CGV ASSIGNMENT

House rotation

Code:

```
#include <stdio.h>
#include <math.h>
#include <GL/glut.h>

GLfloat house[3][9]= {
{100.0,100.0,175.0,250.0,250.0,150.0,150.0,200.0,200.0},
  {100.0,300.0,400.0,300.0,100.0,100.0,150.0,150.0,100.0},
  {1.0,1.0,1.0,1.0,1.0,1.0,1.0,1.0,1.0}
                        };
GLfloat rot_mat[3][3]={   {0}, {0},  {0}  };
GLfloat result[3][9]={  {0}, {0}, {0}  };
GLfloat x=100.0,y=100.0; // Pivot point
GLfloat theta;

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++)
```

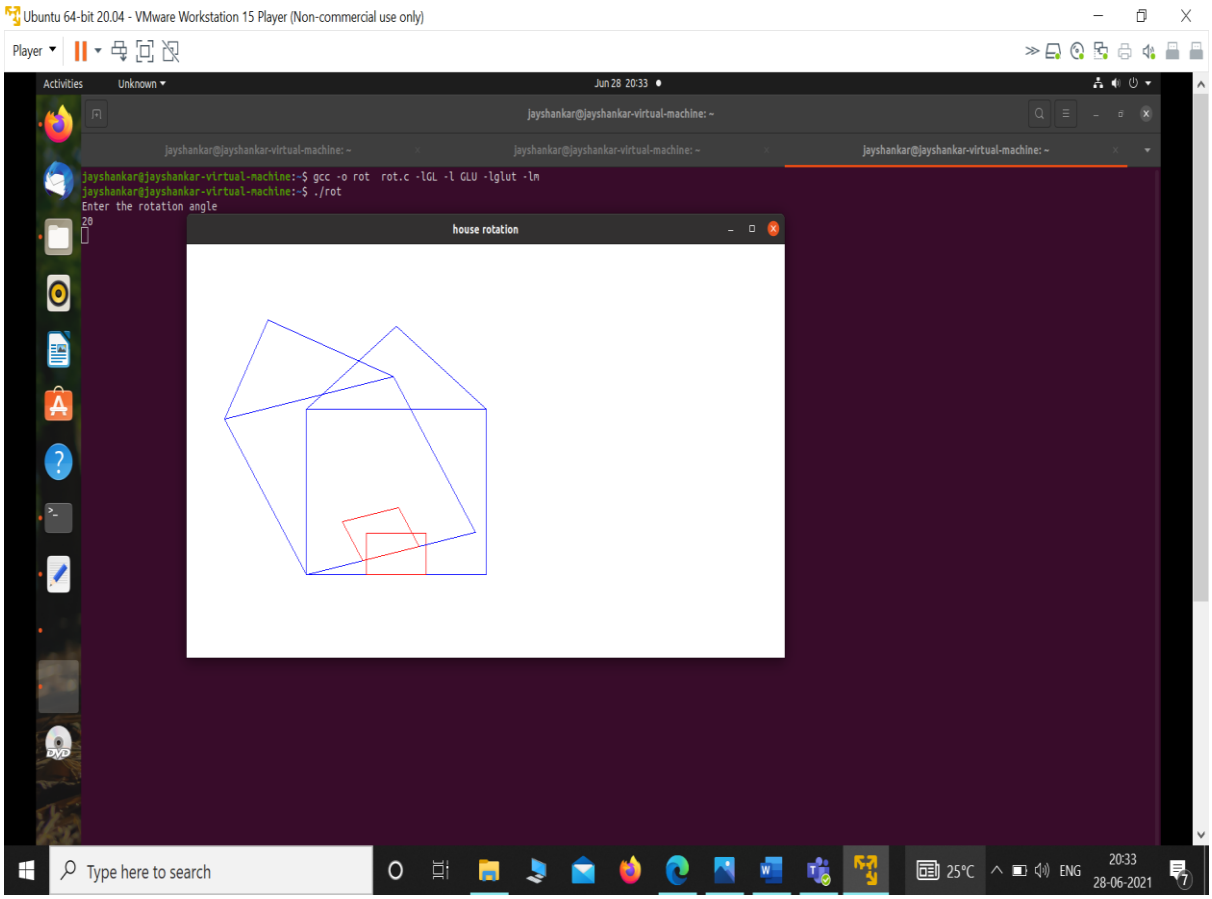
```
                result[i][j]=result[i][j]+rot_mat[i][k]*house[k][j];
        }
}

void rotate()    // Build the rotation matrix
{
        GLfloat m,n;
        m=x-(x*cos(theta))+(y*sin(theta));
        n=y-(x*sin(theta))-(y*cos(theta));
rot_mat[0][0]=cos(theta);
        rot_mat[0][1]=-sin(theta);
        rot_mat[0][2]=m;
        rot_mat[1][0]=sin(theta);
        rot_mat[1][1]=cos(theta);
        rot_mat[1][2]=n;
        rot_mat[2][0]=0;
        rot_mat[2][1]=0;
        rot_mat[2][2]=1;
        //multiply the two matrices: Rotation Matrix * Objet Matrix(house)
        multiply();
}

void drawhouse()
{
glColor3f(0.0, 0.0, 1.0);
glBegin(GL_LINE_LOOP);
```

