#define BLACK 0

#include <stdio.h>

#include <math.h>

#include <GL/glut.h>

GLfloat house[3][3]={{100.0,250.0,175.0},{100.0,100.0,300.0},{1.0,1.0,1.0}};

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

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

GLfloat arbitrary\_x=0;

GLfloat arbitrary\_y=0;

float rotation\_angle;

void multiply()

{

int i,j,k;

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

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

{

result[i][j]=0;

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

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

}

}

void rotate()

{

GLfloat m,n;

m=-arbitrary\_x\*(cos(rotation\_angle) -1) + arbitrary\_y \* (sin(rotation\_angle));

n=-arbitrary\_y \* (cos(rotation\_angle) - 1) -arbitrary\_x \* (sin(rotation\_angle));

rotatemat[0][0]=cos(rotation\_angle);

rotatemat[0][1]=-sin(rotation\_angle);

rotatemat[0][2]=m;

rotatemat[1][0]=sin(rotation\_angle);

rotatemat[1][1]=cos(rotation\_angle);

rotatemat[1][2]=n;

rotatemat[2][0]=0;

rotatemat[2][1]=0;

rotatemat[2][2]=1;

//multiply the two matrices

multiply();

}

void drawhouse()

{

glColor3f(0.0, 0.0, 1.0);

glBegin(GL\_LINE\_LOOP);

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

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

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

glEnd();

}

void drawrotatedhouse()

{

glColor3f(1.0, 0.0, 0.0);

glBegin(GL\_LINE\_LOOP);

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

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

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

glEnd();

}

void display()

{

glClear(GL\_COLOR\_BUFFER\_BIT);

drawhouse();

drawrotatedhouse();

glFlush();

}

void myinit()

{

glClearColor(1.0,1.0,1.0,1.0);

glColor3f(1.0,0.0,0.0);

glPointSize(1.0);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D(0.0,499.0,0.0,499.0);

}

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

{

int ch;

printf("Enter your choice \n1: Rotation about origin \n2: Rotation about a Fixed point\n");

scanf("%d",&ch);

switch(ch)

{

case 1: printf("Enter the rotation angle in degree :");

scanf("%f", &rotation\_angle);

rotation\_angle= (3.14 \* rotation\_angle) / 180;

rotate();

break;

case 2: printf("Enter the fixed points :");

scanf("%f%f", &arbitrary\_x,&arbitrary\_y);

printf("Enter rotation angle in degree :");

scanf("%f", &rotation\_angle);

rotation\_angle= (3.14 \* rotation\_angle) / 180;

rotate();

break;

}

glutInit(&argc,argv);

glutInitDisplayMode(GLUT\_SINGLE|GLUT\_RGB);

glutInitWindowSize(500,500);

glutInitWindowPosition(0,0);

glutCreateWindow("house rotation");

glutDisplayFunc(display);

myinit();

glutMainLoop();

return 0;

}