FACULTY OF ENGINEERING & TECHNOLOGY

BCS -504 Computer Graphics & Multimedia

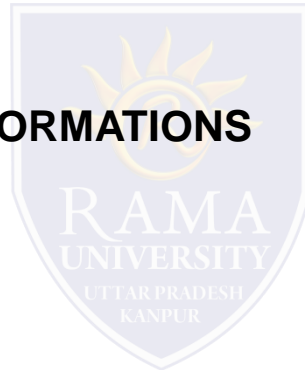Lecture-16

Mr. Dilip Kumar J Saini

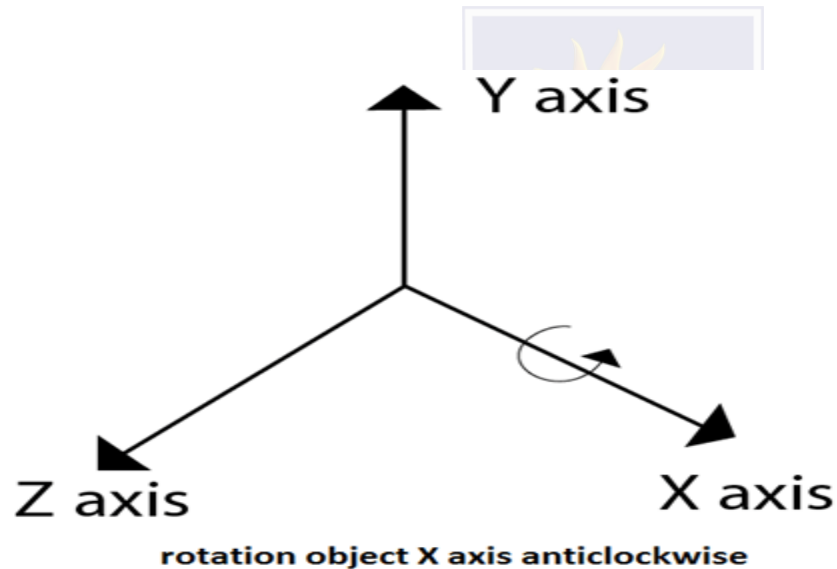Assistant Professor
Computer Science & Engineering

➢ **ROTATION**
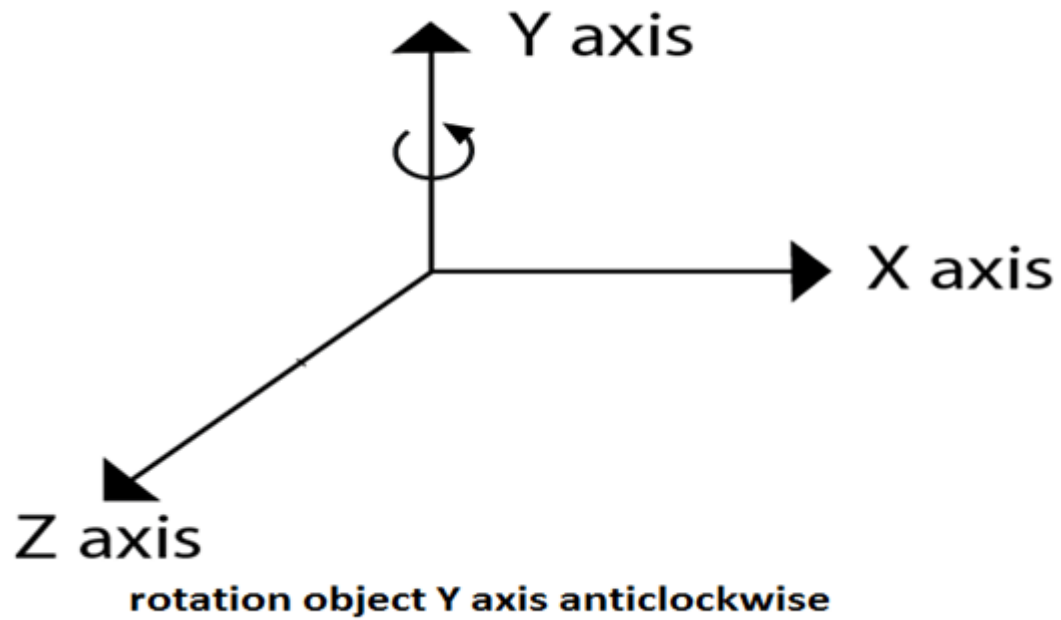
➢ **INVERSE TRANSFORMATIONS**

