University of Asia Pacific

Admit Card

Mid-Term Examination of Fall, 2020

Financial Clearance	PAID

Registration No : 17101086

Student Name : Md. Remon Hasan Apu

Program : Bachelor of Science in Computer Science and Engineering

SI.NO.	COURSE CODE	COURSE TITLE	CR.HR.	EXAM. SCHEDULE
1	CSE 425	Computer Graphics	3.00	
2	CSE 426	Computer Graphics Lab	1.50	
3	CSE 429	Compiler Design	3.00	
4	CSE 430	Compiler Design Lab	1.50	
5	BUS 401	Business and Entrepreneurship	3.00	
6	BUS 402	Business and Entrepreneurship Lab	0.75	
7	CSE 457	Design and Testing of VLSI	3.00	
8	CSE 458	Design and Testing of VLSI Lab	0.75	
9	CSE 400	Project / Thesis	3.00	

Total Credit: 19.50

1. Examinees are not allowed to enter the examination hall after 30 minutes of commencement of examination for mid semester examinations and 60 minutes for semester final examinations.

2. No examinees shall be allowed to submit their answer scripts before 50% of the allocated time of examination has elapsed.

3. No examinees would be allowed to go to washroom within the first 60 minutes of final examinations.

4. No student will be allowed to carry any books, bags, extra paper or cellular phone or objectionable items/incriminating paper in the examination hall.
Violators will be subjects to disciplinary action.

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University of Asia Pacific

Department of Computer Science and Engineering

MID SEMESTER EXAM-FALL 2020

Course Name : Computer Graphics

Course Code : CSE-425

Semester: 4th Year 2nd Semester

SUBMITTED By

Md. Remon Hasan Apu

ID: 17101086, Section: B

Ans: to the Q: NO - 09

a)

$a = 360° - 86° = 279°$

$b = 86/(86+10) = 86/96 = 0.89$

$c = 86/(86+5) = 86/91 = 0.94$

So, HSI $(279°, 0.89, 0.94)$

$\therefore$ BR Sector, $240° \leq H < 360°$

$H = 279°,\ S = 0.89,\ I = 0.94$

$H_1 = 279° - 240° = 39°$

$G = I(1-S) = 0.94(1-0.89) = 0.1034$

$$\therefore B = I\left[1 + \frac{S\cos H_1}{\cos(60° - H_1)}\right]$$

$$= 0.94 \times \left[1 + \frac{(0.89)\cos(39°)}{\cos(60° - 39°)}\right]$$

$$= 0.94 \times \left[1 + \frac{0.73}{0.89}\right]$$

$$= 0.94 \times (1 + 0.82)$$

$$= 0.94 \times 1.82$$

$$= 1.71$$

15

$\therefore R = 3I - (G+B)$

$= 3 \times 0.94 - (0.1034 + 1.71)$

$= 2.82 - 1.813 = 1.007$

$\therefore$ RGB $(1.007, 0.1034, 1.71)$ Ans:

b)

Color model is useful computer vision because for image processing application the color model is used. It denotes color similarly how the human eye sense colors.

There are some components that is including for computer vision in image processing.

1. Hue
2. Saturation
3. Intensity

4

sometime In convolution Neural Network funclities is used as a RGB or Grey prespective for the implementation of computer vision field research.

Irrelevant!

Ans: to the Q: No - 01

a)

i)

~~$G_t = (1-t)^2 P_1 + 2t(1-t) P_2 + t^2 P_3$~~

Affine Combination:

gt is the summation of the parameters with multiplication of combined points where the summation of parameters 1, by this we get a new point.

Example: $P_1(1-t) + P_2$ Parameters are, $1-t$, t

summation is $= 1 - t + t$
$= 1$

i) $Q = (1-t)^2 P_1 + 2t(1-t) P_2 + t^2 P_3$

Parameters are,

$$(1-t)^2 + 2t(1-t) + t^2$$

$$= 1 - 2t + t^2 + 2t - 2t^2 + t^2$$

$$= 1$$

gt is affine combination. because the parameters summation is 1

ii) $Q_2 = P_1 + t^3 P_2$

Parameters are,

$$1 + t^3$$

It is not an affine combination. If the value of t is 0, so it will be affine combination otherwise not.

