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19BCE1027

```
#include <stdio.h>
#include<graphics.h>
#include<stdlib.h>
#include<conio.h>
#include<math.h>
void DrawFn();
void translate();
int graDriver=DETECT,graMode;
int n,xs[100],ys[100],i,xshift,yshift;
void DrawFn()
{
for(i=0;i<n;i++)
 {
 line(xs[i],ys[i],xs[(i+1)%n],ys[(i+1)%n]);
 }
}
void translate()
{
for(i=0;i<n;i++)
 {
 xs[i]+=xshift;
```

```
 ys[i]+=yshift;
 }
}
void refx(int x1,int x2,int x3,int y1,int y2,int y3){
line(320,0,320,430);
line(0,240,640,240);
x1=(320-x1)+320;
x2=(320-x2)+320;
x3=(320-x3)+320;
line(x1,y1,x2,y2);
line(x2,y2,x3,y3);
line(x3,y3,x1,y1);

}
void refy(int x1,int x2,int x3,int y1,int y2,int y3){
line(320,0,320,430);
line(0,240,640,240);
y1=(240-y1)+240;
y2=(240-y2)+240;
y3=(240-y3)+240;
line(x1,y1,x2,y2);
line(x2,y2,x3,y3);
line(x3,y3,x1,y1);
}
```

```
void findNewCoordinate(int s[][2], int p[][1])
{
	int temp[2][1] = { 0 };

	for (int i = 0; i < 2; i++)
		for (int j = 0; j < 1; j++)
			for (int k = 0; k < 2; k++)
				temp[i][j] += (s[i][k] * p[k][j]);

	p[0][0] = temp[0][0];
	p[1][0] = temp[1][0];
}
void scale(int x[], int y[], int sx, int sy)
{
	// Triangle before Scaling
	line(x[0], y[0], x[1], y[1]);
	line(x[1], y[1], x[2], y[2]);
	line(x[2], y[2], x[0], y[0]);

	// Initializing the Scaling Matrix.
	int s[2][2] = { sx, 0, 0, sy };
	int p[2][1];

	// Scaling the triangle
```

```
        for (int i = 0; i < 3; i++)
        {
                p[0][0] = x[i];
                p[1][0] = y[i];

                findNewCoordinate(s, p);

                x[i] = p[0][0];
                y[i] = p[1][0];
        }

        // Triangle after Scaling
        line(x[0], y[0], x[1], y[1]);
        line(x[1], y[1], x[2], y[2]);
        line(x[2], y[2], x[0], y[0]);
}
int main () {
  char choice;
  printf("Enter 1 for translation,2 for reflection,3 for rotation,4 for scaling,5 for shearing along x axis,6 for shearing along y axis.\n");
  scanf("%c", &choice)

  switch(choice) {
    case '1' :
```

```
        int graDriver=DETECT,graMode;
int n,xs[100],ys[100],i,xshift,yshift;
printf("Enter number of sides of polygon: ");
scanf("%d",&n);
printf("Enter co-rdinates: x,y for each vertex ");
for(i=0;i<n;i++)
 scanf("%d%d",&xs[i],&ys[i]);
printf("Enter distances for translation (in x and y directions): ");
scanf("%d%d",&xshift,&yshift);
initgraph(&graDriver,&graMode,"C:\\TURBOC3\\BGI\\");
cleardevice();
//drawing original polygon in RED color
setcolor(RED);
DrawFn();
//Doing translation
translate();
//drawing translated polygon in BLUE color
setcolor(BLUE);
DrawFn();
getch();
break;
case '2' :
int gd=DETECT,gm;
int x1,y1,x2,y2,x3,y3;
```

```
clrscr();
initgraph(&gd,&gm,"c://turboc3//bgi");
line(320,0,320,430);
line(0,240,640,240);
x1=150;y1=100;
x2=220;y2=220;
x3=220;y3=110;
line(x1,y1,x2,y2);
line(x2,y2,x3,y3);
line(x3,y3,x1,y1);
getch();
refx(x1,x2,x3,y1,y2,y3);
getch();
refy(x1,x2,x3,y1,y2,y3);
getch();
closegraph();
break;
     case '3' :
          intgd=0,gm,x1,y1,x2,y2,x3,y3;
   double s,c, angle;
   initgraph(&gd, &gm, "C:\\TURBOC3\\BGI");
   setcolor(RED);
   printf("Enter coordinates of triangle: ");
   scanf("%d%d%d%d%d%d",&x1,&y1,&x2,&y2, &x3, &y3);
```

```
setbkcolor(WHITE);
cleardevice();
line(x1,y1,x2,y2);
line(x2,y2, x3,y3);
line(x3, y3, x1, y1);
getch();
setbkcolor(BLACK);
printf("Enter rotation angle: ");
scanf("%lf", &angle);
setbkcolor(WHITE);
c = cos(angle *M_PI/180);
s = sin(angle *M_PI/180);
x1 = floor(x1 * c + y1 * s);
y1 = floor(-x1 * s + y1 * c);
x2 = floor(x2 * c + y2 * s);
y2 = floor(-x2 * s + y2 * c);
x3 = floor(x3 * c + y3 * s);
y3 = floor(-x3 * s + y3 * c);
cleardevice();
line(x1, y1 ,x2, y2);
line(x2,y2, x3,y3);
line(x3, y3, x1, y1);
getch();
closegraph();
```

