1. Write a Program to implement:
   1. 2D Translation
   2. 2D Rotation
   3. 2D Scaling
   4. 2D Reflection
   5. 2D Shearing

(For doing these Transformations consider any 2D shapes (Line, Triangle, Rectangle etc), and use Homogeneous coordinate Systems)

1. ***2D Translation***
2. Given, vertices of the 2D shape *(x1, y1), (x2, y2), …, (xn, yn)* and, *tx* and *ty* as translation distances on x-axis and y-axis respectively.
3. Find the translation matrix as:
4. For each *(xi, yi),* perform the following:  
   a) Calculate: b) Plot *(xi’, yi’).*
5. ***2D Rotation***
6. Given, vertices of the 2D shape *(x1, y1), (x2, y2), …, (xn, yn)* and, *θ* as angle of rotation.
7. Find the rotation matrix as:
8. For each *(xi, yi),* perform the following:  
   a) Calculate: b) Plot *(xi’, yi’).*
9. ***2D Scaling***
10. Given, vertices of the 2D shape *(x1, y1), (x2, y2), …, (xn, yn)* and, *Sx* and *Sy* as scaling factors.
11. Find the scaling matrix as:
12. For each *(xi, yi),* perform the following:  
    a) Calculate: b) Plot *(xi’, yi’).*
13. ***2D Reflection***
14. Given, vertices of the 2D shape *(x1, y1), (x2, y2), …, (xn, yn)*.
15. Find the reflection matrix as:  
    If (Reflection on X-Axis),  
    If (Reflection on Y-Axis),  
    If (Reflection about the origin),  
    If (Reflection when X = Y),
16. For each *(xi, yi),* perform the following:  
    a) Calculate: b) Plot *(xi’, yi’).*
17. ***2D Shearing***
18. Given, vertices of the 2D shape *(x1, y1), (x2, y2), …, (xn, yn)* and, *Shx* and *Shy* as Shift co-ordinate values.
19. Find the shear matrix as:  
    If (Shear on X-Axis),  
    If (Shear on Y-Axis),
20. For each *(xi, yi),* perform the following:  
    a) Calculate: b) Plot *(xi’, yi’).*