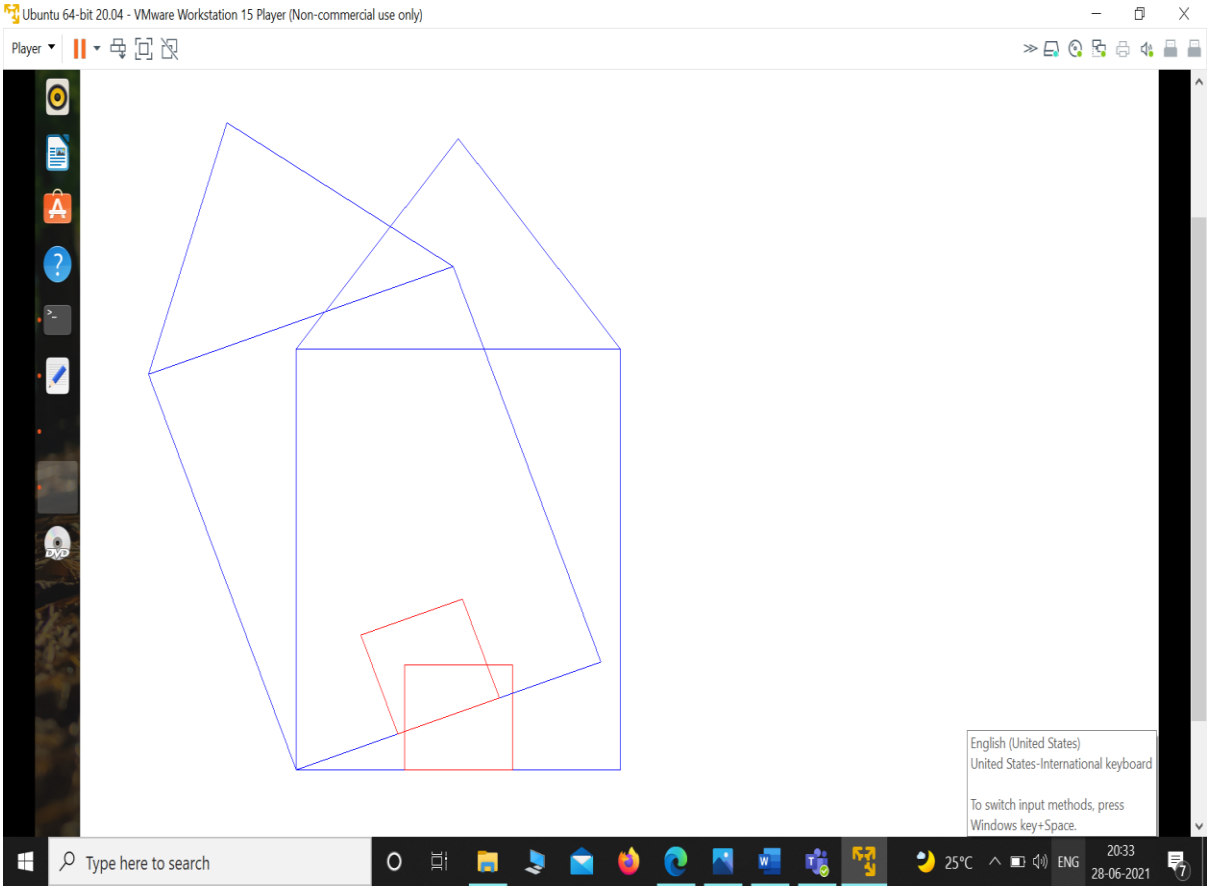
```
                glVertex2f(house[0][0],house[1][0]);
                glVertex2f(house[0][1],house[1][1]);
                glVertex2f(house[0][3],house[1][3]);
                glVertex2f(house[0][4],house[1][4]);
glEnd();

glColor3f(1.0,0.0,0.0);
glBegin(GL_LINE_LOOP);
                glVertex2f(house[0][5],house[1][5]);
                glVertex2f(house[0][6],house[1][6]);
                glVertex2f(house[0][7],house[1][7]);
                glVertex2f(house[0][8],house[1][8]);
glEnd();

glColor3f(0.0, 0.0, 1.0);
glBegin(GL_LINE_LOOP);
                glVertex2f(house[0][1],house[1][1]);
                glVertex2f(house[0][2],house[1][2]);
                glVertex2f(house[0][3],house[1][3]);
glEnd();
}

void drawrotatedhouse()
{
glColor3f(0.0, 0.0, 1.0);
glBegin(GL_LINE_LOOP);
```

```
                glVertex2f(result[0][0],result[1][0]);
                glVertex2f(result[0][1],result[1][1]);
                glVertex2f(result[0][3],result[1][3]);
                glVertex2f(result[0][4],result[1][4]);
glEnd();

glColor3f(1.0,0.0,0.0);
glBegin(GL_LINE_LOOP);
                glVertex2f(result[0][5],result[1][5]);
                glVertex2f(result[0][6],result[1][6]);
                glVertex2f(result[0][7],result[1][7]);
                glVertex2f(result[0][8],result[1][8]);
glEnd();

glColor3f(0.0, 0.0, 1.0);
glBegin(GL_LINE_LOOP);
