



Department of Computer Science & Engineering
National Institute of Technology

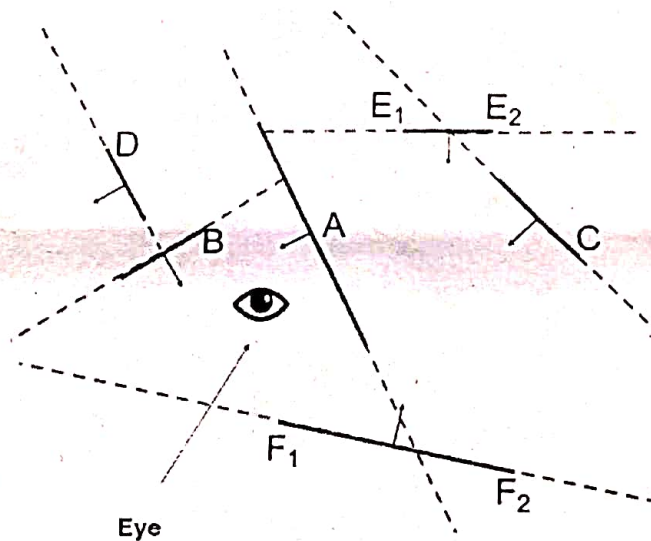
CSPE51 – Augmented & Virtual Reality
Cycle Test -2

Date : 16.10.2024

Time : 10.30 – 11.30 am

Max. mark : 20

1. a) In 3D graphics, the projection matrix $\begin{bmatrix} 1 & 0 & 0 & p \\ 0 & 1 & 0 & q \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ has a vanishing point located on ----- (1)
- b) Do the following operations provide the same result?
“3D rotations about the x-axis followed by an equal angle of rotation about the y-axis is equal to rotation about the y-axis followed by an equal rotation about the x-axis”. Justify your answer. (2)
- c) List the difference between diffusion and specular reflection. (2)
- d) Construct a BSP tree for the following (Note: Start with A) (2)



- e) Consider a unit cube with two vertices at $(0,0,0)$ and $(1,1,1)$. Three of its edges are aligned with the x, y, and z-axis. The cube is rotated about the y-axis by -30 degree, 45 degree on the x-axis, and projected onto the $z = 0$ plane with the center of projection at $z = 2.5$. Find the perspective projection of the cube and the principal vanishing point. (3)
2. a) What is genlock? (1)
- b) What will happen if the line of sight is missed in the interactive device? (2)
- c) Why is user-specific calibration required in the sensing gloves? (2)
- d) Explain the Tactile feedback interface with an example. (2)
- e) How is the tracker information measured on the inertial tracker? List the advantages of the inertial tracker. (3)