B Tech-III (CO) 6th semester

Course: Computer Graphics (CS-3) (CO306)

Tutorial – 5

Based On: 2D Transformation

1. Prove that 2D rotation and scaling are commutative if
    1. $S_x = S_y$
    2. $\Theta = n\pi$.

2. Consider the square A(1,0), B(0,0), C(0,1) and D(1,1). Rotate the square ABCD by 45° clockwise about A(1,0).

3. The reflection along the line y=x is equivalent to the reflection along the X-axis followed by counter clockwise rotation by Θ degrees. Find the value of Θ.

4. Prove that two scaling transformations are commutative i.e. S1.S2=S2.S1

5. a) Find the matrix that represents rotation of an object by 45^oabout the origin.
   b) What are the new coordinates of the point P(2 , -4) after the rotation?

6. A triangle is defined by
   $$\begin{bmatrix} 2 & 2 \\ 4 & 2 \\ 4 & 4 \end{bmatrix}$$
   Find the transformed coordinates after the following transformation
    1. 90^o rotation about origin.
    2. Reflection about line y = -x.

7. Magnify the triangle with vertices A(0,0), B(1,1) and C(5,2) to twice its size while keeping C(5,2) fixed.