

5-Shearing

It produce a distortion of an object. There are two types of shearing

1- Y shearing

It transform the point (X,Y) to the point (Xnew,Ynew) where

$$X_{\text{new}} = X$$

$$Y_{\text{new}} = Y + \text{Shy} * X \quad \text{where } \text{Shy} \neq 0$$

The matrix is

1	Shy	0
0	1	0
0	0	1

Y shearing moves a vertical line up or down depending on the sign of the shear factor Shy. A horizontal line is distorted into a line with slop Shy. And vis versa.

2- X shearing

It transform the point (X,Y) to the point (Xnew,Ynew) where

$$X_{\text{new}} = X + \text{Shx} * Y \quad \text{where } \text{Shx} \neq 0$$

$$Y_{\text{new}} = Y$$

The matrix is

1	0	0
Shx	1	0
0	0	1

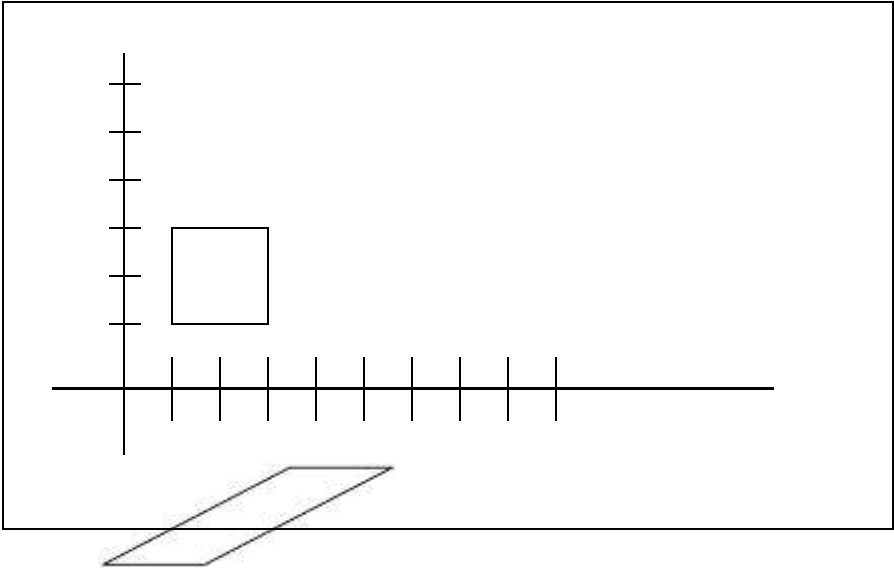
Example : Share the object (1,1) , (3,1) , (1,3) , (3,3) with

a: Shx=2

b: Shy=2

Solution : a: Shx=2

1	1	1		1	0	0		3	1	1
3	1	1		2	1	0		5	1	1
1	3	1	*	0	0	1	=	7	3	1
3	3	1						9	3	1



b- Shy

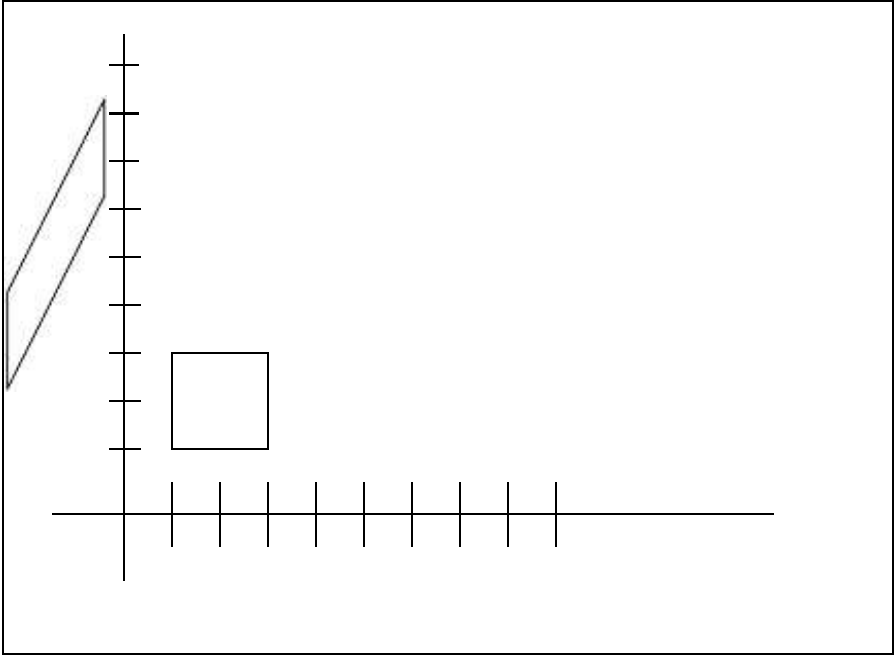
1	1	1
3	1	1
1	3	1
3	3	1

*

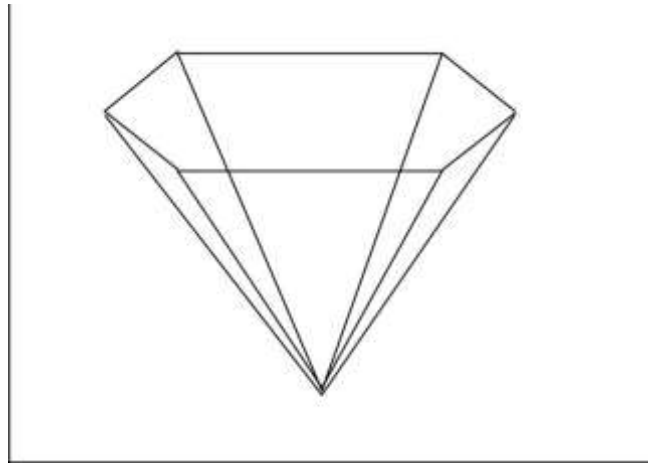
1	2	0
0	1	0
0	0	1

=

1	3	1
3	7	1
1	5	1
3	9	1



Example : Draw the object (5,30),(-5,30),(-11,24),
(-5,18),(5,18),(11,24),(0,0)



- 1- Share the object with $Sh_x=-1$
- 2- Scale on $S_x=2$ and $S_y=1$
- 3- Rotate the object 11 times with $\theta = \pi/6$, draw the object after each rotation

Example : Write a program in VB to generate figure 2 from figure 1

