Develop a program to demonstrate 2D transformation on basic objects

#include<stdio.h>

#include<math.h>

#include<GL/glut.h>

GLfloat t[3][3]={{10.0,30.0,20.0},{20.0,20.0,40.0},{1.0,1.0,1.0}};

GLfloat rotatemat[3][3]={{0},{0},{0}};

GLfloat result[3][9]={{0},{0},{0}};

GLfloat xr=10.0;

GLfloat yr=20.0;

GLfloat theta;

GLint ch;

void multiply(){

int i,j,k;

for(i=0;i<3;i++)

for(j=0;j<9;j++){

result[i][j]=0;

for(k=0;k<3;k++)

result[i][j]=result[i][j]+rotatemat[i][k]\*t[k][j];

}

}

void rotate\_about\_origin(){

rotatemat[0][0]=cos(theta);

rotatemat[0][1]=-sin(theta);

rotatemat[0][2]=0;

rotatemat[1][0]=sin(theta);

rotatemat[1][1]=cos(theta);

rotatemat[1][2]=0;

rotatemat[2][0]=0;

rotatemat[2][1]=0;

rotatemat[2][2]=1;

multiply();

}

void rotate\_about\_fixed\_point(){

GLfloat m,n;

m=xr\*(1-cos(theta))+yr\*sin(theta);

n=yr\*(1-cos(theta))-xr\*sin(theta);

rotatemat[0][0]=cos(theta);

rotatemat[0][1]=-sin(theta);

rotatemat[0][2]=m;

rotatemat[1][0]=sin(theta);

rotatemat[1][1]=cos(theta);

rotatemat[1][2]=n;

rotatemat[2][0]=0;

rotatemat[2][1]=0;

rotatemat[2][2]=1;

multiply();

}

void draw\_triangle(){

glLineWidth(10);

glBegin(GL\_LINE\_LOOP);

glColor3f(1.0,0.0,0.0);

glVertex2f(t[0][0],t[1][0]);

glColor3f(0.0,1.0,0.0);

glVertex2f(t[0][1],t[1][1]);

glColor3f(0.0,0.0,1.0);

glVertex2f(t[0][2],t[1][2]);

glEnd();

glFlush();

}

void draw\_rotated\_triangle(){

glLineWidth(10);

glBegin(GL\_LINE\_LOOP);

glColor3f(1.0,0.0,0.0);

glVertex2f(result[0][0],result[1][0]);

glColor3f(0.0,1.0,0.0);

glVertex2f(result[0][1],result[1][1]);

glColor3f(0.0,0.0,1.0);

glVertex2f(result[0][2],result[1][2]);

glEnd();

glFlush();

}

void display(){

glClear(GL\_COLOR\_BUFFER\_BIT);

if(ch==1){

draw\_triangle();

rotate\_about\_origin();

draw\_rotated\_triangle();

glFlush();

}

if(ch==2){

draw\_triangle();

rotate\_about\_fixed\_point();

draw\_rotated\_triangle();

glFlush();

}

}

void myinit(){

glClearColor(1.0,1.0,1.0,1.0);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D(-50.0,50.0,-50.0,50.0);

}

int main(int argc,char\*\* argv){

printf("\*\*\*Rotation\*\*\*\n1.Rotation about origin\n2.Rotation about a fixed point (xr,yr)\n");

printf("Enter choice\n");

scanf("%d",&ch);

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

scanf("%f",&theta);

theta=theta\*(3.14/180);

glutInit(&argc,argv);

glutInitDisplayMode(GLUT\_SINGLE|GLUT\_RGB);

glutInitWindowSize(500,500);

glutInitWindowPosition(0,0);

glutCreateWindow("Triangle Rotation\n");

glutDisplayFunc(display);

myinit();

glutMainLoop();

return 0;

}

 

 