

Indian Institute of Information Technology Ranchi

Department of Computer Science & Engineering

B. Tech End Semester Examination – Autumn Semester 2022-23

Semester: 5th Sem

Course Instructor: Dr. Shalini Mahato

Course Code: CS-3005

Course Name: Computer Graphics & Multimedia

QUESTION PAPER

Max Marks: 100

Duration: 3 hrs.

Instructions:

- (1). Number in [] indicates marks.
- (2). Any missing data can be assumed suitably.
- (3). Symbols have their usual meaning.

Section A: Answer all the questions.

- 1 (a) Explain different types of 2 dimensional transformation using matrix [10]
 (b) Explain Beam penetration technique for display. [6+4]
 What do you understand by interlacing? What is the need for interlacing?
- 2 (a) Explain Bresenham's line algorithm. What were the problem in DDA line algorithm which were resolved in Bresenham's Line Drawing algorithm [8+2]
 (b) Explain the term resolution and aspect ratio. Find out the aspect ratio of the raster system using 8x10 inches screen and 100pixel/inch [2+3]
 (c) A 70 MB file is reduced to 5MB file. Compute the compression ratio, compression factor and space saving. [3+2]
 What do you understand by GOP in MPEG1 video compression
- 3 (a) Explain X-shear and Y-shear. [2]
 Consider the square A(1,0) B(0,0) C(0,1) D(1,1). Rotate the square ABCD by 45 degree clockwise about A (1,0) [8]
 (b) Explain Boundary Fill and Flood Fill Algorithm. Differentiate between Boundary Fill and Flood Fill Algorithm [8+2]

Section B: Answer any two questions

- 4 (a) How much time is spent scanning across each row of pixels during screen refresh on a raster system with resolution 1280x1024 and a refresh rate of 60 frames per second [5]
 (b) Consider a line from (0, 0) to (4, 6). Use the simple DDA algorithm to rasterize line. [5]
 (c) Explain homogenous coordinates. What is the need of homogenous coordinates? [7+3]
- 5 (a) Plot a circle by Bresenham's algorithm whose radius is 4 and center is (30, 30). [5+5]
 Explicitly tabulate all the points of the circle plotted.
 Write mid-point circle algorithm.

[8+2]

- (b) i) Explain I, B, P and D frames in MPEG1 video compression.
ii) If the display order of the frames is as follows:

IBBBBBPBBPIBBI

What will be the transmission order?

[3+2]

- 6 (a) Compare lossless and lossy compression.

Compare inter-frame and intra-frame redundancies.

- (b) Translate the square ABCD whose co-ordinate are A(0,0), B(3,0), C(3,3) and D(0,3) by 2 units in both directions and then scale by 1.5 units in x-direction and 0.5 units in y-direction [7]

- (c) Explain Inside Test using even-odd method. [6+2]

Based on the Even-odd test, state whether the point lies inside/outside

i) Number of intersection = 4

ii) Number of intersection = 7

End