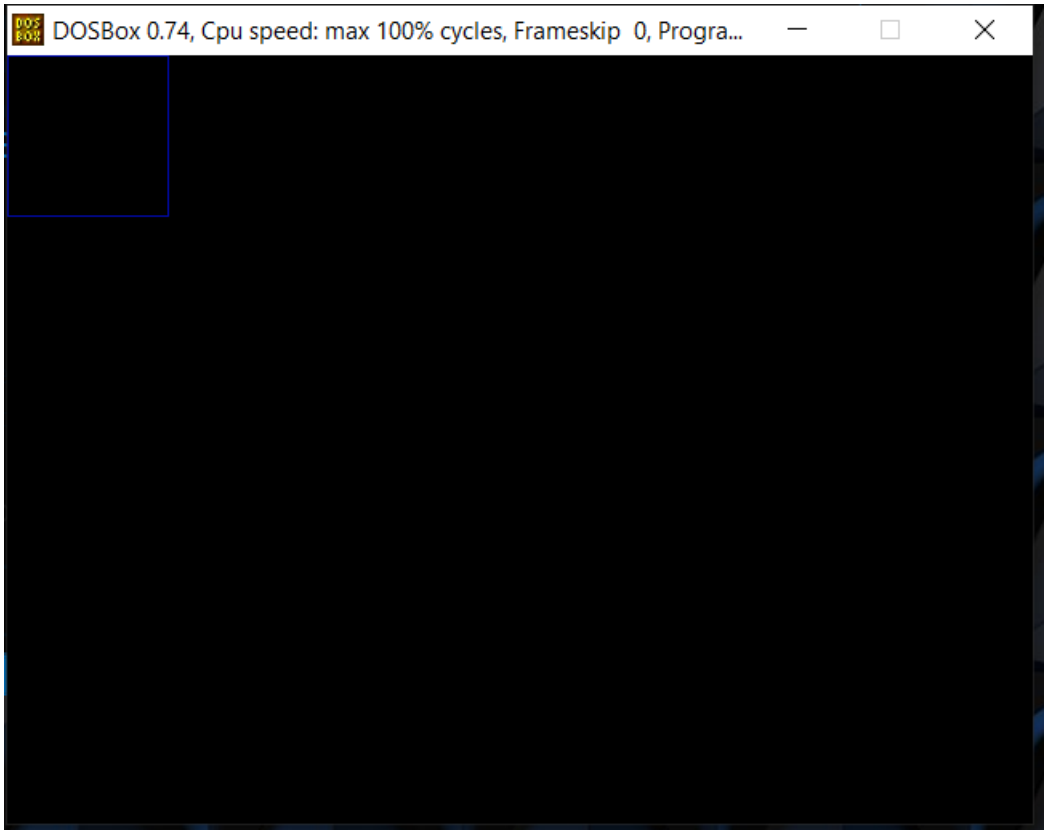
```
    case '4' :
    int x[] = { 100, 200, 300 };
        int y[] = { 200, 100, 200 };
        int sx = 2, sy = 2;

        int gd, gm;
        detectgraph(&gd, &gm);
        initgraph(&gd, &gm," ");

        scale(x, y, sx,sy);
        getch();
      break;
    case '5' :int gd=DETECT,gm;
int x,y,x1,y1,x2,y2,x3,y3,shear_f;
initgraph(&gd,&gm,"C:\\TURBOC3\\BGI");
printf("\n please enter first coordinate = ");
scanf("%d %d",&x,&y);
printf("\n please enter second coordinate = ");
scanf("%d %d",&x1,&y1);
printf("\n please enter third coordinate = ");
scanf("%d %d",&x2,&y2);
printf("\n please enter last coordinate = ");
scanf("%d %d",&x3,&y3);
printf("\n please enter shearing factor x = ");
```

```
scanf("%d",&shear_f);
cleardevice();
line(x,y,x1,y1);
line(x1,y1,x2,y2);
line(x2,y2,x3,y3);
line(x3,y3,x,y);

setcolor(RED);
x=x+ y*shear_f;
x1=x1+ y1*shear_f;
x2=x2+ y2*shear_f;
x3=x3+ y3*shear_f;

line(x,y,x1,y1);
line(x1,y1,x2,y2);
line(x2,y2,x3,y3);
line(x3,y3,x,y);
getch();
closegraph();
        break;
        case '6':int gd=DETECT,gm;
int x,y,x1,y1,x2,y2,x3,y3,shear_f;
initgraph(&gd,&gm,"C:\\TURBOC3\\BGI");
printf("\n please enter first coordinate = ");
```

