Program 5

Write a program to create a house like figure and perform the following operation.

(i) Rotate it about a given fixed point using OpenGL transformation functions.

(ii) Reflect it about an axis y=mx+c using OpenGL transformation functions.

```c
#include <gl/glut.h>
#include <math.h>
#include <stdlib.h>
#include <stdio.h>

float house[11][2] = {{100,200}, {200,500}, {300,200}, {100,200},
                      {100,100}, {175,100}, {175,150}, {225,150},
                      {225,100}, {300,100}, {300,200}};

int angle;
float m,c,theta;
void display()
{
    glClearColor(1,1,1,0);
    glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-450,450,-450,450);
    glMatrixMode(GL_MODELVIEW);
    glLoadIdentity();
```

```
glColor3f (1,0,0);
glBegin ( GL_LINE_LOOP);
for ( int i=0; i< 11; i++)
        glVertex2fv (house[i]);
glEnd ();
glFlush ();

glPushmatrix ();
glTranslate (100,100,0);
glRotatef ( angle, 0,0,1);
glTranslate (-100,-100,0);
glColor3f (1,1,0);
glBegin ( GL_LINE_LOOP);
for (int i=0; i <11; i++)
        glVertex2fv (house[i]);
glEnd ();
glPopmatrix ();
glFlush ();
}
void display2 ()
{
        glClearColor (1,1,1,0);
        glClear (GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT);
        glmatrixmode ( GL_PROJECTION);
        glLoadIdentity ();
        gluOrtho2D (-450, 450, -450, 450);
        glMatrixmode ( GL_MODEL_VIEW);
        glLoadIdentify ();
        glColor3f (1,0,0);
        glBegin ( GL_LINE_LOOP);
```

```
for (int i=0; i <11; i++)
        glvertex2fv (house[i]);
glEnd ();
glFlush();


float    x1=0, x2 =500;
float    y1=m*x1+c;
float    y2 = m*x2+c;
glcolor3f (1,1,0);
glBegin ( GL_LINES);
glvertex2f (x1,y1);
glvertex2f (x2,y2);
glEnd ();
glFlush();


glpushmatrix ();
glTranslatef ( 0, c, 0);
theta = aton(m);
theta = theta * 180 / 3.14;
glrotatef (theta, 0, 0, 1);
glscalef (1, -1, 1);
glrotatef (-theta, 0, 0, 1);
glTranslatef (0, -c, 0);
glBegin ( GL_LINE_LOOP);
    for (int i=0; i<11; i++)
            glvertex2fv (house[i]);
glEnd();
glpopmatrix ();
glFlush();
```

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```
void myInit() {
    glClearColor(1.0,1.0,1.0,1.0);
    glColor3f(t.0, 0.0,0.0);
    glLineWidth(2.0);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-450, 450, -450, 450);
}

void mouse(int btn, int state, int x, int y)
{
    if (btn == GLUT_LEFT_BUTTON && state == GLUT_DOWN) {

        display();

    }
    else if (btn == GLUT_REGHT_BUTTON && state == GLUT_DOWN) {
        display2();

