

SOLUTIONS

MARKS(/20)

BRAC UNIVERSITY

A

Department of Computer Science and Engineering

CSE 423: Computer Graphics (Summer 2025)

Quiz 4

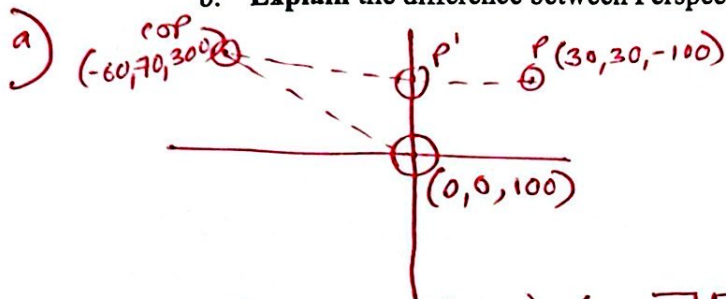
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CO3 Given a point at (30, 30, -100) and Center of Projection, COP at (-60, 70, 300). And the projection plane is at a distance of 200 units away from the Center of Projection.

Q1)

a. Find the projection matrix and calculate the coordinates of the final projected point. 15

b. Explain the difference between Perspective projection and Parallel projection. 5



$$Qdx = -60$$

$$Qdy = 70$$

$$Qdz = 200$$

$$2p = 100$$

$$P' = \begin{bmatrix} 1 & 0 & -\frac{(-60)}{200} & \left(100 \cdot \frac{-60}{200}\right) & 30 \\ 0 & 1 & -\frac{70}{200} & \left(100 \cdot \frac{70}{200}\right) & 30 \\ 0 & 0 & -\frac{100}{200} & 100 \cdot \left(1 + \frac{100}{200}\right) & -100 \\ 0 & 0 & -\frac{1}{200} & \left(1 + \frac{100}{200}\right) & 1 \end{bmatrix} = \begin{bmatrix} -30 \\ 100 \\ 200 \\ 2 \end{bmatrix} = \begin{bmatrix} -15 \\ 50 \\ 100 \\ 1 \end{bmatrix} \quad \text{Ans}$$

b) Explanatory

MARKS(/20)

B

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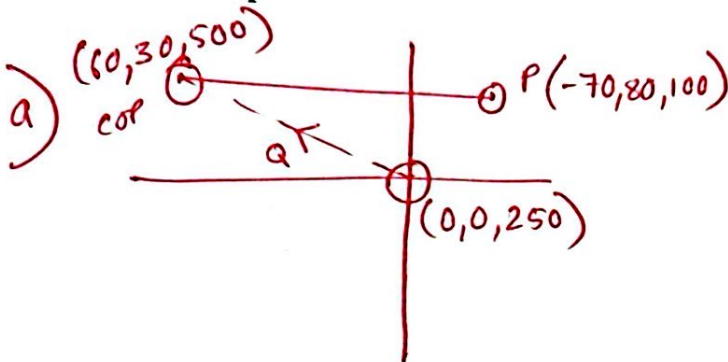
Quiz 4

NAME:	ID:	SEC:
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CO3 Q1) Given a point at $(-70, 80, 100)$ and Center of Projection, COP at $(60, 30, 500)$. And the projection plane is at a distance of 250 units away from the Center of Projection.

a. Find the projection matrix and calculate the coordinates of the final projected point. 15

b. Explain the difference between Orthographic projection and Oblique projection. 5



$$\begin{aligned} Qdx &= 60 \\ Qdy &= 30 \\ Qdz &= 250 \\ zp &= 250 \end{aligned}$$

$$P' = \begin{bmatrix} 1 & 0 & -\frac{60}{250} & 60 \\ 0 & 1 & -\frac{30}{250} & 30 \\ 0 & 0 & -\frac{250}{250} & 500 \\ 0 & 0 & -\frac{1}{250} & 2 \end{bmatrix} \begin{bmatrix} -70 \\ 80 \\ 100 \\ 1 \end{bmatrix} = \begin{bmatrix} -34 \\ 98 \\ 400 \\ 8/5 \end{bmatrix} = \begin{bmatrix} 21.25 \\ 61.25 \\ 250 \\ 1 \end{bmatrix}$$

Ans!

b) Explanatory

MARKS(/20)