Rotation

It is moving of an object about an angle. Movement can be anticlockwise or clockwise. 3D rotation is complex as compared to the 2D rotation. For 2D we describe the angle of rotation, but for a 3D angle of rotation and axis of rotation are required. The axis can be either x or y or z.
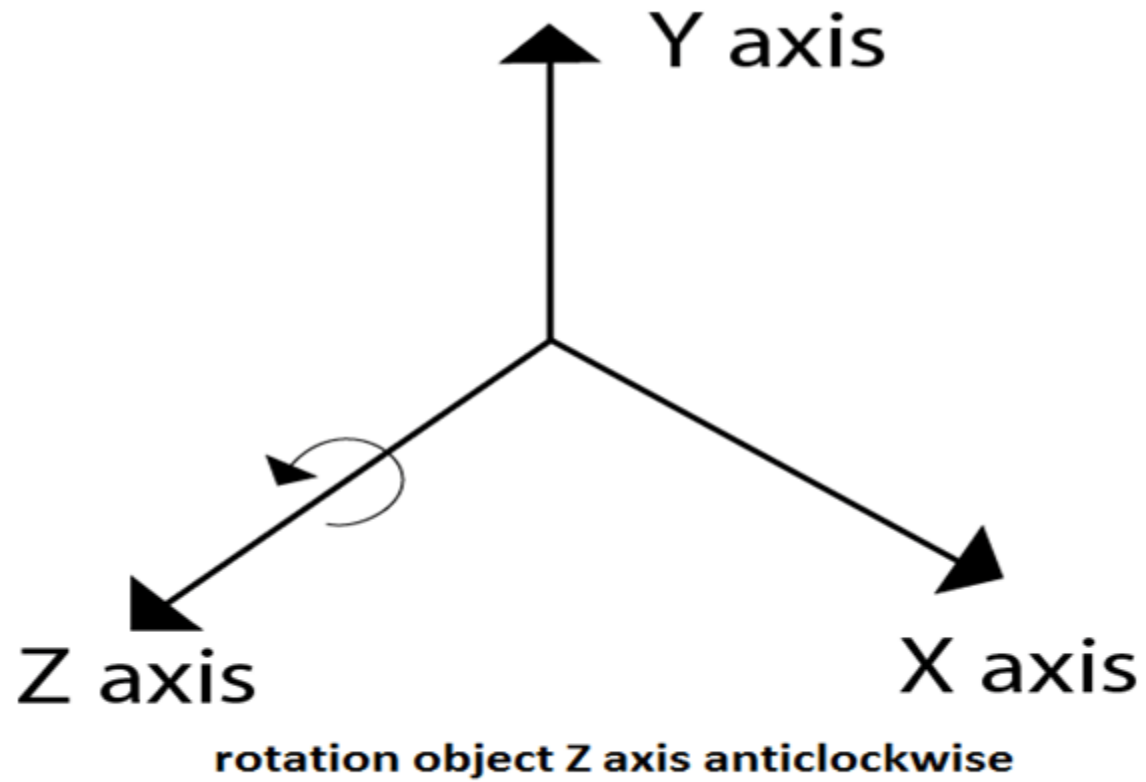
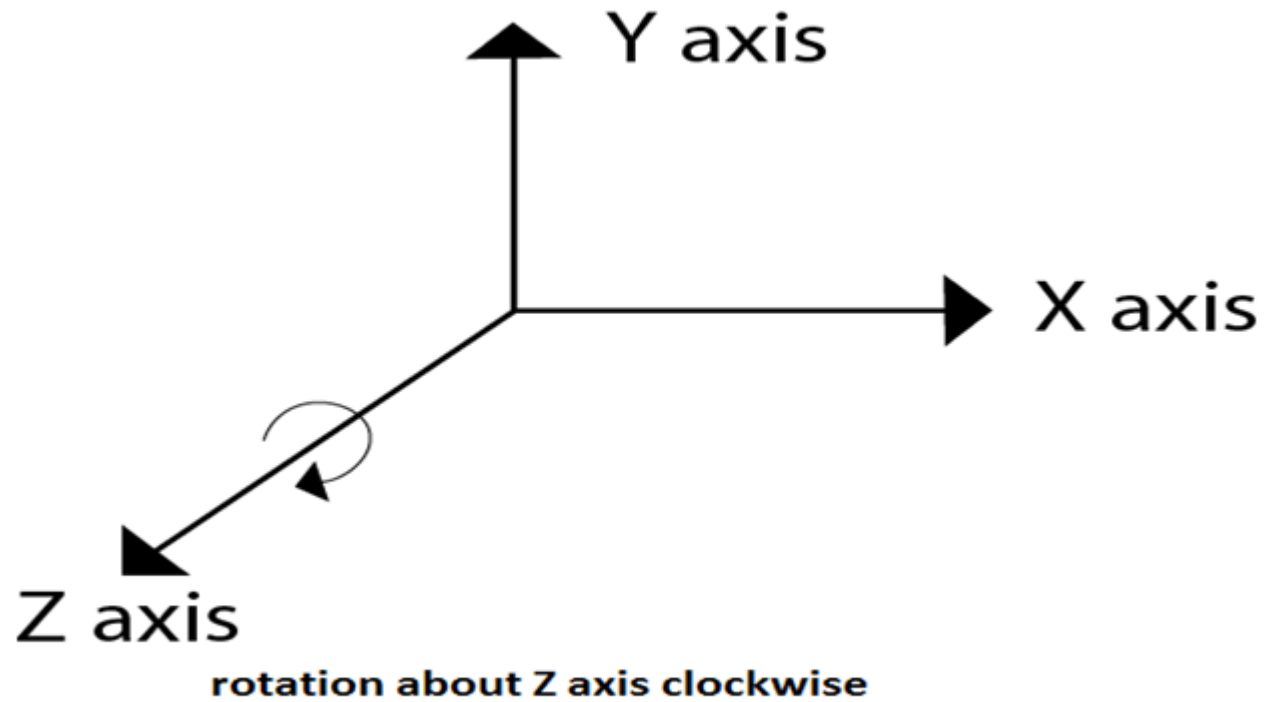**Following figures shows rotation about x, y, z- axis**

