UCS1712 – GRAPHICS AND MULTIMEDIA LAB

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Lab Exercise 2 : DDA Line Drawing Algorithm in C++ using OpenGL

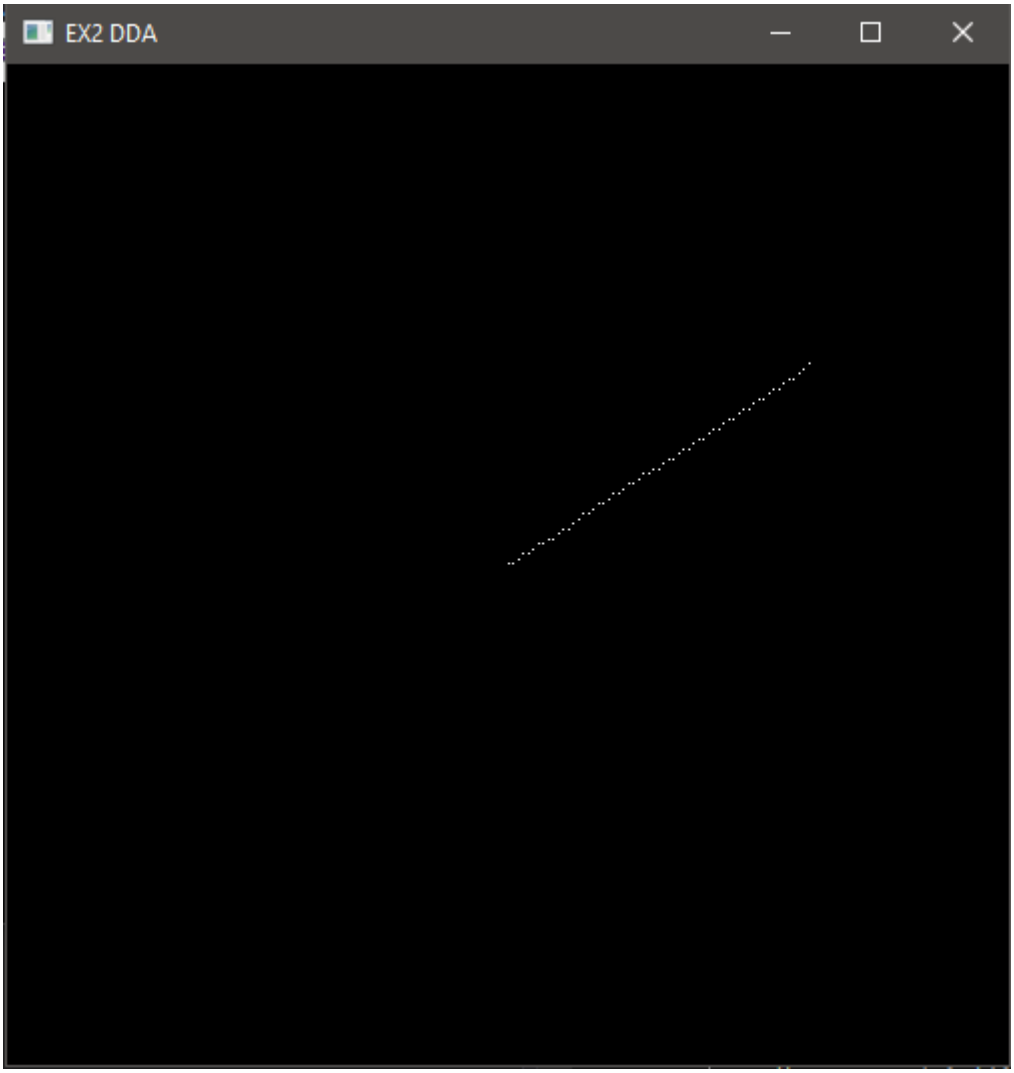
2) To plot points that make up the line with endpoints (x0,y0) and (xn,yn) using DDA line drawing algorithm.

