COSC 4370 - Homework 1

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September 22, 2022

1 Problem

The assignment requires the rasterization of an ellipse. The ellipse to be rasterized is $(\frac{x}{12})^2 + (\frac{y}{2})^2 = 64^2$ where $x \geq 0$.

2 Method

First of all, the size of the screen will be incremented to 800 by 800 so the ellipse generated fits correctly into the screen. The function provided will need to be modified in order to be implemented into the code. It will be solved for y so it is implemented correctly. After that, the $main.cpp$ file will also be modified. The for loop on the $main.cpp$ file provided will be modified so it prints the ellipse correctly.

3 Implementation

First, setting the screen size to 800 by 800 will allow the whole ellipse to be seen when $x >= 0$. Given the formula $(\frac{x}{12})^2 + (\frac{y}{2})^2 = 64^2$, we solve for y, getting $y = \pm \frac{\sqrt{(768+i)(768-i)}}{2}$, and the formula is modified once again adding 384 for it to be visible completely on the picture when $x \geq 0$, obtaining $y = \pm \frac{\sqrt{(768+i)(768-i)}}{2} + 384$. After having the formula ready, we first create a for loop from $i = 0$ to 767, by increasing i by 0.001 every iteration to have more precision when rasterizing the ellipse. Then, in the for loop, we then create two y variables to store the positive formula of the ellipse and the negative formula of the ellipse. We then use the function called set_pixel twice, once to create the positive side of the ellipse, and once for the negative side, using i
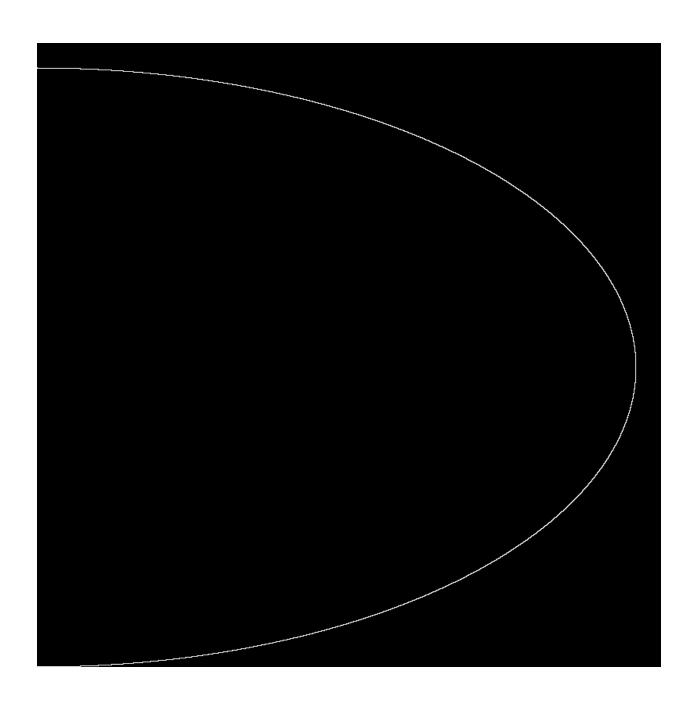
and y as our x and y coordinates for the pixel respectively. After the for loop is done setting the desired pixels, we then write the result into the file "output.bpm"

4 Results

The output of the program was a ".bpm" file, which, when viewed through an image viewer, the right side of an ellipse can be seen.