rotation object X axis anticlockwise

rotation object Y axis anticlockwise

rotation object Z axis anticlockwise

Y axis

X axis

Z axis

rotation about Z axis clockwise

rotation about X axis clockwise
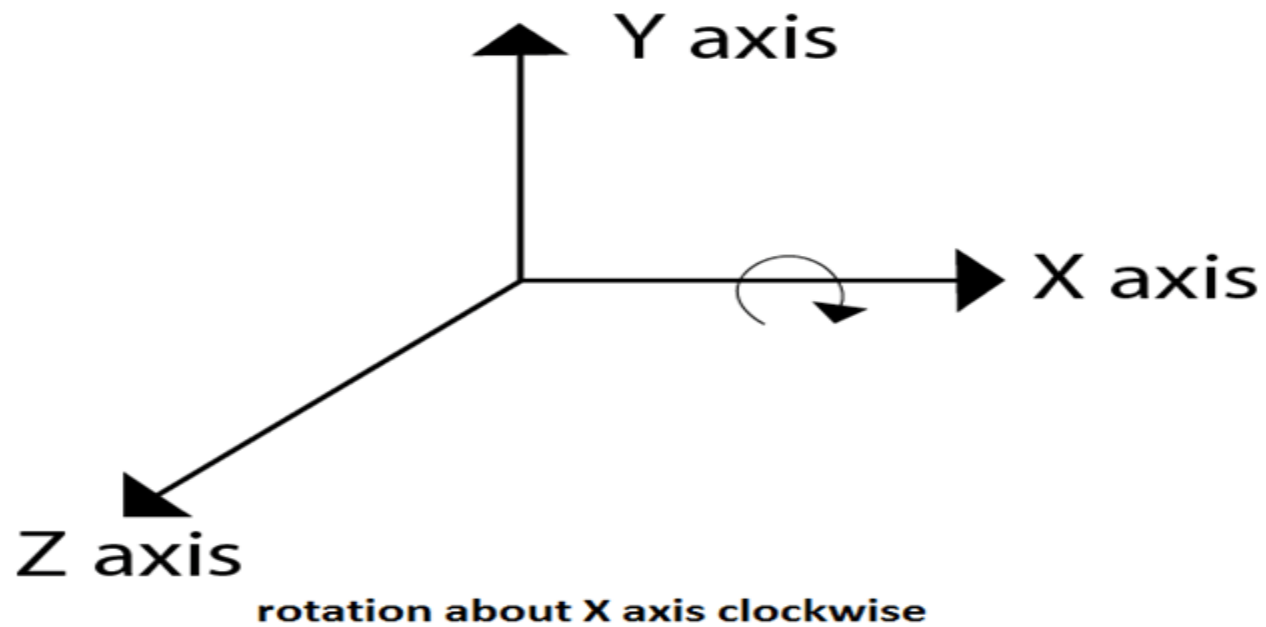
Rotation

