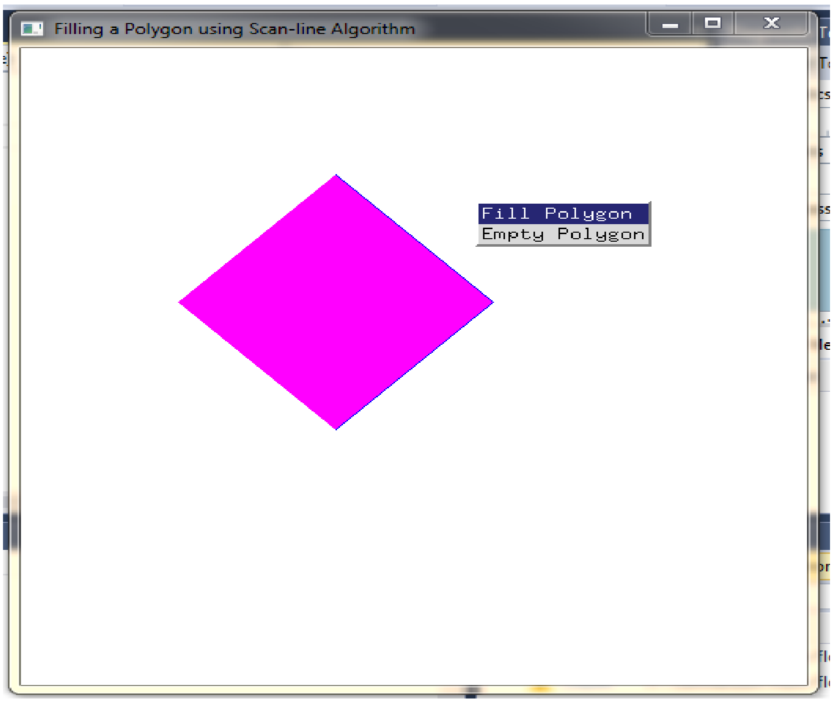
9. Develop a menu driven program to fill the polygon using scan line algorithm

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

float x1, x2, x3, x4, y1, y2, y3, y4;
int fillFlag = 0;

void edgedetect(float x1, float y1, float x2, float y2, int *le, int *re)
{
    float mx, x, temp;
    int i;
    if ((y2 - y1)<0) // we swap so we don't get a negative slope
    {

        temp = y1;
        y1 = y2;
        y2 = temp;
        temp = x1;
        x1 = x2;
        x2 = temp;
    }

    if ((y2 - y1)! = 0)  // to find the slope if not zero i.e., not only a horizontal line
        mx = (x2 - x1) / (y2 - y1);

    else
        mx = x2 - x1;
        // slope is mx

        x = x1;
    for (i = y1; i <= y2; i++)  // follow along the edge of the polygon
    {

        if (x < le[i])
            le[i] = x;

        if (x > re[i])
            re[i] = x;

        x += mx;
    }
}
```

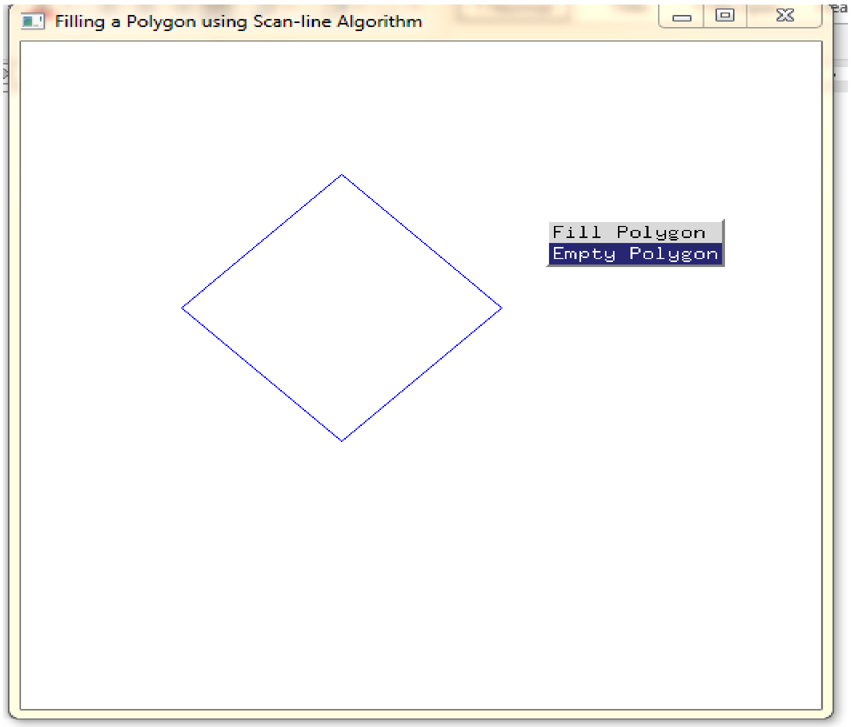
```
void draw_pixel(int x, int y)
{
	glColor3f(1.0, 1.0, 0.0);
	glBegin(GL_POINTS);
	glVertex2i(x, y);
	glEnd();
}

void scanfill(float x1, float y1, float x2, float y2, float x3, float y3, float x4, float y4)

{
	int le[500], re[500]; // left edge and right edge
	int i, y;

	for (i = 0; i<500; i++)
	{

		le[i] = 500;
		re[i] = 0;
	}
	edgedetect(x1, y1, x2, y2, le, re);
	edgedetect(x2, y2, x3, y3, le, re);
	edgedetect(x3, y3, x4, y4, le, re);
	edgedetect(x4, y4, x1, y1, le, re);

	for (y = 0; y<500; y++)
	{
		for (i = le[y]; i<re[y]; i++)
			draw_pixel(i, y);
	}
}

void display()
{
	x1 = 200.0; y1 = 200.0; x2 = 100.0; y2 = 300.0; x3 = 200.0; y3 = 400.0; x4 = 300.0;
y4 = 300.0;
	glClear(GL_COLOR_BUFFER_BIT);
	glColor3f(0.0, 0.0, 1.0);
	glBegin(GL_LINE_LOOP);
	glVertex2f(x1, y1);
	glVertex2f(x2, y2);
	glVertex2f(x3, y3);
	glVertex2f(x4, y4);
	glEnd();
	if (fillFlag == 1)
		scanfill(x1, y1, x2, y2, x3, y3, x4, y4);
	glFlush();
}
```

```
void init()
{
	glClearColor(0.0, 0.0, 0.0, 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);
}

void fillMenu(int option)
{
	if (option == 1)
		fillFlag = 1;
	if (option == 2)
		fillFlag = 2;

	display();
}

void main(int argc, char* argv[])
{
	glutInit(&argc, argv);
	glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
	glutInitWindowSize(500, 500);
	glutInitWindowPosition(0, 0);
	glutCreateWindow("Filling a Polygon using Scan-line Algorithm");
	init();
	glutDisplayFunc(display);
	glutCreateMenu(fillMenu);
	glutAddMenuEntry("Fill Polygon", 1);
	glutAddMenuEntry("Empty Polygon", 2);
	glutAttachMenu(GLUT_RIGHT_BUTTON);
	glutMainLoop();
}
```

Output



Filling a Polygon using Scan-line Algorithm
Fill Polygon
Empty Polygon



Filling a Polygon using Scan-line Algorithm
Fill Polygon
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