C

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Department of Computer Science and Engineering

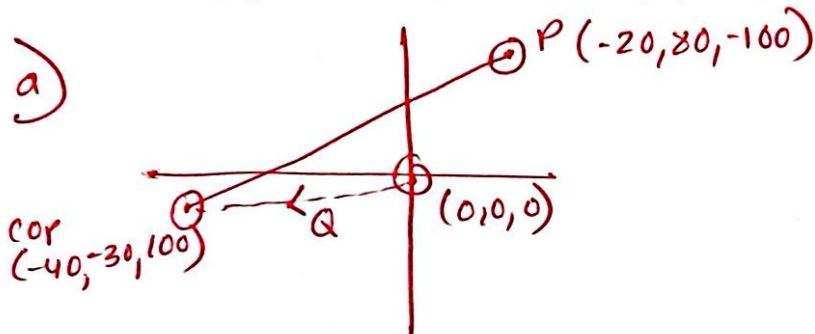
CSE 423: Computer Graphics (Summer 2025)

Quiz 4

NAME:	ID:	SEC:
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CO3 Q1) Given a point at $(-20, 80, -100)$ and Center of Projection, COP at $(-40, -30, 100)$. And the projection plane is at a distance of 100 units away from the Center of Projection.

- Find the projection matrix and calculate the coordinates of the final projected point. 15
- Explain the difference between Perspective projection and Parallel projection. 5



$$\begin{aligned} Qdx &= -40 \\ Qdy &= -30 \\ Qdz &= 100 \\ zp &= 0 \end{aligned}$$

$$P' = \begin{bmatrix} 1 & 0 & \frac{40}{100} & 0 \\ 0 & 1 & \frac{30}{100} & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{100} & 1 \end{bmatrix} \begin{bmatrix} -20 \\ 80 \\ -100 \\ 1 \end{bmatrix} = \begin{bmatrix} -60 \\ 50 \\ 0 \\ 2 \end{bmatrix} = \begin{bmatrix} -30 \\ 25 \\ 0 \\ 1 \end{bmatrix}$$

Ans

b) Explanatory

MARKS(/20)

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D

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CSE 423: Computer Graphics (Summer 2025)

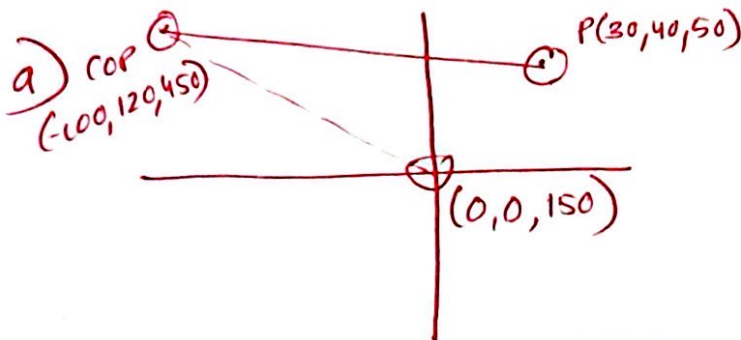
Quiz 4

NAME:	ID:	SEC:
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CO3 Given a point at (30, 40, 50) and Center of Projection, COP at (-100, 120, 450). And the
Q1) projection plane is at a distance of 300 units away from the Center of Projection.

a. Find the projection matrix and calculate the coordinates of the final projected point. 15

b. Explain the difference between Orthographic projection and Oblique projection. 5



$$\begin{aligned} Qdx &= -100 \\ Qdy &= 120 \\ Qdz &= 300 \\ zp &= 150 \end{aligned}$$

$$P' = \begin{bmatrix} 1 & 0 & +\frac{1}{3} & -50 \\ 0 & 1 & -\frac{2}{5} & 60 \\ 0 & 0 & -\frac{1}{2} & 225 \\ 0 & 0 & -\frac{1}{300} & \frac{3}{2} \end{bmatrix} \begin{bmatrix} 30 \\ 40 \\ 50 \\ 1 \end{bmatrix} = \begin{bmatrix} -10/3 \\ 80 \\ 200 \\ 4/3 \end{bmatrix} = \begin{bmatrix} -2.5 \\ 60 \\ 150 \\ 1 \end{bmatrix}$$

Ans?

b) Explanatory