COSC 4370 - Homework 1

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1 Problem

In this assignment, you will be implementing an algorithm for rasterizing an ellipse. You will rasterize the ellipse $(x/12)$^2+$(y/6)$^2=64^2 where x>=0.

2 Method

From the given code I altered the main function based off of the ellipse formula we were given in the initial problem. Since the problem asked to rasterize the ellipse where x>=0 i began to make adjustments to the formula so that we could see the whole positive side of the ellipse. This required the movement of the ellipse on the Y-axis because the ellipse needed to move out of the negative y area, thus we can see the entire positive x side on the output file. Once the ellipse was moved up I was able to go through and place all points on the positive x-axis, and that gave the output of the whole positive x-axis ellipse, i.e the right half of the full ellipse.

3 Implementation

Given the ellipse formula I moved the ellipse up by 384 pixels so the entire ellipse would be in the positive Y zone. Since the region we are working in is all positive values this was necessary to see all the positive x-value points. I then started by breaking down the formula from the initial problem to get all the corresponding y-values to each x-value. WIth me moving up the ellipse to be in the entire positive y region this meant that every x value would have 2 corresponding y-values. To fix this issue when I would go to set the pixels I would subtract the distance from the y-value to the center and then multiply that distance by 2. This would give me the second y-value that corresponded to the initial x-value, which would be on the bottom half of the ellipse. WIth this technique there are some spots where the x-value has many many y-points that correspond, so to counteract this I made a second loop. I looped through with the y-values to find the corresponding x values. This made it so I was able to get any gaps that were made by the first loop because there are to many points that overlapped one x value, thus completing the entire ellipse on the x>=0 plane.

4 Results

The output of the program was a .bmp file which when viewed you will see the right half, or the positive x side of the ellipse.