ID: 1751047
Name: Ha Binh An

Computer Graphic – Lab01
Report
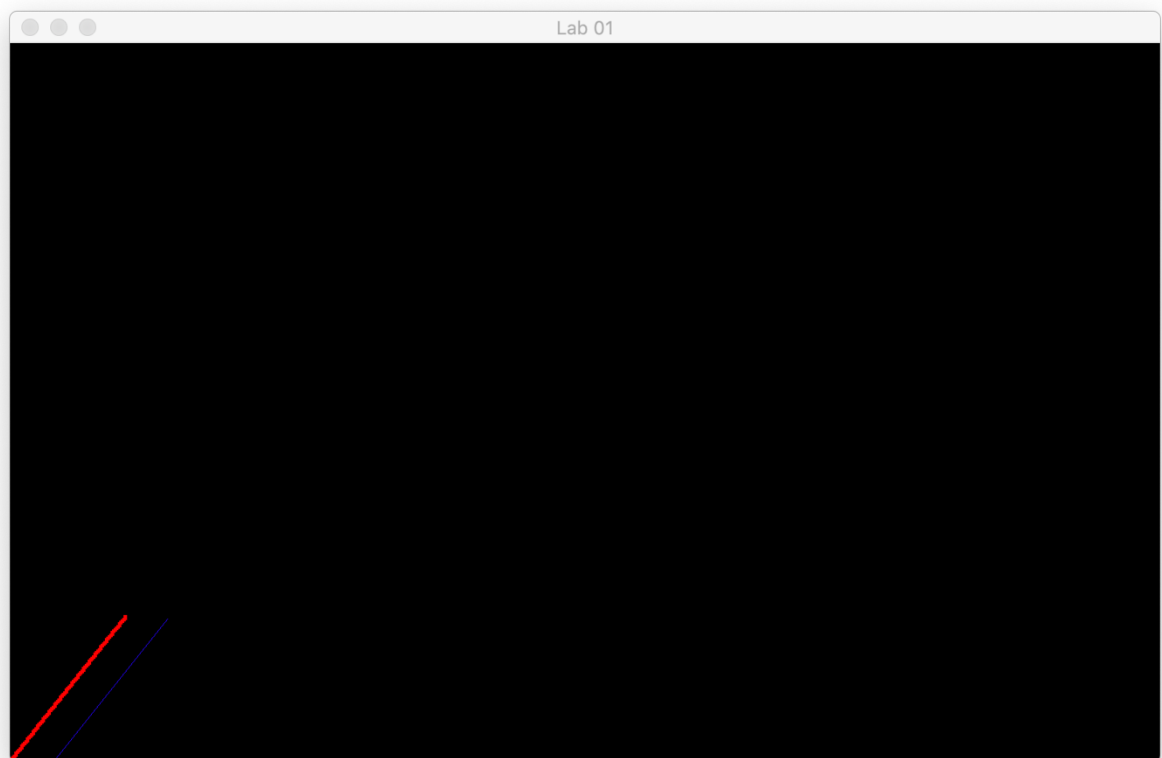
1. DDA algorithm:
   Benchmark:

   ```
   DDA line draw time: 6.04235
   OpenGL line draw time: 0.01944
   ```

   Using <chrono> library in C++, DDA algorithm takes 6ms to draw while OpenGL function only takes 0.01ms.

   Accuracy:
   We will draw DDA from point (0,0) to (80,100) and OpenGL function from: (30,0) to (110,100) for comparison:

   DDA algorithm is red and OpenGL function is blue, we can see they have the same slope, height. But what if we input the same coordinates?

With the same coordinate two lines is the same as each other.
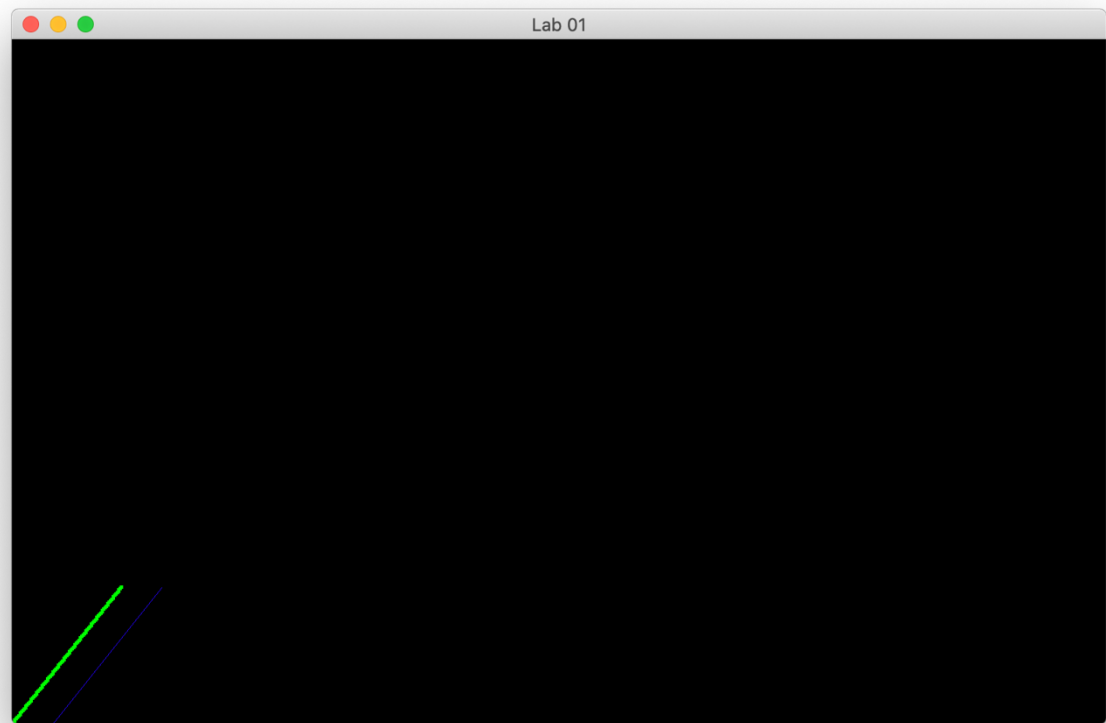
2. Bresenham:
   Benchmark:

```
Bresenham line draw time: 0.096587
OpenGL line draw time: 0.000505
```

   With Bresenham algorithm, the time it takes to draw is clearly better than DDA algorithm, and as good as OpenGL function.

   Accuracy:
   Same as DDA algorithm we will draw Bresenham lines from point (0,0) to (80,100) and OpenGl function from (30,0) to (110,100) :

The green line is Bresenham algorithm and the blue line is OpenGl function. Same as DDA with have the same slope and height. Then we will test with same coordinate:

With the same coordinate, the two lines is completely intersected with each other.

3. Midpoint:
Because the lack of OpenGL function to draw circle, ellipse, parabola and hyperbola. I can not compare mine implemented midpoint algorithm with OpenGl function. But this the full benchmark for line with DDA and Bresenham and midpoint algorithm for circle, ellipse and parabola:

```
DDA line draw time: 8.49995
OpenGL line draw time: 0.002497
Bresenham line draw time: 0.122094
OpenGL line draw time: 0.000556
Midpoint circle draw time: 0.113212
Midpoint ellipse draw time: 0.100015
Midpoint parabola draw time: 0
```

Time unit is: ms.