

## 2. Create and rotate a triangle about the origin and a fixed point.

```

#include<GL/glut.h>
#include<stdio.h>
int x,y;
int where_to_rotate=0;           // don't rotate initially
float rotate_angle=0;           // initial angle
float translate_x=0,translate_y=0; // initial translation

void draw_pixel(float x1 , float y1)
{
    glPointSize(5);
    glBegin(GL_POINTS);
        glVertex2f(x1,y1);       // plot a single point
    glEnd();
}

void triangle(int x, int y)
{
    glColor3f(1,0,0);
    glBegin(GL_POLYGON);       // drawing a Triangle
        glVertex2f(x,y);
        glVertex2f(x+400,y+300);
        glVertex2f(x+300,y+0);
    glEnd();
}

void display()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glLoadIdentity();

    glColor3f(1,1,1);           // mark origin point as white dot
    draw_pixel(0,0);           // plot origin - white colour

    if (where_to_rotate == 1) // rotate around origin
    {
        translate_x = 0;           // no translation for rotation around origin
        translate_y = 0;
        rotate_angle += 1;       // the amount of rotation angle
    }
    if (where_to_rotate == 2) // rotate around Fixed Point
    {
        translate_x = x;           // SET the translation to wherever the customer says
        translate_y = y;
        rotate_angle += 1;       // the amount of rotation angle
        glColor3f(0,0,1);       // mark the customer coordinate as blue dot
        draw_pixel(x,y);         // plot the customer coordinate - blue colour
    }
}

```

```

glTranslatef(translate_x, translate_y, 0); // ACTUAL translation +ve
glRotatef(rotate_angle, 0, 0, 1); // rotate
glTranslatef(-translate_x, -translate_y, 0); // ACTUAL translation -ve

triangle(translate_x, translate_y); // what to rotate? - TRIANGLE boss

glutPostRedisplay(); // call display function again and again
glutSwapBuffers(); // show the output
}

void init()
{
glClearColor(0,0,0,1); //setting to black
glMatrixMode(GL_PROJECTION);
glLoadIdentity();
gluOrtho2D(-800, 800, -800, 800);
glMatrixMode(GL_MODELVIEW);
}

void rotateMenu (int option)
{
if(option==1)
where_to_rotate=1; // rotate around origin

if(option==2)
where_to_rotate=2; // rotate around customer's coordinates

if(option==3)
where_to_rotate=3; // stop rotation
}

int main(int argc, char **argv)
{
printf( "Enter Fixed Points (x,y) for Rotation: \n");
scanf("%d %d", &x, &y); // getting the user's coordinates to rotate

glutInit(&argc, argv); // initialize the graphics system
glutInitDisplayMode(GLUT_DOUBLE|GLUT_RGB); // SINGLE also works
glutInitWindowSize(800, 800); // 800 by 800 size..you can change it
glutInitWindowPosition(0, 0); // where do you wanna see your window
glutCreateWindow("Create and Rotate Triangle"); // title

init(); // initialize the canvas

glutDisplayFunc(display); // call display function

glutCreateMenu(rotateMenu); // menu items
glutAddMenuEntry("Rotate around ORIGIN",1);
glutAddMenuEntry("Rotate around FIXED POINT",2);
}

```

```

glutAddMenuEntry("Stop Rotation",3);
glutAttachMenu(GLUT_RIGHT_BUTTON);

glutMainLoop();           // run forever
}

