Daniel Meyer

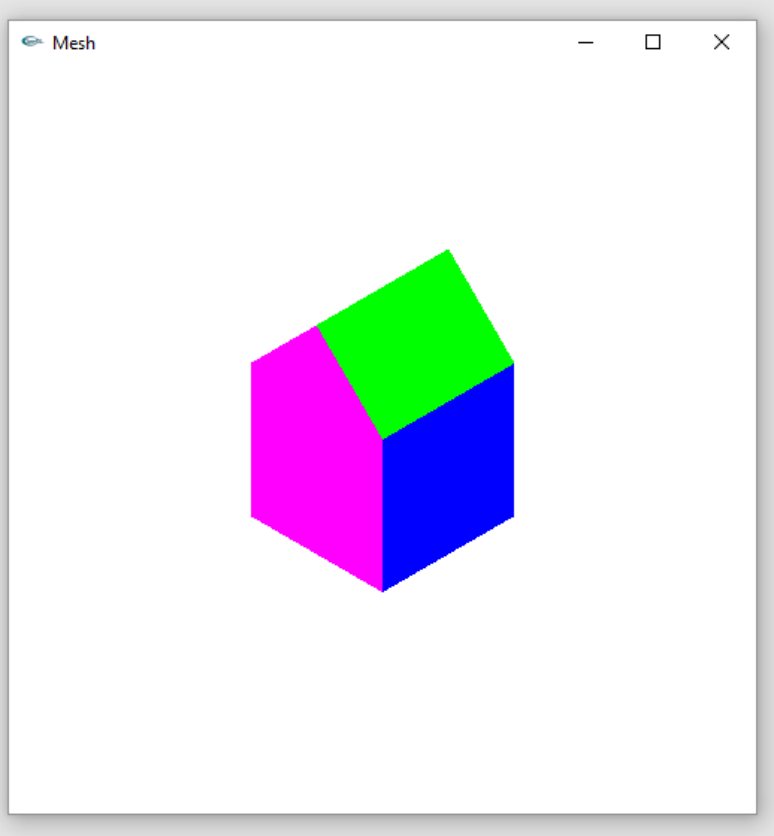
CSE 420-01

Lab 7

Polygon Modeling

Lab 7 Report

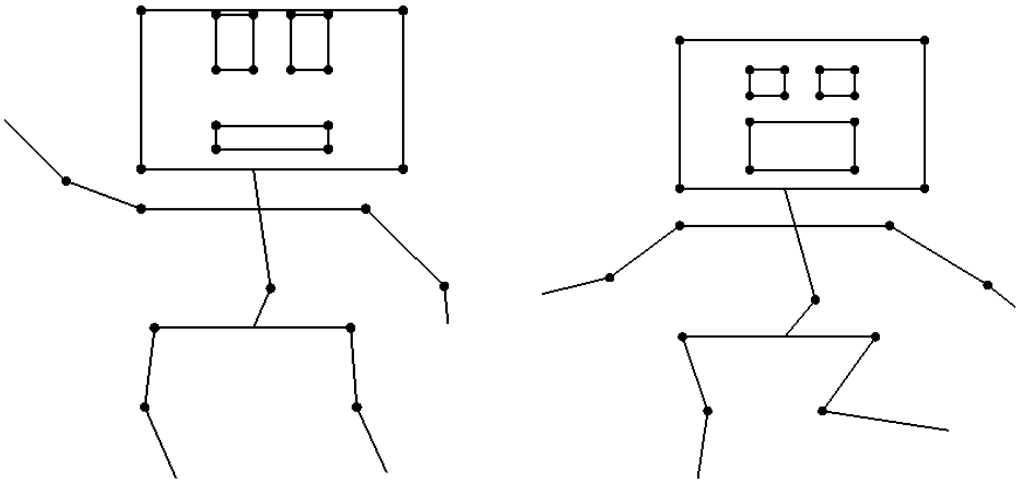
Part 1: (success)




```
void Mesh::setColor( int n )
{
  if ( n == 1 )
    glColor3f( 1, 0, 0 );
  else if ( n == 2 )
    glColor3f( 0, 1, 0 );
  else if ( n == 3 )
    glColor3f( 0, 0, 1 );
  else if ( n == 4 )
    glColor3f( 1, 1, 0 );
  else if ( n == 5 )
    glColor3f( 1, 0, 1 );
  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

  glEnable( GL_CULL_FACE );
  glCullFace ( GL_BACK );
  for(int f = 0; f < numFaces; f++) // draw each face
  //for(int f = 6; f < numFaces; f++) // draw each face
  {
    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();
    //SDL_Delay ( 1000 );
    glFlush ();
    cout << endl;
  }
} //drawMesh
```