Case 1: +ve slope Left to Right line

- |m|<= 1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = 0;
    float y1 = 0;
    float x2 = 60;
    float y2 = 40;
    dx = x2 - x1;
    dy = y2 - y1;

    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();
```

```
    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
    }


    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```

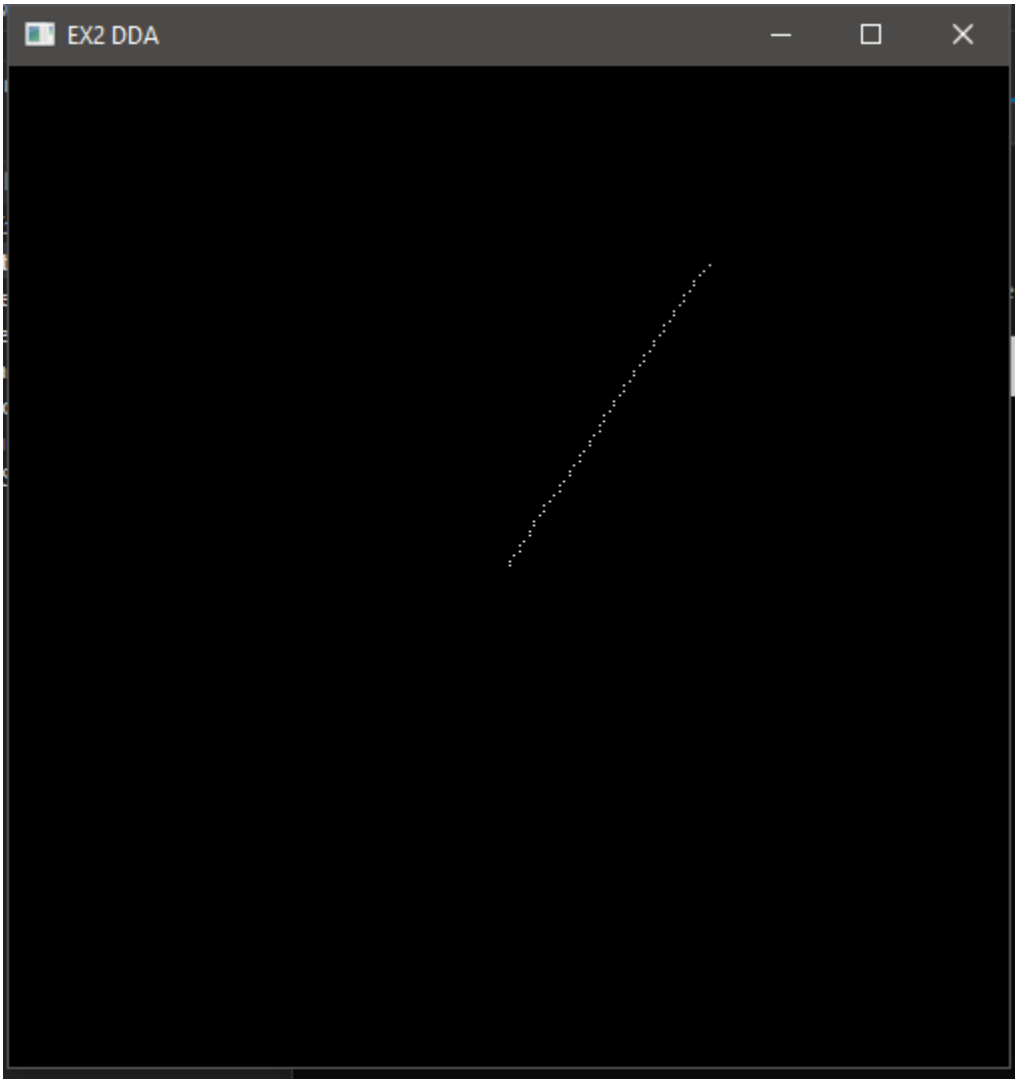


- |m|>1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = 0;
    float y1 = 0;
    float x2 = 40;
    float y2 = 60;
    dx = x2 - x1;
    dy = y2 - y1;
```

