ASSIGNMENT 4
TRANSFORMATIONS

```
#include<iostream>
#include<math.h>
#include<GL/glut.h>
using namespace std;
int choice;
int x1,x2,x3,x4,yy1,y2,y3,y4,nx1,nx2,nx3,nx4,ny1,ny2,ny3,ny4,c,shx,shy;
float sx,sy,xt,yt,r;
double t;

void display()
{
	glClear(GL_COLOR_BUFFER_BIT);
	glColor3f(1.0,1.0,1.0);
	glBegin(GL_LINES);
	glVertex2i(-500,0);
	glVertex2i(500,0);
	glVertex2i(0,-500);
	glVertex2i(0,500);
	glEnd();
	glColor3f(1.0,1.0,0.0);
	glBegin(GL_LINE_LOOP);
	glVertex2f(x1,yy1);
	glVertex2f(x2,y2);
	glVertex2f(x3,y3);

	glEnd();
	glColor3f(1.0,0.0,0.0);
	glBegin(GL_LINE_LOOP);

	glVertex2f(nx1,ny1);
	glVertex2f(nx2,ny2);
	glVertex2f(nx3,ny3);

	glEnd();
	glFlush();
}

void myinit()
{

	glClearColor(0.0,0.0,0.0,1.0);
	glMatrixMode(GL_PROJECTION);
	glLoadIdentity();
	gluOrtho2D(-500.0,500.0,-500.0,500.0);
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}
int main(int argc,char **argv)
{
	x1=100;
	yy1=113;
	x2=200;
	y2=113;
	x3=150;
	y3=200;


	cout<<"\n1.Translation\n2.Rotation \n3.Scaling \n4.Shear\n5.Exit\nEnter your
choice:";
	cin>>c;
	switch(c)
	{
		case 1:
			cout<<"\nEnter the translation factor x:";
			cin>>xt;
			cout<<"\nEnter the translation factor y:";
			cin>>yt;
			nx1=x1+xt;
			ny1=yy1+yt;
			nx2=x2+xt;
			ny2=y2+yt;
			nx3=x3+xt;
			ny3=y3+yt;

			glutInit(&argc,argv);

			glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
			glutInitWindowSize(500,500);
			glutInitWindowPosition(0,0);
			glutCreateWindow("Translation");
			glutDisplayFunc(display);
			myinit();
			glutMainLoop();
			break;

		case 2:
			cout<<"\nEnter the angle of rotation";
			cin>>r;
			t=3.14*r/180;
			nx1=(x1*cos(t)-yy1*sin(t));
			ny1=(x1*sin(t)+yy1*cos(t));
			nx2=(x2*cos(t)-y2*sin(t));
			ny2=(x2*sin(t)+y2*cos(t));
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        nx3=(x3*cos(t)-y3*sin(t));
        ny3=(x3*sin(t)+y3*cos(t));



        glutInit(&argc,argv);
        glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
