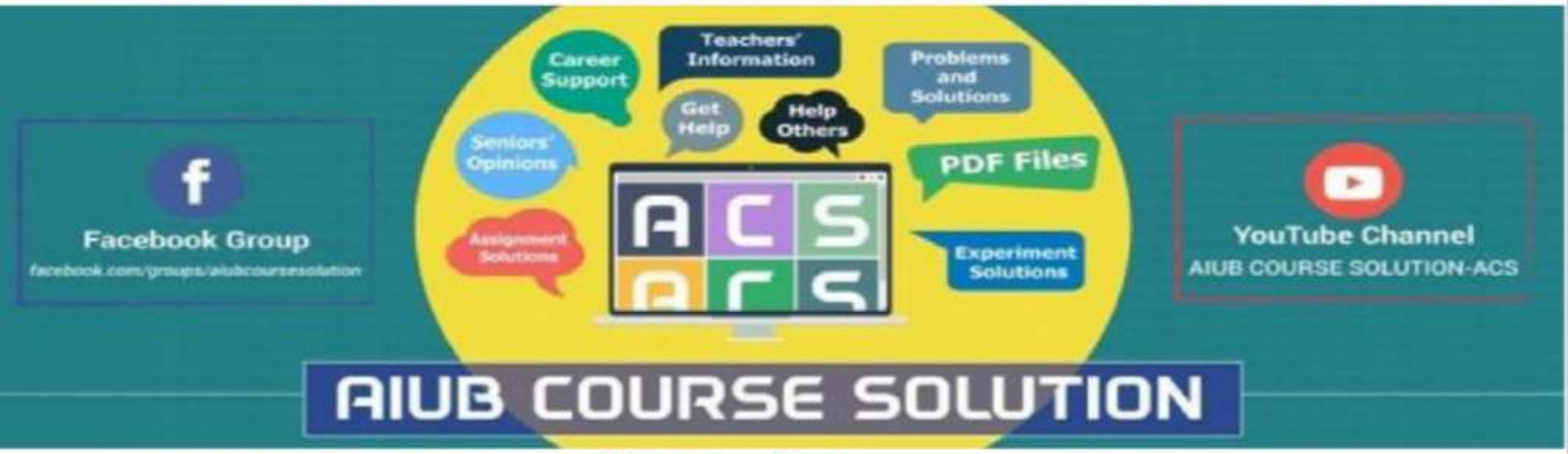

COURSE NAME: Computer Graphics

SEMESTER: 7th

SOLVED BY

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Computer Graphics

1) Pixel: A pixel is one of the many tiny dots that make up the representation of a picture in a computer's memory.

2) Rastere & vector image.

Rastere	Vector
pixel map	Geometrically difined shapes.
photography quality	Complex drawings.
Paint software	Drawing software
Largere storage ~~requirment~~ requirements	Highere Computational requirements.
Enlarging image produce gagged edges	Objects scale smoothly.
Resolution of output limited by resolution of image.	Resoution of output limited by output device.

Raster Image: These are bitmaps.

A bitmap is a grid of individual pixels that collectively compose an image.

use of Raster Image: These are best used for non line art images; specifically digitized photographs, scanned artwork or detailed graphics.

Drawback: Resolution in raster graphics is measured in dpi, dots per inch. The higher the dpi, the better the resolution.

Example: TIFF, JPEG, GIF, PCX & BMP files.

Vector Image: Vector graphics are based on mathematical foremulas that define geometric primitives such as polygones, circles, rectangles, curves & lines.

Uses: Most created images meet these specifications, including logos, letterchand and fonts.

Example: AI, EPS, CGM, WMF & PICT (Mac)

Color Model: A color model is a system for creating a full range of colors from a small set of primary colors.

- Additive '+'
- Subtractive '-'

Additive
- use light to display colors
- colors perceived in additive models ~~use prin~~ are the result of transmitted light. (RGB)

Subtractive
- use printing inks
- perceived in subtract models are the result of reflective light. (CMYK)

RGB to CMY

- C = 1 − (color.R / 255.0)
- M = 1 − (color.B / 255.0)
- Y = 1 − (color.B / 255.0)

CMY to RGB

- R = (1 − C) * 255.0
- G = (1 − M) * 255.0
- B = (1 − Y) * 255.0

Direct Coding: is an algorithm that provides some amount of storage space for each pixel so that the pixel is coded with a color.

Look-up Table: used to store the ~~store~~ the starting addresses of each line and the values corresponding to the placement of pixels within a byte.

- pixel values do not code color directly
- Refer to table color values
- A table with 256 color with RGB values.

Halftone: Halftone is the technique that simulates continuous tone imagery through the use of dots.

Dots can be varied either in size, shape & spacing.

Halftone work process: Halftone process, in printing a technique of breaking up an image into series of dots so as to reproduce the full tone range of a photograph or tone art work.

Chapter 2

Bresenham's Mid Point Circle Algorithm

The mid point circle is an algorithm used to determine the points needed for rasterising the circle. Bresenham's circle algorithm is derived from the mid point circle algorithm.

$$x^2+y^2-R^2=0$$

Chapter 3

Reflection on X Axis

$$x_{new} = x_{old}, \quad y_{new} = -y_{old}$$

$$\begin{bmatrix} x_{new} \\ y_{new} \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix} \times \begin{bmatrix} x_{old} \\ y_{old} \end{bmatrix}$$

Reflection on Y Axis

$$x_{new} = -x_{old}, \quad y_{new} = y_{old}$$

$$\begin{bmatrix} x_{new} \\ y_{new} \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} \times \begin{bmatrix} x_{old} \\ y_{old} \end{bmatrix}$$

Shearing on X Axis

$$x_{new} = x_{old} + Shx \times y_{old} \qquad y_{new} = y_{old}$$

$$\begin{bmatrix} x_{new} \\ y_{new} \end{bmatrix} = \begin{bmatrix} 1 & Shx \\ 0 & 1 \end{bmatrix} \times \begin{bmatrix} x_{old} \\ y_{old} \end{bmatrix}$$

⊛ Shearing on y Axis

$$x_{new} = x_{old}$$

$$y_{new} = y_{old} + sh_y \times x_{old}$$

$$\begin{bmatrix} x_{new} \\ y_{new} \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ sh_y & 1 \end{bmatrix} \times \begin{bmatrix} x_{old} \\ y_{old} \end{bmatrix}$$

Lookup Table

0	r	g	b
1	1111111	1111111	1111111
2			
255			

* Direct Coding

Magenta:
Red Bit 1 → 1
Green Bit 2 → 0
Blue Bit 3 → 1

Black
Red bit 1 → 0
Green bit 2 → 0
Blue bit 3 → 0

Green: Red bit 1 → 0
Green bit 2 → 1
Blue bit 3 → 0

Cyan
1 → 0
2 → 1
3 → 1

Red: Red bit 1 → 1
Green bit 2 → 0
Blue bit 3 → 0

Yellow: Red bit → 1
Green bit → 1
Blue bit → 0

White
Red bit → 1
Green bit → 1
Blue bit → 1

Blue:
1 → 0
2 → 0
3 → 1