                glVertex2f(result[0][1],result[1][1]);
                glVertex2f(result[0][2],result[1][2]);
                glVertex2f(result[0][3],result[1][3]);
glEnd();
}
void display()
{
glClear(GL_COLOR_BUFFER_BIT);
drawhouse();
rotate();
```

```
drawrotatedhouse();
glFlush();
}

void myinit()
{
	glClearColor(1.0,1.0,1.0,1.0);
	glMatrixMode(GL_PROJECTION);
	glLoadIdentity();
	gluOrtho2D(0.0,499.0,0.0,499.0);
}

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

	printf("Enter the rotation angle\n");
	scanf("%f", &theta);
	theta=(3.14/180)*theta;
	glutInit(&argc,argv);
	glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
	glutInitWindowSize(500,500);
	glutCreateWindow("house rotation");
	glutDisplayFunc(display);
	myinit();
	glutMainLoop();
}
```

Output:


Ubuntu 64-bit 20.04 - VMware Workstation 15 Player (Non-commercial use only)
Player
Activities
Unknown
Jun 28 20:33
jayshankar@jayshankar-virtual-machine: ~
jayshankar@jayshankar-virtual-machine:~$ gcc -o rot rot.c -lGL -l GLU -lglut -lm
jayshankar@jayshankar-virtual-machine:~$ ./rot
Enter the rotation angle
20
house rotation
Type here to search
25°C
ENG
20:33
28-06-2021


Ubuntu 64-bit 20.04 - VMware Workstation 15 Player (Non-commercial use only)
Player
English (United States)
United States-International keyboard
To switch input methods, press
Windows key+Space.
Type here to search
25°C
ENG
20:33
28-06-2021