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18CS62

Sixth Semester B.E. Degree Examination, June/July 2023
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. What is computer graphics? Mention the list of applications. How they are classified? **(06 Marks)**

   b. Explain with neat diagram operation of cathode-Ray tubes and shadow-mask CRT. **(08 Marks)**

   c. Explain the logical organization of the video-controller. **(06 Marks)**

OR

2 a. Write Bresenham's line drawing algorithm. Using Bresenhams algorithm calculate the pixel positions for the screen coordinates (1, 1) and (6, 7). **(10 Marks)**

   b. Write midpoint circle algorithm. Draw the circle with 8 as radius. **(10 Marks)**

Module-2

3 a. Explain scanline polygon filling algorithm with neat sketches and example. **(06 Marks)**

   b. With a neat figure explain various polygon types in OpenGL. **(06 Marks)**

   c. What is concatenation of transformation? Explain the following considered 2D:
      i)   Rotation about a fixed point
      ii) Scaling about a fixed point. **(08 Marks)**

OR

4 a. Define the following two dimensional transformations translation, rotation, scaling reflection and shearing. Give example for each. **(10 Marks)**

   b. With a neat figure explain two dimensional viewing pipeline? Explain OpenGL 2D viewing functions. **(10 Marks)**

Module-3

5 a. Explain window to view port coordinate transformation. **(04 Marks)**

   b. Explain the Cohen Sutherland line clipping algorithm considering are all cases. **(08 Marks)**

   c. With an example explain Sutherland Hodgeman polygon clipping algorithm. **(08 Marks)**

OR

6 a. Discuss the OpenGL functions for the following 3D dimensional transformations:
      i) Translation   ii) Scaling   iii) Rotation. **(06 Marks)**

   b. Explain the following color models:
      i) RGB color model   ii) CMY color model. **(08 Marks)**

   c. Explain the basic illumination models. **(06 Marks)**

Module-4

7 a. What is three dimensional viewing? Explain three dimensional viewing pipeline with neat diagram. **(08 Marks)**

  b. Explain OpenGL three dimensional viewing functions, with example for each:
  i) gluLookAt   ii) glOrtho   iii) glPerspective   iv) glFrustum.   **(12 Marks)**

OR

8 a. Explain classification of visible surface detection and back face detection algorithm.   **(08 Marks)**

  b. Explain Z-buffer or depth buffer algorithm for visible surface detection.   **(06 Marks)**

  c. Discuss OpenGL visibility-detection functions with an example.   **(06 Marks)**

Module-5

9 a. List and explain the various classes of logical input devices that are supported by OpenGL. With suitable diagrams, explain various input modes.   **(10 Marks)**

  b. Explain how keyboard, window and mouse events are recognized by GLUT. Give suitable example.   **(10 Marks)**

OR

10 a. How pop-up menus are created using GLUT? Illustrate with an example.   **(06 Marks)**

  b. What are the features of a good interactive program? What are the advantages of double buffering? Explain.   **(08 Marks)**

  c. Explain Bezier cubic curves. Give the properties of Bezier curves.   **(06 Marks)**

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