CPSC 314
Theory Assignment 3

Due Tuesday, November 10 at 23:59

Submit your answers on the corresponding assignment on canvas

Given a triangle $\triangle abc$ with the following data:

	Coordinates xyz	Color rgb [0,255]	normal
a	[0.5,-0.8,0.6]	[255,0,0]	[-0.087,-0.054,0.995]
b	[0.6,3,-0.7]	[125,23,54]	[-0.426,0.723,0.542]
c	[-0.7,-0.5,-0.5]	[3,0,255]	[-0.923,-0.051,0.381]

a) This triangle is intersecting the canonical view volume. To which clipping planes is this triangle intersecting? **(5 points)**

b) Compute all the intersection points between this triangle and the canonical view volume. Compute the intersections following the same order of the triangle's points (first, the edge ab, then bc, and finally ca) Show the coordinates of the new points. **(15 points)**

c) Starting from the initial point a, and following the previous direction, rename your triangle's points, including the new points. Using the new names, which points are discarded? **(5 points)**

d) After discarding the outiside points, retriangulate the resulting polygon, using the "shortest edge" approach. List the new triangles naming them with their point's new names. **(5 points)**

e) Compute the interpolated color and normal values of any new point (Intersections from section b). List these points with their corresponding interpolated color and normal. (Don't use barycentric coordinates, use linear interpolation) **(20 points)**

f) From each new triangle, compute the coordinates (xyz in NDC space) of new points with barycentric coordinates [0.333,0.333,0.333]. List these new points with their xyz coordinates. **(20 points)**

g) Consider a point p in coordinates [0,0,-0.104]. This point is inside of one of the resulting triangles after clipping. Tell us which triangle. Prove it by listing all its barycentric coordinates with each resulting triangle. **(15 points)**

h) Now that you know which triangle the point p corresponds to, compute its interpolated color and normal using barycentric coordinates.

(15 points)