Part 2: (success)

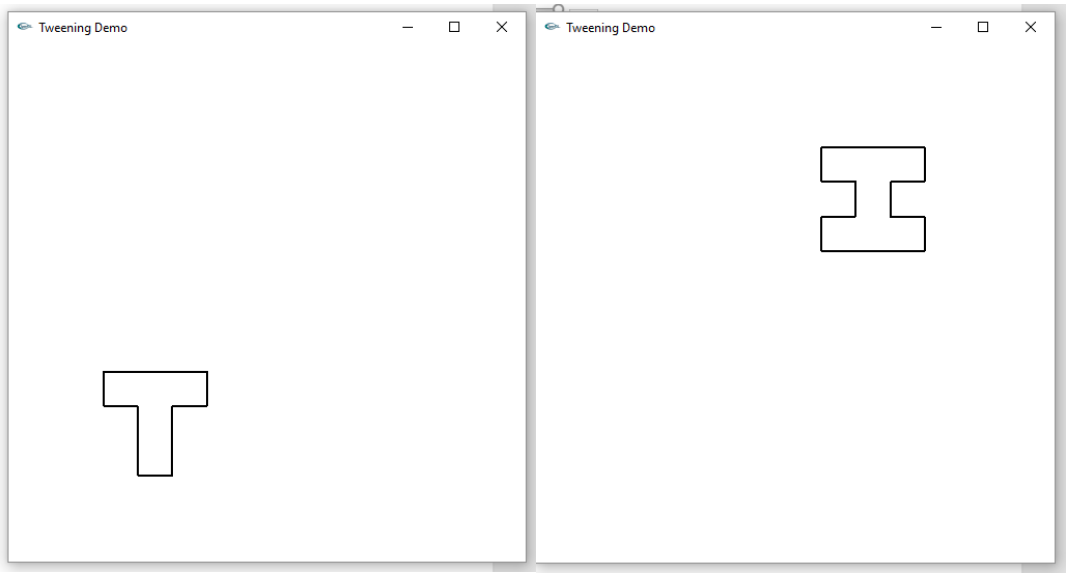


```
void makeHead(Point2 A[], Point2 B[])
{
     A[0].x = 3; A[0].y = 8;          A[1].x = 6.5;  A[1].y = 8;
     A[2].x = 6.5; A[2].y = 12;       A[3].x = 3;  A[3].y = 12;
     A[4].x = 3; A[4].y = 8;          A[5].x = 6.5;  A[5].y = 8;

     B[0].x = 3; B[0].y = 8;          B[1].x = 6.5;  B[1].y = 8;
     B[2].x = 6.5; B[2].y = 12;       B[3].x = 3;  B[3].y = 12; //Head
     B[4].x = 3; B[4].y = 8;          B[5].x = 6.5;  B[5].y = 8;
}

void makeMouth(Point2 A[], Point2 B[])
{
     A[0].x = 4;          A[0].y = 8.5;        A[1].x = 5.5;  A[1].y
= 8.5;
     A[2].x = 5.5;    A[2].y = 9;              A[3].x = 4;    A[3].y
= 9;
     A[4].x = 4;          A[4].y = 8.5;        A[5].x = 5.5;  A[5].y
= 8.5;

     B[0].x = 4;          B[0].y = 8.5;        B[1].x = 5.5;  B[1].y
= 8.5;
     B[2].x = 5.5;    B[2].y = 10;         B[3].x = 4;        B[3].y
= 10; //Mouth
     B[4].x = 4;          B[4].y = 8.5;        B[5].x = 5.5;  B[5].y
= 8.5;
}
```

```
void makeLeftEye(Point2 A[], Point2 B[])
{
	A[0].x = 4;		A[0].y = 10.5;	A[1].x = 4.5;	A[1].y =
10.5;
	A[2].x = 4.5;	A[2].y = 12;	A[3].x = 4;	A[3].y = 12;
	A[4].x = 4;		A[4].y = 10.5;	A[5].x = 4.5;	A[5].y =
10.5;

	B[0].x = 4;		B[0].y = 10.5;	B[1].x = 4.5;	B[1].y =
10.5;
	B[2].x = 4.5;	B[2].y = 11;	B[3].x = 4;		B[3].y = 11;
	B[4].x = 4;		B[4].y = 10.5;	B[5].x = 4.5;	B[5].y =
10.5;
}

void makeRightEye(Point2 A[], Point2 B[])
{
	A[0].x = 5;		A[0].y = 10.5;		A[1].x = 5.5;	A[1].y
= 10.5;
	A[2].x = 5.5;	A[2].y = 12;		A[3].x = 5;	A[3].y = 12;
	A[4].x = 5;		A[4].y = 10.5;		A[5].x = 5.5;	A[5].y
= 10.5;

	B[0].x = 5;		B[0].y = 10.5;		B[1].x = 5.5;	B[1].y
= 10.5;
	B[2].x = 5.5;	B[2].y = 11;		B[3].x = 5;		B[3].y
= 11;
	B[4].x = 5;		B[4].y = 10.5;		B[5].x = 5.5;	B[5].y
= 10.5;
}


Point2 A[10], B[10];
Point2 A1[10], B1[10];
Point2 A2[10], B2[10];
Point2 A3[10], B3[10];
Point2 A4[10], B4[10];
Point2 A5[10], B5[10];
Point2 A6[10], B6[10];
Point2 center(0, 0);
float t = 0, deltat = 0.1;
float deltax = 2, deltay = 0;

void init(void)
{
	gluOrtho2D(0.0, 30.0, 0.0, 30.0);
```

```
	makeHand(A, B);		//create figure A and B
	makeBody(A1, B1);	//create figure A1 and B1
	makeLeg(A2, B2);	//create figure A2 and B2
	makeHead(A3, B3);
	makeMouth(A4, B4);
	makeLeftEye(A5, B5);
	makeRightEye(A6, B6);

	glLineWidth(2);
	glClearColor(1.0, 1.0, 1.0, 0.0);
}

void display(void)
{
	glClear(GL_COLOR_BUFFER_BIT);

	drawTween(A, B, 6, t, center);
	drawTween(A1, B1, 3, t, center);
	drawTween(A2, B2, 6, t, center);
	drawTween(A3, B3, 6, t, center);
	drawTween(A4, B4, 6, t, center);
	drawTween(A5, B5, 6, t, center);
	drawTween(A6, B6, 6, t, center);

	glFlush();
	glutSwapBuffers();
}
```

