SSN COLLEGE OF ENGINEERING, KALAVAKKAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UCS1712-Graphics and Multimedia Lab

Programming Assignment 1

DDA Line Drawing Algorithm in C++ using OpenGL

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a) To plot points that make up the line with endpoints (x0,y0) and (xn,yn) using DDA line drawing algorithm.

Case 1: +ve slope Left to Right line

Case 2: +ve slope Right to Left line

Case 3: -ve slope Left to Right line

Case 4: -ve slope Right to Left line

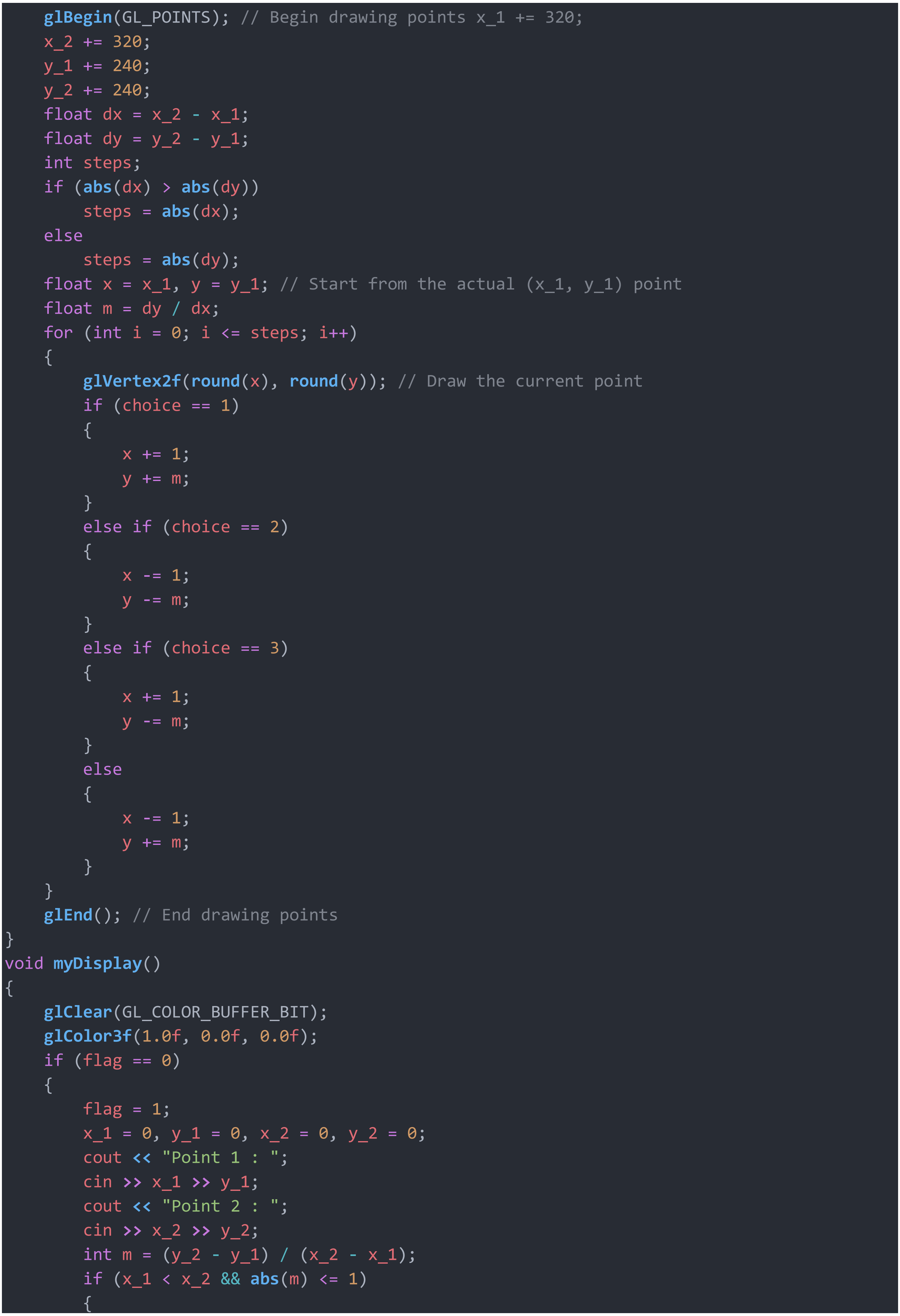
Each case has two subdivisions

(i) |m|<= 1 (ii) |m|>1

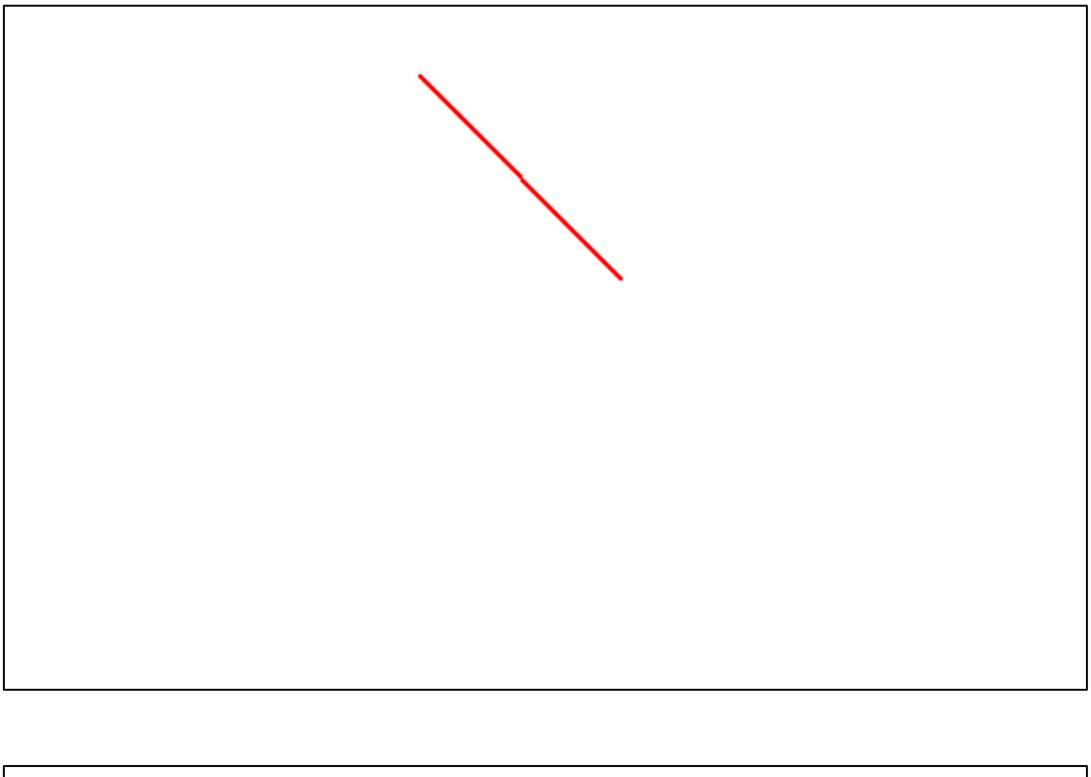
Note that all four cases of line drawing must be given as test cases.