        glutInitWindowSize(500,500);
        glutInitWindowPosition(0,0);
        glutCreateWindow("Rotation");
        glutDisplayFunc(display);
        myinit();
        glutMainLoop();
        break;

case 3:
        cout<<"\nEnter the scaling factor x";
        cin>>sx;
        cout<<"\nEnter the scaling factor y";
        cin>>sy;

        t=3.14*r/180;


        nx1=x1*sx;
        ny1=yy1*sy;
        nx2=x2*sx;
        ny2=y2*sy;
        nx3=x3*sx;
        ny3=y3*sy;


        glutInit(&argc,argv);
        glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
        glutInitWindowSize(500,500);
        glutInitWindowPosition(0,0);
        glutCreateWindow("Scaling");
        glutDisplayFunc(display);
        myinit();
        glutMainLoop();
        break;


case 4:
        cout<<"\nEnter the shear factor x";
        cin>>shx;
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                cout<<"\nEnter the shear factor y";
                cin>>shy;

                nx1=(x1+shx*yy1);
                nx2=(x2+shx*y2);
                nx3=(x3+shx*y3);

                ny1=(yy1+shy*x1);
                ny2=(y2+shy*x2);
                ny3=(y3+shy*x3);

                glutInit(&argc,argv);
                glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
                glutInitWindowSize(500,500);
                glutInitWindowPosition(0,0);
                glutCreateWindow("Shear");
                glutDisplayFunc(display);
                myinit();
                glutMainLoop();
                break;


        case 5:
                break;

                default:        cout<<"Enter the correct choice:";
}
return 0;
}
```
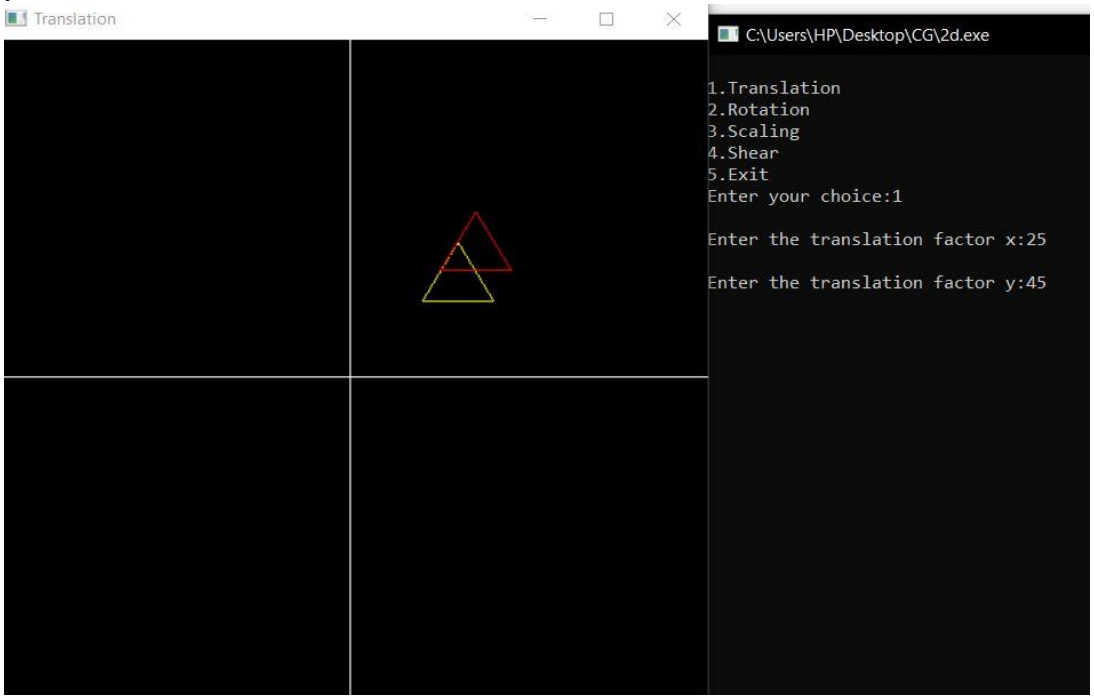
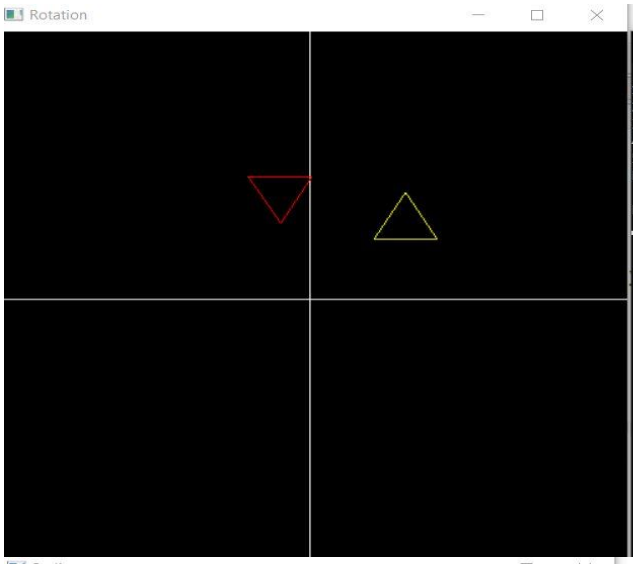
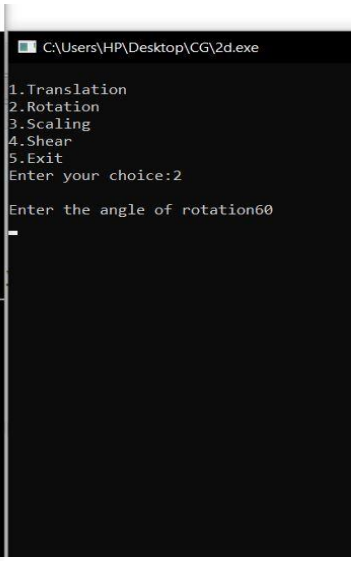
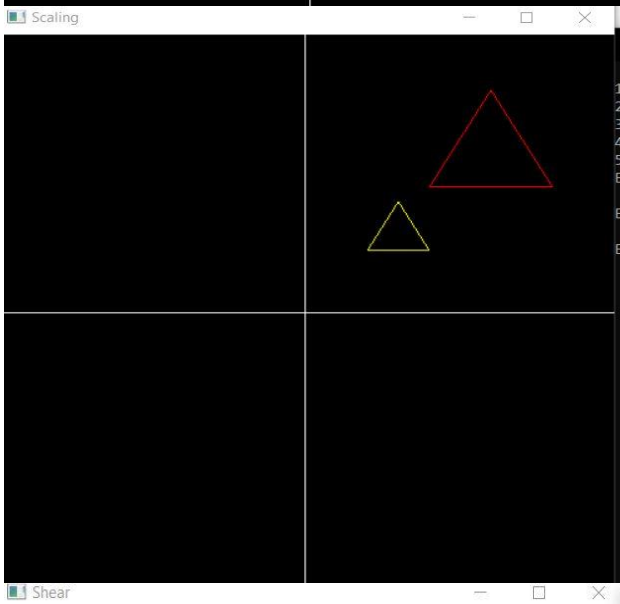
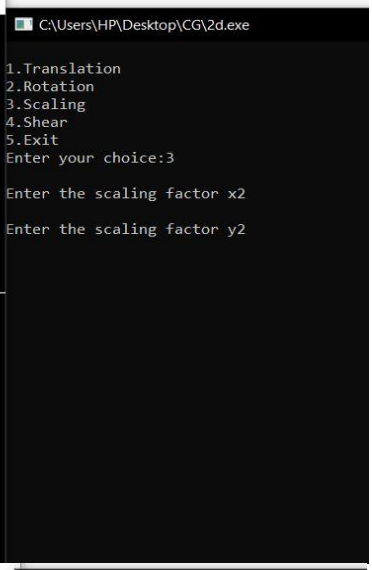
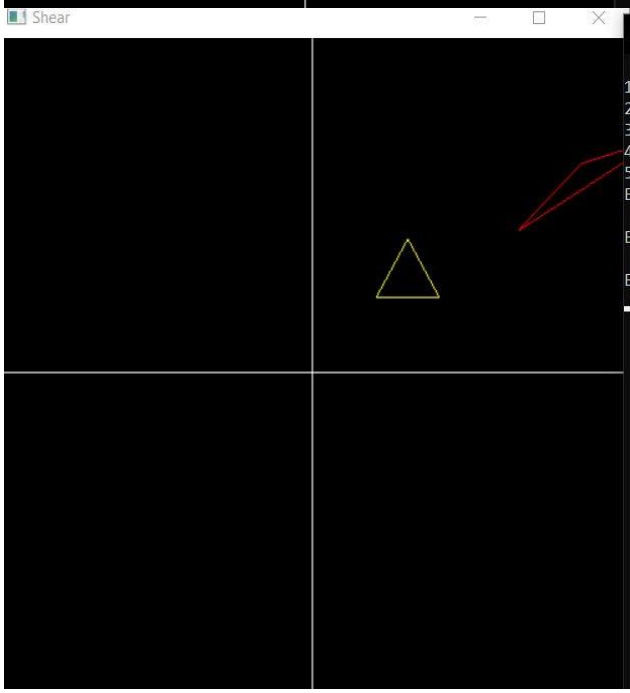



