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UNIVERSITY EXAMINATIONS 2023/2024

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE AND BACHELOR OF SCIENCE IN MATHEMATICS

CIT 3401: COMPUTER GRAPHICS

DATE: APRIL 2024 **TIME: 2 HOURS**

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

a) Illustrate your understanding of the following terms as used in Computer Graphics and give a brief description of each (6 Marks)
   i. Vertical Retrace.
   ii. Horizontal Retrace.

b) Draw a line using the digital Differential analyzer line drawing algorithm starting at point
   a. (4,4) and ends at point (12, 10) (6 Marks)

c) Using a monochrome screen, Discuss how memory mapping works for a monochrome screen (5 Marks)

d) Discuss computer monitor display resolution, showing how a user can be able to increase or decrease the resolution (4 Marks)

e) Discuss the following output primitives attributes (4 Marks)
   i. Point

ii. Line

f) Reflect against the x axis, a polygon with the following end points (9,9) (10,9), (10, 10) and (9,10) (5 Marks)

QUESTION TWO (20 MARKS)

a) Rotate by 45 degrees anti-clockwise, a polygon with the following end points (10, 10) (13,10), (13,13) and (10,13) (5 Marks)

b) Discuss the advantages of Liquid Crystal Display (7 Marks)

c) Discuss the Cohen-Sutherland line clipping algorithm (8 Marks)

QUESTION THREE (20 MARKS)

a) Consider three different raster systems with resolutions of 540 x 380, 1080 x 924 and 1560 x 1048. What size is frame buffer (in bytes) for each of these systems to store 12 bits per pixel? (6 Marks)

b) Transmission is when the light photon can pass through the surface. Discuss two types of light transmission (6 Marks)

c) Using examples, differentiate between analytical and incremental line drawing algorithms (8 Marks)

QUESTION FOUR (20 MARKS)

a) Draw a circle centered at point (5,5) and has a radius of 6 units using the polar coordinates method (7 Marks)

b) Discuss the following transformations (6 Marks)

i. Translation

ii. Rotation

c) Discuss the texture mapping process (7 Marks)

QUESTION FIVE (20 MARKS)

a) Discuss the history of computer graphics (8 Marks)

b) Discuss the camera analogy as applied in computer graphics (6 Marks)

c) Draw a line using the Bresenham's line drawing algorithm starting at point (1 and ends at point (1 1, 10) (6 Marks)