SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107
Accredited by NAAC-UGC with 'A' Grade
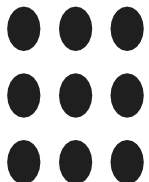**Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai**

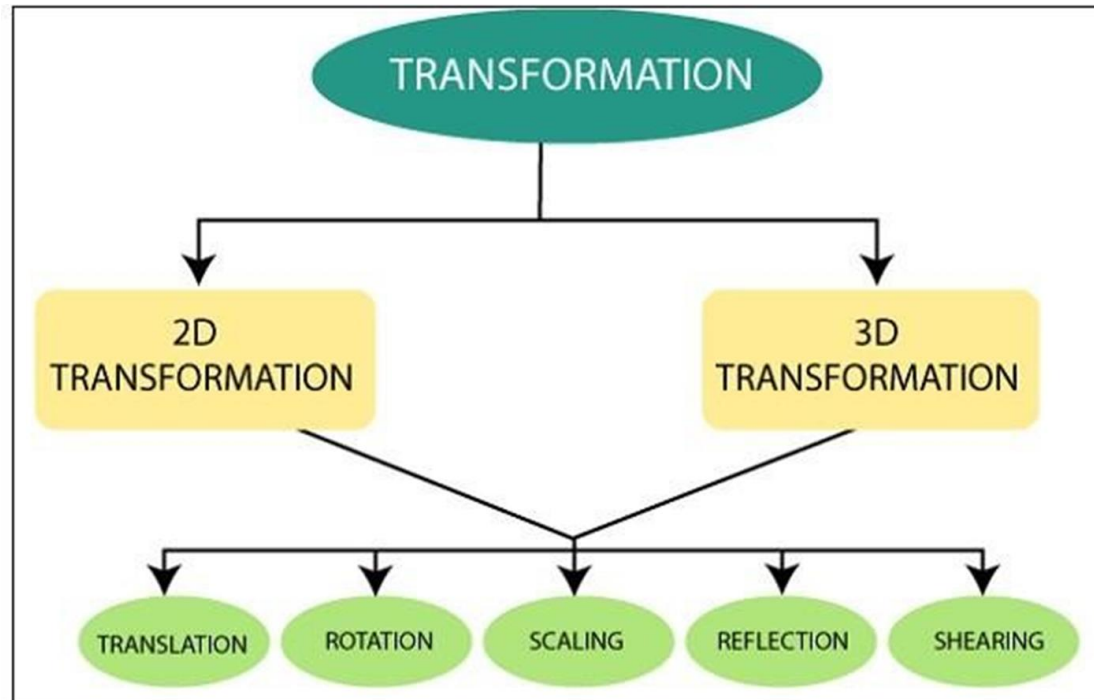## Department of Information Technology

Computer Graphics

Unit 2 : TRANSFORMATIONS - SHEARING

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Transformation

➢ In computer graphics, transformation refers to the process of changing the position, size, or orientation of an object.

➢ It is used to manipulate and animate objects in a virtual environment.

Shearing

➢ Shearing deals with changing the shape and size of the 2D object along x-axis and y-axis.

➢ It is similar to sliding the layers in one direction to change the shape of the 2D object.

➢ It is an ideal technique to change the shape of an existing object in a two dimensional plane.

➢ In a two dimensional plane, the object size can be changed along X direction as well as Y direction.
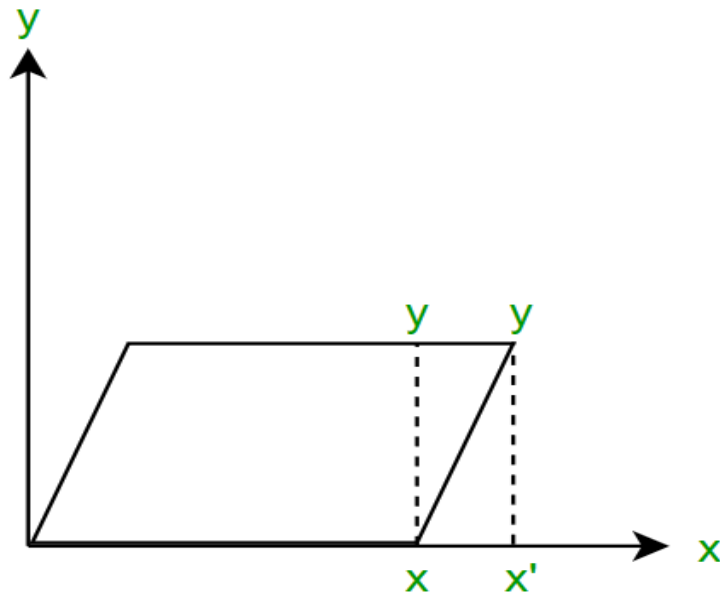
x-Shear :

In x shear, the y co-ordinates remain the same but the x co-ordinates changes.

