

Assignment 2 Report

- **Part 1**

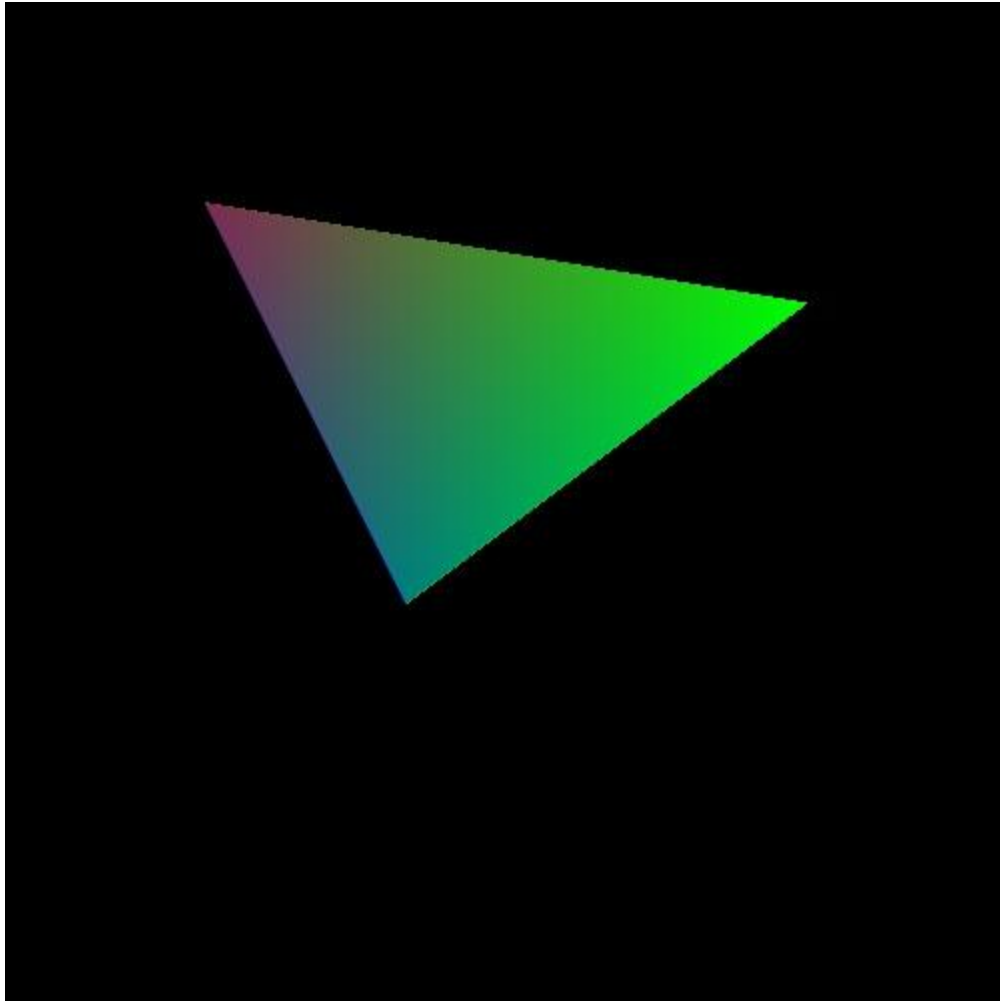
- This part of the assignment was probably the easiest. First, four points of varying colors were plotted on the screen's four corners. Then, an interpolated line was drawn between the top two points and another between the bottom two points. Using two for loops, vertical interpolated lines were drawn up between every pixel of the top most horizontal and bottom most horizontal lines. To calculate $d1$ and $d2$, I simply made " $d1 = i$ " and " $d2 = 299 - d1$." From there, the rest was pretty straightforward, using the linear interpolation formula in the notes. The result can be seen below:

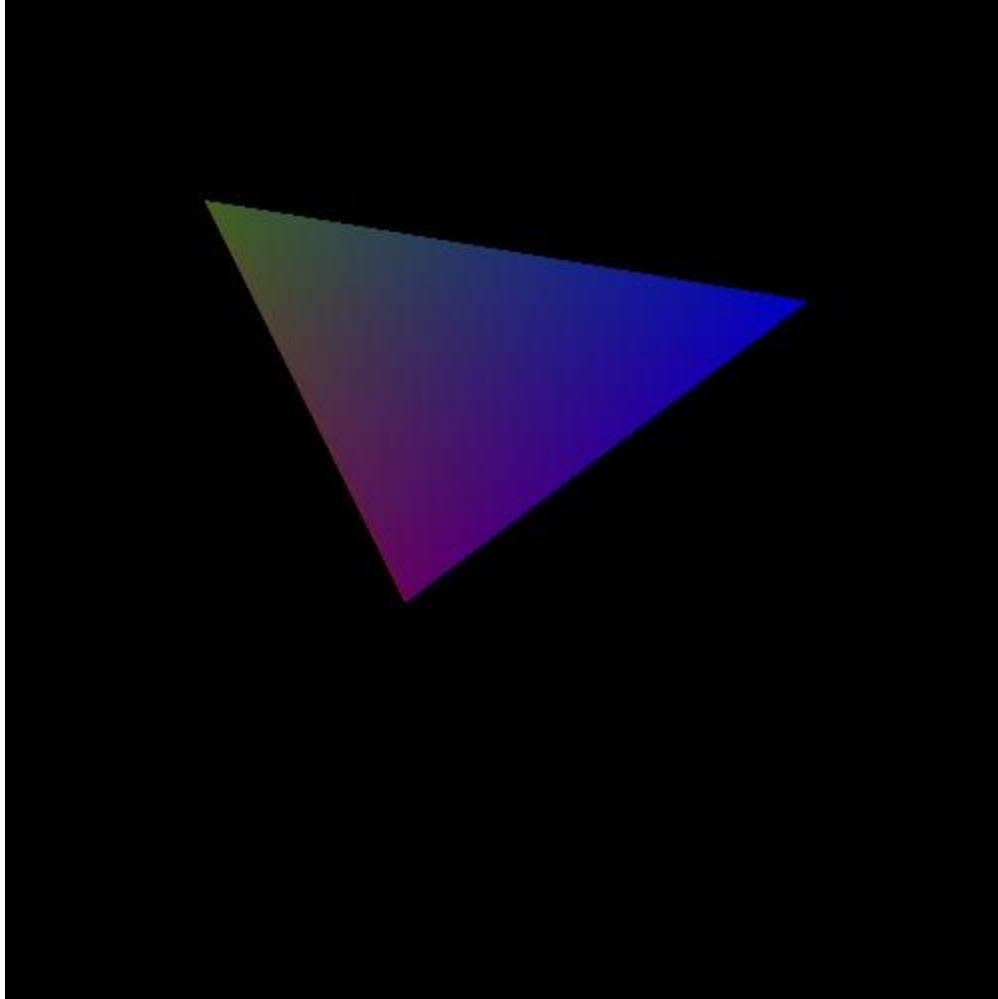




- **Part 2**

- This part was by far one of the hardest. Like with the first part of the assignment, points were plotted on the screen with varying colors, 3 points to be exact. Utilization of the midpoint algorithm was key to putting up the sides between the 3 points, however the algorithm as it was in my notes was a bit incomplete. The technique for interpolation of these lines was the same as in the first part so there was no issue there. That took care of the “draw(x,y)” part of the algorithm written in my notes. The main issue was with the part that came after that. I could not understand what the if statement was checking for until after a bit of random experimentation I realized that it had something to do with the implicit equation given to us in our notes.
- Interpolating the inside of the triangle was difficult as well. The equation listed on the instructions for this assignment allowed the program to get the area of the whole triangle as well as the smaller ones needed for Barycentric Interpolation. Checking if a point was inside the triangle was a bit trickier. The big thing to note is that the areas of the 3 inner triangles must add up to equal the whole triangle. Otherwise if a point is outside the whole triangle, this would not be true and the program would fail.
- The results are below:





- **Part 3**
 - The biggest struggle with this part of the assignment was trying to get OpenGL running on the computer. The assignment itself was relatively straightforward after that. Anton's tutorial on the triangle was full of a great deal of information, most of which won't sink in on this first attempt alone. For the three triangles I plotted their individual points on paper and then moved on to put them in their own float arrays. From there it was copying and pasting the vertex and fragment shader code to work for each triangle. The color for each vertex was also changed in the frag_colour function to give the triangles the desired variation.