

International Islamic University Chittagong
Department of Computer Science and Engineering
Mid Term Examination Spring 2023

Course Code: CSE-4741 Course Title: Computer Graphics

Total Marks: 30

Time: 1:30 hours

Answer all questions. Figures in the right margin indicate full marks.

- | | Mark | CO | DL |
|--|------|-----|----|
| a) “Computer graphics is consist of imaging, modeling, rendering and animation” – Explain statement with proper examples. | 3 | CO2 | C2 |
| b) If we use 2-bytes pixel values in a 32-bit lookup table representation, how many bytes does the lookup table occupy? How many entries does the lookup table have? How many bytes does the image occupy? | 2 | CO4 | C3 |
| c) Describe RGB and CMY color model. Why an additional black pigment is used in printer? | 3 | CO1 | C1 |
| d) Write the pros and cons of raster display and vector display. | 2 | CO1 | C1 |

- a) Solve the following equations for Bresenham’s circle algorithm. 4 CO3 C3

$$d_{i+1} = \begin{cases} d_i + 4x_i + 6 & \text{if } d_i < 0 \\ d_i + 4(x_i - y_i) + 10 & \text{if } d_i \geq 0 \end{cases}$$

OR

Solve the following equations for Midpoint circle algorithm.

$$p_{i+1} = \begin{cases} p_i + 2x_{i+1} + 1 & \text{if } p_i < 0 \\ p_i + 2(x_{i+1} - y_{i+1}) + 1 & \text{if } p_i \geq 0 \end{cases}$$

- b) “Displaying smoothly drawn curves on a pixilated display can produce horribly jagged edges”. What are the aliasing effects? How can we solve these problems? 3 CO2 C2
- c) Distinguish Flood fill and Boundary fill algorithm. 3 CO1 C1

OR

Describe different Character representation techniques.

- a) i) Find the matrix that represents the rotation of an object by 30° about the origin. 4 CO4 C4
 ii) What are the new coordinates of the point A(4, -6) after the rotation about B(2, 5)?
- b) “Instance transformation is the combination of many transformations” - Explain with necessary figures/examples. 2 CO2 C2
- c) Find the new coordinates of the triangle P(-1,2), Q(2,4), R(0,0) about Q(2,4) 4 CO4 C4
 (i) it has been expanded twice its size and
 (ii) reduced to half its size.

OR

Find the transformation matrix M_L of mirror reflection of a point about a line L ($y = b$).