

2. Program to create and rotate a triangle about the origin and a fixed point.

Objective:

In this program, students will learn to rotate a triangle about its fixed point and origin using openGL functions.

Program:

```
//Lab2: rotate a triangle about the origin and a fixed point
```

```
#include<windows.h>
```

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

```
#include<stdio.h>
```

```
int x=100,y=100; //fixed points
```

```
int rFlag=0;
```

```
float th=0.0;
```

```
void draw_pixel(float x1,float y1)
```

```
{
    glColor3f(0.0,0.0,1.0);
    glPointSize(5.0);
    glBegin(GL_POINTS);
    glVertex2f(x1,y1);
    glEnd();
}
```

```
void triangle()
```

```
{
    glBegin(GL_POLYGON);
    glVertex2f(100,100);
    glVertex2f(100,400);
    glVertex2f(300,100);
    glEnd();
}
```

```
void display()
```

```
{
    glClear(GL_COLOR_BUFFER_BIT);
    glLoadIdentity();
    glColor3f(1.0,1.0,0.0);
    triangle(); //original triangle
    if(rFlag==1) //Rotate Around origin
    {
        draw_pixel(0.0,0.0); //draw origin
        glRotatef(th,0.0,0.0,1.0);
        glColor3f(1.0,0.0,0.0);
        triangle(); //rotated triangle
    }
}
```

```
if(rFlag==2) //Rotate Around Fixed Point
{
    draw_pixel(x,y);//draw fixed point
    glTranslatef(x,y,0.0);
    glRotatef(th,0.0,0.0,1.0);
    glTranslatef(-x,-y,0.0);
    glColor3f(0.0,1.0,0.0);
    triangle(); //rotated triangle
}
glutPostRedisplay();
glutSwapBuffers();
}

void myInit()
{
    glClearColor(0.0,0.0,0.0,1.0);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-500.0, 500.0, -500.0, 500.0);
    glMatrixMode(GL_MODELVIEW);
}
void rotateMenu (int option)
{
    if(option==1)
    rFlag=1;
    if(option==2)
    rFlag=2;
    if(option==3)
    rFlag=3;
}

int main(int argc, char **argv)
{
    printf("\nEnter the rotation angle\n");
    scanf("%f",&th);
    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_DOUBLE|GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(0, 0);
    glutCreateWindow("Create and Rotate Triangle");
    myInit();
    glutDisplayFunc(display);
    glutCreateMenu(rotateMenu);
    glutAddMenuEntry("Rotate around ORIGIN",1);
    glutAddMenuEntry("Rotate around FIXED POINT",2);
    glutAddMenuEntry("Stop Rotation",3);
    glutAttachMenu(GLUT_RIGHT_BUTTON);
    glutMainLoop();
    return 0;
}
```

OUTPUT:



