**Lab sheet 4 – 2D Transformations and Line Clipping**

**Use homogeneous transformation matrix representation for implementation**

1. Write a program to translate a triangle. (Read Triangle coordinates and translation vector from the user. Draw both original and translated triangles in two different colors)
2. Write a program to scale a square. (Read Square coordinates and scaling vector from the user. Draw both original and scaled squares in two different colors)
3. Write a program to rotate a triangle counter clockwise w.r.t a fixed point. (Read triangle coordinates, rotating angle and fixed point from the user. Draw both original and rotated triangles in two different colors). (*Remember: Convert angle from degree to radian before calculating cosine and sine values. Formula radian = degree \* pi/180*)

**Command for compiling programs for rotation = gcc filename –lgraph -lm**

1. Write a program to rotate a triangle clockwise w.r.t a fixed point. (Read triangle coordinates, rotating angle and fixed point from the user. Draw both original and rotated triangles in two different colors). (*Remember: Convert angle from degree to radian before calculating cosine and sine values. Formula radian = degree \* pi/180*)) **Command for compiling programs for rotation = gcc filename –lgraph -lm**
2. Write a program to scale a square w.r.t a fixed point. (Read Square coordinates fixed point and scaling vector from the user. Draw both original and scaled squares in two different colors)
3. Write a program to reflect a triangle w.r.t a line y=x.
4. Write a program to perform x-shear on a square. (Read Square coordinates and shear factor from the user. Draw both original and sheared squares in two different colors)
5. Write a program to perform y-shear on a square. (Read Square coordinates and shear factor from the user. Draw both original and sheared squares in two different colors)
6. Write a program to perform x-shear on a square w.r.t a line y=yref. (Read Square coordinates, reference line and shear factor from the user. Draw both original and sheared squares in two different colors)
7. Write a program to perform y-shear on a square w.r.t a line x=xref. (Read Square coordinates, reference line and shear factor from the user. Draw both original and sheared squares in two different colors)
8. Write a program to implement Cohen-Sutherland Line clipping. Read Clipping window coordinates and line coordinates from the user. Draw the window, original line and the clipped line.

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