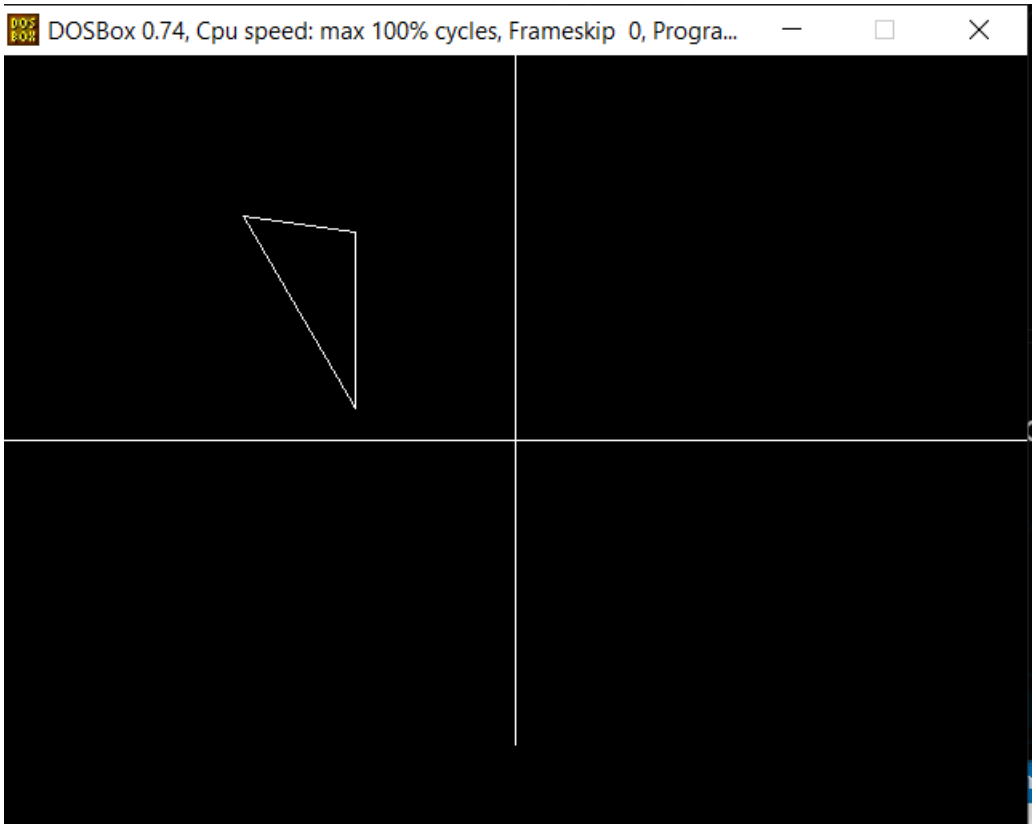
```
scanf("%d %d",&x,&y);
printf("\n please enter second coordinate = ");
scanf("%d %d",&x1,&y1);
printf("\n please enter third coordinate = ");
scanf("%d %d",&x2,&y2);
printf("\n please enter last coordinate = ");
scanf("%d %d",&x3,&y3);
printf("\n please enter shearing factor y = ");
scanf("%d",&shear_f);
cleardevice();
line(x,y,x1,y1);
line(x1,y1,x2,y2);
line(x2,y2,x3,y3);
line(x3,y3,x,y);

setcolor(RED);
y=y+ x*shear_f;
y1=y1+ x1*shear_f;
y2=y2+ x2*shear_f;
y3=y3+ x3*shear_f;

line(x,y,x1,y1);
line(x1,y1,x2,y2);
line(x2,y2,x3,y3);
```

```
line(x3,y3,x,y);

getch();

closegraph();

break;

     default :

        printf("Wrong Choice.Try Again.\n" );

  }

  return 0;

}
```

