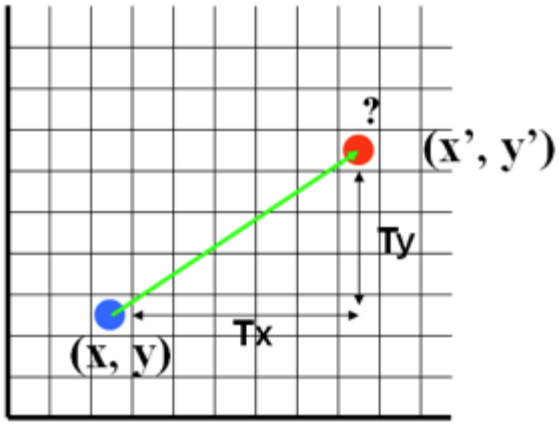
Experiment-5

Aim: To learn translation Transformation performed on 2-D graphics object.

Theory

1. The geometrical change of an object from a current size/shape to new size/shape with change in the coordinates of the object is called as transformation.
2. A translation moves an object to a different position on the screen.
3. The transformation is needed to manipulate the initial object coordinate and display the modified object coordinate with the help of translation factors in X-direction defined as 'Tx' and Y-directions defined as 'Ty' as shown in figure below:



4. We can translate a point in 2-D by adding translation coordinate (Tx, Ty)to the original coordinate (x, y) toget the new coordinates (x' ,y')

x' = x + Tx;

y'= y + Ty;

5. A translation moves all the points in the object along the same straight-line path to new positions w.r.t Tx and Ty.
6. Translation can be represented with the use of Homogenous coordinate system using matrix representation as

$$\begin{bmatrix} x' \\ y' \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & t_x \\ 0 & 1 & t_y \\ 0 & 0 & 1 \end{bmatrix} \bullet \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

where , P(x ,y) coordinate will be translated to P'(x', y') with respect to the translation factor 'tx' and 'ty'.

Procedure

ALGORITHM :

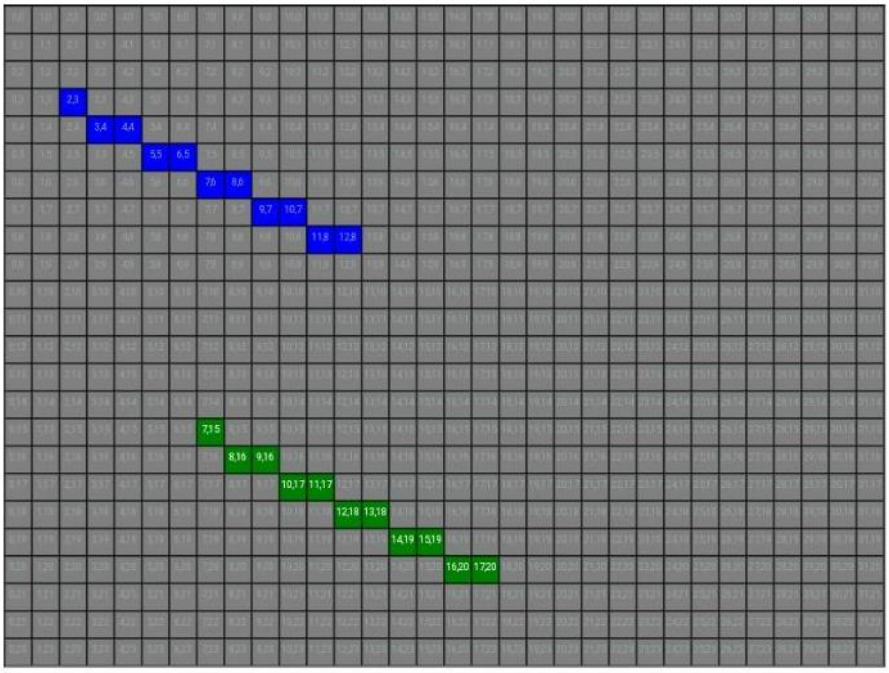
1. Start.
2. Accept coordinates to construct a 2-D object.
3. Calculate the Length of the Line segment:
4. Display the 2-D object.
5. Construct the Homogeneous matrix for the object with reference to the coordinate of the object.
6. Accept the translation value tx, ty with reference to the coordinate system.
7. Move the 2D object with tx, ty (x' = x + tx; y' = y + ty) with the use of Homogeneous matrix described earlier.
8. Plot translated object (x', y') w.r.t.Homogeneous coordinates.
9. Stop.

Stimulation:

Translate the given line by Tx=5 and Ty=12

Q1 Q2 Q3

Check Co-ordinates Clear Canvas



Green - Correctly Plotted Co-ordinates
Red - Wrong Co-ordinates plotted
Black - Co-ordinates which are correct but not plotted

Conclusion: Translation transformation is performed on 2D Graphics object.