

## Quiz #1 (CSE 4190.562)

March 17, 2014 (Monday)

Name: \_\_\_\_\_ Dept: \_\_\_\_\_ ID No: \_\_\_\_\_

1. (5 points) Given four lines in the plane

$$l_i : a_i x + b_i y + c_i = 0, \quad i = 1, 2, 3, 4,$$

determine the line  $l$  passing through the intersection point of the first two lines ( $l_1$  and  $l_2$ ) and the intersection point of the last two lines ( $l_3$  and  $l_4$ ).

2. (8 points) What is the inverse of the following 2D transformation?

$$\begin{bmatrix} r_{11} & r_{12} & t_x \\ r_{21} & r_{22} & t_y \\ 0 & 0 & 1 \end{bmatrix}$$

Note that the above is a rotation  $R = \begin{bmatrix} r_{11} & r_{12} \\ r_{21} & r_{22} \end{bmatrix}$  followed by a translation  $\mathbf{t} = \begin{bmatrix} t_x \\ t_y \end{bmatrix}$ .

3. (7 points) Determine the projection matrix for a perspective projection with view point  $(3, 7)$  and viewline  $x + y + 1 = 0$ . Apply the projection to the points  $A(1, 2)$ ,  $B(3, 4)$ , and  $C(5, 6)$ .