```
    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();

    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
    }


    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
```

```
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```

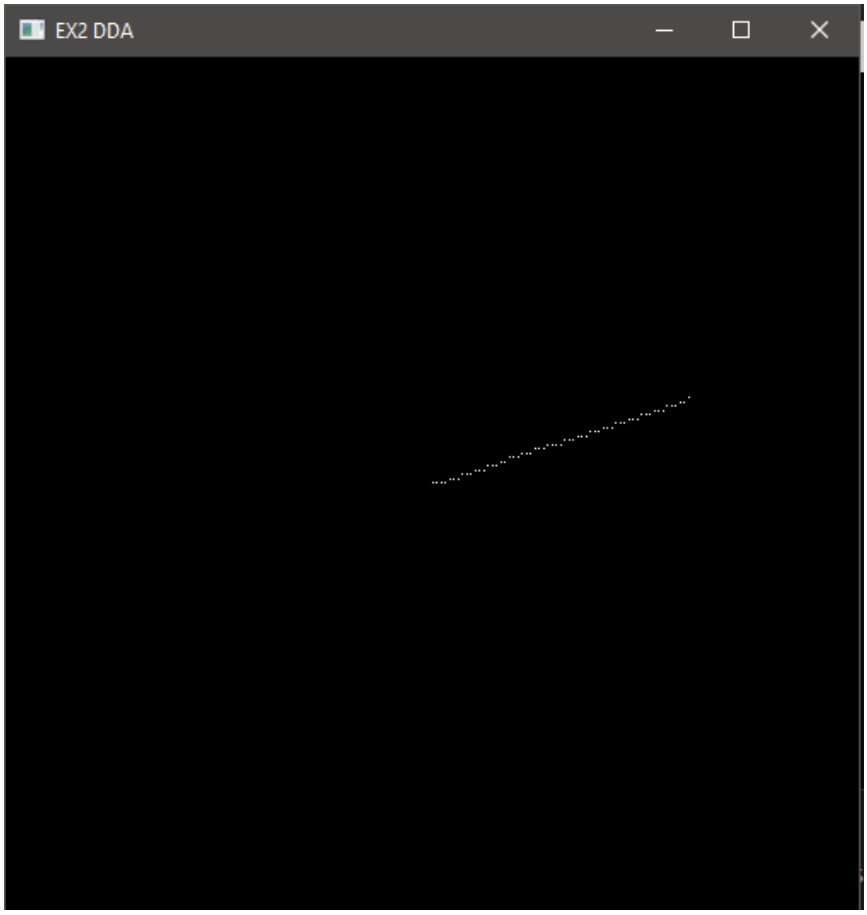


Case 2: +ve slope Right to Left line

- |m|<= 1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = 60;
    float y1 = 20;
    float x2 = 0;
    float y2 = 0;
    dx = x2 - x1;
    dy = y2 - y1;

    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();

