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**UCS1712-Graphics and Multimedia Lab**

**Programming Assignment 3**

**Bresenham’s Line Drawing Algorithm in C++ using OpenGL**

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To plot points that make up the line with endpoints (x0,y0) and (xn,yn) using Bresenham’s 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 <GLUT/glut.h>

#include <cmath>

using namespace std;

int flag = 0;

int 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**()

{

    x\_1 += 320;

    y\_1 += 240;

    x\_2 += 320;

    y\_2 += 420;

**glColor3f**(1.0f, 0.0f, 0.0f);

    float dx = x\_2 - x\_1;

    float dy = y\_2 - y\_1;

    int p = 2 \* dy - dx;

**glBegin**(GL\_POINTS); // Begin drawing pointswhile (x\_1 < x\_2)

    {

**glVertex2f**(x\_1, y\_1);

        x\_1++;

        if (x\_1 >= 0)

        {

            p -= 2 \* dx;

            y\_1++;

        }

        p += 2 \* dx;

    }

**glEnd**();

    // End drawing points

}

void **drawAxes**()

{

**glBegin**(GL\_LINES);

    // Draw X-axis

**glColor3f**(0.0f, 0.0f, 0.0f); // Set color to black

**glVertex2f**(0, 240);          // X-axis starting point

**glVertex2f**(640, 240);        // X-axis ending point

    // Draw Y-axis

**glVertex2f**(320, 0);   // Y-axis starting point

**glVertex2f**(320, 480); // Y-axis ending point

**glEnd**();              // End drawing lines

}

void **myDisplay**()

{

**glClear**(GL\_COLOR\_BUFFER\_BIT);

    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;

    }

**drawAxes**();

**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;

}

 