Nguyen Ho Huu Nghia
1751013

Lab 01

CS411
April 24, 2020

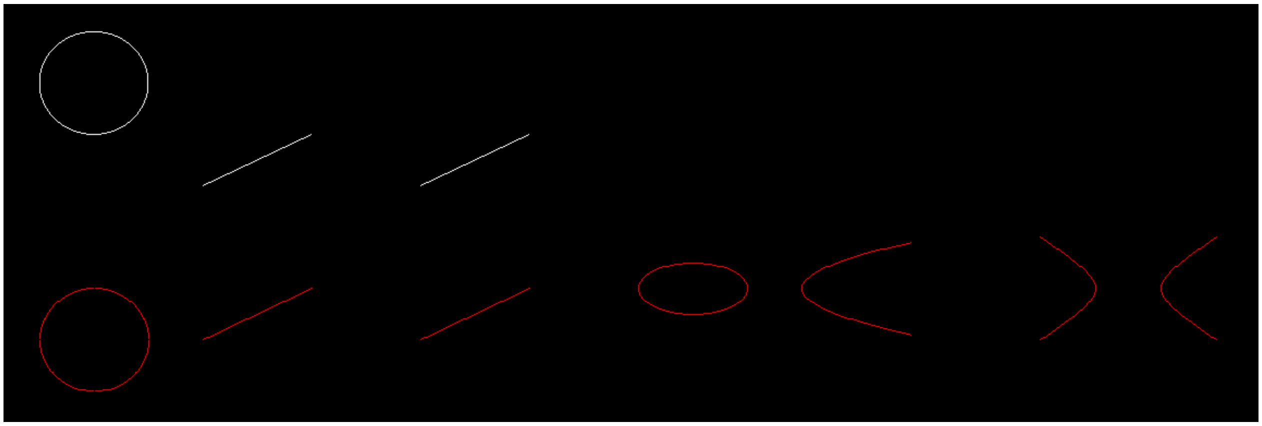

Figure 1: Demonstration: The red shapes are the ones I implemented using specified algorithm. The red line on the left is implemented with DDA algorithm. The red line on the right is implemented with Bresenham algorithm. The white shapes are the ones I implemented with OpenGL implementation.

1 Comparison of execution time

The following is the runtime of each implementation/function. The runtime is recorded for five runs and then averaged.

Some conclusion about the speed can be drawn from this experiment:

- Line: DDA < Bresenham < OpenGL function
- Circle: Midpoint < OpenGL function

Runtime number	1	2	3	4	5	Average
Line DDA	48	57	68	51	73	59.4
Line Bresenham	5	17	3	8	2	7
Line OpenGL	2	2	1	2	1	1.6
Circle Midpoint	28	32	21	33	22	27.2
Circle OpenGL	12	33	12	11	9	15.4
Ellipse Midpoint	11	21	13	8	13	13.2
Parabola Midpoint	13	16	14	10	16	13.8
Hyperbola Midpoint	15	17	15	14	14	15

2 Comparison of accuracy

The accuracy of each implementation is judged by computing the distance from the OpenGL function. The distance is the accumulated pixels distance between the pixels in the method and the pixels in the OpenGL function.

From the comparison, we can see that DDA algorithm has smaller distance compared to Bresenham algorithm.

	Accumulated Pixels Distance
Line DDA	1843.13
Line Bresenham	3436.85
Circle Midpoint	159.646