(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1037 Roll No. | | | | | | | | | | |

B.Tech.

SIXTH SEMESTER EXAMINATION, 2004-2005

COMPUTER GRAPHICS

Time : 2 Hours *Total Marks : 50*

Note : *Attempt ALL questions.*

1. Attempt ***any four*** parts of the following : **(3x4=12)**

(a) Discuss various types of Computer Graphics. You are also required to differentiate between Raster and Vector Graphics.

(b) Write the steps to plot a line when two end points of the line are given, i.e., (x_0, y_0) and (x_1, y_1).

(c) Write the steps to trace a circle using midpoint circle generating algorithm.

(d) Suppose you have a system with an 8 inch by 10 inch video monitor that can display 100 pixels per inch. If memory is organized in one-byte words, the starting frame buffer address is 0, and each pixel is assigned 6 bits of storage, what is the frame buffer address (or addresses) of the pixel with screen coordinates (x, y) ?

(e) Explain boundary fill algorithm of polygon filling.

(f) Explain Bresenham's line drawing algorithm.

2. Attempt *any four* parts of the following : **(3x4=12)**

(a) Show that the composition of two rotations is additive by concatenating the matrix representations for $R(\theta_1)$ and $R(\theta_2)$ to obtain -

$R(\theta_1).R(\theta_2) = R(\theta_1 + \theta_2)$

(b) Show that transformation matrix for a reflection about line $y = x$, is equivalent to a reflection relative to the x axis followed by a counterclockwise rotation of 90°.

(c) Explain transformation sequence to produce scaling with respect to a selected fixed point (x_f, y_f) using a scaling function that can only scale relative to the coordinate origin.

(d) What are different picture construction techniques ? Explain any one in detail.

(e) What is a segment ? Explain with suitable example.

(f) Explain the steps of closing and deleting algorithm of a segment.

3. Attempt *any two* parts of the following : **(7x2=14)**

(a) Find the instance transformation which places a half-size copy of the square A (0, 0), B (1, 0), C (1, 1) and D (0, 1) defined in master coordinate system into a world coordinate system in such a way that the centre of the square is at $(-1, -1)$ in the world coordinate system.

(b) Set up all geometric data tables and auxiliary table for representing a unit cube.

(c) Explain the concept of rotation in 3-D objects.

4. Attempt *any two* parts of the following : **(6x2=12)**

(a) Explain Cohen-Sutherland line clipping technique. Write this technique in algorithmic form also.

(b) Explain oblique projection transformation and obtain its transformation matrix.

(c) Explain Bezier method of curve drawing.

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