COSC 4370 - Homework 1

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1. Problem

The main problem that we are trying to solve in this assignment is the rasterization of an ellipse. According to the instructions, it is clearly understood that an ellipse is derived from the following equation: (x/12)^2 + (y/6)^2 = 64^2 where y >= 0.

2. Method

Initially, there were two files provided to us, the BMP.h file and the main.cpp file. However, there was only a need to alter the main.cpp file. The method for creating an ellipse was to take the given equation and convert that into a program that ensured the rasterization of the ellipse. Through this method, there were several functions that were applied such as the square root function, and the power function.

3. Implementation

First, the parameters were created to ensure that the ellipse had enough room to display properly, without crossing the borders. The parameters that were given, ended up creating a 1500 by 800 slate. This allowed the ellipse to have a proper foundation. Second, the variables were created and given an initial value of zero, but then later, these variables were applied in the power function to replicate the original equation. Continuing on, it was essential to create a for loop to iterate through, and create the actual outline of the ellipse. Furthermore, after the for loop, there were several functions that were used such as the power function and the square root function which allowed the ellipse to shift, to make sure that the ellipse would output in a correct format. The math was calculated on a separate line to give individuals a clear idea of what calculations were being done, and in what order. It is important to note that without the last computation, the ellipse would have only displayed in the first quadrant. Lastly, the set_pixel line allowed for the output of the image in the white, and the write function allowed for the ellipse to be displayed in a new file called output.bmp.

4. Results

The results that were generated from the program created a rasterized white ellipse with bounds of 1500 by 800. Due to the equation, the picture displays only the top part of the ellipse.