    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
```

```
    }


    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```

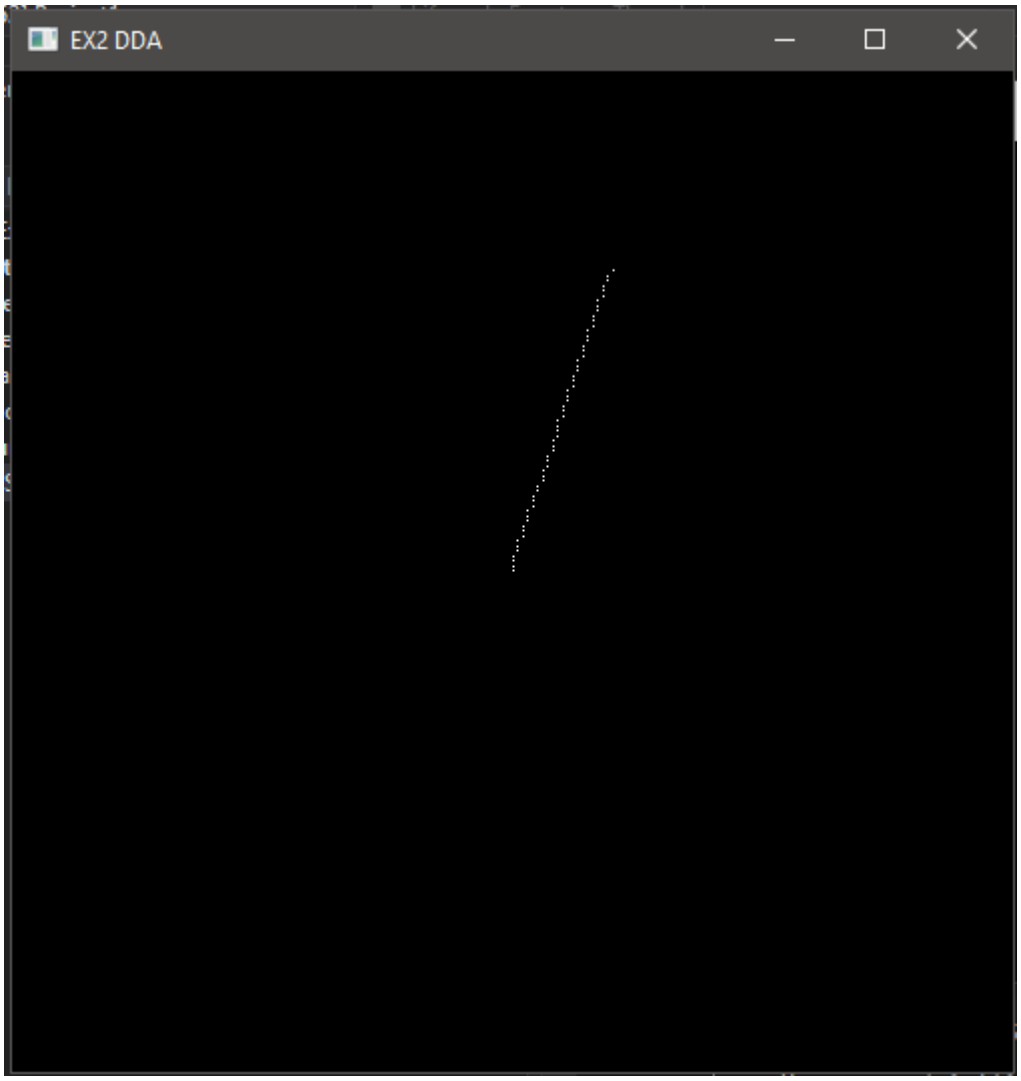


- |m|>1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = 20;
    float y1 = 60;
    float x2 = 0;
    float y2 = 0;
    dx = x2 - x1;
    dy = y2 - y1;

    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
```

```
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();

