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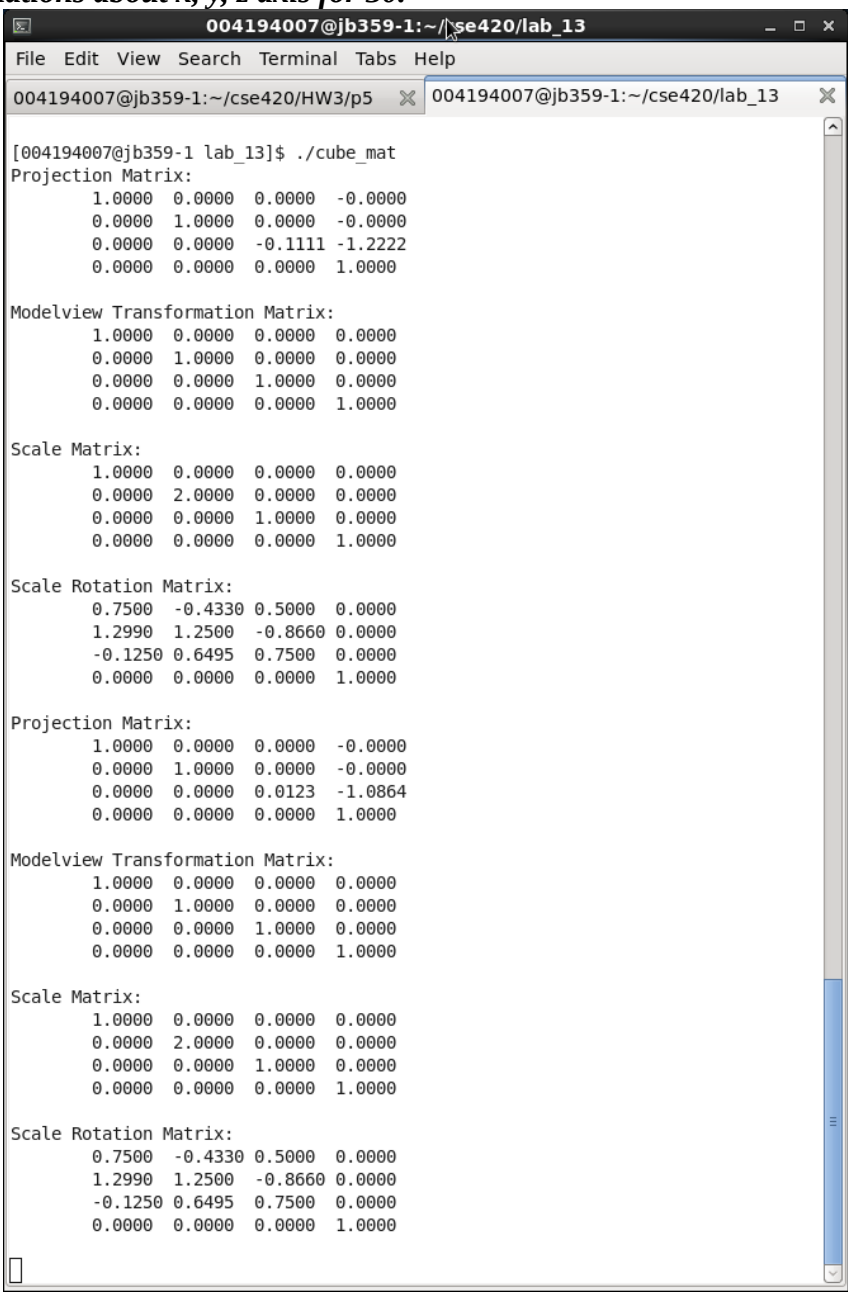
Lab 13

***Try different projection and modelview transformations ( translation, rotation, and scaling ) and examine the outputs to check if they are consistent with what you expect. In particular, try the rotation transformations about x, y, z axis for 30.***




```
void display(void)
{
  float p[4][4];
  double pd[4][4];

  glClear (GL_COLOR_BUFFER_BIT);
  glColor3f (0.0, 1.0, 0.0);              //green color
```

```
   glLoadIdentity ();              // clear the matrix
   glMatrixMode (GL_PROJECTION);
                                   // viewing transformation
//   glFrustum (-1.0, 1.0, -1.0, 1.0, 2.0, 20.0);
//   gluPerspective ( 53, 1, 2, 20 );   //tan 26.5 = 1/2.0
     glOrtho (-1.0, 1.0, -1.0, 1.0, 2.0, 20.0);
//   gluLookAt (0.0, 0.0, 5.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0);

   glMatrixMode (GL_MODELVIEW);
   glLoadIdentity();
   glGetFloatv(GL_PROJECTION_MATRIX,&p[0][0]);
   cout << "Projection Matrix:" << endl;
   print_mat ( p );
   glGetDoublev(GL_MODELVIEW_MATRIX, &pd[0][0]);
   cout << "Modelview Transformation Matrix:" << endl;
   print_mat ( pd );
   glScalef (1.0, 2.0, 1.0);       // modeling transformation

   glGetFloatv(GL_MODELVIEW_MATRIX,&p[0][0]);
   cout << "Scale Matrix:" << endl;
   print_mat ( p );

   glRotatef ( 30, 1, 0, 0 );
   glRotatef ( 30, 0, 1, 0 );
   glRotatef ( 30, 0, 0, 1 );
   glGetDoublev(GL_MODELVIEW_MATRIX, &pd[0][0]);
   cout << "Scale Rotation Matrix:" << endl;
   print_mat ( pd );
   glutWireCube (1.0);

   glFlush ();
}
```

***What is the composite transformation matrix of an x-roll of 20$^o$, followed by a y-roll of 30$^o$, and a z-roll of 40$^o$?***

| | | | | |
|---|---|---|---|---|
| Rx(20o) . Ry(30o) . Rz(40o) = | 0.663 | -0.557 | 0.5 | 0 |
| | 0.735 | 0.61 | -0.3 | 0 |
| | -0.14 | 0.564 | 0.814 | 0 |
| | 0 | 0 | 0 | 1 |

4. No, they are not the same.

Report:

I completed this lab.