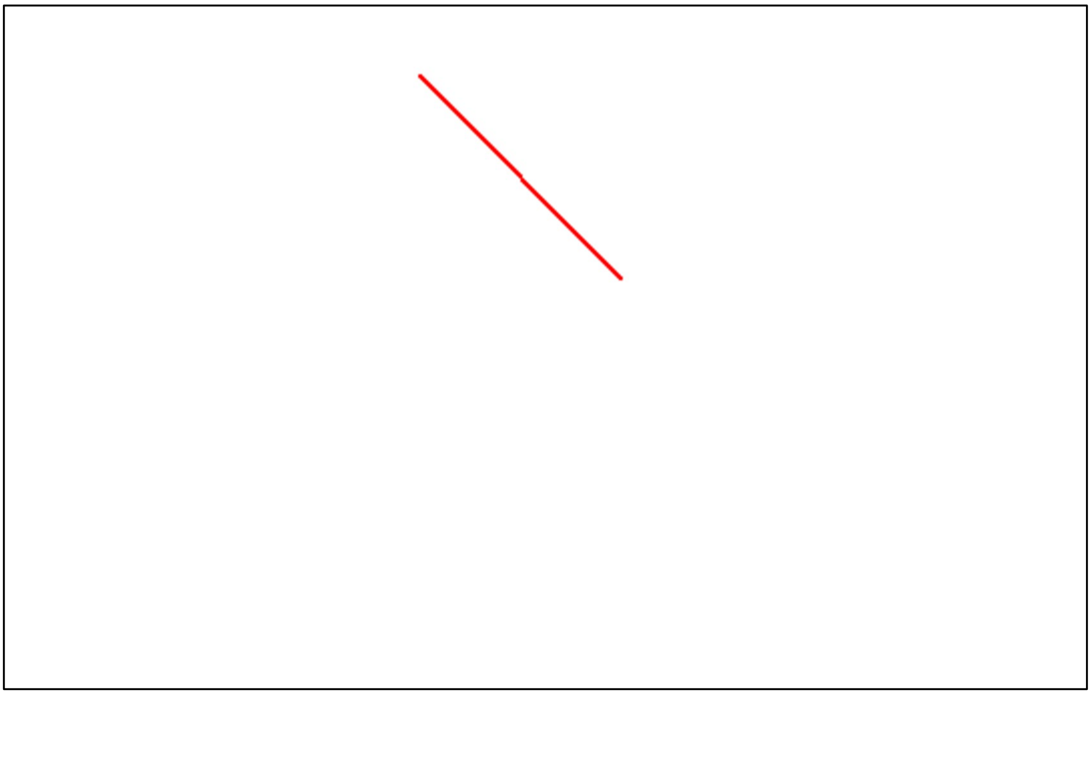
Source code:

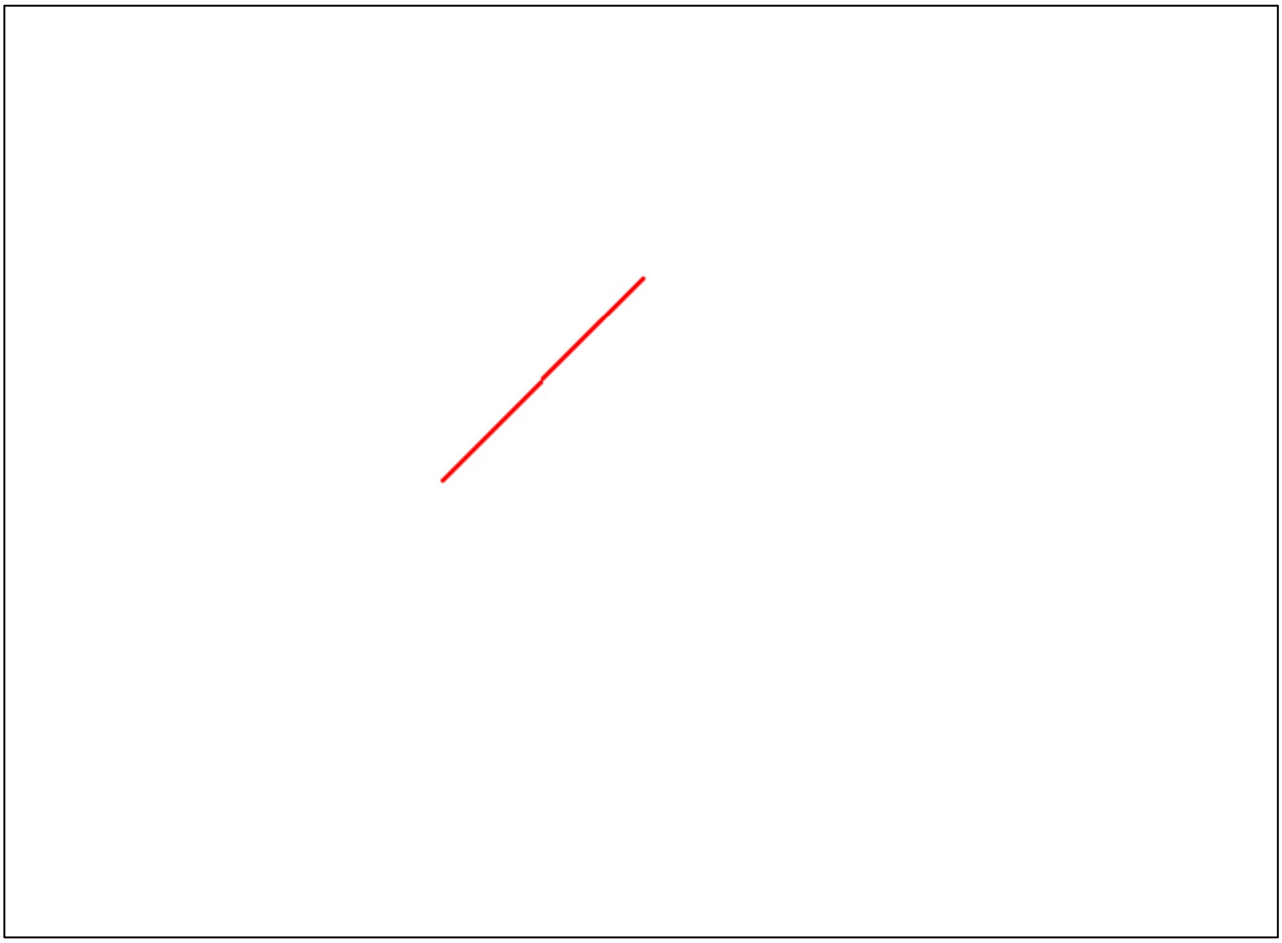
```
include <iostream>

#include <cmath>
#include <GLUT/glut.h>

using namespace std;
int choice = 0, flag = 0;
float x_1 = 0, y_1 = 0, x_2 = 0, y_2 = 0;
string cnt = "YES";

void myInit()
{
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glPointSize(2);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(0.0, 640.0, 0.0, 480.0);
}

void drawLine()
{
```

