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Question Paper Code: R4F05

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Fourth Semester

Computer Science and Design

R21UCD405 COMPUTER GRAPHICS

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Classify the different types of primitives available in OpenGL. CO1- U
2. Using the DDA algorithm calculates the number of steps for the given CO2- App
coordinates starting point (5, 6) and ending point (13, 10)?
3. Write a C Program to draw basic graphics primitives like line and circle. CO2- App
4. Given a square object with coordinate points A(0, 3), B(3, 3), C(3, 0), D(0, 0). CO2- App
Apply the scaling parameter 2 towards the X axis and 3 towards the Y axis
and obtain the new coordinates of the object corner A.
5. What is a transformation matrix in 3D computer graphics? CO1- U
6. Outline a triangle with different colors on each of the vertices using OpenGL. CO2- App
7. What are the key elements of designing a successful animated sequence? CO1- U
8. Classify the different types of texture maps supported by OpenGL. CO1- U
9. What are the benefits of using Vulkan over other graphics APIs? CO1-U
10. How are primitives specified in Vulkan? CO1- U

PART – B (5 x 16= 80 Marks)

11. (a) Explain in detail about Bresenham's line generating algorithm. CO1- U (16)
Give an example.
Or
(b) Discuss in detail about Bresenham's line Drawing Algorithm. CO1- U (16)

12. (a) (i) Explain the inverse transformation of a translation and rotation achieved in 2D? CO1- U (8)
- (ii) Explain the concept of the world-coordinate system and device-coordinate system in 2D viewing. CO1- U (8)
- Or
- (b) Discuss in detail about the 2D Transformation and its types. CO1- U (16)
13. (a) Given a 3D object with coordinate points A(0, 3, 1), B(3, 3, 2), C(3, 0, 0), D(0, 0, 0). Apply the translation with the distance 1 towards the X axis, 1 towards the Y axis, and 2 towards the Z axis and obtain the new coordinates of the object in a pictorial representation and display the Matrix form. CO2- App (16)
- Or
- (b) Given a 3D triangle with points (0, 0, 0), (1, 1, 2) and (1, 1, 3). Apply shear parameter 2 on X axis, 2 on Y axis and 3 on Z axis and find out the new coordinates of the object CO2- App (16)
14. (a) Explain the Ray Casting algorithm for visible surface detection. CO1- U (16)
- Or
- (b) Explain the importance of storyboarding in the design of animation sequences? CO1- U (16)
15. (a) Explain the role of shaders in Vulkan, and how do they differ from shaders in other graphics APIs? CO1- U (16)
- Or
- (b) How does the depth buffer affect the overall performance of rendering in real-time applications, such as video games? CO1- U (16)