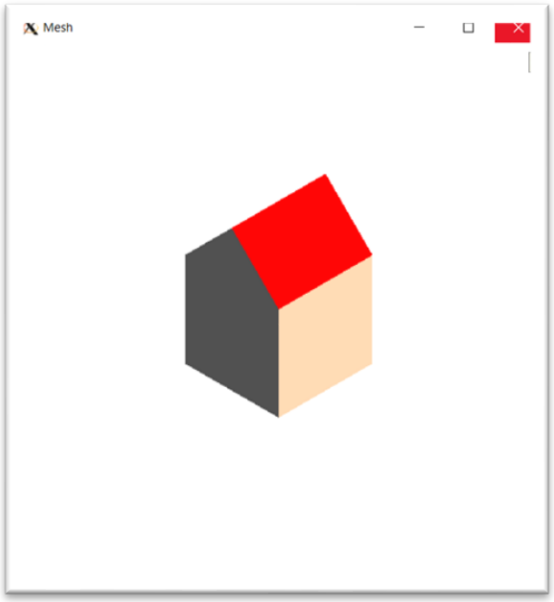
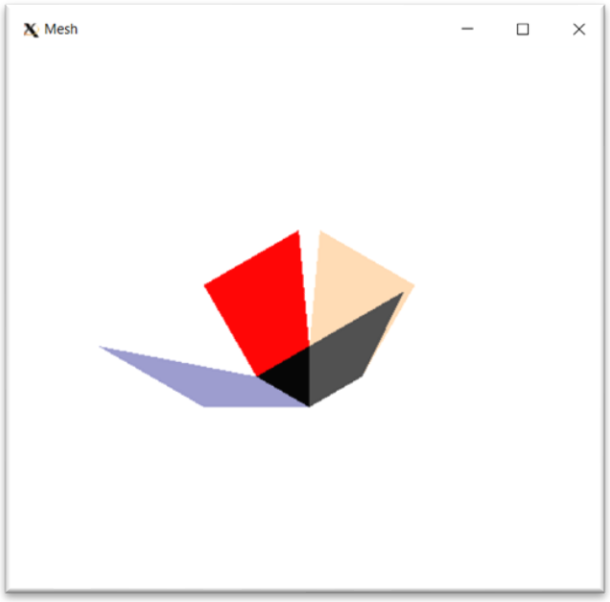
CSE4200 Lab7 – Spencer Wallace

Summary:

All parts completed successfully. I was able to draw the barn with nicer colors and cull the back faces for a nicer image of the barn. I was also able to modify the data.txt to produce an image with 5 faces. Because of this, I am giving myself full points.

Images





Code

```
#include "mesh.h"

using namespace std;

Mesh::Mesh()    //constructor

{

  numVerts = numFaces = numNormals = 0;

  pt = NULL;

  norm  =  NULL;
```

```
  face = NULL;
}

bool Mesh::isEmpty()
{
  return (numVerts == 0) || (numFaces == 0) || (numNormals == 0);
}

void Mesh::setColor( int n )
{
  if ( n == 1 )
    glColor3f( 0.6, 0.6, 0.8 );
  else if ( n == 2 )
    glColor3f( 1, 0, 0 );
  else if ( n == 3 )
    glColor3f( 1, 0.85, 0.7 );
  else if ( n == 4 )
    glColor3f( 0.3, 0.3, 0.3 );
  else if ( n == 5 )
    glColor3f( 0.3, 0.3, 0.3 );
  else if ( n == 6 )
    glColor3f( 0, 1, 1 );
  else
    glColor3f( 0, 0, 0 );
}

void Mesh::drawMesh()   // use OpenGL to draw this mesh
{
  // draw each face of this mesh using OpenGL: draw each polygon.
```

```
  if( isEmpty() ) return; // mesh is empty

  for(int f = 0; f < numFaces; f++) // draw each face
  {
    glEnable(GL_CULL_FACE);
    glCullFace(GL_BACK);
    glBegin(GL_POLYGON);
    cout << endl;
    setColor( f );
    for(int v = 0; v < face[f].nVerts; v++) // for each vertex
    {
       int in = face[f].vert[v].normIndex ; // index of this normal
       int iv =  face[f].vert[v].vertIndex ; // index of this vertex
       glNormal3f(norm[in].x, norm[in].y, norm[in].z);
       cout << "[" << norm[in].x << "," << norm[in].y << "," <<
             norm[in].z << "]" << "    ";
       glVertex3f(pt[iv].x, pt[iv].y, pt[iv].z);
       cout << "(" << pt[iv].x << "," << pt[iv].y << "," <<
             pt[iv].z << ")" << "    ";
    }
    glEnd();
    cout << endl;
  }
} //drawMesh

//read Mesh data from file
int Mesh:: readFile(char * fileName)
{
  fstream infile;
```

```
 infile.open(fileName, ios::in);
 cout << "opening file " << endl;
 if(infile.fail()) return -1; // error - can't open file
 if(infile.eof())  return -1; // error - empty file
 infile >> numVerts >> numNormals >> numFaces;
 pt = new Point3[numVerts];
 norm = new Vector3[numNormals];
 face = new Face[numFaces];
 //check that enough memory was found:
 if( !pt || !norm || !face)return -1; // out of memory
 cout << "file open O.K. " << endl;

 for(int p = 0; p < numVerts; p++) // read the vertices
   infile >> pt[p].x >> pt[p].y >> pt[p].z;
 for(int n = 0; n < numNormals; n++) // read the normals
   infile >> norm[n].x >> norm[n].y >> norm[n].z;
 cout << "numFaces = " << numFaces << endl;
 for(int f = 0; f < numFaces; f++)// read the faces
 {
   infile >> face[f].nVerts;

   face[f].vert = new VertexID[face[f].nVerts];
   for(int i = 0; i < face[f].nVerts; i++)
      infile >> face[f].vert[i].vertIndex;
   for(int i = 0; i < face[f].nVerts; i++)
      infile  >> face[f].vert[i].normIndex;
 }
 return 0; // success
} //readFile
```

Data

12 7 5

0 0 0 0.5 0 0 0 0 0.5 0.5 0 0.5

1 1 2 0 1 2

0 1 1 0 1 0.1

0.1 1 0 1 1 0

1 1 0.1 1 1 1

-1 0 0 0 1 0 0.707 0.707 0

1 0 0 0 -1 0 0 0 1 0 0.5 -1

4 0 2 3 1 1 1 1 1

4 4 5 2 3 1 1 1 1

4 7 6 2 0 2 2 2 2

4 9 8 0 1 0 0 0 0

4 10 11 3 1 3 3 3 3