Extra Credit: (Success)




```
void makeFigures(Point2 A[], Point2 B[])
{
	A[0].x = 0;	A[0].y = 0;	A[1].x = 3;	A[1].y = 0;
	A[2].x = 6;	A[2].y = 0;	A[3].x = 6;	A[3].y = -2;
	A[4].x = 4;	A[4].y = -2;	A[5].x = 4;	A[5].y = -4;
	A[6].x = 6;	A[6].y = -4;	A[7].x = 6;	A[7].y = -6;
	A[8].x = 0;	A[8].y = -6;	A[9].x = 0;	A[9].y = -
4;
	A[10].x = 2;	A[10].y = -4;	A[11].x = 2;	A[11].y = -2;
	A[12].x = 0;	A[12].y = -2;

	B[0].x = 0;	B[0].y = 0;	B[1].x = 3;	B[1].y = 0;
	B[2].x = 6;	B[2].y = 0;	B[3].x = 6;	B[3].y = -2;
	B[4].x = 4;	B[4].y = -2;	B[5].x = 4;	B[5].y = -6;
	B[6].x = 2;	B[6].y = -6;	B[7].x = 2;	B[7].y = -2;
	B[8].x = 0;	B[8].y = -2;
}

void setColor(int i)
{
	switch (i) {
	case 1:
		glColor3f(0, 1, 1);
		break;
	case 2:
		glColor3f(0, 1, 0);	//green
		break;
	case 3:
```

```
            glColor3f(1, 1, 0);
            break;
      case 4:
            glColor3f(1, 0, 0);   //red
            break;
      case 5:
            glColor3f(0, 0, 1);   //blue
            break;
      default:
            glColor3f(0, 0, 0);   //black
      }
}
```

Summary:

For the first part of the assignment I had to modify the given mesh.cpp file to use a different set of data. I did this by modifying the data.txt file's contents and then changed the colors of the new barn object. Then, per the instructions, I added the code for culling to increase the clarity of the barn by culling the back faces. For the next part of the assignment, I added the head, mouth, and eyes to the animated skeleton. I then animated the eyes and mouth using tweening. Finally, for the extra credit I modified another of the provided programs to animate the morphing of a T into an I in 10 steps. All of the programs compiled and ran correctly. As a result, I feel I earned the full 20 points and the 5 points extra credit.