Lab : 5 To perform 2D transformations such as translation, scaling, and  rotation  on 2D object

**ALGORITHM:**

Start

Initialize the graphics mode.

Construct a 2D object  (use Drawpoly()) e.g. (x,y)

A) Translation

Get the translation value tx, ty

Move the 2d object with tx, ty (x’=x+tx,y’=y+ty)

Plot (x’,y’)

B)  Scaling

Get the scaling value Sx,Sy

Resize the object with Sx,Sy  (x’=x\*Sx,y’=y\*Sy)

Plot (x’,y’)

C) Rotation

Get the Rotation angle

Rotate the object by the angle ф

x’=x cos ф -  y sin ф

y’=x sin ф  - y cosф

Plot (x’,y’)

**PROGRAM:**

#include <graphics.h>

#include <stdlib.h>

#include <stdio.h>

#include <conio.h>

#include<math.h>

void main()

{

            int gm;

            int gd=DETECT;

            int x1,x2,x3,y1,y2,y3,nx1,nx2,nx3,ny1,ny2,ny3,c;

            int sx,sy,xt,yt,r;

            float t;

            initgraph(&gd,&gm,"c:\tc\bg:");

            printf("\t Program for basic transactions");

            printf("\n\t Enter the points of triangle");

            setcolor(1);

            scanf("%d%d%d%d%d%d",&x1,&y1,&x2,&y2,&x3,&y3);

            line(x1,y1,x2,y2);

            line(x2,y2,x3,y3);

            line(x3,y3,x1,y1);

            getch();

            printf("\n 1.Transaction\n 2.Rotation\n 3.Scalling\n 4.exit");

            printf("Enter your choice:");

            scanf("%d",&c);

            switch(c)

            {

                        case 1:

                                    printf("\n Enter the translation factor");

                                    scanf("%d%d",&xt,&yt);

                                    nx1=x1+xt;

                                    ny1=y1+yt;

                                    nx2=x2+xt;

                                    ny2=y2+yt;

                                    nx3=x3+xt;

                                    ny3=y3+yt;

                                    line(nx1,ny1,nx2,ny2);

                                    line(nx2,ny2,nx3,ny3);

                                    line(nx3,ny3,nx1,ny1);

                                    getch();

                        case 2:

                                    printf("\n Enter the angle of rotation");

                                    scanf("%d",&r);

                                    t=3.14\*r/180;

                                    nx1=abs(x1\*cos(t)-y1\*sin(t));

                                    ny1=abs(x1\*sin(t)+y1\*cos(t));

                                    nx2=abs(x2\*cos(t)-y2\*sin(t));

                                    ny2=abs(x2\*sin(t)+y2\*cos(t));

                                    nx3=abs(x3\*cos(t)-y3\*sin(t));

                                    ny3=abs(x3\*sin(t)+y3\*cos(t));

                                    line(nx1,ny1,nx2,ny2);

                                    line(nx2,ny2,nx3,ny3);

                                    line(nx3,ny3,nx1,ny1);

                                    getch();

                        case 3:

                                    printf("\n Enter the scalling factor");

                                    scanf("%d%d",&sx,&sy);

                                    nx1=x1\*sx;

                                    ny1=y2\*sy;

                                    nx2=x2\*sx;

                                    ny2=y2\*sy;

                                    nx3=x3\*sx;

                                    ny3=y3\*sy;

                                    line(nx1,ny1,nx2,ny2);

                                    line(nx2,ny2,nx3,ny3);

                                    line(nx3,ny3,nx1,ny1);

                                    getch();

                        case 4:

                                    break;

                        default:

                                    printf("Enter the correct choice");

                                    }

                                    closegraph();

                                    }