Following figure show rotation of the object about the Y axis

Y axis

X axis

Z axis

Following figure show rotation of the object about the Z axis
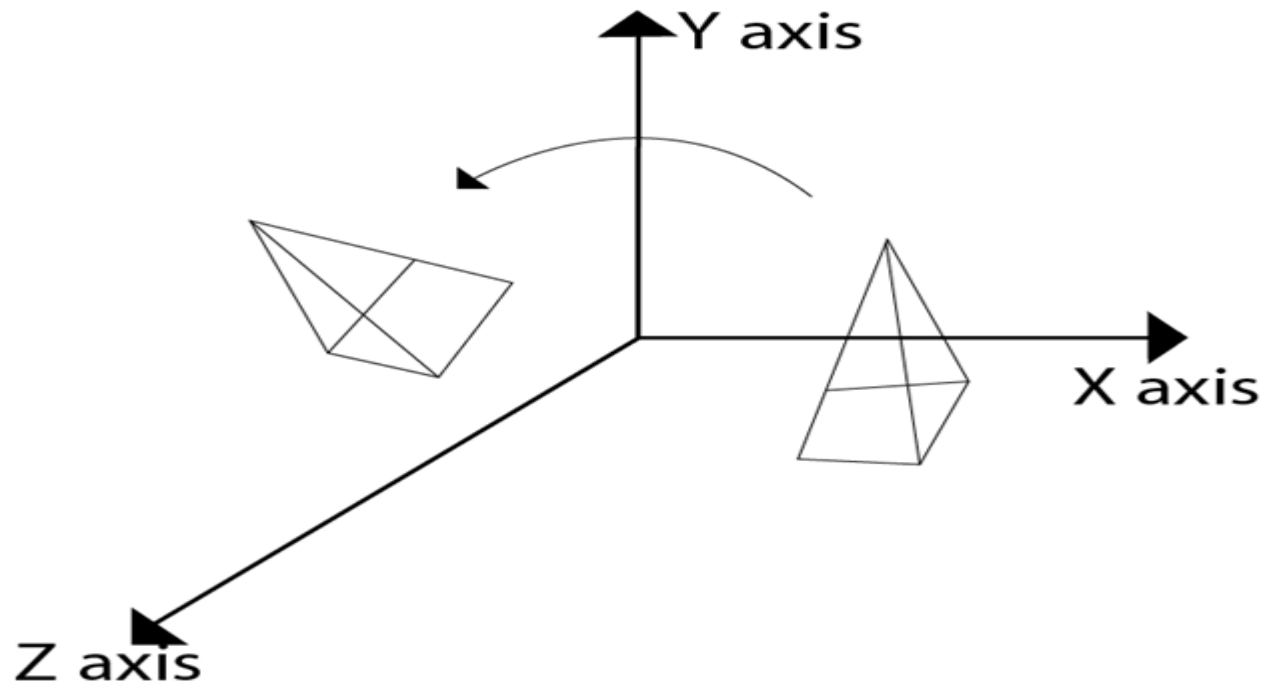
Inverse Transformations

These are also called as opposite transformations. If T is a translation matrix than inverse translation is representing using T^{-1}. The inverse matrix is achieved using the opposite sign.

Example1: Translation and its inverse matrix

Translation matrix   **Inverse translation matrix**

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ T_x & T_y & T_z & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ -T_x & -T_y & -T_z & 1 \end{pmatrix}$$

MUTIPLE CHOICE QUESTIONS:

Sr no	Question	Option A	Option B	OptionC	OptionD
1	In CRT converted to voltage levels that are applied to the diodes to produce the ………….on the display	Image pattern	light pattern	both a & b	Reflection
2	How many plates are used in Liquid Crystal Display ?	2	3	4	1
3	Morphing is a technique of……	image processing	display	pivot point	coordinates
4	Small system such as calculator and portable laptop uses the…………..	cathode display	Liquid Crystal Display	transformations	morphing
5	Which plates are used in between liquid crystal material?	light polarizer at right angles	reflect polarizer at right angles	projection	no polarizer

REFERENCES

- http://www.engppt.com/search/label/Computer%20Graphics