    }
}

void main(int argc, char** argv)
{
        printf("Enter the rotation angle\n");
        scanf_s("%d", &angle);
        printf("enter c and m value for line y = mx+c\n");
        scanf_s("%f%f", &c, &m);
        glutInit(&argc, argv);
        glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
        glutInitWindowSize(900,900);
        glutWindowPosition(100,100);
        glutCreateWindow("House Rotation");
        myInit();
        glutMainLoop();
}
```
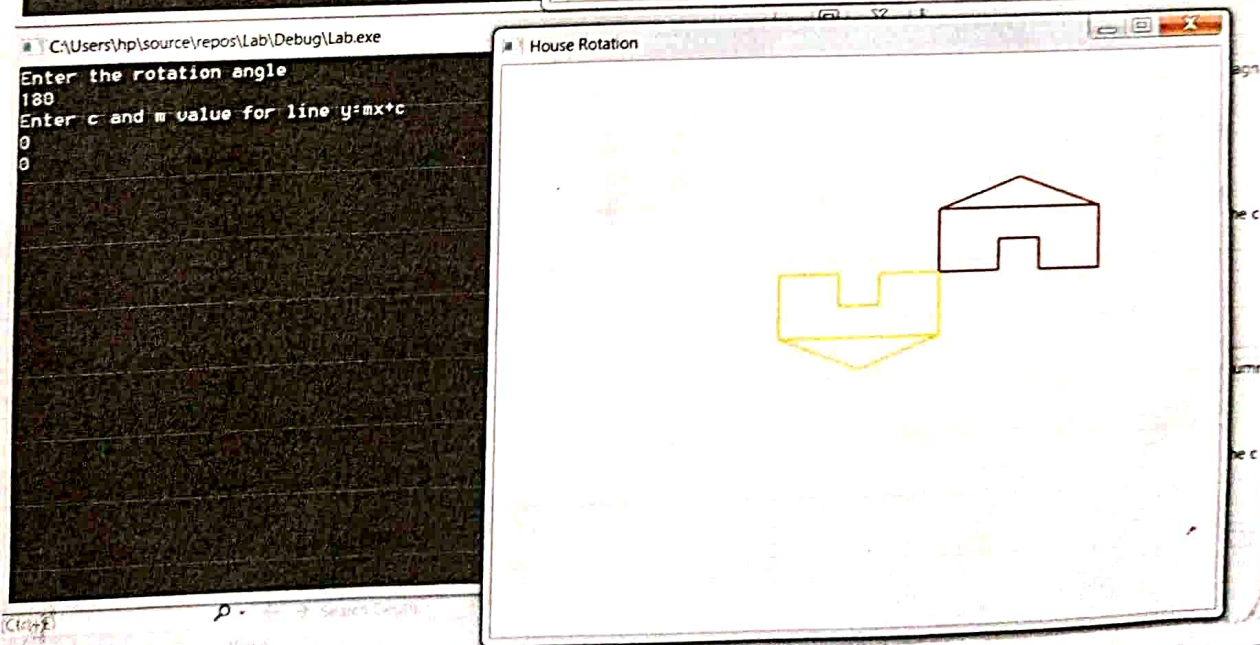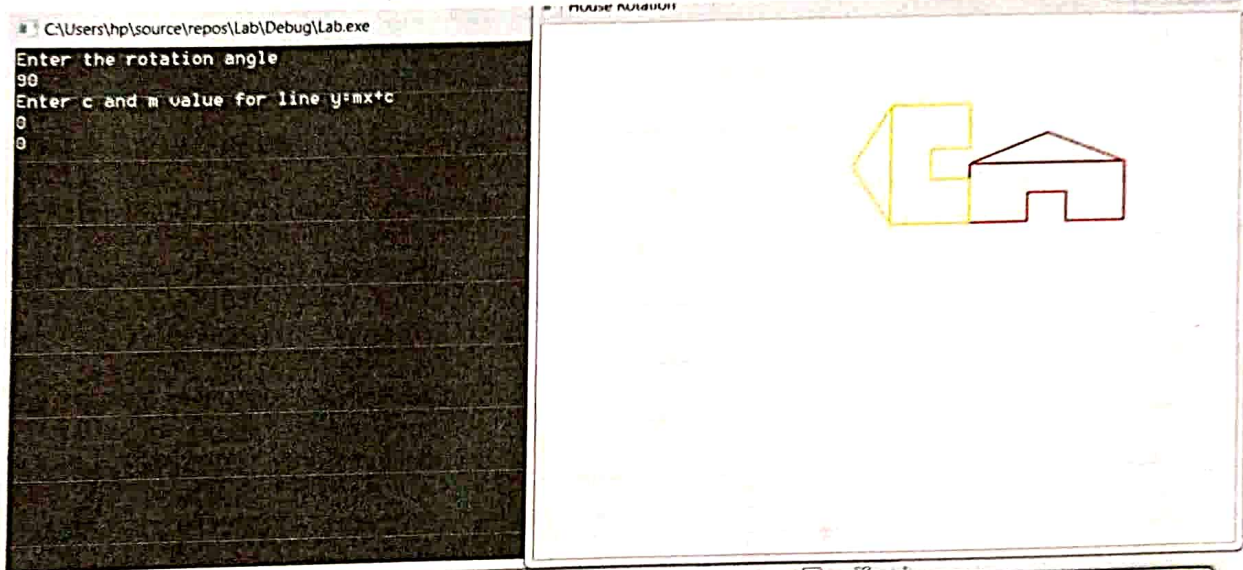
Output:-


```
C:\Users\hp\source\repos\Lab\Debug\Lab.exe
Enter the rotation angle
90
Enter c and m value for line y=mx+c
0
0
```



```
C:\Users\hp\source\repos\Lab\Debug\Lab.exe
Enter the rotation angle
180
Enter c and m value for line y=mx+c
0
0
```

C:\Users\hp\source\repos\Lab\Debug\Lab.exe
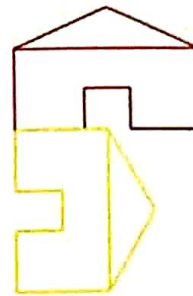
```
Enter the rotation angle
270
Enter c and m value for line y=mx+c
2
3
```

House Rotation

C:\Users\hp\source\repos\Lab\Debug\Lab.exe

```
Enter the rotation angle
360
Enter c and m value for line y=mx+c
2
3
```