Written Problems for CS445 Project 2, Fall 10

3D Transformation: What are the 4x4 matrices (or product of matrices) in homogeneous coordinates that represent the following transformations. In each case, also give the inverse (if it exists). Note, you can leave answers in terms of sines and cosines:

a. Uniform scale by 5 around the origin.

b. Translation by (3,2,1).

c. Rotation by 50 degrees about the z-axis.

d. Reflection about the z axis.

e. Uniform scale by 2 around the point (2,-1,3).

f. Scale by 2 along y axis.

g. Scale by 2 along a direction defined by the points (0,0,0) and (1,1,0).

h. Rotation by 30 degrees along a direction defined by the points (0,0,0) and (1,0,1), and around the point (-3,10,6).

i. Shear along z by an amount proportional to x..

j. Projection onto the x-z plane.