CBCS SCHEME

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21AI644

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. Discuss the various video display devices used in computer graphics and their key characteristics. **(10 Marks)**

b. Explain the steps involved in a basic line drawing algorithm in OpenGL using a Digital Differential Analyzer (DDA) method. Compute the same for the specified coordinates (2, 3) and (10, 8). **(10 Marks)**

OR

2 a. Illustrate the attributes of points and lines in an OpenGL program. Write an example code that changes the color, size of points and lines. **(10 Marks)**

b. Explain Bresenham's line drawing algorithm with an example. **(10 Marks)**

Module-2

3 a. Discuss the need of homogeneous coordinate system. Illustrate 2D geometric transformations with matrix representation. **(10 Marks)**

b. Describe 2D composite transformations. Why are they useful in computer graphics? **(04 Marks)**

c. Explain the functions of OpneGL commands used for 2D geometric transformations. **(06 Marks)**

OR

4 a. Explain any 6 OpenGL 3D geometric transformation functions. **(06 Marks)**

b. Illustrate Raster methods for geometric transformation with a neat diagram. **(06 Marks)**

c. Explain various OpenGL functions used for performing raster operations. **(08 Marks)**

Module-3

5 a. Discuss the various interactive picture construction techniques in computer graphics. **(10 Marks)**

b. Differentiate between logical and physical input devices with examples. **(06 Marks)**

c. Implement a basic input function in OpenGL that capture mouse clicks and outputs the coordinates. **(04 Marks)**

OR

6 a. Explain the development stages involved in designing animation sequences. **(04 Marks)**

b. Discuss the various traditional animation techniques. **(04 Marks)**

c. Explain any six principles of designing an effective Graphical User Interface (GUI). **(12 Marks)**

Module-4

7 a. Explain digital image representation and its significance in image processing. (08 Marks)
b. Describe the following: (i) Neighbourhood (ii) Adjacency (08 Marks)
c. Calculate the Euclidean distance between two given pixels in a digital image at (3, 4) and (7, 1). (04 Marks)

OR

8 a. Discuss the different types of images. (05 Marks)
b. Explain the various applications of digital image processing. (05 Marks)
c. Classify image processing operations based on their functions. (10 Marks)

Module-5

9 a. Discuss the main steps involved in Canny edge detection algorithm. (10 Marks)
b. Differentiate between region-based and edge-based image segmentation techniques. (10 Marks)

OR

10 a. Explain the different classification methods used in image segmentation. (10 Marks)
b. Explain how discontinuities in intensity values are detected in an image. (10 Marks)

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