

# Bangladesh University of Business and Technology



## Lab no: 2

Course Name: Computer Graphics Lab

Course Code: CSE 342

### **Submitted By:**

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## **Lab No: 02**

### **Lab Task Name: Mid-Point Line Drawing Algorithm**

#### **Objective:**

In computer graphics, a line drawing algorithm is an algorithm for approximating a line segment on discrete graphical media, such as pixel-based displays and printers. On such media, line drawing requires an approximation (in nontrivial cases). Basic algorithms rasterize lines in one color.

#### **Algorithm:**

```
int dx = X2 - X1;
int dy = Y2 - Y1;

if(dy<=dx) //m<=0
{
    int d = dy - (dx/2);
    int x = X1, y = Y1;
    cout << x << ", " << y
<< "\n";

    while (x < X2)
    {
        x++;

        if (d < 0)
            d = d + dy;

        else
        {
            d = d+(dy - dx);
            y++;
        }
        cout << x << ", "
<< y << "\n";
    }
}

else if(dx<dy) //m>1
{
    int d = dx - (dy/2);
```

```

    int x = X1, y = Y1;
    cout << x << "," << y
<< "\n";

```

```

    while (y < Y2)
    {
        y++;

        if (d < 0)
            d = d + dx;

        else
        {
            d = d+(dx - dy);
            x++;
        }
        cout << x << ","
<< y << "\n";
    }
}

```

### **Program:**

```

#include<bits/stdc++.h>
using namespace std;
#include<stdio.h>
#include <GL/gl.h>
#include <GL/glut.h>

```

```

int X1 = 2, Y1 = 2, X2 = 8,
Y2 = 5;
void midPoint(void)
{
    glClear
(GL_COLOR_BUFFER_B
IT);
    glEnd();
    glColor3f (0.0, 1.0, 0.0);
    glBegin(GL_POINTS);

```

```

int dx = X2 - X1;
int dy = Y2 - Y1;

if(dy<=dx) //m<=0
{
    int d = dy - (dx/2);
    int x = X1, y = Y1;
    cout << x << "," << y
<< "\n";

    while (x < X2)
    {
        x++;

        if (d < 0)
            d = d + dy;

        else
        {
            d = d+(dy - dx);
            y++;
        }
        cout << x << "," <<
y << "\n";
    }
}

else if(dx<dy) //m>1
{
    int d = dx - (dy/2);
    int x = X1, y = Y1;
    cout << x << "," << y
<< "\n";

    while (y < Y2)
    {
        y++;

        if (d < 0)

```

```

        d = d + dx;

    else
    {
        d = d+(dx - dy);
        x++;
    }
    cout << x << "," <<
y << "\n";
    }
}
glEnd();
glFlush ();
}

```

```

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

```

```

glMatrixMode(GL_PROJE
CTION);
    glLoadIdentity();
    glOrtho(0.0, 1.0, 0.0,
1.0, -1.0, 1.0);
}

```

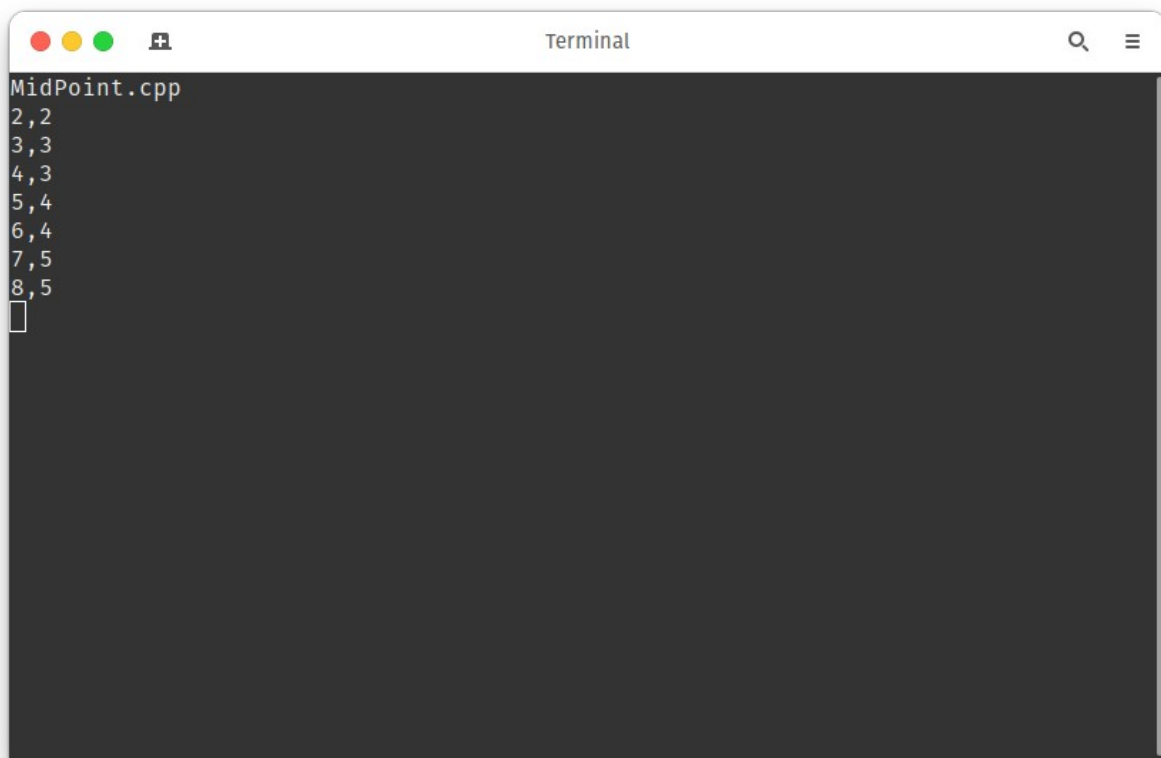
```

int main(int argc, char**
argv)
{
    glutInit(&argc, argv);
    glutInitDisplayMode
(GLUT_SINGLE |
GLUT_RGB);
    glutInitWindowSize
(500, 500);
    glutInitWindowPosition
(100, 100);
    glutCreateWindow
("hello");

```

```
init ();  
  
glutDisplayFunc(midPoint)  
;  
    glutMainLoop();  
    return 0;  
}
```

### **Input & Output:**

A screenshot of a macOS Terminal window titled "Terminal". The window has a dark gray background and a white title bar with standard macOS window controls (red, yellow, green buttons) and a search icon. The terminal shows the filename "MidPoint.cpp" at the top. Below it, there is a list of input coordinates: "2,2", "3,3", "4,3", "5,4", "6,4", "7,5", and "8,5". A white cursor is visible on the line following "8,5".

```
MidPoint.cpp  
2,2  
3,3  
4,3  
5,4  
6,4  
7,5  
8,5  
█
```