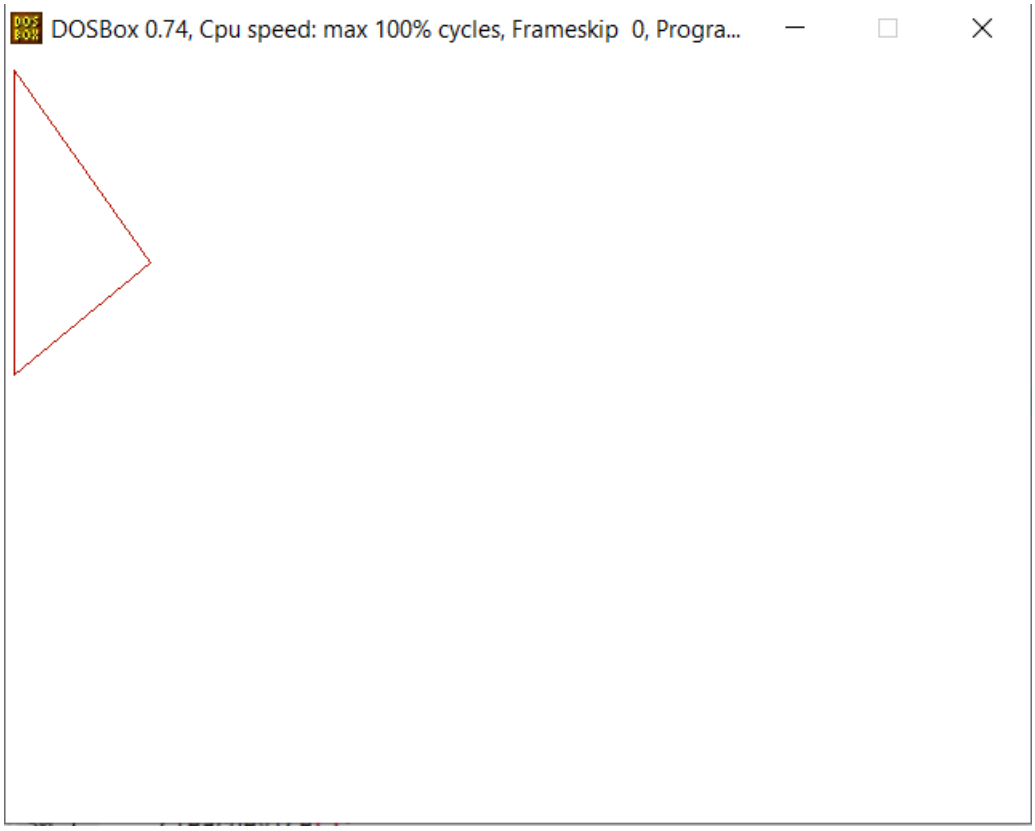
TRANSLATION:



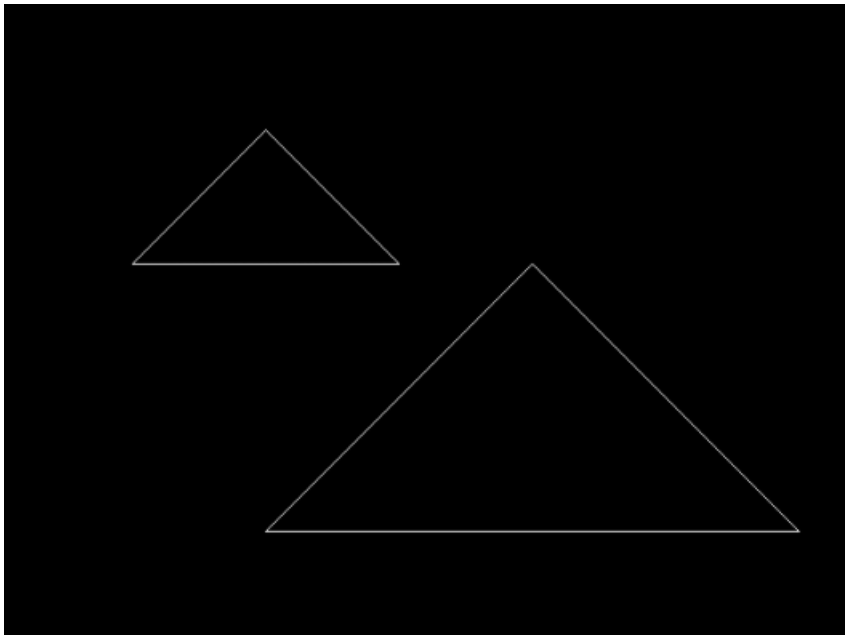
REFLECTION:



ROTATION:



SCALING:



SHEARING ALONG X-AXIS:

SHEARING ALONG Y-AXIS: