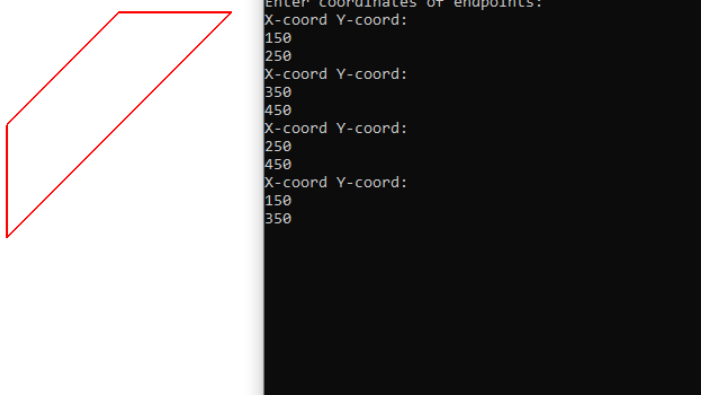
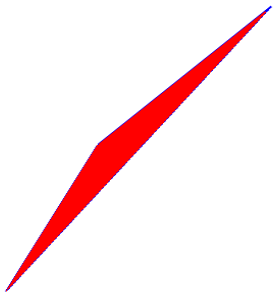
4. Write a program to fill any given polygon using scan-line area filling algorithm.

```
#include<stdlib.h>
#include<gl/glut.h>
#include<stdio.h>
#include<algorithm>
#include<iostream>
#include<windows.h>
using namespace std;
float x[100], y[100];
int n, m;
int wx = 500, wy = 500;
static float intx[10] = { 0 };
void draw_line(float x1, float y1, float x2, float y2) {
	Sleep(100);
	glColor3f(1, 0, 0);
	glBegin(GL_LINES);
	glVertex2f(x1, y1);
	glVertex2f(x2, y2);
	glEnd();
	glFlush();
}
void edgeDetect(float x1, float y1, float x2, float y2, int scanline) {
	float temp;
	if (y2 < y1) {
		temp = x1; x1 = x2; x2 = temp;
		temp = y1; y1 = y2; y2 = temp;
	}
	if (scanline > y1 && scanline < y2)
		intx[m++] = x1 + (scanline - y1) * (x2 - x1) / (y2 - y1);

}
void scanfill(float x[], float y[]) {
	for (int s1 = 0; s1 <= wy; s1++) {
		m = 0;
		for (int i = 0; i < n; i++) {
			edgeDetect(x[i], y[i], x[(i + 1) % n], y[(i + 1) % n], s1);
		}
		sort(intx, (intx + m));
		if (m >= 2)

			for (int i = 0; i < m; i = i + 2)
				draw_line(intx[i], s1, intx[i + 1], s1);

	}
}
void display_filled_polygon() {
	glClear(GL_COLOR_BUFFER_BIT);
	glLineWidth(2);
	glBegin(GL_LINE_LOOP);
	for (int i = 0; i < n; i++)
		glVertex2f(x[i], y[i]);
	glEnd();
	scanfill(x, y);
```

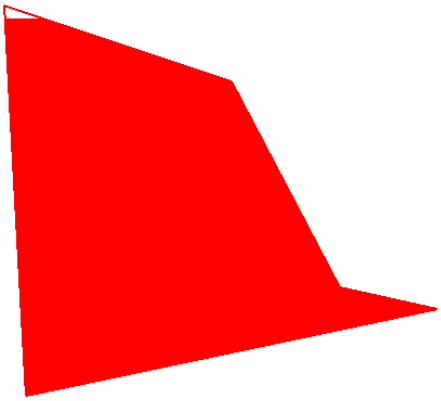
```
}
void myInit() {
	glClearColor(1, 1, 1, 1);
	glColor3f(0, 0, 1);
	glPointSize(1);
	gluOrtho2D(0, wx, 0, wy);
}
void main(int ac, char* av[]) {
	glutInit(&ac, av);
	printf("Enter no. of sides: \n");
	scanf_s("%d", &n);
	printf("Enter coordinates of endpoints: \n");
	for (int i = 0; i < n; i++)
	{
		printf("X-coord Y-coord: \n");
		scanf_s("%f %f", &x[i], &y[i]);
	}
	glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
	glutInitWindowSize(500, 500);
	glutInitWindowPosition(0, 0);
	glutCreateWindow("scanline");
	glutDisplayFunc(display_filled_polygon);
	myInit();
	glutMainLoop();
}
```

OUTPUT





```
Enter no. of sides:
3
Enter coordinates of endpoints:
X-coord Y-coord:
320
420
X-coord Y-coord:
150
250
X-coord Y-coord:
60
70
```



```
Enter no. of sides:
5
Enter coordinates of endpoints:
X-coord Y-coord:
50
450
X-coord Y-coord:
260
380
X-coord Y-coord:
360
190
X-coord Y-coord:
450
170
X-coord Y-coord:
70
90
```

```
Enter no. of sides:
4
Enter coordinates of endpoints:
X-coord Y-coord:
250
120
X-coord Y-coord:
300
80
X-coord Y-coord:
60
90
X-coord Y-coord:
190
200
```

scanline