**Practical No: 06**

**Aim :** Write a c graphics program to perform Window-to Viewport Transformation.

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**Code :**

#include<graphics.h>

#include<conio.h>

#include<stdio.h>

int main ()

{

int W\_xmax, W\_ymax, W\_xmin, W\_ymin;

int V\_xmax, V\_ymax, V\_xmin, V\_ymin;

float sx, sy;

int x, x1, x2, y, y1, y2;

int gr = DETECT, gm;

initgraph (&gr, &gm, "C:\\TURBOC3\\BGI");

printf ("\n\*\*\*\*\*\* Window to Viewport \*\*\*\*\*\*\*\*\*\*\*\n");

printf ("Enter the coordinates for triangle \n x and y = ");

scanf ("%d %d", &x, &y);

printf ("\n x1 and y1 = ");

scanf ("%d %d", &x1, &y1);

printf ("\n x2 and y2 = ");

scanf ("%d %d", &x2, &y2);

printf ("Please enter Window coordinates \n First enter XMax, YMax =");

scanf ("%d %d", &W\_xmax, &W\_ymax);

printf ("\n Now, enter XMin, YMin =");

scanf ("%d %d", &W\_xmin, &W\_ymin);

cleardevice ();

delay (50);

//Window

rectangle (W\_xmin, W\_ymin, W\_xmax, W\_ymax);

outtextxy (W\_xmin, W\_ymin - 10, "Window");

//drawing a triangle

line (x, y, x1, y1);

line (x1, y1, x2, y2);

line (x2, y2, x, y);

// viewport

V\_xmin = 300;

V\_ymin = 30;

V\_xmax = 550;

V\_ymax = 350;

rectangle (V\_xmin, V\_ymin, V\_xmax, V\_ymax);

outtextxy (V\_xmin, V\_ymin - 10, "Viewport");

// calculatng Sx and Sy

sx = (float) (V\_xmax - V\_xmin) / (W\_xmax - W\_xmin);

sy = (float) (V\_ymax - V\_ymin) / (W\_ymax - W\_ymin);

x = V\_xmin + (float) ((x - W\_xmin) \* sx);

x1 = V\_xmin + (float) ((x1 - W\_xmin) \* sx);

x2 = V\_xmin + (float) ((x2 - W\_xmin) \* sx);

y = V\_ymin + (float) ((y - W\_ymin) \* sy);

y1 = V\_ymin + (float) ((y1 - W\_ymin) \* sy);

y2 = V\_ymin + (float) ((y2 - W\_ymin) \* sy);

// drawing triangle

line (x, y, x1, y1);

line (x1, y1, x2, y2);

line (x2, y2, x, y);

getch ();

closegraph();

}

**Output :**