    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
    }


    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
```

```
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```

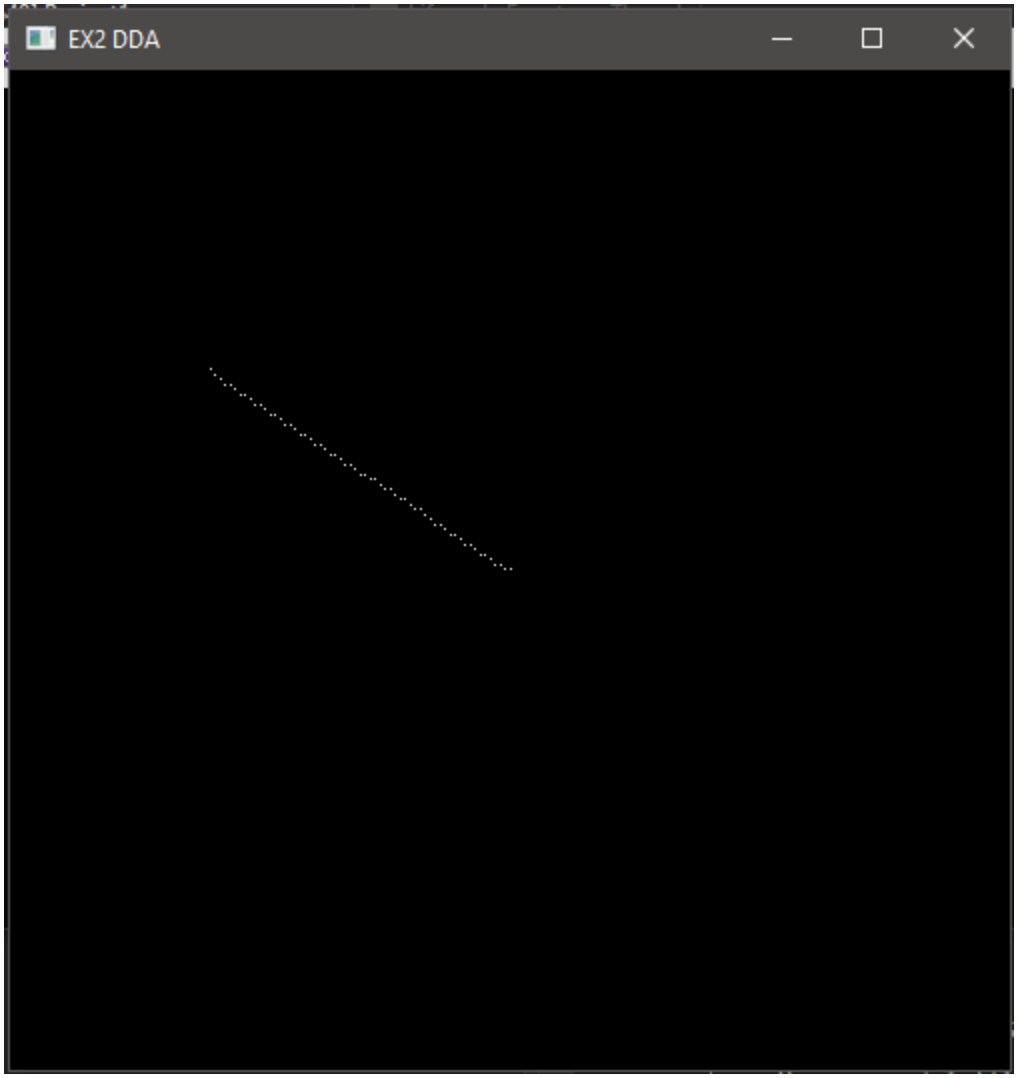


Case 3: -ve slope Left to Right line

- |m|<= 1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = -60;
    float y1 = 40;
    float x2 = 0;
    float y2 = 0;
    dx = x2 - x1;
    dy = y2 - y1;

    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();