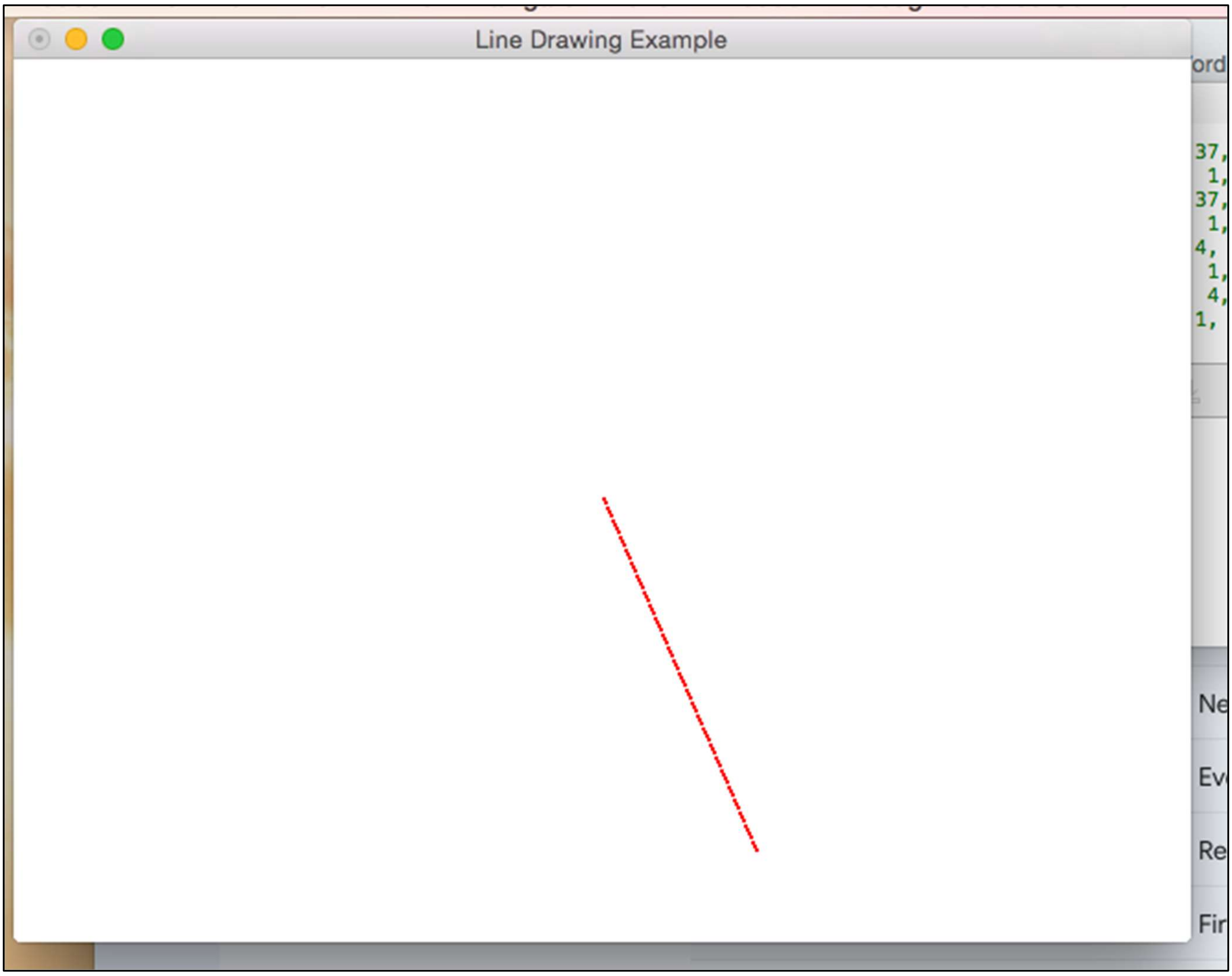


```
    glBegin(GL_POINTS); // Begin drawing points x_1 += 320;
    x_2 += 320;
    y_1 += 240;
    y_2 += 240;
    float dx = x_2 - x_1;
    float dy = y_2 - y_1;
    int steps;
    if (abs(dx) > abs(dy))
        steps = abs(dx);
    else
        steps = abs(dy);
    float x = x_1, y = y_1; // Start from the actual (x_1, y_1) point
    float m = dy / dx;
    for (int i = 0; i <= steps; i++)
    {
        glVertex2f(round(x), round(y)); // Draw the current point
        if (choice == 1)
        {
            x += 1;
            y += m;
        }
        else if (choice == 2)
        {
            x -= 1;
            y -= m;
        }
        else if (choice == 3)
        {
            x += 1;
            y -= m;
        }
        else
        {
            x -= 1;
            y += m;
        }
    }
    glEnd(); // End drawing points
}
void myDisplay()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glColor3f(1.0f, 0.0f, 0.0f);
    if (flag == 0)
    {
        flag = 1;
        x_1 = 0, y_1 = 0, x_2 = 0, y_2 = 0;
        cout << "Point 1 : ";
        cin >> x_1 >> y_1;
        cout << "Point 2 : ";
        cin >> x_2 >> y_2;
        int m = (y_2 - y_1) / (x_2 - x_1);
        if (x_1 < x_2 && abs(m) <= 1)
        {
            choice = 1;
        }
        else if (x_2 > x_1 && abs(m) <= 1)
        {
            choice = 2;
        }
        else if (x_1 < x_2 && abs(m) > 1)
        {
            choice = 3;
        }
        else
        {
            choice = 4;
        }
    }
    drawLine();
    glFlush();
    cout << "Want to continue (YES/NO) : ";
    cin >> cnt;
    if (cnt == "NO")
    {
        cout << "Exiting...\n";
        exit(0);
    }
    flag = 0;            // Reset flag for the next line
    glutPostRedisplay(); // Continue updating the display
}
int main(int argc, char **argv)
{
    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(640, 480);
    glutCreateWindow("Line Drawing Example");
    myInit();
    glutDisplayFunc(myDisplay);
    glutMainLoop();
    return 0;
}
```








Line Drawing Example