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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33224 Roll No. 1 2 1 0 [redacted]

B. Tech Examination 2022-24

(Odd Semester)

COMPUTER GRAPHICS

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : $1 \times 8 = 8$

   (a) Explain the difference between random scan displays and raster scan displays.

   (b) Name the basic type of graphic displays.

   (c) What is the purpose of a frame buffer in graphic displays?

   (d) Define translation in the context of basic transformations.

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(e) What is clipping window in Cohen-Sutherland line clipping algorithm.

(f) Explain the purpose of homogenerous coordinater in computer graphics.

(g) What is quadric surface? Provide an example.

(h) Define the back-face detection algorithm.

SECTION – B

2. Attempt any two parts of the following . $6 \times 2 = 12$

(a) Explain how the midpoint circle algorithm works,and demonstrate its implementation for drawing a circle of a given radins.

(b) Illustrate the process of applying a composite transformation to an object in a 2D scene, inccluding translation, rotation and scaling.

(c) Compare and contrast quadric surfaces, B-spline and Bezier curves and surfaces Also discuss the advantages and limitations of these representations.

(d) Compare and contrast the phong illumination model, and the warm illumination model, highlighting their strengths and limitations in rendering lighting effects.

SECTION – C

Note:- Attempt any two parts from each question . All part carry equal marks. $8 \times 5 = 40$

3. (a) Design a modified version of midpoint circle drawing algorithm that can handle drawing ellipses with varying major and minor axes and explain the modifiations.

(b) Discuss the advantages and diadvantages of random scan displays and raster scan displays considering factors such as image quality, refresh rate and memory requirements.

(c) Write the pseudocode for DDA line drawing algorithm and the midpoint circle drawing algorithm, allowing users to input coordinates.

4. (a) Explain how translation, rotation and scaling transformations can be represented using matrices.

(b) Compare and contrast the Cohen-Sutherland, and Liang-Barsky algorithm.

(c) Explain how composite transformations are constructed and their significance in creating complex 3D scenes.

5. (a) Evaluate the impact of hidden lines and surfaces algorithms on the quality of 3D graphics.

(b) Discuss how the choice of colors and their combinations impacts the overall aesthetics of a 3D environment.

(c) Evaluate the techniques for achieving transparency and its significance in scenarios like glass materials or water bodies.

6. (a) Analyze the principles and advantages of parallel line algorithm. Evaluate the scenarios where parallal line algorithms are particularly beneficial.

(b) Provide real world examples of applications where random scan displays and raster scan displays are commonly used.

(c) Provide real-world examples where the choice between 'Depth Buffer' and 'A-buffer' methods is crucial for rendering complex 3-D scenes and explain the consequences of seleting one over the other.

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