Experiment-9

Student Name: Mayank Singh **UID: 22BCS10205**
Branch: CSE **Section/Group: 22BCS_IOT-612/B**
Semester: 6 **Date of Performance:10/04/2025**
Subject Name: Computer Graphics Lab **Subject Code: 22CSH-352**

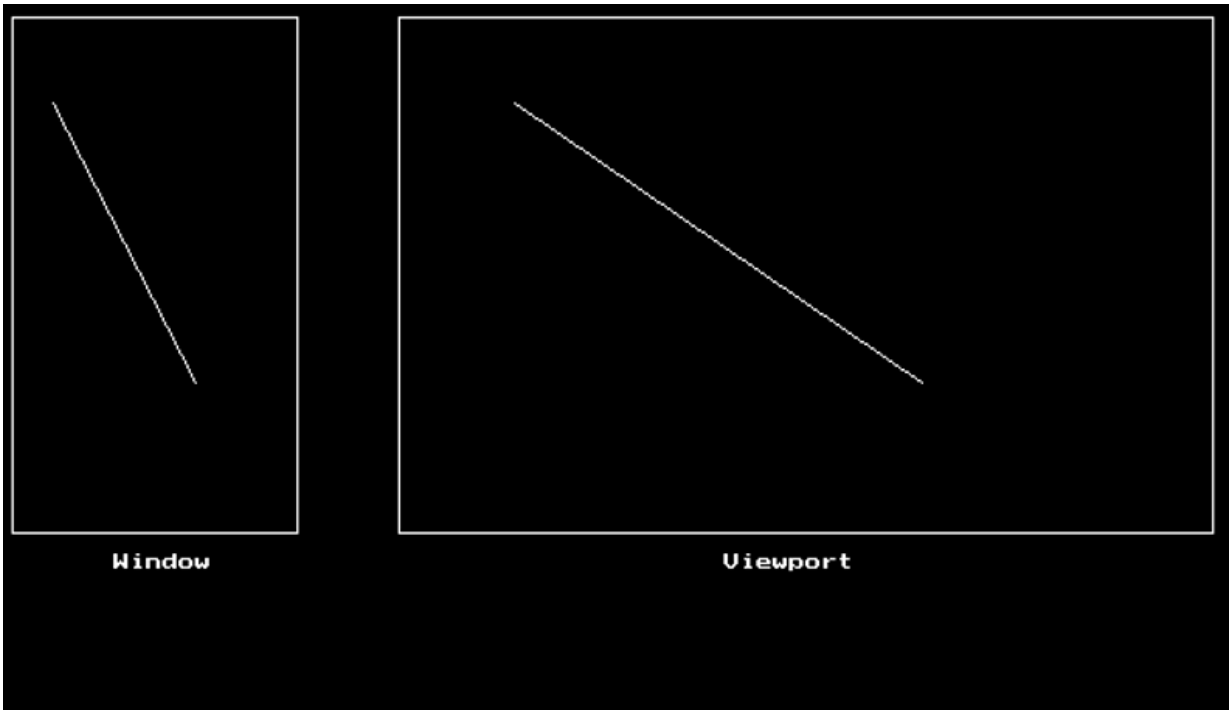
1. **Aim:** Demonstrate the result of window-to-viewport transformation by implementing and visualizing the process.

2. **Objective:** To perform window to viewport transformation and visualize the process.

3. **Implementation/Code:**

```
#include <graphics.h>
#include <conio.h>
#include <iostream.h>
#include <dos.h>
void main() {
   int gd = DETECT, gm;
   initgraph(&gd, &gm, "C:\\Turboc3\\BGI");
   setbkcolor(BLACK);
   cleardevice();
   setcolor(WHITE);
   float wxmin = 10, wxmax = 150, wymin = 10, wymax = 250;
   float vxmin = 200, vxmax = 600, vymin = 10, vymax = 250;
   int wx1 = 30, wy1 = 50, wx2 = 100, wy2 = 180;
   rectangle(wxmin, wymin, wxmax, wymax);
   rectangle(vxmin, vymin, vxmax, vymax);
   float sx = (vxmax - vxmin) / (wxmax - wxmin);
   float sy = (vymax - vymin) / (wymax - wymin);
   line(wx1, wy1, wx2, wy2);
   float vx1 = sx * (wx1 - wxmin) + vxmin;
   float vy1 = sy * (wy1 - wymin) + vymin;
   float vx2 = sx * (wx2 - wxmin) + vxmin;
   float vy2 = sy * (wy2 - wymin) + vymin;
   line(vx1, vy1, vx2, vy2);
   outtextxy(60, 260, "Window");
   outtextxy(360, 260, "Viewport");
   getch();
   closegraph();
  }
```

4. Output:



5. Learning Outcomes:

- Understand basic window-to-viewport transformation concepts in computer graphics.
- Apply scaling factors to transform line coordinates from one coordinate system to another.
- Develop interactive graphics programs using graphics.h and cin/cout for user input.
- Visualize coordinate mapping by drawing rectangles for the window and viewport and rendering lines accordingly.
- Implement real-time graphical rendering using line drawing and coordinate transformation in C++.