Marks)
- b. With a neat diagram, explain different input modes. (06 Marks)
- c. With an example of code-segment, explain how to define and execute display lists using OpenGL. (08 Marks)

OR

- 10 a. With an example of code segment, explain different functions used to create menus in OpenGL. (08 Marks)
- b. Describe how to generate text using OpenGL functions along with its types. (06 Marks)
- c. Explain Bezier Spline curves with its necessary equations. (06 Marks)

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