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21CS63

Sixth Semester B.E. Degree Examination, June/July 2024 Computer Graphics and Fundamentals of Image Processing

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 illustrate the application of computer graphics. (10 Marks)
- b. Illustrate display window management system using GLUT. (10 Marks)

OR

- 2 a. Using Bresenham's line drawing algorithm digitize the line with end points (20, 10) to (30, 18). (10 Marks)
- b. With a simple OpenGL program demonstrate the different OpenGL functions. (10 Marks)

Module-2

- 3 a. Illustrate the need of homogeneous co-ordinate system and demonstrate translation, rotation, scaling in 2D homogeneous co-ordinate system with matrix representation. (10 Marks)
- b. Obtain a matrix representation for rotation and scaling of a object about a specified pivot point in 2D. (10 Marks)

OR

- 4 a. Illustrate the raster method for geometric transformation. (10 Marks)
- b. List and explain all 3-D geometric transformation. (10 Marks)

Module-3

- 5 a. Illustrate the logical classification of input devices. (08 Marks)
- b. Elaborate the following with the suitable OpenGL function using code snippet:
 - i) GLUT mouse function
 - ii) GLUT keyboard function. (12 Marks)

OR

- 6 a. Demonstrate the steps in design of animation. (08 Marks)
- b. Illustrate the use of morphing with edge equalization and vertex equalization. (12 Marks)

Module-4

- 7 a. What is image processing? List some of the fields of I_p . (04 Marks)
- b. List the types of images based on nature, attribute and colour. (06 Marks)
- c. Let $V = \{0, 1\}$, compute the D_e , D_4 , D_8 and D_m distance between 2 pixel p and q. Let the pixel coordinates of p and q be (3, 0) and (2, 3). (10 Marks)

$$\begin{matrix}
 0 & 1 & 1 & 1 \\
 1 & 0 & 0 & 1 \\
 1 & 1 & 1 & 1(q) \\
 1 & 1 & 1 & 1 \\
 (p) & & &
 \end{matrix}$$

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.

OR

- 8 a. Describe image interpolation technique. (10 Marks)
b. List and explain arithmetic operations by considering an example. (10 Marks)

Module-5

- 9 a. What is image segmentation? Describe the types of segmentation algorithm. (10 Marks)
b. With the help of flow chart. Explain the stages of edge detection. (10 Marks)

OR

- 10 a. Write a brief note on:
i) Canny edge detection (10 Marks)
ii) Graph theoretic algorithm (10 Marks)
b. Explain the basic type of grey level discontinuities in a digital image. (10 Marks)

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