If P(x, y) is the point then the new points will be P'(x', y') given as –

x'= x + Shx ∗ y;
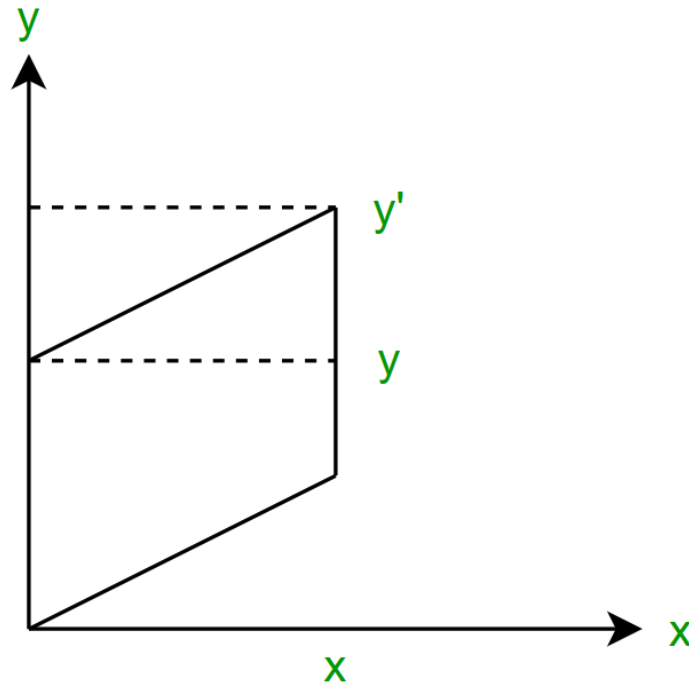
y'=y *x'=x+Shx∗y;y'=y*

y-Shear :

In y shear, the x co-ordinates remain the same but the y co-ordinates changes.

If P(x, y) is the point then the new points will be P'(x', y') given as —
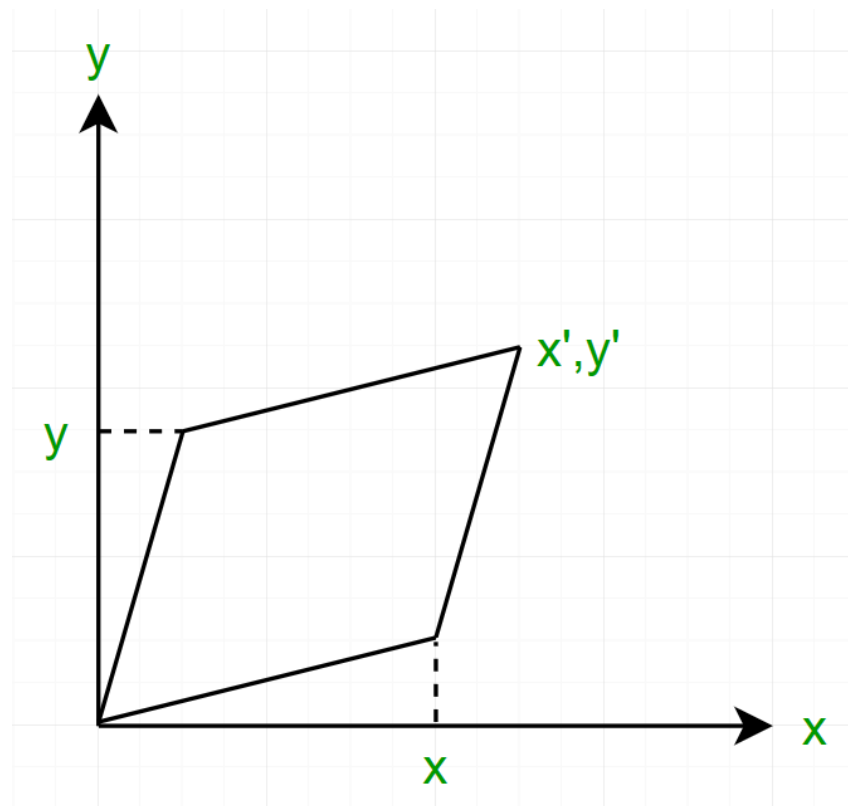
x'=x;

y'=y+Shy∗x;

x-y Shear :

In x-y shear, both the x and y co-ordinates changes. If P(x, y) is the point then the new points will be P'(x', y') given as –

x'=x+Shx∗y;

y'=y+Shy∗x;

Example :

Given a triangle with points (1, 1), (0, 0) and (1, 0). Find out the new coordinates of the object along x-axis, y-axis, xy-axis. (Applying shear parameter 4 on X-axis and 1 on Y-axis.).

Explanation :

Given,

Old corner coordinates of the triangle = A (1, 1), B(0, 0), C(1, 0)

Shearing parameter along X-axis (Shx) = 4

Shearing parameter along Y-axis (Shy) = 1

Along x-axis:

A'=(1+4*1, 1)=(5, 1)
B'=(0+4*0, 0)=(0, 0)
C'=(1+4*0, 0)=(1, 0)

Along y-axis:

A"=(1, 1+1*1)=(1, 2)
B"=(0, 0+1*0)=(0, 0)
C"=(1, 0+1*1)=(1, 1)

Along xy-axis:

A'''=(1+4*1, 1+1*1)=(5, 2)
B'''=(0+4*0, 0+1*0)=(0, 0)
C'''=(1+4*0, 0+1*1)=(1, 1)