```

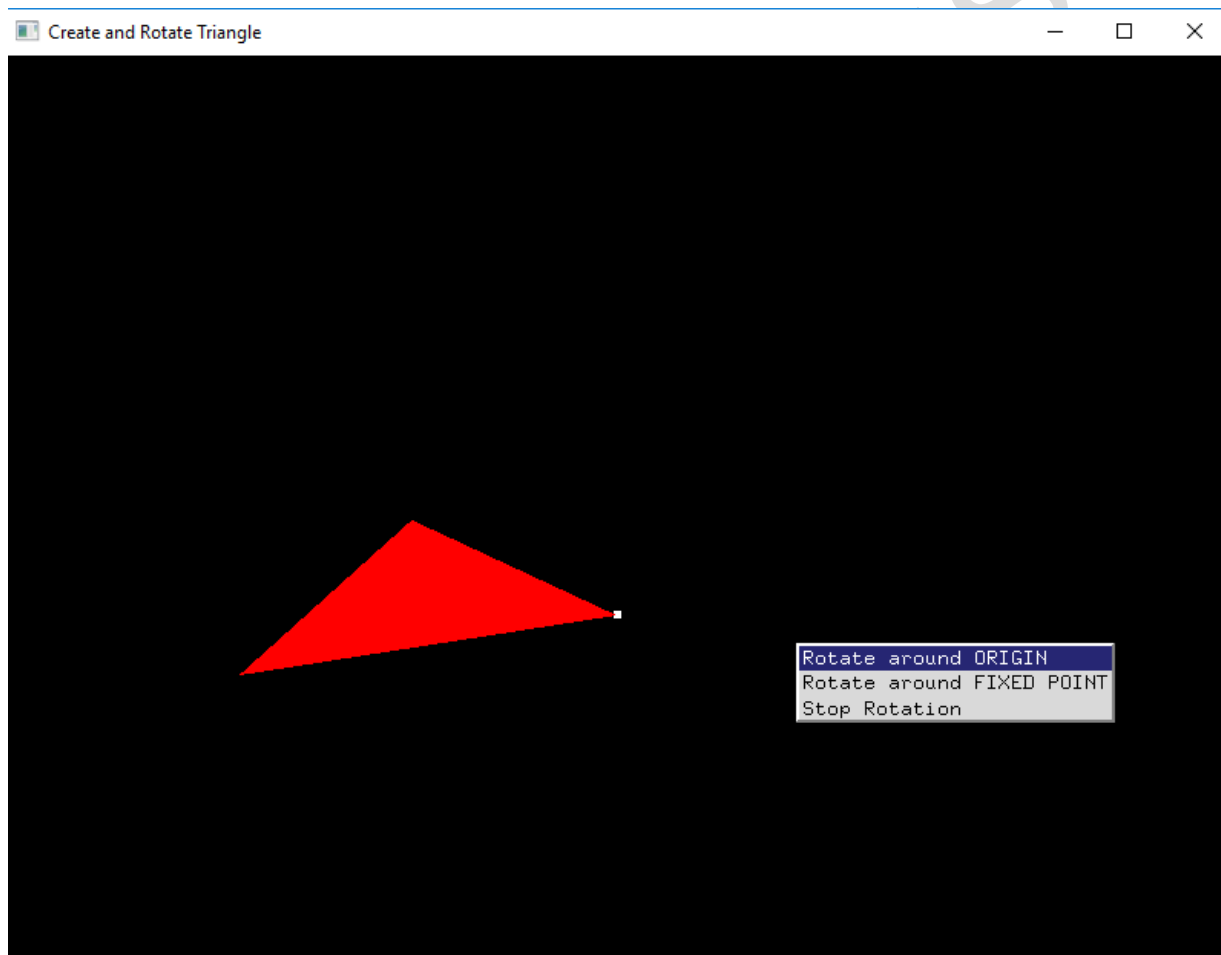
## OUTPUT

```

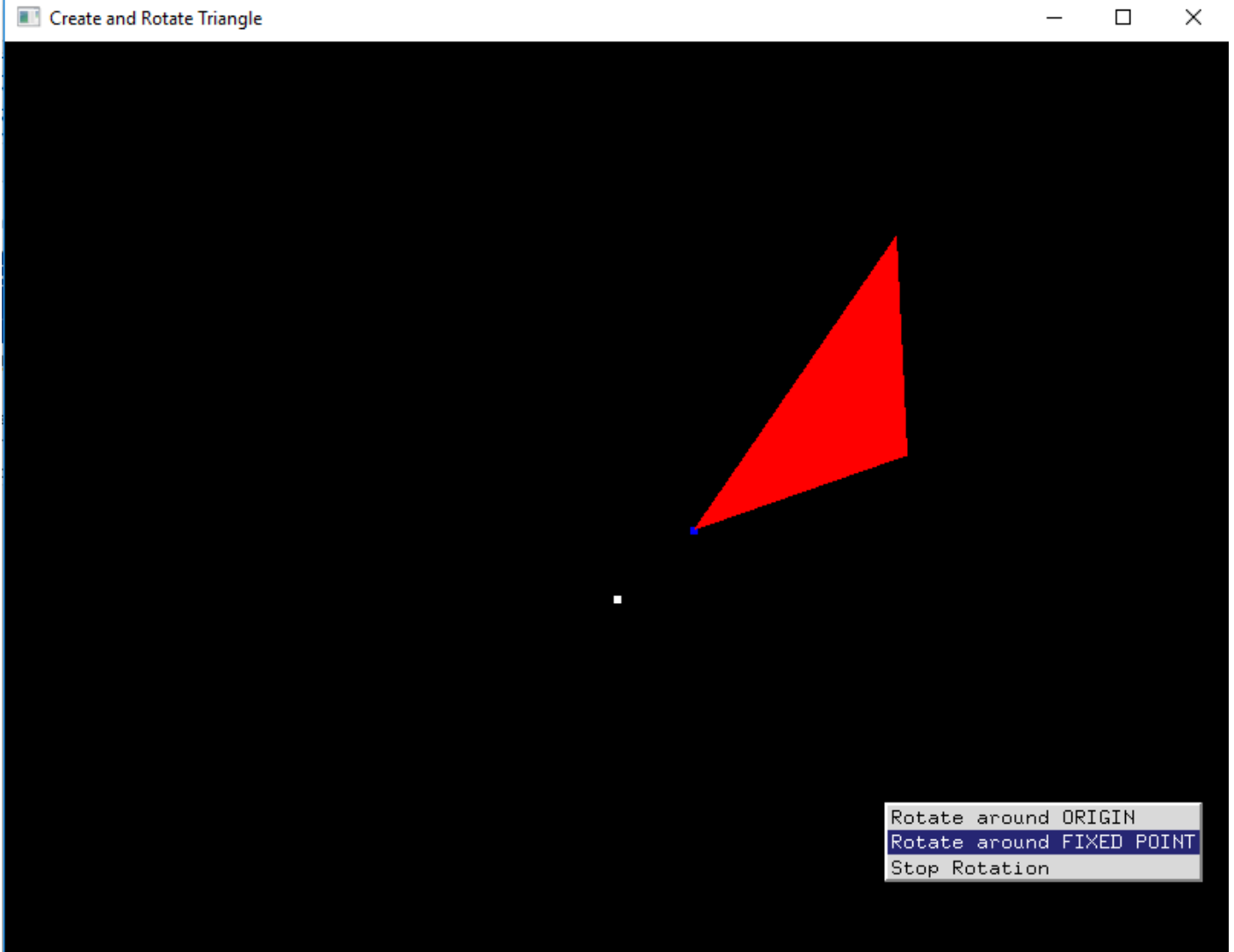
"C:\Users\Shankara\Dropbox\CG\Lab Final\temp\2\bin\Debug\2.exe"
Enter Fixed Points (x,y) for Rotation:
100
100

```

if we select "Rotate around ORIGIN" option



if we select "Rotate around FIXED POINT" option



SHANKAR