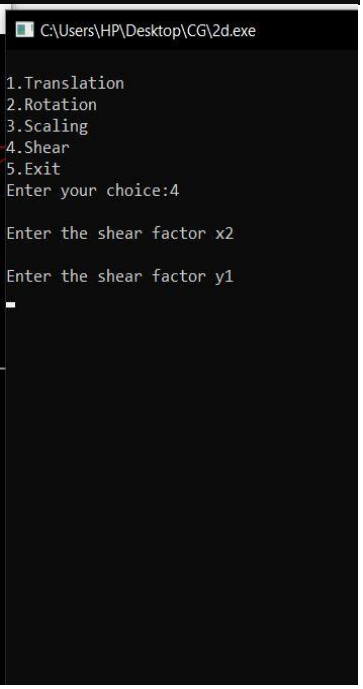

Rotation


C:\Users\HP\Desktop\CG\2d.exe
1.Translation
2.Rotation
3.Scaling
4.Shear
5.Exit
Enter your choice:2
Enter the angle of rotation60


Scaling


C:\Users\HP\Desktop\CG\2d.exe
1.Translation
2.Rotation
3.Scaling
4.Shear
5.Exit
Enter your choice:3
Enter the scaling factor x2
Enter the scaling factor y2


Shear


C:\Users\HP\Desktop\CG\2d.exe
1.Translation
2.Rotation
3.Scaling
4.Shear
5.Exit
Enter your choice:4
Enter the shear factor x2
Enter the shear factor y1