    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
```

```
    }


    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```

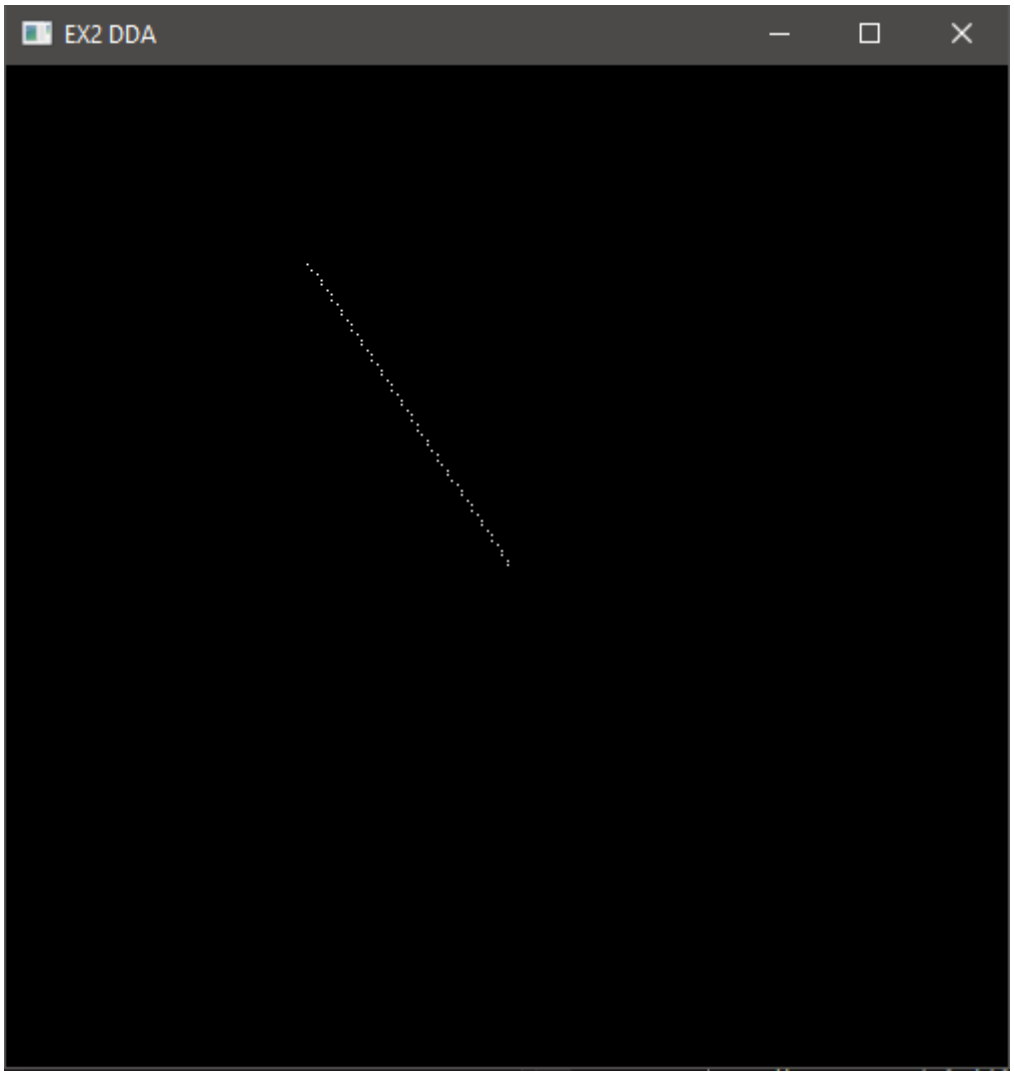


- |m|>1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = -40;
    float y1 = 60;
    float x2 = 0;
    float y2 = 0;
    dx = x2 - x1;
    dy = y2 - y1;
```

```
    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();

