CIS 441/541: Project #1D
Due January 31st, 2019 (which means 6am February 1st)
Worth 5% of your grade

For this project, you will remove hidden surfaces using the zbuffer algorithm. You will also add the ability to interpolate colors within a triangle.

Instructions

1) Download reader1D.cxx. It has a routine to read triangles from a file. Incorporate its GetTriangles routine in the place of GetTriangles from project 1C.
2) Download the geometry file "proj1d_geometry.vtk".
3) Because we are interpolating colors, unsigned chars will no longer work – we would get weird interpolation effects. Instead, we will represent colors as double precision numbers – 0 is absence of color, and 1 is presence of color. This double precision representation should be converted back to unsigned char as you set the color for a pixel in the image. And we will again need our "ceil_441" trick. The exact code: "ceil_441(value*255)".
4) NOTE: there are new data members for the Triangle class.

   ```
   class Triangle
   {
     public:
         double      X[3];
         double      Y[3];
         double      Z[3];
         double      colors[3][3];
   };
   ```

   The Z part is easy. Note that colors is different as well. There used to be one color for the entire triangle. Now there is a color for each vertex. And it is in double precision. Also colors[1][2] would be the blue component for vertex 1, while colors[2][1] would be the green component for vertex 2. Make sure you get Triangle::colors changed, since the GetTriangles depends on it.

5) Note that the output image is 1000x1000. You should initialize the buffer to be black (0,0,0). This was done for you in previous projects, so just make sure that code didn't go anywhere.
6) The correct image is posted to the website

When you are done upload your code to Canvas.

If your program produces the wrong picture, then you should expect to get less than half credit. I would prefer correct code late than incorrect code on time.