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13MCA34

Third Semester MCA Degree Examination, Dec.2018/Jan.2019
Computer Graphics

Time: 3 hrs. Max. Marks:100

Note: *Answer any FIVE full questions.*

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.

1 a. Explain with necessary GLUT functions how display window management is done. **(10 Marks)**

b. Explain the following OpenGL functions:
i) glClear (GL_COLOR_BUFFER_BIT)
ii) glColor3f (1.0, 0.0, 0.0)
iii) gluOrtho2D (xw_{min}, xw_{max}, yw_{min}, yw_{max})
iv) glFlush( )
v) glClearColor (red, green, blue, alpha). **(10 Marks)**

2 a. Write Bresenham's line drawing algorithm and plot a line using Bresenham's algorithm between the endpoints (20, 10) and (25, 14). **(10 Marks)**

b. Write a program to implement midpoint circle generation algorithm. **(10 Marks)**

3 a. Explain OpenGL polygon fill-area functions with eaxample. **(10 Marks)**

b. Explain 3D translation, scaling, rotation and reflection transformations. **(10 Marks)**

4 a. Explain the following:
i) General 2D pivot point rotation.
ii) General 2D fixed point scaling. **(10 Marks)**

b. What is composite transformation? Show that the composition of two rotations is additive and two scaling is multiplizative by concatenating the matrix representations for $R(\theta_1)$, $R(\theta_2)$ and (sx_1, sy_1), (sx_2, sy_2). **(10 Marks)**

5 a. Explain offline transformations. **(04 Marks)**

b. Explain transformation between coordinate system in 3D. **(06 Marks)**

c. Write a program to create and fill the object by using boundary fill algorithm. **(10 Marks)**

6 a. Explain normalization and viewport transformation in 2D viewing. **(10 Marks)**

b. Explain Nicholl-Lee-Nicholl line clipping algorithm with equations. **(10 Marks)**

7 a. Describe Sutherland Hodgeman polygon clipping algorithm with an example. **(10 Marks)**

b. Explain the following:
i) Orthogonal projections
ii) Perspective projections. **(10 Marks)**

8 Write short notes on:
a. Design of animation sequence
b. Traditional animation technique
c. Bezier spline curve
d. 3D viewing coordinate parameter. **(20 Marks)**

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