13MCA34

Third Semester MCA Degree Examination, June/July 2019
Computer Graphics

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. What is OpenGL? Explain three types of OpenGL line functions with example for each.
                                                                        (08 Marks)
   b. List the statements needed to set up an OpenGL display window with title 'Computer Graphics', whose top left corner is at pixel position (100, 100) with a window width of 400 pixels and a height 300 pixels.
                                                                        (04 Marks)
   c. Explain the OpenGL display call back routine.   (04 Marks)
   d. Define the following:
      i)   Screen coordinates
      ii) Relative coordinates.
                                                                        (04 Marks)

2 a. Write a program to draw line segment using DDA line drawing algorithm.   (07 Marks)
   b. Write Midpoint circle drawing algorithm for the circle with input radius r and circle center (x_c, y_c).
                                                                        (07 Marks)
   c. Discuss different types of polygons. List the methods to identify the type of polygons.
                                                                        (06 Marks)

3 a. Define Geometric Transformation. Explain the 2 Dimensional Translation, Rotation and Reflection transformations.
                                                                        (10 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 $R(\theta_1) R(\theta_2)$ and $(Sx_1, Sy_1) (Sx_2, Sy_2)$.
                                                                        (07 Marks)
   c. Write the inverse matrix representation for two dimensional translation, rotation and scaling transformations.
                                                                        (03 Marks)

4 a. Explain 3 dimensional translation, reflection and scaling transformations.   (09 Marks)
   b. Describe Basic OpenGL geometric transformation with example.   (06 Marks)
   c. With neat sketches, describe the rotation of 3D object about an axis that is parallel to one of the coordinate axis.
                                                                        (05 Marks)

5 a. Define the terms Window and Viewport.   (04 Marks)
   b. Explain Cohen Sutherland line clipping Algorithm.   (08 Marks)
   c. Brief point clipping and text clipping.   (08 Marks)

6 a. Explain Projection, Depth Cueing and Surface rendering in 3 dimensional viewing.
                                                                        (06 Marks)
   b. Brief three dimensional viewing pipe line in detail.   (06 Marks)
   c. Explain the three dimensional transformation matrices from world of viewing coordinates.
                                                                        (08 Marks)

7 a. Explain the following:
  i) Orthogonal projections
  ii) Oblique parallel projections. **(10 Marks)**
 b. What do you mean by perspective projection? Derive perspective projective transformation matrix. **(10 Marks)**

8 a. What is computer animation? Explain the basic approach to design animation sequences. **(08 Marks)**

 b. Write short notes:
  i) Traditional Animation Techniques
  ii) Double Buffering
  iii) Bezier Spline Curve. **(12 Marks)**

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