<u>Matrix Format:</u>

$Q_1 = (1-t^2)P_1 + 2t(1-t)P_2 + t^2 P_3$

$Q_2 = P_1 + t^3 P_2$

9

Now, (i) For Q_1

$$\begin{bmatrix} 1-t^2 & 2t-2t^2 & t^2 \end{bmatrix} \begin{bmatrix} P_1 \\ P_2 \\ P_3 \end{bmatrix} \Rightarrow$$

For, ~~(ii)~~ Q_2 Matrix,

$$\begin{bmatrix} 1 & t^3 \end{bmatrix} \begin{bmatrix} P_1 \\ P_2 \end{bmatrix}$$

b)

Here,

$v = 86/200 = 0.43$

$t_1 = 0.43$

$t_2 = 0.43 + 0.1 = 0.53$

$t_3 = \cancel{t_2}\ 0.53 + 0.2 = 0.73$

For, $t_1 = 0.43$, $t_2 = 0.53$, $t_3 = 0.73$

Given,

$P_0 = (1, 2)$, $P_1 = (3, 8)$, $P_2 = (12, 13)$

Equation of Bezier Curve,

$\cancel{P(t) = (1-t)^3 P_0 + 3t(1-t^2) P_1 + 3t^2 (1-t) P_2}$

$P(t) = (1-t)^2 P_0 + 2(1-t) t P_1 + t^2 P_2$

For, $t_1 = 0.43$

$Q_x(0.43) = (1-0.43)^2 \times 1 + 2(1-0.43) \times 0.43 \times 3 + (0.43)^2 \times 12$

$= 4.01$

$Q_y(0.43) = (1-0.43)^2 \times 2 + 2 \times (1-0.43) \times 0.43 \times 8 + (0.43)^2 \times 13$

$= 6.97$

[0.47

for, $t_2 = 0.53$,

$$a_{2x}(0.53) = (1-0.53)^2 \times 1 + 2 \times (1-0.53) \times 0.53 \times 3 + (0.53)^2 \times 12$$

$$= 5.08$$

$$a_{2y}(0.53) = (1-0.53)^2 \times 2 + 2 \times (1-0.53) \times 0.53 \times 8 + (0.53)^2 \times 13$$

$$= 8.07$$

for, $t_3 = 0.73$,

[0.27

$$a_{3}(x)(0.73) = (1-0.73)^2 \times 1 + 2 \times (1-0.73) \times 0.73 \times 3 + (0.73)^2 \times 12$$

$$= 7.65$$

$$a_{3y}(0.73) = (1-0.73)^2 \times 2 + 2 \times (1-0.73) \times 0.73 \times 8 + (0.73)^2 \times 13$$

$$= 10.27$$

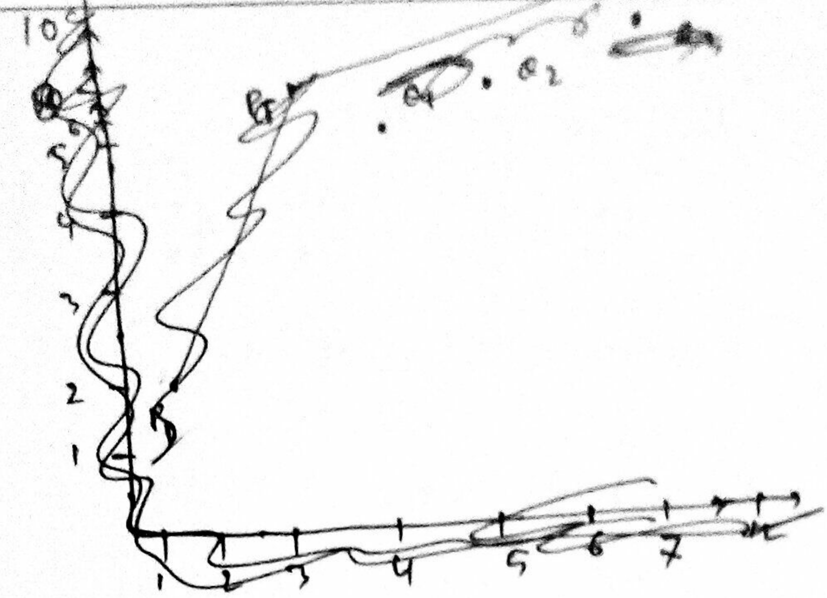
10

So,

$O_1(4.01, 6.77)$

$O_2 = (5.08, 8.67)$ Ans:

$O_3 = (7.65, 10.27)$



<u>Ans: to the Q: NO - 02</u>

c)

$w = (86 \% 10) + 9$
$= 6 + 9 = 15$

$P_1 (75, 90, 150, w)$ $P_3 (110, 110, 200, w)$

$P_2 (100, 110, 150\ w)$ $P_4 (110, 100, 200, w)$

Now, we calculate the coordinate of the polygon in 3D space.