    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
    }


    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
```

```
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```

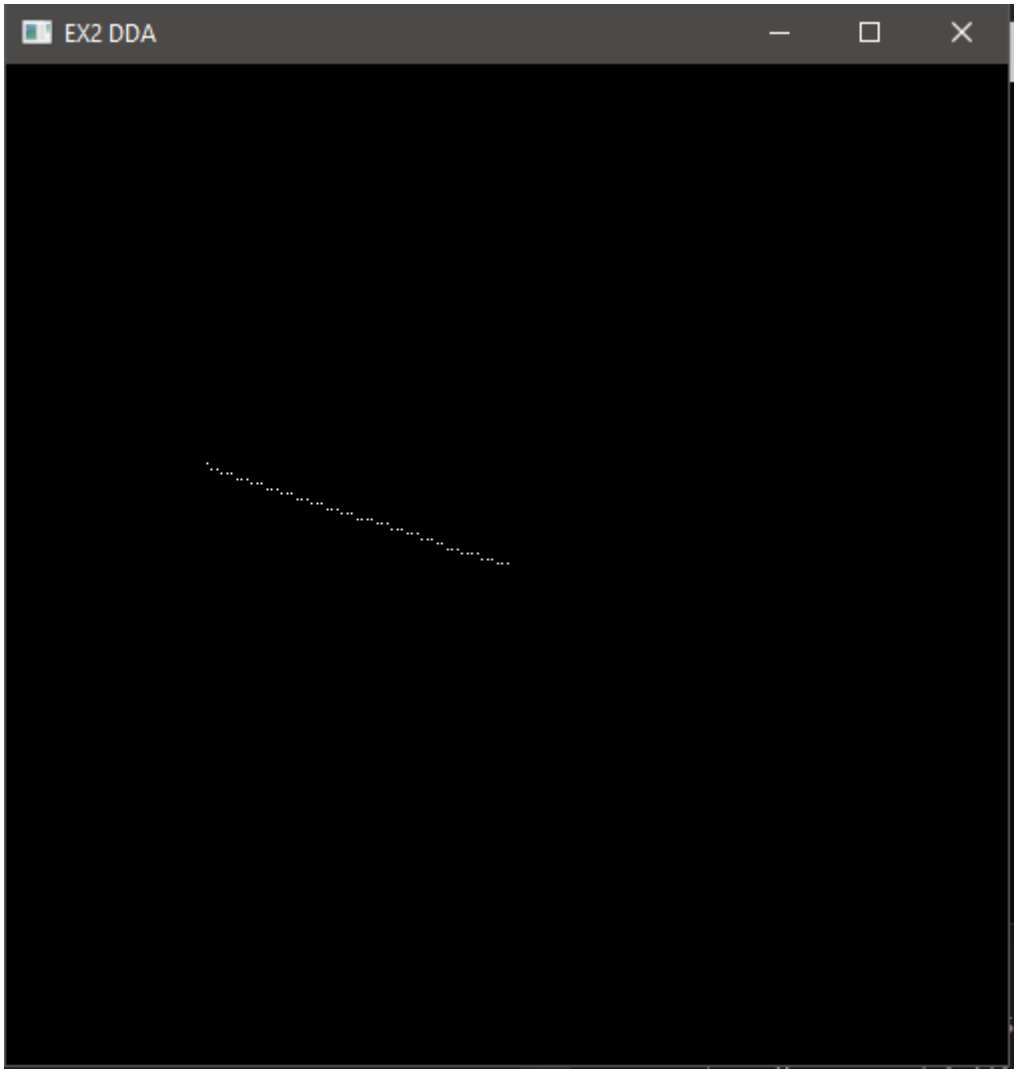


Case 4: -ve slope Right to Left line

- |m|<= 1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = 0;
    float y1 = 0;
    float x2 = -60;
    float y2 = 20;
    dx = x2 - x1;
    dy = y2 - y1;

    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();

    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
```

```
    }

    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```



- |m|>1

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

void display(void)
{
    float dy, dx, step, x, y, k, Xin, Yin;
    float x1 = 0;
    float y1 = 0;
    float x2 = -20;
    float y2 = 60;
    dx = x2 - x1;
    dy = y2 - y1;
```

```
    if (abs(dx) > abs(dy))
    {
        step = abs(dx);
    }
    else
        step = abs(dy);

    Xin = dx / step;
    Yin = dy / step;

    x = x1;
    y = y1;
    glBegin(GL_POINTS);
    glVertex2i(x, y);
    glEnd();

    for (k = 1; k <= step; k++)
    {
        x = x + Xin;
        y = y + Yin;

        glBegin(GL_POINTS);
        glVertex2i(x, y);
        glEnd();
    }


    glFlush();
}

void init(void)
{
    glClearColor(0.7, 0.7, 0.7, 0.7);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-100, 100, -100, 100);
}

int main(int argc, char** argv) {

    glutInit(&argc, argv);
```

```
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(100, 100);
    glutCreateWindow("EX2 DDA");
    init();
    glutDisplayFunc(display);
    glutMainLoop();

    return 0;
}
```