For, P_1 4D to 3D

we know,

$x' = \frac{x}{w}, \ y' = \frac{y}{w}, \ z' = \frac{z}{w}, \ w' = \frac{w}{w}$

$\therefore P_1 = \left(\frac{75}{15}, \frac{90}{15}, \frac{150}{15}, \frac{15}{15} \right)$
$= (5, 6, 10, 1)$

for,

P_2, 4D to 3D

$$\therefore P_2 = \left(\frac{100}{15}, \frac{110}{15}, \frac{150}{15}, \frac{15}{15}\right)$$

$$= (6.67, 7.34, 10, 1)$$

10

for, P_3, 4D to 3D

$$\therefore P_3 = \left(\frac{110}{15}, \frac{110}{15}, \frac{200}{15}, \frac{15}{15}\right)$$

$$= (7.34, 7.34, 13.34, 1)$$

for, P_4, 4D to 3D

$$\therefore P_4 = \left(\frac{110}{15}, \frac{100}{15}, \frac{200}{15}, \frac{15}{15}\right)$$

$$= (7.34, 6.67, 13.34, 1)$$

$\therefore$ Now we found 3D space of polygon

$P_1 = (5, 6, 10, 1)$

$P_2 = (6.67, 7.34, 10, 1)$

$P_3 = (7.34, 7.34, 13.34, 1)$

$P_4 = (7.34, 6.67, 13.34, 1)$ Ans:)

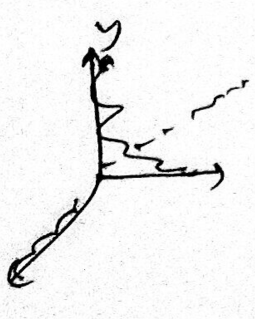
0) The prespective of camera Tramformation is some mathemetical model of an pinhole camera model. It folltws perspective projection vewing and projection combination in camera Transformation.

There are camera panameters:

1. Dinection vector
2. Camena Position
3. up dinection
4. Angel of view
5. near fan distance

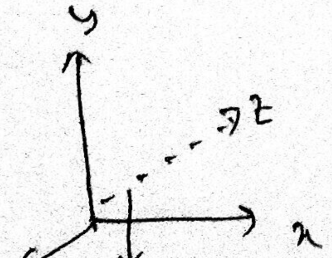
Now, Here,

spatial dimention (x, y, t)
homogenous dimension (w)

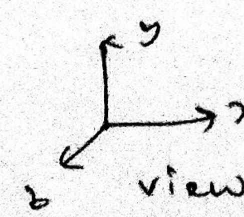


The matrix will be,

$$c = \begin{array}{l} \begin{bmatrix} x_e & y_c & z_e \\ x_c & y_c & z_e \\ x_a & y_a & z_a \end{bmatrix} \end{array} \begin{array}{l} \rightarrow \text{is cameradirectio} \\ \rightarrow \text{view direction} \\ \rightarrow \text{up direction} \end{array}$$



view vendon



view camera

∴ The every direction with some cordinate

$$V = \begin{array}{c|cccc} & x & y & z & w/n \\ \hline x & \cot\frac{\alpha}{2} & 0 & 0 & 0 \\ y & 0 & \cot\frac{\alpha}{2} & 0 & 0 \\ z & 0 & 0 & \frac{f+n}{f-n} & -1 \\ w/n & 0 & 0 & \frac{2fn}{f-n} & 0 \end{array}$$

matrix of viewing camera

7

Let, n = new plane

f = far plane

CXV → camera Transformation:

$[x \quad y \quad z \quad 1] \times CV = [x' \quad y' \quad z' \quad w]$

4D point

$[x' \quad y' \quad z' \quad w] \rightarrow$ 4D point

$\Rightarrow \left[\frac{x'}{w}, \frac{y'}{w}, \frac{z'}{w}, 1\right]$

(x, y) 3d

b)

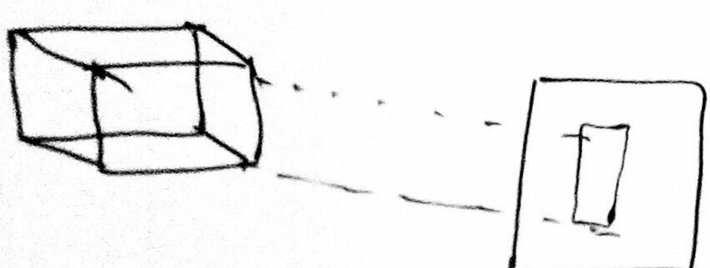
Parrallel projection represents the object in a different way like telescope. Perspective projection represents the object in three dimensional way. In parallel projection, these effects are not created. In

2

prespective projection, objects that are far away appear smaller, and objects that are near apear bigger.

object

What happend to parallel lines?



view plan

—o—